

*This Official Statement has been prepared by the North Carolina Turnpike Authority to provide information on the Series 2016 Bonds. Selected information is presented on this cover page for the convenience of the user. To make an informed decision regarding the Series 2016 Bonds, a prospective investor should read this Official Statement in its entirety. Unless otherwise indicated, capitalized terms used on this cover page have the meanings given in the Official Statement.*



**\$137,051,904.35**  
**NORTH CAROLINA TURNPIKE AUTHORITY**  
**Monroe Expressway Toll Revenue Bonds, Series 2016**



consisting of

**\$119,455,000**  
**Monroe Expressway**  
**Toll Revenue Bonds, Series 2016A**

**\$17,596,904.35**  
**Monroe Expressway**  
**Toll Revenue Bonds, Series 2016C**  
**(Capital Appreciation Bonds)**

**Dated: Date of Delivery**

**Due: as shown on inside front cover**

*Tax Treatment:* In the opinion of Bond Counsel, under current law and subject to conditions described in the Section herein “TAX TREATMENT,” interest on the Series 2016 Bonds (a) is not included in gross income for federal income tax purposes, (b) is not an item of tax preference for purposes of the federal alternative minimum income tax imposed on individuals and corporations, and (c) is exempt from all income taxes in the State of North Carolina. Such interest may be included in the calculation of a corporation’s alternative minimum income tax and a holder may be subject to other federal tax consequences as described in the Section herein “TAX TREATMENT.”

*Redemption:* The Series 2016A Bonds are subject to optional redemption on or after July 1, 2026. The Series 2016A Term Bonds are subject to mandatory sinking fund redemption as described herein. The Series 2016C Bonds are subject to optional redemption on or after July 1, 2026. See “THE SERIES 2016 BONDS – Redemption Provisions.”

*Security:* The Series 2016 Bonds will be special obligations of the Authority, secured by and payable from the Revenues of the Monroe Expressway System described in this Official Statement and, under certain circumstances, the proceeds of the Series 2016 Bonds, investment earnings and certain other proceeds. *Neither the credit nor the taxing power of the State of North Carolina (the “State”) or any of the State’s political subdivisions is pledged for the payment of principal of, premium, if any, or interest on the Series 2016 Bonds, and no Owner of the Series 2016 Bonds has the right to compel the exercise of the taxing power of the State or any of the State’s political subdivisions or the forfeiture of any of their respective properties other than Revenues in connection with any default on the Series 2016 Bonds. ACCELERATION IS NOT A REMEDY AVAILABLE TO OWNERS OF THE SERIES 2016 BONDS UPON DEFAULT.*

*Interest Payment Dates:* Interest on the Series 2016A Bonds will be paid on January 1 and July 1, commencing July 1, 2017. Interest on the Series 2016C Bonds will not be paid currently, but will be paid upon the maturity thereof. See “THE SERIES 2016 BONDS – Interest Rate Provisions of Series 2016 Bonds.”

*Denominations:* \$5,000 or any whole multiple thereof.

*Closing Date/Settlement:* January 31, 2017.

*Bond Counsel:* Hunton & Williams LLP.

*Underwriters’ Counsel:* McGuireWoods LLP, Raleigh, North Carolina.

*Trustee and Bond Registrar:* Wells Fargo Bank, N.A., Jacksonville, Florida.

The Series 2016 Bonds are offered, when, as and if issued and received by the Underwriters, subject to prior sale and the opinion of Bond Counsel as to their validity, the tax treatment of interest on the Series 2016 Bonds and certain other matters.

**BofA Merrill Lynch**

**Citigroup**

**J.P. Morgan**

**Wells Fargo Securities**

## MATURITY SCHEDULE

### \$6,515,000 Series 2016A Current Interest Serial Bonds

<u>Due July 1</u>	<u>Principal Amount</u>	<u>Interest Rate</u>	<u>Price</u>	<u>Yield</u>	<u>CUSIP**</u>
2023	\$1,140,000	5.00%	112.774%	2.81%	65830UAF9
2041	465,000	4.25	99.245	4.30	65830UAA0
2042	4,910,000	5.00	107.292	4.06*	65830UAB8

\$33,515,000 Series 2016A Current Interest 5.00% Term Bonds Due July 1, 2047, Price 106.888%, Yield 4.11%\* CUSIP 65830UAC6\*\*

\$40,395,000 Series 2016A Current Interest 5.00% Term Bonds Due July 1, 2051, Price 106.085%, Yield 4.21%\* CUSIP 65830UAD4\*\*

\$39,030,000 Series 2016A Current Interest 5.00% Term Bonds Due July 1, 2054, Price 105.290%, Yield 4.31%\* CUSIP 65830UAE2\*\*

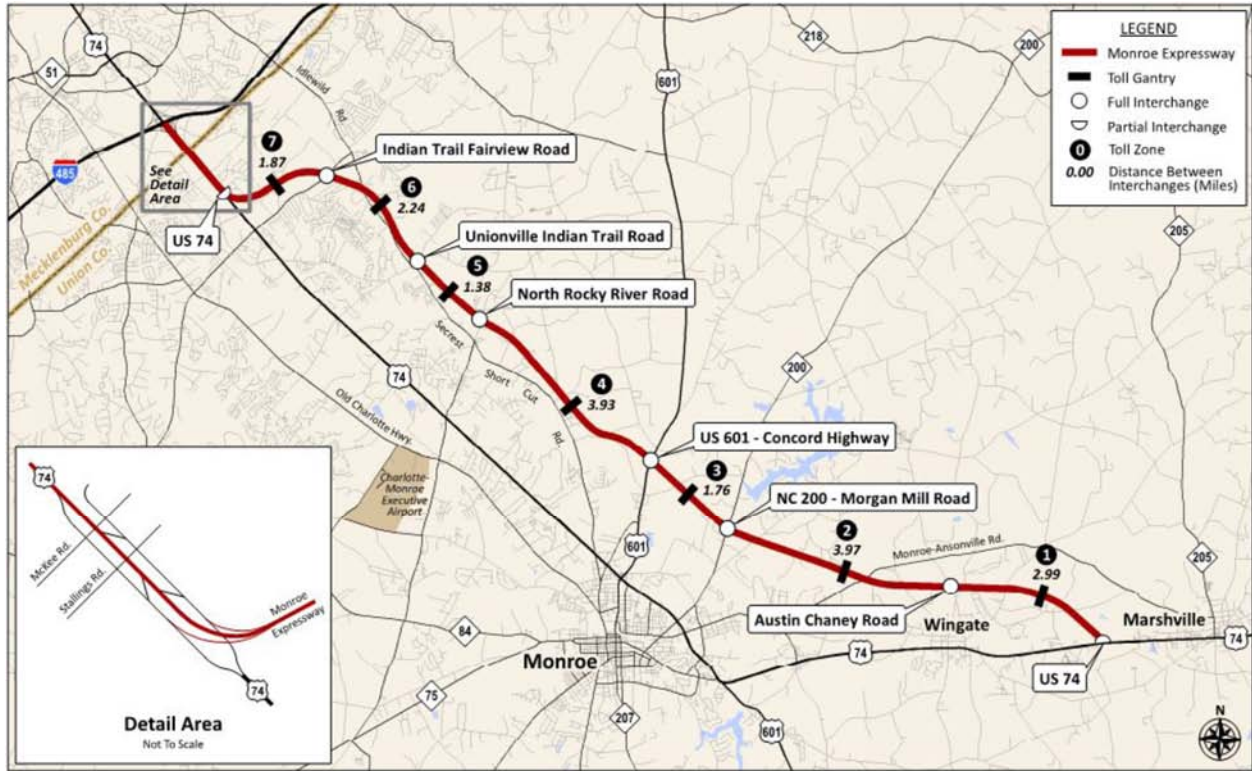
### \$17,596,904.35 Series 2016C Capital Appreciation Bonds

<u>Due July 1</u>	<u>Initial Price Per \$5,000 Payable at Maturity</u>	<u>Aggregate Initial Offering Price</u>	<u>Maturity Amount</u>	<u>Approximate Yield to Maturity</u>	<u>CUSIP**</u>
2026	\$3,488.30	\$638,358.90	\$915,000.00	3.86%	65830UAX0
2027	3,296.25	735,063.75	1,115,000.00	4.04	65830UAG7
2028	3,103.90	983,936.30	1,585,000.00	4.22	65830UAH5
2029	2,912.50	949,475.00	1,630,000.00	4.40	65830UAJ1
2030	2,752.10	999,012.30	1,815,000.00	4.50	65830UAK8
2031	2,588.20	1,009,398.00	1,950,000.00	4.62	65830UAL6
2032	2,446.70	1,064,314.50	2,175,000.00	4.69	65830UAM4
2033	2,313.50	1,110,480.00	2,400,000.00	4.75	65830UAN2
2034	2,184.95	1,151,468.65	2,635,000.00	4.81	65830UAP7
2035	2,064.90	1,199,706.90	2,905,000.00	4.86	65830UAQ5
2036	1,953.20	1,234,422.40	3,160,000.00	4.90	65830UAR3
2037	1,849.80	1,257,864.00	3,400,000.00	4.93	65830UAS1
2038	1,758.20	1,313,375.40	3,735,000.00	4.94	65830UAT9
2039	1,670.80	1,334,969.20	3,995,000.00	4.95	65830UAU6
2040	1,587.45	1,360,444.65	4,285,000.00	4.96	65830UAV4
2041	1,507.95	1,254,614.40	4,160,000.00	4.97	65830UAW2

\*Yield to first optional call date of July 1, 2026.

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## North Carolina Turnpike Authority Monroe Expressway



**Regional Location Map**



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**NORTH CAROLINA TURNPIKE AUTHORITY**

STATE OFFICIALS

Roy Cooper	Governor
MG(R) James H. Trogdon, III, P.E.	Secretary of NCDOT
David Tyeryar	Chief Financial Officer of NCDOT

AUTHORITY MEMBERS

Perry R. Safran	Vice Chairman
Robert D. Teer, Jr.	Secretary/Treasurer
MG(R) James H. Trogdon, III, P.E.	Member
Scott Aman	Member
John Collett	Member
Jim Crawford	Member
Montell W. Irvin	Member
Charles L. Travis, III	Member
James Walker	Member

MANAGEMENT STAFF

Beau Memory	Executive Director
Marvin T. Butler	Deputy Director
David Roy	Director of Finance and Budget
Andy Lelewski, PE	Director of Toll Road Operations

MUNICIPAL ADVISOR

PFM Financial Advisors, LLC, Orlando, Florida

TRAFFIC & REVENUE CONSULTANT

CDM Smith Inc., New Haven, Connecticut

GENERAL ENGINEERING CONSULTANT

HNTB Corporation, Raleigh, North Carolina

BOND COUNSEL

Hunton & Williams LLP

**IN CONNECTION WITH THIS OFFERING, THE UNDERWRITERS MAY OVERALLOT OR EFFECT TRANSACTIONS THAT STABILIZE OR MAINTAIN THE MARKET PRICE OF THE SERIES 2016 BONDS AT A LEVEL ABOVE THAT WHICH MIGHT OTHERWISE PREVAIL IN THE OPEN MARKET. SUCH STABILIZING, IF COMMENCED, MAY BE DISCONTINUED AT ANY TIME.**

No dealer, broker, salesman or other person has been authorized to give any information or to make any representation other than those contained in this Official Statement in connection with the offering described herein, and, if given or made, such other information or representation must not be relied upon as having been authorized. This Official Statement does not constitute an offer to sell or the solicitation of an offer to buy any securities other than the Series 2016 Bonds offered hereby, nor shall there be any offer or solicitation of such offer or sale of the Series 2016 Bonds in any jurisdiction in which it is unlawful for such person to make such offer, solicitation or sale. Neither the delivery of this Official Statement nor the sale of any of the Series 2016 Bonds implies that the information herein is correct as of any date subsequent to the date thereof.

Neither the Series 2016 Bonds nor the Trust Agreement have been registered or qualified with the Securities and Exchange Commission by reason of the provisions of Section 3(a)(2) of the Securities Act of 1933, as amended, or Section 304(a)(4) of the Trust Indenture Act of 1939, as amended. The registration or qualification of the 2016 Bonds and the Trust Agreement in accordance with applicable provisions of securities laws of the states, if any, in which the Series 2016 Bonds and the Trust Agreement have been registered or qualified, and the exemption from registration or qualification in other states, shall not be regarded as a recommendation thereof.

In making an investment decision, investors must rely on their own examination of the terms of the offering, including the merits and risks involved. These securities have not been recommended by any federal or state securities commission or regulatory authority. Furthermore, the foregoing authorities have not confirmed the accuracy or determined the adequacy of this document. Any representation to the contrary is a criminal offense.

All quotations from and summaries and explanations of laws and documents herein do not purport to be complete, and reference is made to such laws and documents for full and complete statements of their provisions. Any statements made in this Official Statement involving estimates or matters of opinion, whether or not expressly so stated, are intended merely as estimates or opinions and not as representations of fact. The information set forth herein has been obtained from the Authority and other sources that are deemed to be reliable, but is not guaranteed as to accuracy or completeness by, and is not to be construed as a representation of, the Underwriters. The information contained herein is subject to change after the date of this Official Statement, and this Official Statement speaks only as of its date.

Certain statements contained in this Official Statement reflect forecasts and constitute forward-looking statements rather than historical facts. In this respect, the words “estimate,” “project,” “anticipate,” “expect,” “intend,” “believe” and similar expressions are intended to identify forward-looking statements. All such forward-looking statements are expressly qualified by the cautionary statements set forth in this Official Statement.

The Underwriters have provided the following sentence for inclusion in this Official Statement. The Underwriters have reviewed the information in this Official Statement in accordance with, and as part of, their responsibilities to investors under the federal securities laws as applied to the facts and circumstances of this transaction, but the Underwriters do not guarantee the accuracy or completeness of such information.

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## OFFICIAL STATEMENT



Concerning

**\$137,051,904.35**

**NORTH CAROLINA TURNPIKE AUTHORITY  
Monroe Expressway Toll Revenue Bonds, Series 2016  
consisting of**

**\$119,455,000**

**Monroe Expressway  
Toll Revenue Bonds, Series 2016A**

**\$17,596,904.35**

**Monroe Expressway  
Toll Revenue Bonds, Series 2016C  
(Capital Appreciation Bonds)**

### INTRODUCTION

The purpose of this Official Statement, which includes the appendices, is to provide certain information in connection with the issuance by the North Carolina Turnpike Authority (the “Authority”) of its \$137,051,904.35 Monroe Expressway Toll Revenue Bonds, Series 2016, consisting of \$119,455,000 Monroe Expressway Toll Revenue Bonds, Series 2016A (the “Series 2016A Bonds”) and \$17,596,904.35 Monroe Expressway Toll Revenue Bonds, Series 2016C (Capital Appreciation Bonds) (the “Series 2016C Bonds” and, together with the Series 2016A Bonds, the “Series 2016 Bonds”). The Series 2016 Bonds will be issued pursuant to applicable provisions of law, bond orders adopted by the Authority on November 14, 2011, and November 3, 2016 (collectively, the “Bond Order”), and a Trust Agreement dated as of December 1, 2016 (the “Trust Agreement”), between the Authority and Wells Fargo Bank, N.A., Jacksonville, Florida, as trustee (the “Trustee”), which amends and restates the Trust Agreement dated as of November 1, 2011 (the “Original Trust Agreement”), between the Authority and the Trustee.

This introduction provides certain limited information to serve as a guide to the Official Statement and is expressly qualified by the Official Statement as a whole. Investors should make a full review of the entire Official Statement and the documents summarized or described herein.

For the definition of certain terms used herein and a summary of certain provisions of the Trust Agreement, see APPENDIX B hereto. Capitalized terms used herein and not otherwise defined have the meanings given such terms in the Trust Agreement unless otherwise indicated.

Authorization. The Series 2016 Bonds are being issued pursuant to Article 6H of Chapter 136 of the North Carolina General Statutes (Public Toll Roads and Bridges), as amended (the “Authority Act”) and The State and Local Government Revenue Bond Act, Article 5 of Chapter 159 of the General Statutes of North Carolina, as amended (the “Revenue Bond Act”), the Bond Order and the Trust Agreement.

To finance a portion of the costs of the Monroe Expressway (as hereinafter defined), the Authority has previously issued its (1) \$233,920,000 Monroe Connector System State Appropriation Revenue Bonds, Series 2010A (Federally Taxable – Build America Bonds) (the “2010A State Appropriation Bonds”), all of which are currently outstanding, and (2) \$214,505,000 Monroe Connector System State Appropriation Revenue Bonds, Series 2011 (the “2011 State Appropriation Bonds and, together with the 2010A State Appropriation Bonds, the “State Appropriation Bonds”), of which \$139,830,000 in principal amount is currently outstanding.

Security. The Series 2016 Bonds will be special obligations of the Authority, secured by and payable from the Revenues of the Monroe Expressway, and, under certain circumstances, the proceeds of

the Series 2016 Bonds, investment earnings and certain other proceeds. As defined in the Trust Agreement, “Revenues” consist primarily of the tolls, fees, charges and any other payments received by the Authority from the ownership and operation of the Monroe Expressway. Revenues also include a portion of the amounts to be received by the Authority from an annual appropriation of \$24,000,000 to the Authority from the State of North Carolina after payment of debt service on the State Appropriation Bonds, as described below under “PLAN OF FINANCE – State Appropriated Revenues; State Appropriation Bonds.” **Most of such annual appropriation from the State will be used to pay debt service on the State Appropriation Bonds.** The Series 2016 Bonds will be also secured by funds in the Senior Lien Reserve Fund, the Ramp-Up Reserve Account and the Pledged Account within the Authority’s General Reserve Fund, and by certain funds, accounts and subaccounts held by the Trustee under the Trust Agreement.

The Trust Agreement provides that the Series 2016 Bonds will be secured by a pledge, charge and lien upon the Revenues on parity with any other Senior Lien Indebtedness secured by the Trust Agreement. See “SECURITY AND SOURCES OF PAYMENT FOR THE SERIES 2016 BONDS” herein.

Purpose and Plan of Finance. The Series 2016 Bonds are being issued for the purpose of providing funds, together with any other available funds, (a) to pay the costs of land acquisition, design, construction and equipping of the Monroe Expressway, an approximately 19.7-mile controlled access roadway including 18.1 miles of toll road to be built in Mecklenburg and Union Counties, North Carolina (the “Monroe Expressway” or “Project”), (b) to provide funds to pay a portion of the interest on the Series 2016A Bonds through September 1, 2019, (c) to fund the Senior Lien Reserve Fund in the amount of the initial Senior Lien Reserve Requirement, (d) to refund in advance of their maturity the Authority’s \$10,000,000 Monroe Connector System Senior Lien Turnpike Revenue Bonds, Series 2011 (the “2011 Bonds”) issued under the Original Trust Agreement, of which \$6,290,000 is currently outstanding, and (e) to pay certain costs incurred in connection with the issuance of the Series 2016 Bonds.

Construction of the Monroe Expressway began in May 2015, and is expected to be substantially complete by December, 2018, with final completion expected in May, 2019. Construction costs to date, including design and engineering costs, development costs, and right-of-way acquisition have been funded from the proceeds of the 2010A State Appropriation Bonds and funds provided by the North Carolina Department of Transportation (“NCDOT”). The remaining costs of the Monroe Expressway will be paid from the proceeds of the Series 2016 Bonds, remaining proceeds of the State Appropriation Bonds, funds from the NCDOT State Transportation Improvement Program for the Monroe Expressway anticipated to be in the amount of \$22,000,000 (“STIP Funds”), and a subordinated loan anticipated to be in the amount of \$166,500,000 (the “TIFIA Loan”) to be made to the Authority by the United States Department of Transportation (“USDOT”) under the Transportation Infrastructure Finance and Innovation Act (“TIFIA”) pursuant to a Loan Agreement, dated as of the Closing Date, between the Authority and USDOT (the “TIFIA Loan Agreement”). The Authority expects to close on the TIFIA Loan Agreement on the Closing Date.

The Authority and the Monroe Expressway. See “THE AUTHORITY” herein for certain information regarding the Authority and “THE MONROE EXPRESSWAY” herein for particular information regarding the Monroe Expressway toll road project being undertaken by the Authority. The Authority has entered into a separate agreement with a private party for the design and construction of the portions of the Monroe Expressway to be designed and constructed with proceeds of the Series 2016 Bonds. See “THE MONROE EXPRESSWAY – Construction of the Project” for a discussion of such contractual arrangement and a description of such contract.

Consultants Reports. CDM Smith Inc. (the “Traffic Consultant”) has prepared the comprehensive traffic and revenue study attached hereto as APPENDIX C, which forecasts the estimated traffic and toll revenue for the Monroe Expressway. HNTB Corporation, the General Engineering Consultant (the “GEC”) has prepared the GEC’s Report attached hereto as APPENDIX D, which, among other things, describes the location, construction cost estimates, construction schedule and operation and maintenance expense cost estimates for the Monroe Expressway.

Details of Bonds. The Series 2016 Bonds will be dated the date of delivery thereof. Interest on the Series 2016A Bonds will be payable on January 1 and July 1, beginning July 1, 2017, at the rates shown on the inside front cover. Interest on the Series 2016C Bonds will not be paid currently, but will compound semi-annually and will be payable upon maturity as described below. See “THE SERIES 2016 BONDS.” Principal of the Series 2016 Bonds will be payable, subject to prior redemption as described herein, on July 1 in the years and amounts shown on the inside front cover.

The Series 2016 Bonds will be issued as fully registered bonds in book-entry-only form, without physical delivery of bond certificates to the beneficial owners of the Series 2016 Bonds. The Bond Registrar will make payment of principal of and interest on the Series 2016 Bonds to The Depository Trust Company, New York, New York (“DTC”), which will in turn remit such payment to its participants for subsequent distribution to the beneficial owners of the Series 2016 Bonds. Individual purchases of the Series 2016 Bonds by the beneficial owners will be made in denominations of \$5,000 or whole multiples thereof payable at maturity. See APPENDIX F hereto for more information regarding DTC and the book-entry-only system.

Tax Status. See “TAX TREATMENT” herein.

Professionals. The Underwriters set forth on the cover page of this Official Statement (the “Underwriters”), are underwriting the Series 2016 Bonds. Hunton & Williams LLP is serving as Bond Counsel. McGuireWoods LLP, Raleigh, North Carolina, is serving as counsel to the Underwriters. Ebony Pittman, Esq., an Assistant Attorney General for the State, is serving as counsel to the Authority, and Elizabeth McKay, Esq., Special Deputy Attorney General, is serving as counsel to NCDOT. Wells Fargo Bank, N.A., Jacksonville, Florida, is serving as the Trustee and Bond Registrar. PFM Financial Advisors, LLC, Orlando, Florida, is acting as municipal advisor to the Authority in connection with the issuance of the Series 2016 Bonds.

## **THE AUTHORITY**

The Authority is a body politic and corporate and a public agency of the State of North Carolina created pursuant to the Authority Act and exists within the North Carolina Department of Transportation (“NCDOT”). The Authority is empowered by the Authority Act to design, establish, purchase, construct, operate and maintain the turnpike projects within the State specifically authorized by the North Carolina General Assembly. At present, four potential toll facilities have been identified by the General Assembly for development by the Authority as turnpike projects, including the Triangle Expressway, which has been completed, and the Monroe Expressway.

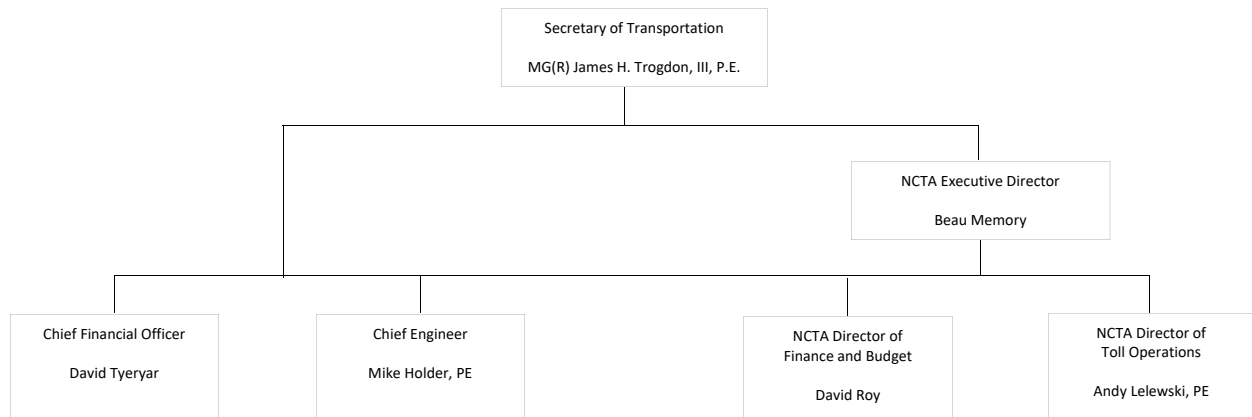
The Authority is governed by a nine member Authority Board, consisting of four members appointed by the General Assembly of North Carolina (two members appointed by the President Pro-Tempore of the Senate and two members appointed by the Speaker of the House of Representatives), four members appointed by the Governor of the State, and the North Carolina Secretary of Transportation. The Chair of the Authority is selected annually by the Authority Board. The election of the Chair is expected to occur when the Authority Board meets on February 2, 2017. The Authority Board appoints

the Executive Director of the Authority, who is the Chief Administrative Officer of the Authority, responsible for the daily administration of the toll projects undertaken by the Authority.

The following is a list of the current members of the Authority Board, their occupations and the expiration of their terms of office.

<u>Name</u>	<u>Occupation</u>	<u>Term Expires</u>
MG(R) James H. Trogdon, III, P.E.	Secretary, NCDOT	Ex-Officio
Perry R. Safran, Vice Chair	Attorney, Safran Law Offices	2017
Robert D. Teer, Jr., Secretary/Treasurer	President, Teer Associates	2019
Scott Aman	President, New Dixie Oil Corporation	2017
John Collet	Principal, Collett & Associates	2019
Jim Crawford	Former Member, North Carolina General Assembly	2019
Montell W. Irvin	President and CEO, Ramey Kemp & Associates, Inc.	2019
Charles L. Travis, III	Mayor, Town of Cornelius	2019
James Walker	Attorney/Mediator	2019

The Authority is part of NCDOT, and executive leadership of both the Authority and NCDOT are involved in all Authority projects. The following organizational chart demonstrates the integration of various functions of NCDOT and the Authority.



The following are the current members of senior management of NCDOT and the Authority and summaries of their professional experience.

*MG(R) James H. Trogdon, III, P.E., Secretary, NCDOT.* Major General James H. “Jim” Trogdon, III was named as Secretary to NCDOT by Governor Roy Cooper on January 3, 2017. Prior to assuming this role, Mr. Trogdon served as the National Transportation Director for SAS Institute. Mr. Trogdon previously worked at NCDOT spending over 20 years with the Department, serving most recently as its Chief Operating Officer from 2009 until his retirement in 2013. Mr. Trogdon holds the

rank of Major General (Ret) in the Army National Guard, and retired in 2016 as the Deputy Adjutant General for the North Carolina National Guard. He earned his Masters of Strategic Studies degree from the U.S. Army War College in Carlisle, Pennsylvania, and he earned his bachelor's degree and master's degree in civil engineering from North Carolina State University in Raleigh, North Carolina. He is a licensed professional engineer in North Carolina.

*Beau Memory, Executive Director of the Authority.* Beau Memory is the executive director of the Authority and is responsible for developing and implementing its strategic vision to address the combined effects of rapid growth, increasing congestion and funding challenges. Prior to his role at the Authority, Mr. Memory served as a senior policy advisor for the Office of the President Pro Tempore in the North Carolina Senate. His previous experience also includes serving as the legislative program manager for NCDOT and as the communications manager for the Authority. Mr. Memory earned a Bachelor of Science in political science from the University of North Carolina at Charlotte.

*David Tyeryar, Chief Financial Officer, NCDOT.* David Tyeryar is responsible for planning and oversight of, as well as researching new revenue sources for, the state's growing transportation infrastructure demands. Before joining NCDOT, Mr. Tyeryar served as Deputy Secretary and CFO for the Virginia Department of Transportation, where he helped implement a number of funding reforms to help address that state's challenges. He helped pass Virginia's first comprehensive transportation funding plan in 27 years, which provided more than 13,000 jobs and \$9.5 billion in economic investments. He also established the office of Public Private Partnerships, which resulted in more than \$5 billion in projects, using less than \$1 billion in state funds. Prior to the Virginia DOT, Mr. Tyeryar served as Budget Director and Accounting Division Manager for Prince William County, Virginia.

*Mike Holder, Chief Engineer, NCDOT.* Mike Holder has served as the Chief Engineer of the NCDOT since 2014. As such, Mr. Holder oversees all 14 Transportation Divisions. From 2000 until 2014, Mr. Holder was the Division Engineer for Division 12, which includes Gaston, Cleveland, Iredell, Alexander, Catawba and Lincoln counties. In this role, he managed construction projects, maintenance, operations and customer service for the Division. Mr. Holder previously served as a Division Construction Engineer for Division 9 in Winston-Salem and Resident Engineer for Division 7 in Greensboro.

*David Roy, Director of Finance and Budget of the Authority.* David Roy serves as the Authority's Director of Finance and Budget. Since joining the Authority in 2013, Mr. Roy has been responsible for all aspects of financial analysis, planning, and reporting for turnpike projects. Prior to joining the Authority, Mr. Roy spent seven years in investment banking with Credit Suisse, serving in various fixed income and valuation risk capacities. Mr. Roy is a native of Raleigh, North Carolina and received his undergraduate degree in Business Administration, with a second major in Economics, from The University of North Carolina at Chapel Hill. He later received his MBA from the University of Chicago, Booth School of Business.

*Andy Lelewski, Director of Toll Road Operations of the Authority.* Andy Lelewski serves as the Authority's Director of Toll Road Operations. He is a registered professional engineer in Florida and North Carolina. Prior to his work at Authority, Mr. Lelewski worked for the national consulting firm PBS&J, now a part of the Atkins Group, for 11 years. In 2007, he began working with the Authority as a consultant project manager for toll technology and operations activities and joined the Authority in 2009. He is responsible for the planning, design, implementation, and operation of the toll collection systems and operation services for all Authority projects. Mr. Lelewski is a graduate of the University of Pittsburgh, School of Engineering.

The Authority Act authorizes the Authority to issue bonds pursuant to the Revenue Bond Act to finance the cost of the Turnpike Projects it undertakes, and to fix, revise, charge, retain, enforce and collect tolls and fees for the use of the Turnpike Projects. The Monroe Expressway will be the second toll project to be financed by the Authority. The Authority previously financed the Triangle Expressway System, an 18.8 mile, all electronic toll road in the Raleigh-Durham area that opened in December, 2011, and is proceeding with plans for financing and constructing several additional toll road projects in the State. These projects include a network of express lanes in the Charlotte area, an extension of the Triangle Expressway, and the Mid-Currituck Bridge to connect the North Carolina Outer Banks to the mainland. **None of such other projects will be cross-collateralized with the Monroe Expressway.**

Under the Authority Act, the Authority is located within the Department of Transportation, and is subject to the supervision of the Secretary of NCDOT. Construction and operation costs of the Authority relating to the Project are eligible to be paid by NCDOT. As described herein under “PLAN OF FINANCE – Contributions by NCDOT,” in the Trust Agreement NCDOT has agreed to provide funds to the Authority to pay construction costs (to the extent such costs exceed available sources), and to cover any shortfalls in operations and maintenance costs and in the renewal and replacement reserve. Any such funds paid by NCDOT (other than the first \$55,000,000 contributed by NCDOT to pay Costs of the Project which does not have to be repaid) will be repaid by the Authority from toll revenues to the extent available after payment of other required amounts under the Trust Agreement. See “PLAN OF FINANCE – Repayment of Contributions by NCDOT” herein.

## **THE SERIES 2016 BONDS**

### **Authorization**

The issuance of the Series 2016 Bonds received the required approval of the North Carolina Local Government Commission (the “LGC”) on November 30, 2016. The LGC is a division of the State Treasurer’s office charged with general oversight of local government finance in North Carolina, as well as certain matters of finance by selected State Agencies. Its approval is required for the issuance of the Series 2016 Bonds by the Authority. In determining whether to allow bonds to be issued under the Revenue Bond Act, the LGC has been given wide statutory discretion to consider the need for and feasibility of the projects to be financed, the issuing unit’s capability to repay the amount financed from the pledged revenue sources and the issuer’s general compliance with State budget and finance laws. Under the Revenue Bond Act, the LGC is also responsible, with the Authority’s approval, for selling bonds issued pursuant to the Revenue Bond Act.

Pursuant to the Authority Act, the Authority is authorized to issue refunding bonds under the Revenue Bond Act with a maximum maturity of forty years from the date of issuance of the refunding bonds (not forty years from the date the project financed was placed in service, which is the case for other refunding bonds issued under the Revenue Bond Act).

### **General**

The Series 2016 Bonds will be dated the date of delivery thereof and will bear interest from their date as described below. The Series 2016 Bonds will mature, subject to prior redemption as described below, on July 1 in the years and amounts shown on the inside front cover. The Series 2016 Bonds will be issued as fully registered bonds and will be subject to the provisions of the book-entry-only system described below. Individual purchases of the Series 2016 Bonds by the beneficial owners will be made in denominations of \$5,000 or whole multiples thereof.

## Interest Rate Provisions of Series 2016 Bonds

Interest on the Series 2016A Bonds will be payable on each January 1 and July 1, beginning July 1, 2017, at the rates shown on the inside front cover page hereof.

Interest on the Series 2016C Bonds will not be paid currently, but will accrue from the date of issuance thereof and be paid at maturity. A purchaser of a Series 2016C Bond at the initial offering price set forth in this Official Statement on the date of issuance and who holds such Series 2016C Bond to maturity will receive at maturity an amount equal to such offering price plus accrued interest, compounded semi-annually on each January 1 and July 1 over the life of the Series 2016C Bond at the approximate yield to maturity shown in this Official Statement. The amount payable on the Series 2016C Bonds at any given time is referred to as the “Accreted Amount.”

APPENDIX A sets forth a Table of Accreted Amounts for the Series 2016C Bonds, which shows the Accreted Amounts of the Series 2016C Bonds on each January 1 and July 1, per \$5,000 payable at maturity. Accreted Amounts at times between the dates shown in the table will be interpolated on a straight-line basis.

## Redemption Provisions

Optional Redemption. The Series 2016A Bonds maturing on or after July 1, 2041, are subject to redemption prior to their respective maturities, at the option of the Authority, from any moneys that may be available for such purposes, either in whole or in part on any date on or after July 1, 2026, at a redemption price equal to 100% of the principal amount of such Series 2016A Bonds to be redeemed, plus accrued interest to the redemption date.

The Series 2016C Bonds maturing on or after July 1, 2027, are subject to redemption prior to their respective maturities, at the option of the Authority, from any moneys that may be available for such purposes, either in whole or in part on any date on or after July 1, 2026, at a redemption price equal to 100% of the Accreted Amount of such Series 2016C Bonds to be redeemed.

Sinking Fund Redemption. The Series 2016A Bonds maturing on July 1, 2047, are subject to mandatory sinking fund redemption, at a redemption price equal to the principal amount to be redeemed plus accrued interest, if any, to the redemption date, without premium, on July 1 in the years and amounts as follows:

<u>Year</u>	<u>Amount</u>
2043	\$5,445,000
2044	6,025,000
2045	6,670,000
2046	7,350,000
2047*	8,025,000

\* Maturity.

The Series 2016A Bonds maturing on July 1, 2051, are subject to mandatory sinking fund redemption, at a redemption price equal to the principal amount to be redeemed plus accrued interest, if any, to the redemption date, without premium, on July 1 in the years and amounts as follows:

<u>Year</u>	<u>Amount</u>
2048	\$8,740,000
2049	9,525,000
2050	10,670,000
2051*	11,460,000

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\* Maturity.

The Series 2016A Bonds maturing on July 1, 2054, are subject to mandatory sinking fund redemption, at a redemption price equal to the principal amount to be redeemed plus accrued interest, if any, to the redemption date, without premium, on July 1 in the years and amounts as follows:

<u>Year</u>	<u>Amount</u>
2052	\$12,075,000
2053	13,150,000
2054*	13,805,000

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\* Maturity.

Redemption Procedures. At least 30 days, but not more than 60 days, prior to the redemption date of any Series 2016 Bonds to be redeemed, whether such redemption be in whole or in part, the Bond Registrar will cause a notice of redemption to be mailed first-class, postage prepaid, to all Owners of Series 2016 Bonds to be redeemed in whole or in part; provided, however, that notices to any Securities Depository will be sent by registered or certified mail or by other electronic means as may be required by the operational procedures of such Securities Depository. Failure to mail any such notice to any Owner or any defect in such notice will not affect the validity of the proceedings for such redemption as to the Series 2016 Bonds of any other Owner to whom such notice is properly given.

The Series 2016 Bonds shall be redeemed only in whole multiples of \$5,000 principal amount (maturity amount for Series 2016C Bonds). If less than all of the Series 2016 Bonds of a Series are called for redemption, the maturities or portions of maturities of Series 2016 Bonds of such Series to be redeemed will be as set forth in an Officer's Certificate of the Authority filed with the Trustee. If less than all the Series 2016 Bonds of any one maturity are called for redemption, and the Series 2016 Bonds are not held in book-entry only form, the Bond Registrar will effect the redemption of the Series 2016 Bonds of such maturity on a pro-rata basis among registered owners, subject to \$5,000 minimum denomination requirements, using such method as the Trustee deems fair and appropriate. If the Series 2016 Bonds are held in book-entry only form, and less than all of the Series 2016 Bonds of any one maturity are to be called for redemption, the particular Series 2016 Bonds or portions thereof to be redeemed will be selected by lot in accordance with the procedures of the Securities Depository. If a portion of a Series 2016 Bond is called for redemption, a new Series 2016 Bond of the same Series and maturity, in principal amount equal to the unredeemed portion thereof, will be issued to the Owner upon surrender thereof.

Upon giving notice and depositing funds or securities with the Trustee or the Bond Registrar as provided in the Trust Agreement, the Series 2016 Bonds or portions thereof so called for redemption shall become due and payable on the redemption date, and interest on such Series 2016 Bonds or portions thereof shall cease to accrue from and after such date.



Any notice of optional redemption may state that the redemption to be effected is conditioned upon the receipt by the Trustee or Bond Registrar on or prior to the redemption date of moneys sufficient to pay the principal of and premium, if any, and interest on the Series 2016 Bonds to be redeemed and that if such moneys are not so received such notice shall be of no force or effect and such Series 2016 Bonds shall not be required to be redeemed. In the event that such notice contains such a condition and moneys sufficient to pay the principal of and premium, if any, and interest on such Series 2016 Bonds are not received by the Trustee or Bond Registrar on or prior to the redemption date, the redemption will not be made and the Bond Registrar will within a reasonable time thereafter give notice, in the manner in which the notice of redemption was given, that such moneys were not so received.

### **Book-Entry Only**

The Series 2016 Bonds will be issued as fully registered bonds in book-entry-only form without physical delivery of bonds to the beneficial owners of the Series 2016 Bonds. The Trustee will make payments of principal of and interest on the Series 2016 Bonds to DTC, which will in turn remit such payments to DTC participants for subsequent distribution to the beneficial owners of the Series 2016 Bonds. See APPENDIX F hereto for more information regarding DTC and the book-entry-only system.

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## ANNUAL DEBT SERVICE REQUIREMENTS

The following table sets forth for each Fiscal Year ending June 30, the amounts required for the payment of debt service related to the Series 2016 Bonds.

Fiscal Year Ending June 30 <sup>1</sup>	<u>Series 2016A Bonds</u>		<u>Series 2016C Bonds<sup>2</sup></u>		<u>Total</u>
	<u>Principal</u>	<u>Interest</u>	<u>Initial Principal</u>	<u>Compounded Interest</u>	
2017		\$2,503,773.99			\$2,503,773.99
2018		5,969,262.50			5,969,262.50
2019		5,969,262.50			5,969,262.50
2020		5,969,262.50			5,969,262.50
2021		5,969,262.50			5,969,262.50
2022		5,969,262.50			5,969,262.50
2023	\$1,140,000	5,969,262.50			7,109,262.50
2024	-	5,912,262.50			5,912,262.50
2025	-	5,912,262.50			5,912,262.50
2026	-	5,912,262.50	\$638,358.90	\$276,641.10	6,827,262.50
2027	-	5,912,262.50	735,063.75	379,936.25	7,027,262.50
2028	-	5,912,262.50	983,936.30	601,063.70	7,497,262.50
2029	-	5,912,262.50	949,475.00	680,525.00	7,542,262.50
2030	-	5,912,262.50	999,012.30	815,987.70	7,727,262.50
2031	-	5,912,262.50	1,009,398.00	940,602.00	7,862,262.50
2032	-	5,912,262.50	1,064,314.50	1,110,685.50	8,087,262.50
2033	-	5,912,262.50	1,110,480.00	1,289,520.00	8,312,262.50
2034	-	5,912,262.50	1,151,468.65	1,483,531.35	8,547,262.50
2035	-	5,912,262.50	1,199,706.90	1,705,293.10	8,817,262.50
2036	-	5,912,262.50	1,234,422.40	1,925,577.60	9,072,262.50
2037	-	5,912,262.50	1,257,864.00	2,142,136.00	9,312,262.50
2038	-	5,912,262.50	1,313,375.40	2,421,624.60	9,647,262.50
2039	-	5,912,262.50	1,334,969.20	2,660,030.80	9,907,262.50
2040	-	5,912,262.50	1,360,444.65	2,924,555.35	10,197,262.50
2041	465,000	5,912,262.50	1,254,614.40	2,905,385.60	10,537,262.50
2042	4,910,000	5,892,500.00	-	-	10,802,500.00
2043	5,445,000	5,647,000.00	-	-	11,092,000.00
2044	6,025,000	5,374,750.00	-	-	11,399,750.00
2045	6,670,000	5,073,500.00	-	-	11,743,500.00
2046	7,350,000	4,740,000.00	-	-	12,090,000.00
2047	8,025,000	4,372,500.00	-	-	12,397,500.00
2048	8,740,000	3,971,250.00	-	-	12,711,250.00
2049	9,525,000	3,534,250.00	-	-	13,059,250.00
2050	10,670,000	3,058,000.00	-	-	13,728,000.00
2051	11,460,000	2,524,500.00	-	-	13,984,500.00
2052	12,075,000	1,951,500.00	-	-	14,026,500.00
2053	13,150,000	1,347,750.00	-	-	14,497,750.00
2054	13,805,000	690,250.00	-	-	14,495,250.00
<b>Total</b>	<b>\$119,455,000</b>	<b>\$192,917,823.99</b>	<b>\$17,596,904.35</b>	<b>\$24,263,095.65</b>	<b>\$354,232,823.99</b>

<sup>1</sup> Debt service payments for each Fiscal Year reflect payments due on the immediately following July 1.

<sup>2</sup> Debt service consists of initial principal plus compounded interest payable upon maturity or redemption.

## PLAN OF FINANCE

The following table shows the estimated sources of funding, and permitted uses of such funding, for the Monroe Expressway, net of amounts contributed by NCDOT (other than STIP Funds) and capitalized interest on the TIFIA Loan (which is added to the TIFIA Loan balance). The table shows which sources are available to pay various Costs of the Project:

Sources							
	Series 2010	Series 2011	Series 2011	State Highway	Series 2016	TIFIA	Total
	Approp Bonds	Toll Rev. Bonds	Approp Bonds	Trust Fund	Toll Rev. Bonds	Loan	
Par Amounts							
CIB	233,920,000	10,000,000	214,505,000		119,455,000	166,500,000	744,380,000
CAB					17,596,904		17,596,904
+Premium/-Discount			18,693,018		7,331,386		26,024,404
Total Bond Proceeds	233,920,000	10,000,000	233,198,018		144,383,290	166,500,000	788,001,308
State Highway Trust Fund <sup>1</sup>				22,000,000			22,000,000
Cash Contribution for 2011 Defeasance					5,372,278		5,372,278
<b>Total Sources</b>	<b>233,920,000</b>	<b>10,000,000</b>	<b>233,198,018</b>	<b>22,000,000</b>	<b>149,755,569</b>	<b>166,500,000</b>	<b>815,373,587</b>

Uses							
	Series 2010	Series 2011	Series 2011	State Highway	Series 2016	TIFIA	Total
	Approp Bonds	Toll Rev. Bonds	Approp Bonds	Trust Fund	Toll Rev. Bonds	Loan	
Construction Cost							
Construction Fund Deposit	198,793,929	9,819,500	231,735,079	9,290,124	114,731,869	166,500,000	730,870,501
Capitalized Interest Funds	29,081,083				15,437,176		44,518,259
Debt Service Reserve Funds	4,303,953				11,833,180		16,137,133
TIFIA Loan Debt Service Reserve Fund <sup>1</sup>				12,387,437			12,387,437
Fuel Hedge Cap Premium <sup>1</sup>				322,439			322,439
Refunding Escrow Deposits (2011 Toll Revenue Bonds)					6,375,333		6,375,333
Cost of Issuance	1,741,036	180,500	1,462,939		1,378,009		4,762,485
<b>Total Uses</b>	<b>233,920,000</b>	<b>10,000,000</b>	<b>233,198,018</b>	<b>22,000,000</b>	<b>149,755,569</b>	<b>166,500,000</b>	<b>815,373,587</b>

1. For tax purposes, cash is being used to fund the TIFIA reserve and the cost of the Fuel Price Hedge.

As indicated on the table above, Costs of the Project will be financed with the proceeds of the Series 2016 Bonds and State Appropriation Bonds previously issued by the Authority, STIP Funds provided by NCDOT, and disbursements to the Authority from USDOT under the TIFIA Loan. Interest earnings on amounts in the Project Fund will also be available to pay such costs, but are not reflected in the table. Pursuant to the Trust Agreement, NCDOT has agreed to provide advances required to complete construction of the Project in the event that the sources described above are not sufficient. In addition, NCDOT has agreed (i) to advance to the Authority amounts necessary to pay Operating Expenses of the Monroe Expressway in the event that the Revenues of the Monroe Expressway are not sufficient for such purpose, and (ii) to make advances to fund any deficiencies in the Renewal and Replacement Fund created under the Trust Agreement in the event that sufficient Revenues are not received in order to make the required deposits to the Renewal and Replacement Fund. It is expected that costs of the Project will be paid first from the remaining proceeds of the State Appropriation Bonds, then from STIP Funds in the Project Fund, then from proceeds of the Series 2016 Bonds, and finally from the proceeds of the TIFIA Loan. See **“THE MONROE EXPRESSWAY – Total Sources and Uses for Monroe Expressway”**

### Proceeds of the Series 2016 Bonds

Pursuant to the Trust Agreement, the proceeds of the Series 2016 Bonds will be applied to (a) pay a portion of the costs of land acquisition, design, construction and equipping of the Project, (b) provide funds to pay a portion of the interest on the Series 2016A Bonds through September 1, 2019, (c) fund the Senior Lien Reserve Fund in the amount of the initial Senior Lien Reserve Requirement, (d) refund the 2011 Bonds in advance of their maturity and (e) pay certain costs incurred in connection with the issuance of the Series 2016 Bonds.

## **Refunding of 2011 Bonds**

In order to accomplish the refunding of the 2011 Bonds in advance of their maturities, a portion of the proceeds of the sale of the Series 2016 Bonds, together with other available funds of the Authority, will be deposited into an escrow fund (the “2011 Escrow Fund”) established pursuant to the Trust Agreement and held by the Trustee, acting as escrow agent (the “Escrow Agent”). A portion of the amounts deposited in the 2011 Escrow Fund will be invested in defeasance obligations (the “Escrow Securities”), the maturing principal and interest of which will provide funds, together with other amounts on deposit in the 2011 Escrow Fund, to pay when and as due, respectively, (1) interest on the 2011 Bonds until October 1, 2017 (the earliest date of optional redemption of the 2011 Bonds), (2) \$835,000 in mandatory sinking fund redemption on July 1, 2017, and (3) the remaining principal amount of the 2011 Bonds on October 1, 2017. See “**VERIFICATION**” herein. The Escrow Agent will be given irrevocable instructions to redeem the 2011 Bonds on October 1, 2017. **The beneficial owners of the Series 2016 Bonds will have no rights, security or interest in and to the 2011 Escrow Fund whatsoever.**

## **TIFIA Loan**

The Authority and the USDOT will enter into the TIFIA Loan Agreement, pursuant to which the USDOT agrees, subject to the conditions set forth in the TIFIA Loan Agreement, to make a loan to the Authority in an initial principal amount up to \$166,500,000 to be used to pay or reimburse the Authority for payment of “Eligible Project Costs” of the Monroe Expressway. The unpaid balance of the TIFIA Loan bears interest at an interest rate determined on the date of closing of the TIFIA Loan, which is expected to occur on the Closing Date. Funds under the TIFIA Loan Agreement are transferred from the United States Department of the Treasury upon presentation by the Authority of a request for disbursement in accordance with the provisions of the TIFIA Loan Agreement. The Authority’s obligation to make the loan repayments required under the TIFIA Loan Agreement will be secured by a pledge under the Trust Agreement of the Revenues. The pledge of Revenues to secure the TIFIA Loan repayments will be generally subordinate to the payment of Senior Lien Indebtedness, including the Series 2016 Bonds. However, if obligations are owed to USDOT under the TIFIA Loan Agreement, upon the occurrence of an Event of Default that is a Bankruptcy Related Event under the Trust Agreement with respect to the Authority, the obligations of the Authority to USDOT under the TIFIA Loan Agreement will become Senior Lien Indebtedness, secured on a parity with other Senior Lien Indebtedness (including the Series 2016 Bonds), except that USDOT will not be entitled to be paid from amounts on deposit in the Senior Lien Reserve Fund. As defined in the Trust Agreement, a “Bankruptcy Related Event” includes, in addition to various insolvency events affecting the Authority, failure by the Authority to make two (2) consecutive payments of debt service on the TIFIA Bond in accordance with the terms of the TIFIA Loan Agreement. See “**SECURITY AND SOURCES OF PAYMENT FOR THE SERIES 2016 BONDS – TIFIA Indebtedness Upon Occurrence of Bankruptcy Related Event.**”

Interest on the TIFIA Loan will compound semi-annually, will be fully capitalized until the January 1 or July 1 (each a “Semi-Annual Payment Date”) immediately following the second anniversary of the Substantial Completion Date of the Project, which is the date on which the Project is open to vehicular or passenger traffic. The final maturity date of the TIFIA Loan is July 1, 2053, as such date may be adjusted as set forth in the TIFIA Loan Agreement, but in no event shall such date be later than 35 years following the Substantial Completion Date.

## **STIP Funds**

NCDOT has agreed to provide an estimated amount of \$22,000,000 from the NCDOT State Transportation Improvement Program (“STIP Funds”) to pay a portion of the Costs of the Project. The

STIP Funds will be deposited with the Trustee in the Project Fund and used to pay Costs of the Project. The STIP Funds are not a loan and do not have to be repaid.

### **State Appropriated Revenues; State Appropriation Bonds**

Pursuant to Section 136-176(b2) of the North Carolina General Statutes, the General Assembly of North Carolina has provided for a continuing annual appropriation of \$24,000,000 to the Authority from the Highway Trust Fund for the Monroe Expressway to service debt and fund required reserves in connection with bonds issued to finance the Monroe Expressway. This State appropriation for the Monroe Expressway is defined in the Trust Agreement and herein as the “State Appropriated Revenues.” The annual appropriation does not constitute a pledge of the faith and credit and taxing power of the State of North Carolina, and nothing contained therein prohibits the General Assembly from amending the annual appropriation to decrease or eliminate the amount annually appropriated to the Authority.

Under the plan of finance, the Authority and the Trustee previously entered into a separate Trust Agreement, dated as of October 1, 2010 (as supplemented, the “State Appropriation Trust Agreement”), pursuant to which the Authority issued the State Appropriation Bonds, which are secured solely by the State Appropriated Revenues and investment earnings thereon and certain funds held under the State Appropriation Trust Agreement. The State Appropriation Bonds are not secured by the tolls or other revenues of the Monroe Expressway or any funds held under the Trust Agreement. Under the State Appropriation Trust Agreement, amounts not needed in any fiscal year to make debt service payments on the State Appropriation Bonds will be withdrawn from the State Appropriation Trust Agreement and deposited to the Revenue Fund created under the Trust Agreement. Upon such withdrawal from the State Appropriation Trust Agreement, the amounts so transferred shall be transferred free and clear of the lien and pledge of the State Appropriation Trust Agreement and the amounts so transferred will constitute “Revenues” under the Trust Agreement. There is no assurance that any such amounts will be available to be transferred to the Trust Agreement.

### **Contributions by NCDOT**

Preliminary Costs. Certain design and engineering costs, development costs, and right-of-way acquisition costs for a portion of the Monroe Expressway, as well as environmental mitigation costs have been funded by NCDOT.

Funding of Construction Completion. The Project will be built pursuant to the design-build contract described below under the caption “THE MONROE EXPRESSWAY.” Such contract is a fixed price contract, subject to certain contingencies. Based upon the estimate of its engineers and the contract prices, the Authority believes that sufficient funds will be available to pay the Costs of the Project from the sources described above. Nevertheless, in the event that unexpected or unforeseen circumstances result in additional unanticipated costs in excess of the amounts available, NCDOT has undertaken pursuant to the Trust Agreement to provide additional funding to complete the Project. The Trust Agreement provides that such payments are to be paid by NCDOT from amounts then available in the State Highway Fund or the State Highway Trust Fund, subject to appropriation and availability of funds for such use in such funds. NCDOT currently has \$55,000,000 under the State Transportation Improvement Plan earmarked for the Monroe Expressway (in addition to an estimated amount of \$22,000,000 in STIP Funds required for the Project); such funds are available to pay such excess construction costs.

Funding of Operating Expenses. As described below under “SECURITY AND SOURCES OF PAYMENT FOR THE SERIES 2016 BONDS,” the Operating Expenses of the Monroe Expressway are payable from Revenues after the prior payment of debt service on Senior Lien Bonds, Subordinate Lien

Bonds, the TIFIA Loan and the funding, if necessary, of deficiencies in the debt service reserve funds for Senior Lien Bonds and Subordinate Lien Bonds (including the TIFIA Loan). In order to assure a source of funds for payment of Operating Expenses of the Monroe Expressway, the Trust Agreement creates an Operating Reserve Fund that the Authority can draw upon to pay required Operating Expenses in the event funds in the Operations and Maintenance Expense Fund are not sufficient therefor. NCDOT has agreed in the Trust Agreement to pay to the Trustee amounts necessary to replenish the Operating Reserve Fund up to the Operating Reserve Fund Requirement if insufficient revenues are available therefor. The Trust Agreement provides that such payments are to be paid by NCDOT from amounts then available in the State Highway Fund, subject to appropriation and availability of funds for such use in such fund.

Funding of Renewal and Replacement Reserve Fund. The Trust Agreement creates a Renewal and Replacement Fund as a special fund to which deposits are to be made from Revenues to pay all or a portion of the cost of unusual or extraordinary maintenance, repairs, renewals or replacements or capital improvements related to the Monroe Expressway. Under the Trust Agreement, deposits to the Renewal and Replacement Fund are to be made from Revenues in amounts designed to assure that funds will be available for the required purpose when needed, as described below under the caption “SECURITY AND SOURCES OF PAYMENT FOR THE SERIES 2016 BONDS – Application of Revenues.” In order to assure that the Renewal and Replacement Fund is funded as required, NCDOT has agreed in the Trust Agreement to pay the amount necessary so that funds on deposit in the Renewal and Replacement Fund equal the Renewal and Replacement Fund Requirement. The Trust Agreement provides that such payments are to be paid by NCDOT from amounts then available in the State Highway Fund or the State Highway Trust Fund, subject to appropriation and availability of funds for such use in such funds.

Repayment of NCDOT Contributions. The Authority may be required to repay any amounts advanced by NCDOT as described above under “Funding of Construction Completion,” “Funding of Operating Expenses” and “Funding of Renewal and Replacement Reserve Fund,” (other than the first \$55,000,000 contributed by NCDOT out of STIP funds to pay Costs of the Project, which does not have to be repaid), with interest, from Revenues, but only after payment of current debt service on the Series 2016 Bonds, Senior Lien Bonds, Subordinate Lien Bonds, and the TIFIA Loan, the funding of any deficiency in all debt service reserve funds held under the Trust Agreement, funding of required deposits to the Operations and Maintenance Expense Fund, the Operating Reserve Fund, the Renewal and Replacement Fund, and the TIFIA Scheduled Prepayment Fund required under the Trust Agreement, or from amounts deposited and held in the General Reserve Fund available for such expense. In addition, so long as the TIFIA Loan is outstanding, no such repayments shall be made to NCDOT unless certain conditions set forth in the TIFIA Loan Agreement have been met. See “SECURITY AND SOURCES OF PAYMENT FOR THE SERIES 2016 BONDS – Application of Revenues.”

## **SECURITY AND SOURCES OF PAYMENT FOR THE SERIES 2016 BONDS**

### **General**

The Series 2016 Bonds will be special obligations of the Authority, secured by and payable from the Revenues of the Monroe Expressway and, under certain circumstances, the proceeds of the Series 2016 Bonds, investment earnings and certain net insurance and other proceeds.

**The principal of and interest on the Series 2016 Bonds shall not be payable from the general funds of the Authority or NCDOT, nor shall they constitute a legal or equitable pledge, charge, lien, or encumbrance upon any of its property or upon any of its income, receipts, or revenues, except the funds which are pledged under the Bond Order and the Trust Agreement. Neither the credit**

**nor the taxing power of the State or any instrumentality thereof are pledged for the payment of the principal or interest of the Series 2016 Bonds, and no Owner of Series 2016 Bonds has the right to compel the exercise of the taxing power by the State or any instrumentality thereof or the forfeiture of any of its property other than Revenues in connection with any default thereon. Acceleration is not a remedy available to the Owners of the Series 2016 Bonds following an Event of Default.**

As described below under “Application of Revenues,” the Operating Expenses of the Monroe Expressway are payable from Revenues after the payment of debt service on Senior Indebtedness, Subordinated Indebtedness, the TIFIA Loan Agreement and the funding of certain reserves. As such, the Series 2016 Bonds and other Senior Lien Indebtedness are secured by a “gross revenue” pledge of the Revenues of the Monroe Expressway.

### **Pledge of Revenues**

The Revenues of the Monroe Expressway are pledged to the payment of, and as security for (a) Senior Lien Indebtedness (including Senior Lien Bonds and Senior Lien Parity Debt), (b) Subordinate Lien Indebtedness (including Subordinate Lien Bonds and Subordinate Lien Parity Debt), and (c) TIFIA Indebtedness.

The term “Revenues” for any particular period includes all receipts, revenues, income, proceeds and money received in any period by or for the Authority in respect of the Monroe Expressway, including all toll revenues, payments, proceeds, fees, charges, rents and all other income derived by or for the Authority from the ownership and operation of the Monroe Expressway, and all other income derived by the Authority from the operation or ownership of the Monroe Expressway; proceeds of use and occupancy or business interruption insurance and amounts received as liquidated damages under contracts for construction of the Monroe Expressway; the portion of the State Appropriated Revenues transferred to the Revenue Fund from the State Appropriation Trust Agreement; and investment earnings on amounts in the Revenue Fund. See APPENDIX B--“Definitions of Certain Terms and Summary of the Trust Agreement” for a complete definition of Revenues.

Under North Carolina law, the State agrees that once revenue bonds are issued under the Act and are outstanding and unpaid, the State will not limit or alter the rights vested in the Authority at the time of issuance of such bonds to establish, maintain, revise, charge, and collect such rates, fees, tolls, and other charges for the use of the project financed by such revenue bonds as shall produce revenues at least sufficient with other available funds to meet the expense of maintenance and operation of and renewal and replacements to such project, including reserves therefor, to pay when due the principal, interest, and redemption premiums of such bonds, and to fulfill the terms of any agreements made with the bondholders, noteholders, nor will the State in any way impair the rights and remedies of the bondholders until such bonds are fully paid.

### **Project Fund**

The proceeds of the Series 2016 Bonds (less the Senior Lien Reserve Requirement, amounts necessary to refund the Series 2011 Bonds, and the amount representing capitalized interest deposited to the Senior Lien Debt Service Fund) will be deposited in the Project Fund created by the Trust Agreement and held by the Trustee. Amounts deposited in the Project Fund, including investment earnings thereon, will be used to pay a portion of the Costs of the Monroe Expressway and the costs incurred in connection with the issuance of the Series 2016 Bonds. Amounts on deposit in the Project Fund derived from proceeds of the Series 2016 Bonds and earnings thereon are, to the extent permitted by law, subject to a lien and charge in favor of the Owners of the Series 2016 Bonds pending the application of such amounts to pay Costs of the Project.

See APPENDIX B – “Definitions of Certain Terms and Summary of the Trust Agreement – The Project Fund” for certain provisions of the Trust Agreement relating to the expenditure of amounts in the Project Fund to pay Costs of the Monroe Expressway.

### **Senior Lien Reserve Fund**

The Trust Agreement creates a special fund designated the Senior Lien Reserve Fund. Each Senior Lien Resolution providing for the issuance or incurrence of Senior Lien Indebtedness may provide that the Senior Lien Indebtedness authorized thereby will be secured by the Senior Lien Reserve Fund. If any Senior Lien Indebtedness is secured by the Senior Lien Reserve Fund, the Authority must fund the Senior Lien Reserve Fund in an amount equal to the Senior Lien Reserve Requirement at the time of delivery and payment for such Senior Lien Indebtedness. If the Senior Lien Resolution authorizing Senior Lien Indebtedness does not provide that such Senior Lien Indebtedness will be secured by the Senior Lien Reserve Fund, such Senior Lien Indebtedness will have no claim on the Senior Lien Reserve Fund.

The Series 2016 Bonds will be secured by the Senior Lien Reserve Fund. A deposit of \$11,833,180.22 will be made to the Senior Lien Reserve Fund from proceeds of the Series 2016 Bonds to fund the initial Senior Lien Reserve Requirement. Moneys on deposit in the Senior Lien Reserve Fund (or provided under a Reserve Alternative Instrument) will be used as necessary to pay the principal of and interest on all Senior Lien Indebtedness secured by the Senior Lien Reserve Fund to the extent that moneys on deposit in the Senior Lien Debt Service Fund and Accounts thereof for such payment are insufficient therefor. See APPENDIX B – “Definitions of Certain Terms and Summary of the Trust Agreement” for a more detailed description of the Senior Lien Reserve Requirement.

A Senior Lien Resolution authorizing Senior Lien Indebtedness may also provide for the creation of a Separate Reserve Fund to be maintained by the Trustee or a Depository that will secure only the Senior Lien Indebtedness authorized by such Senior Lien Resolution. The Series 2016 Bonds will not be secured by a Separate Reserve Fund. In the event the TIFIA Loan Agreement becomes Senior Lien Indebtedness as a result of a Bankruptcy Related Event, the TIFIA Loan Agreement will not be secured by the Senior Lien Reserve Fund.

Any deficiency in the Senior Lien Reserve Fund resulting from the withdrawal of moneys therein or from the amount on deposit in such fund on any valuation date required by the Trust Agreement being less than the applicable requirement therefor shall be made up immediately with transfers first from the Pledged Account and second from the Ramp-Up Reserve Account, and then, to the extent a deficiency still exists, from the monthly deposits by the Trustee from Revenues as described under “SECURITY AND SOURCES OF PAYMENT FOR THE SERIES 2016 BONDS – Application of Revenues,” below.

### **General Reserve Fund – Ramp-Up Reserve Account and Pledged Account**

The Trust Agreement creates a General Reserve Fund, in which there is a Pledged Account, an Unpledged Account and Ramp-Up Reserve Account. The Ramp-Up Reserve Account will be funded initially from the general revenue fund of the Authority in an amount equal to \$25,000,000 (the “Original Ramp-Up Reserve Account Deposit”), and thereafter from Revenues after all other deposits have been made under the Trust Agreement. Prior to the first Calculation Date after the fifth anniversary of the Substantial Completion Date of the Project, funds in the Ramp-Up Reserve Account are only available to be transferred to the Senior Lien Reserve Fund, the Subordinate Lien Reserve Fund or the TIFIA Reserve Fund for deficiencies therein resulting from transfers to the Senior Lien Debt Service Fund or the Subordinate Lien Debt Service Fund necessary to make payments of principal of and interest on the Bonds and Additional Secured Indebtedness when due. On the first Calculation Date immediately



succeeding the fifth anniversary of the Substantial Completion Date, any portion of the Original Ramp-Up Reserve Account Deposit remaining in the Ramp-Up Reserve Account shall be transferred to the Unpledged Account. On each Calculation Date thereafter, amounts in the Ramp-Up Reserve Account may be applied at the direction of the Authority (A) (i) to the payment of Senior Debt Service or Subordinate Debt Service to the extent there are insufficient funds on deposit in the Senior Debt Service Fund or the Subordinate Debt Service Fund or available to be transferred from the Pledged Account, as described below, to make such payments when due or (ii) to any other Project Account (other than the Pledged Account) to satisfy any deficiency in any such Project Account and (B) after any deposits required pursuant to subclause (A) and upon satisfaction by the Authority of the Restricted Payment Conditions, to the Pledged Account and the Unpledged Account.

Moneys held for the credit of the Pledged Account shall be used to make transfers to the Interest Account, the Principal Account, and the Sinking Fund Account within the Senior Lien Debt Service Fund and the Subordinate Lien Debt Service Fund, as necessary, to the extent funds in the related Senior Lien Reserve Fund, Subordinate Lien Reserve Fund or TIFIA Reserve Fund, are not available to make such payments. In addition, at the direction of the Authority, amounts on deposit in the Pledged Account may be (A) applied at any time to the payment of (I) Guarantee Repayments, (II) principal and interest on Junior Indebtedness or (III) deficiencies in debt service due on Appropriation Bonds resulting from sequestration and non-payment of the federal interest subsidies thereon or (B) upon satisfaction of the requirements in the following sentence, transferred at any time to a new account within the Project Fund to pay costs of improvements to the Initial Project or any Additional Project. Prior to transferring any amounts from the Pledged Account to the Project Fund, the Borrower shall deliver to the TIFIA Lender, no earlier than ten (10) Business Days and no later than three (3) Business Days prior to the proposed transfer, a certificate signed by the Borrower's Authorized Representative certifying as to compliance with the Restricted Payment Conditions, including a Coverage Certificate providing calculations in reasonable detail of the applicable coverage ratios. The Borrower shall only apply amounts on deposit in the Pledged Account for costs of an Additional Project in accordance with the provisions of the TIFIA Loan Agreement and this Trust Agreement. Amounts in the Pledged Account may also be transferred at any time to the Ramp-Up Reserve Account at the direction of the Authority.

### **General Reserve Fund – Unpledged Account**

Funds in the Unpledged Account of the General Reserve Fund may be used by the Authority for any legally available purpose; provided that, so long as the TIFIA Bond is outstanding, prior to using funds transferred from the Ramp-Up Reserve Account to the Unpledged Account for any purpose, the Authority shall prepay the TIFIA Loan in an amount equal to 50% of the amount to be so used.

### **Other Funds and Accounts**

Revenue Fund. The Revenue Fund is held by the Trustee. The Authority will deposit all Revenues as received in the Revenue Fund for application as hereinafter described.

Senior Lien Debt Service Fund. The Senior Lien Debt Service Fund is held by the Trustee and is composed of four separate accounts called the Interest Account, the Principal Account, the Sinking Fund Account, and the Redemption Account, and within each such account, a separate subaccount for the Series 2016 Bonds and the TIFIA Bond. Each Supplemental Trust Agreement authorizing a Series of Bonds will provide for the creation, to the extent applicable, of separate subaccounts within the Interest Account, the Principal Account, the Sinking Fund Account and the Redemption Account relating to the Series of Bonds authorized by such Supplemental Trust Agreement. Moneys held in such subaccounts are pledged to the payment of the principal of (whether at maturity or pursuant to mandatory sinking fund

redemption) and interest on the Series of Bonds for which such subaccounts are established and do not secure other Series of Bonds or other Parity Debt.

Subordinate Lien Debt Service Fund. In addition to the Senior Lien Debt Service Fund, the Trust Agreement creates a Subordinate Lien Debt Service Fund, to which deposits will be made from Revenues to pay debt service on Subordinate Lien Indebtedness including, so long as no Bankruptcy Related Event relating to the Authority has occurred, the TIFIA Loan. Deposit to such Fund from Revenues is subordinate to the deposits required to be made to the Senior Lien Debt Service Fund.

TIFIA Reserve Fund. In addition to the Senior Lien Reserve Fund, the Trust Agreement creates a TIFIA Reserve Fund, which can be used to pay debt service on the TIFIA Loan to the extent funds in the Subordinate Lien Debt Service Fund are insufficient therefor.

Operations and Maintenance Expenses Fund. Moneys held for the credit of the Operations and Maintenance Expense Fund are to be used only to pay Operating Expenses of the Monroe Expressway.

Renewal and Replacement Fund. Moneys held for the credit of the Renewal and Replacement Fund, together with any earnings thereon, are to be used to pay costs of capital improvements related to the Monroe Expressway, as provided in the Capital Improvement Plan and unusual or extraordinary maintenance, repairs, renewals or replacements.

TIFIA Scheduled Prepayment Fund. Amounts in the TIFIA Scheduled Prepayment Fund are to be used to pay TIFIA Scheduled Prepayment Amounts on the due dates therefor as set forth in the TIFIA Loan Agreement. Failure of such amounts to be sufficient to pay in full any TIFIA Scheduled Prepayment Fund is not a default or an Event of Default under the Trust Agreement or the TIFIA Loan Agreement, and is not taken into account in determining whether a Bankruptcy Related Event has occurred with respect to the Authority. Any TIFIA Scheduled Prepayment Amount that is not paid on the date such amount is due under the TIFIA Loan Agreement shall be added to the TIFIA Scheduled Prepayment Amount due on the immediately succeeding Semi-Annual Payment Date under the TIFIA Loan Agreement.

Insurance and Condemnation Award Fund. The Insurance and Condemnation Award Fund is held by the Trustee. Under certain circumstances described in the Trust Agreement, Net Insurance Proceeds and Net Eminent Domain Proceeds are required to be deposited by the Authority in the Insurance and Condemnation Award Fund. Moneys held in the Insurance and Condemnation Award Fund will be disbursed to repair or replace the Monroe Expressway or to pay or redeem Bonds and Parity Debt, in the manner set forth in the Trust Agreement.

## **Application of Revenues**

The Trust Agreement provides that on the last Business Day of each month, the Trustee shall withdraw all Revenues and other amounts held in the Revenue Fund and apply the same in the following manner and order (the following is a general summary of the application of Revenues at the end of each month, see “Definitions of Certain Terms and Summary of the Trust Agreement – Application of Money in the Revenue Fund” in APPENDIX B hereto for a more detailed description of the application of Revenues):

- (a) to the Interest Account of the Senior Lien Debt Service Fund and to any other Persons entitled thereto as the holder of Senior Lien Parity Debt, the amount (in equal monthly deposits) needed to pay interest payable on Senior Lien Bonds (including the TIFIA Bond if a Bankruptcy Related Event relating to the Authority has occurred) and other Senior Lien Parity

Debt on the next Interest Payment Date (if such Interest Payment Date is within seven months of such deposit);

(b) to the Principal Account and the Sinking Fund Account of the Senior Lien Debt Service Fund and to any other Persons entitled thereto as the holder of Senior Lien Parity Debt the amount (in equal monthly deposits) needed to pay the Principal payable on Senior Lien Bonds (including the TIFIA Bond if a Bankruptcy Related Event relating to the Authority has occurred) and any other Senior Lien Parity Debt on the next Principal Payment Date for each such Senior Lien Bonds or Senior Lien Parity Debt;

(c) if (i) the amount in the Senior Lien Reserve Fund is less than the Senior Lien Reserve Requirement, (ii) the amount in any Separate Reserve Fund for Senior Indebtedness is less than the applicable reserve requirement therefor, and, (iii) if a Bankruptcy Related Event relating to the Authority has occurred, the amount in the TIFIA Reserve Fund is less than the TIFIA Reserve Requirement, then to the funds described in (i), (ii) and (iii) above, an amount, determined such that the deficiency is paid on or before the next Interest Payment Date in equal monthly payments beginning with the month in which the deficiency is identified, to make up any deficiencies in such funds; provided, however, that if there shall not be sufficient Revenues to satisfy all such deposits and payments, such deposits and payments shall be made for deposit to each of such funds ratably according to the amount so required to be deposited or paid;

(d) to the Interest Account of the Subordinate Lien Debt Service Fund and to any other Persons entitled thereto as the holder of Subordinate Lien Parity Debt an amount equal to the amount of interest payable on each Series of Subordinate Lien Bonds (including the TIFIA Bond if a Bankruptcy Related Event relating to the Authority has not occurred) on the next Interest Payment Date for each such Series of Subordinate Lien Bonds and Subordinate Lien Parity Debt (if such Interest Payment Date is within seven months of such deposit) divided by the number of monthly deposits to be made to such subaccounts with respect to interest on such Subordinate Lien Bonds and Subordinate Lien Parity Debt on or prior to the next Interest Payment Date for each such Series of Subordinate Lien Bonds and Subordinate Lien Parity Debt;

(e) to the Principal Account and the Sinking Fund Account of the Subordinate Lien Debt Service Fund and to any other Persons entitled thereto as the holder of Subordinate Lien Parity Debt the amount (in equal monthly deposits) needed to pay the Principal payable on Subordinate Lien Bonds (including the TIFIA Bond if a Bankruptcy Related Event relating to the Authority has not occurred) and any other Subordinate Lien Parity Debt (if such Principal Payment Date is within thirteen months of such deposit) divided by the number of monthly deposits to be made to such subaccounts with respect to Principal on such Subordinate Lien Bonds on or prior to the next Principal Payment Date for each such Series of Subordinate Lien or Subordinate Lien Parity Debt;

(f) so long as no Bankruptcy Related Event relating to the Authority has occurred, if the amount in (i) the Subordinate Lien Reserve Fund, if any, (ii) any Separate Reserve Fund for Subordinate Indebtedness, or (iii) the TIFIA Reserve Fund is less than the applicable reserve requirement therefor, then to the funds described in (i), (ii) and (iii) above, an amount, determined such that the deficiency is paid on or before the next Interest Payment Date in equal monthly payments beginning with the month in which the deficiency is identified in order to make up such deficiency; provided, however, that if there shall not be sufficient Revenues to satisfy all such deposits and payments, such deposits and payments shall be made for deposit such funds ratably according to the amount so required to be deposited or paid;

(g) to the credit of the Operations and Maintenance Expense Fund an amount equal to the next succeeding month's budgeted Operating Expenses as set forth in the Annual Budget;

(h) to the credit of the Operating Reserve Fund such amount as shall be necessary to make the amount on deposit therein equal to the Operating Reserve Fund Requirement, which is an amount, beginning four months after the Substantial Completion Date, equal to one-fourth (1/4) of the total budgeted Operating Expenses of the Monroe Expressway for the current Fiscal Year as set forth in the Annual Budget;

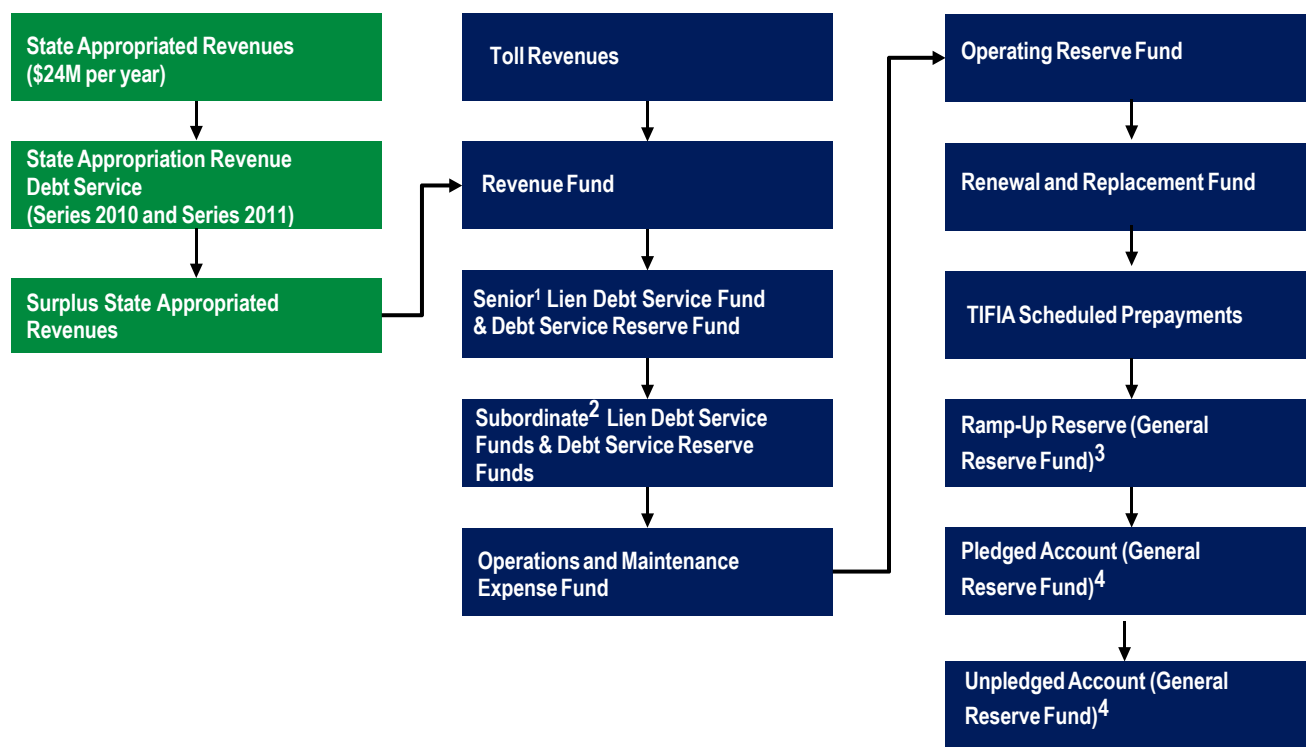
(i) beginning in the first month after the Substantial Completion Date, to the credit of the Renewal and Replacement Fund, such amount as shall be necessary to make the amount on deposit therein equal to the Renewal and Replacement Fund Requirement;

(j) beginning in the first month of each payment period set forth in the TIFIA Loan Agreement for which a TIFIA Scheduled Prepayment Amount is to be paid, to the credit of the TIFIA Scheduled Prepayment Fund until the amount on deposit therein equals the TIFIA Scheduled Prepayment Amount due at the end of such payment period; and

(k) after all deposits are made in accordance with subsections (a) through (j) above, any remaining moneys shall be deposited in the Ramp-Up Reserve Account.

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The following chart depicts the flow of funds under the Trust Agreement, including the flow of funds of the State Appropriated Revenues under the State Appropriation Trust Agreement.



**Notes:**

**1** Includes TIFIA Bond after Bankruptcy Related Event occurs

**2** Includes TIFIA Bond unless Bankruptcy Related Event occurs

**3** Funding at closing at \$25 million. Beginning 5 years after the Substantial Completion Date, any amounts remaining from the initial \$25 million deposit will be transferred to the Unpledged Account; other funds may be released to the Pledged Account upon meeting covenant and coverage conditions

**4** Funds may be used for Guarantee Repayments, Additional Projects and, in the case of the Unpledged Account, any other legal purpose of the Authority

**TIFIA Indebtedness Upon Occurrence of Bankruptcy Related Event**

In the case of the occurrence and continuance of a Bankruptcy Related Event with respect to the Authority, all TIFIA Indebtedness shall automatically and without notice be deemed to constitute Senior Lien Parity Debt, and the Holder of such TIFIA Indebtedness shall be entitled to all rights of a Holder of Senior Lien Parity Debt, except that the Holders of TIFIA Indebtedness shall have no rights in, or claim to, any amounts held in the Senior Lien Reserve Fund or any Separate Reserve Fund. A Bankruptcy Related Event with respect to the Authority is defined in the Trust Agreement and the TIFIA Loan Agreement to include voluntary and involuntary proceedings with respect to the Authority under any Insolvency Law, failure by the Authority generally to pay its debts with respect to the Monroe Expressway as they become due, and failure by the Authority to make two (2) consecutive payments on the TIFIA Bond in accordance with the TIFIA Loan Agreement.

## **Rate Covenant**

Under the Trust Agreement, the Authority has covenanted as follows:

(i) to fix, charge and collect tolls, fees, rentals and other charges for the use of and for services furnished or to be furnished by the Monroe Expressway, and that from time to time and as often as it shall appear necessary, to revise such tolls, fees, rentals and other charges as may be necessary or appropriate, in order that for each Fiscal Year, beginning with the first full Fiscal Year in which the Project is in operation, the Revenues in such Fiscal Year will be not less than 130% of the Long-Term Debt Service Requirement for Senior Lien Indebtedness only for such Fiscal Year; and

(ii) to fix, charge and collect tolls, fees, rentals and other charges for the use of and for services furnished or to be furnished by the Monroe Expressway, and that from time to time and as often as it shall appear necessary, to revise such tolls, fees, rentals and other charges as may be necessary or appropriate, in order that for each Fiscal Year, beginning with the first full Fiscal Year in which the Project is in operation, the Revenues in such Fiscal Year will be not less than 110% of the Long-Term Debt Service Requirement for Parity Debt for such Fiscal Year.

The Authority also covenants to fix, charge and collect tolls, fees, rentals and other charges so that the Revenues will be sufficient in each fiscal year to make all the deposits to the various funds described above. The Trust Agreement contains certain additional provisions regarding the Authority's covenants as to tolls. See "Definitions of Certain Terms and Summary of the Trust Agreement – Rate Covenants; Permitted Reduction of Rates" in APPENDIX B hereto for such additional details. In addition, the TIFIA Loan Agreement imposes a Senior Debt Service Coverage Ratio requiring debt service coverage for Senior Lien Indebtedness and a Total Debt Service Coverage Ratio requiring debt service coverage for both Senior Lien Indebtedness and Subordinate Lien Indebtedness that are more restrictive than the Rate Covenant contained in the Trust Agreement; such restrictions will remain in place so long as the TIFIA Bond is Outstanding.

If the rate covenant described in (i) and (ii) above (herein the "Rate Covenant") is not met, the Authority is obligated to request a Traffic Consultant to make its recommendations, if any, as to a revision of the Authority's tolls, fees, rentals and charges, its Operating Expenses or the method of operation of the Monroe Expressway in order to satisfy the Rate Covenant. The Authority is obligated under the Trust Agreement to revise its tolls, fees, rentals and charges or its Operating Expenses or alter its methods of operation, which revisions or alterations need not comply with the Traffic Consultant's recommendations but which are projected by the Authority to result in compliance with the Rate Covenant. The Authority has also adopted a Toll Rate Policy that requires the Authority to set the initial toll rate schedule for the use of the Monroe Expressway at a level that the Traffic Consultant confirms will produce the Revenues of the Monroe Expressway at least equal to the amount set forth in the Traffic and Revenue Report. Following the adoption of the initial toll rate schedule, the tolls set forth in such schedule will be increased annually by the Authority on January 1 of each year by the same percentage for each year as assumed in the Traffic and Revenue Report. See "**THE MONROE EXPRESSWAY – Toll Rate Policy**" herein.

## **Additional Parity and Subordinated Indebtedness**

Under the conditions and limitations set forth in the Trust Agreement and without the approval or consent of the Owners or Holders of Indebtedness (but with the approval of USDOT so long as the TIFIA Bond is Outstanding), the Authority may issue or incur additional Senior Lien Indebtedness and Subordinate Lien Indebtedness (collectively, "Additional Bonds") secured by a pledge, charge and lien

upon the Revenues on parity with the Series 2016 Bonds. Additional Bonds can only be issued for the purpose of refunding existing Bonds or Parity Debt, providing funds for the payment of or to complete payment of any part of the Cost of the Project or any Additional Project and to make deposits to reserve funds relating to the Project or the Additional Project.

“Additional Projects” are limited to additions, acquisitions, improvements, extensions or equipping of or relating to either the Project or any previous Additional Project that has become part of the Monroe Expressway, provided an Additional Project must either be a NCDOT project identified on the 2016-2025 State Transportation Improvement Plan as I-5507, I-5718, U-2509 and U-5536a, or connect directly to or be adjacent to the then existing System, or be located within the geographic boundaries of Division 10 of NCDOT and have received the consent of the TIFIA Lender to be designated an Additional Project. For any Additional Project, the Authority Board must determine, based on forecasts of Revenues and Operating Expenses for the System after completion of the Additional Project by the Traffic Consultant and General Engineering Consultant, respectively, that the Additional Project will not result in a lower Total Debt Service Coverage Ratio or a lower TIFIA Loan Life Coverage Ratio through the final maturity date for the TIFIA Bond. See APPENDIX B – “Definitions of Certain Terms and Summary of the Trust Agreement.”

Prior to incurrence of any Long-Term Indebtedness constituting Senior-Lien Indebtedness, the Authority shall deliver to the Trustee:

- (i) an Officer’s Certificate certifying that the Authority was in compliance with its rate covenant as described above for the most recent Fiscal Year for which audited financial statements are available;
- (ii) a report of a Traffic Consultant stating that for each Fiscal Year next succeeding the date on which such Long-Term Indebtedness is incurred through the final maturity date of any Long-Term Indebtedness, the forecasted Revenues in each such Fiscal Year is at least 140% of the Long-Term Debt Service Requirement with respect to all Outstanding Long-Term Indebtedness constituting Senior Lien Indebtedness (excluding any Long-Term Indebtedness constituting Senior Lien Indebtedness to be refunded by the Long-Term Indebtedness to be incurred) and the Long-Term Indebtedness proposed to be incurred;
- (iii) a report of a Traffic Consultant stating that for each Fiscal Year next succeeding the date on which such Long-Term Indebtedness is incurred through the final maturity date of any Long-Term Indebtedness, the forecasted Revenues is at least 130% of the sum of the Long-Term Debt Service Requirement with respect to all Outstanding Parity Debt in such Fiscal Year;
- (iv) a report of a Traffic Consultant showing that for each Fiscal Year next succeeding the date on which such Long-Term Indebtedness is incurred through the final maturity date of any Long-Term Indebtedness, the forecasted Revenues in each Fiscal Year will be sufficient to make all of the deposits in each such Fiscal Year required under the Trust Agreement as described in paragraphs (a) through (m) under “--Application of Revenues” above; and
- (v) evidence that such Senior Lien Indebtedness will be rated at an investment grade rating by Fitch, Moody’s or S&P.

The Trust Agreement contains provisions setting forth additional requirements for the issuance of Senior Lien Indebtedness and additional conditions under which Senior Lien Indebtedness may be incurred in order to complete the Project or any Additional Project or to refund Outstanding Long Term Indebtedness or in certain other circumstances. So long as the TIFIA Bond is outstanding, no

Indebtedness secured by Revenues or any assets of the Monroe Expressway can be issued without the consent of USDOT. See “Definitions of Certain Terms and Summary of the Trust Agreement – Limitation on Senior Lien Indebtedness” in APPENDIX B hereto for such additional details.

Under the conditions and limitations set forth in the Trust Agreement and without the approval or consent of the Owners or Holders of Senior Lien Indebtedness, but with the consent of USDOT so long as the TIFIA Bond is Outstanding, the Authority may issue or incur Subordinate Lien Indebtedness secured by a pledge, charge and lien upon Revenues subordinate to the payment of Senior Lien Indebtedness. In addition, subject to the approval of USDOT so long as the TIFIA Bond is outstanding, the Authority may incur Derivative Indebtedness that is either Senior Lien Indebtedness or Subordinate Lien Indebtedness without complying with the requirements set forth above. See “Definitions of Certain Terms and Summary of the Trust Agreement – Limitation on Subordinate Lien Indebtedness” in APPENDIX B hereto. The Authority does not anticipate issuing any Subordinate Lien Indebtedness.

## AMENDMENT AND RESTATEMENT OF THE ORIGINAL TRUST AGREEMENT

The Original Trust Agreement provides that it may be amended upon agreement by the Authority and the Trustee with the consent of all holders of all obligations issued thereunder. In connection with the execution and delivery of the Series 2016 Bonds, the Authority and the Trustee have agreed to enter into the Trust Agreement to amend and restate the Original Trust Agreement so that the lien on the Revenues will relate back to the date of the Original Trust Agreement and the issuance of the 2011 Bonds. **By purchasing the Series 2016 Bonds, the holders thereof will be deemed to have consented to the amendment and restatement of the Original Trust Agreement as provided in the Trust Agreement.** See “Definitions of Certain Terms and Summary of the Trust Agreement” in APPENDIX B hereto.

## THE MONROE EXPRESSWAY

### General

The “Monroe Expressway” will extend for approximately 19.73 miles from U.S. Highway 74 at Interstate 485 in Mecklenburg County, North Carolina near the Town of Matthews, to U.S. Highway 74 between the Towns of Wingate and Marshville in Union County, North Carolina (of which approximately 18 miles will be tolled). With the Monroe Expressway in place, travelers would have a limited access, four-lane, high-grade facility from U.S. 74 at I-485 to U.S. 74 near Marshville, North Carolina, providing an alternate and time saving route for travelers who are currently taking U.S. Highway 74 through the City of Monroe and several other communities.

The map set forth on page (i) hereof shows the route of the Monroe Expressway and the surrounding area.

The Monroe Expressway will follow a generally northwest-southeast orientation parallel to U.S. 74. The availability of this road will significantly improve travel between Union County, which, according to the latest United States census data, was the fastest growing county in North Carolina between 2000 and 2010, and Mecklenburg County and the City of Charlotte, which is the economic hub of the region.

The Monroe Expressway will have six full and two partial interchanges, including the entry point at a partial interchange with existing US Highway 74 approximately 1.5 miles southeast of Interstate 485 in Stallings; the interchange at Indian Trail-Fairview Road (SR 1520) in Hemby Bridge; the interchange with Unionville-Indian Trail Road (SR 1367) in Indian Trail; the interchange with North Rocky River Road (SR 1514) in Indian Trail; the interchange with U.S. Highway 601 in Unionville; the interchange



with N.C. Highway 200 (also known as Morgan Mill Road) in Monroe; the interchange with Austin Chaney Road (SR 1758) in Wingate; and the entry point from U.S. Highway 74 between Marshville and Wingate. Approximately one mile of existing U.S. Highway 74 from Interstate 485 up to the partial interchange will be improved to consist of an elevated freeway with compressed interchanges and adjacent service roads. This portion will not be tolled. Mainline tolling will begin just past the entry point and before the first full interchange. Construction of the Monroe Expressway began in May, 2015, and it is expected to be in service as a toll road by December, 2018.

On October 28, 2010, the Authority opened bids for the Monroe Expressway highway design-build project. Monroe Bypass Constructors, LLC, a joint venture of United Infrastructure Group, Anderson Columbia Company and Boggs Paving, was the successful proposer for the design and construction of the Monroe Expressway with a bid amount of \$367,700,000. This contract is referred to herein as the “Design-Build Contract” and the contracting party thereunder is herein referred to as the “Design-Build Contractor.” Additional information regarding the Design-Build Contract is included in APPENDIX D – GEC REPORT to this Official Statement.

As of September 30, 2016, the Design-Build Contract, including change orders, supplemental agreements, and claims, is valued as \$453.5 million. Overall, the construction of Monroe Expressway is approximately 62% complete, with the Design-Build Contractor having billed \$280 million. Construction activities that are more than 50% complete include clearing, erosion control, drainage, earthwork, bridges, culverts, and walls. The remaining items that are less than 50% complete include pavement and markings, concrete barrier, permanent seeding, intelligent transportation system (“ITS”) and toll infrastructure, and signage.

### **Right-of-Way Acquisition**

As of November 14, 2016, the NCDOT has right-of-entry to all 471 parcels impacted by the Monroe Expressway corridor. Acquisition of all right-of-way is in accordance with established NCDOT and Federal Highway Administration (“FHWA”) policies and procedures as outlined in the NCDOT Right-of-Way Manual. All acquisitions have been and will be in accordance with the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (“Uniform Act”) and all applicable statutes of the State of North Carolina.

There are 471 parcels impacted by the corridor. The Authority has engaged four professional services firms with experience in right-of-way acquisitions, relocations and related services to manage and perform the right-of-way acquisition process for the Authority. As of November 14, 2016, right-of-way and easement acquisition for the Monroe Expressway is complete. 362 parcels have been settled, and 109 parcels have been filed for condemnation. The Authority Act vests in the Authority the same powers of eminent domain to obtain property required for its purposes as are vested in the NCDOT. These powers include a “quick take” power to acquire title immediately upon the filing of a condemnation action and deposit of the applicable fees with the court. Under this statutory authority, the owner of the condemned property may challenge the fairness of the price paid, but not the taking.

The Authority will settle the remaining condemnation cases with proceeds of the State Appropriation Bonds, the TIFIA Loan and the Series 2016 Bonds.

### **Construction of the Project**

The Design-Build Contract provides that the Design-Build Contractor will design and construct the project in accordance with the route for the highway designated by the Authority. The Design-Build Contractor is required to design the project in accordance with the project contract documents that include

the Request for Proposals (the “Construction RFP”) and all standard drawings, details and specifications that are referred to therein. The design is required to conform to Federal Highway Administration and American Association of State Highway and Transportation Officials (“AASHTO”) guidelines.

The Design-Build Contract provides for a bonus of \$3,000,000 if substantial completion (as defined in the Design-Build Contract), including toll integration, of the Monroe Expressway is achieved on schedule. The Design-Build Contract also provides that the Design-Build Contractor will be liable for liquidated damages in the amount of \$25,000 per calendar day for each day of delay in achieving substantial completion and \$10,000 per calendar day for each day of delay in achieving final completion of the Monroe Expressway.

A summary of the project budget for Monroe Expressway is set forth below under the caption “GEC REPORT.”

### **Project Cost Contingencies**

The Design-Build Contract is a fixed fee, lump sum contract that limits the Authority’s exposure on the majority of risk elements for design and construction of the corridor. However, contingencies are still included in the Plan of Finance to ensure that any reasonably possible issues that arise are accounted for. Contingency funds have been specifically set aside for construction change orders, diesel fuel price adjustments, asphalt cement price adjustments, an on-time completion bonus, and miscellaneous project costs. There is also a significant contingency embedded within the right-of-way budget that allows for condemned parcels, on average, to settle for two times the appraised value.

The change order contingency was budgeted at \$26.6 million, or approximately 7% of the construction cost of the Project. As of September 2016, there are executed change orders valued at \$4.38 million; additional change orders are expected to continue throughout construction.

Provisions have been included in the Design-Build Contract for price adjustments for asphalt cement and diesel fuel. These items have price adjustment clauses due to the current volatility in the marketplace, to ensure that the Authority does not pay exorbitant amounts in bid contingencies, and to balance the risk to the Design-Build Contractor. When the price of these materials drops from a base price index as provided in the Construction RFP, NCDOT reduces payments to the Design-Build Contractor according to a quantity-based formula. If the prices rise above the base prices noted in the Construction RFP, the Authority will draw from its contingency pool to pay additional compensation. In order to mitigate a portion of the risk associated with rising fuel prices, the Authority purchased a diesel fuel hedge which caps the cost of diesel fuel. The premium for the hedge was \$322,839. Savings from the hedge have freed up funds estimated between \$4,400,000 and \$5,200,000 from the diesel fuel reserve fund under the Design-Build Contract that can be used for other purposes. Because the prices of diesel fuel and asphalt cement have been lower than the base prices during the first fifteen months of construction, NCDOT has been able to reduce payments to the Design-Build Contractor by almost \$800,000. The reserve funds for these adjustments remain in the project budget, at \$5.8 million for diesel and \$8.0 million for asphalt cement.

A miscellaneous project contingency of approximately 2.5% of the total project cost was included in the project budget to cover unforeseen circumstances. As of September 2016, the reserve fund for these costs has not been utilized. The following table outlines the contingencies included in the capital cost budget and the overall Plan of Finance:

Project Element	Current Estimate (\$M)	Contingency (\$M)	Budgeted Cost (\$M)
Highway Design-Build Contract	\$ 449.12		\$ 449.12
Change Orders	\$ 4.38	\$ 22.19	\$ 26.57
Construction Engineering & Inspection	\$ 18.18		\$ 18.18
Diesel Fuel Reserve Account		\$ 5.83	\$ 5.83
Asphalt Cement Reserve Account		\$ 8.05	\$ 8.05
Stipends	\$ 0.50		\$ 0.50
Incentives		\$ 3.00	\$ 3.00
Toll Integration	\$ 23.95		\$ 23.95
Right of Way Acquisition	\$ 147.27		\$ 147.27
Utility Relocation	\$ 4.76		\$ 4.76
Landscaping	\$ 5.91		\$ 5.91
NCDOT Labor and Administration	\$ 19.06		\$ 19.06
Marketing & Outreach	\$ 3.43		\$ 3.43
Miscellaneous Project Costs		\$ 15.23	\$ 15.23
<b>Total</b>	<b>\$ 676.56</b>	<b>\$ 54.31</b>	<b>\$ 730.87</b>

The Authority believes that it has set aside reasonable budgets for various project elements, along with adequate contingency funds. All contingency funds are fluid, and can be reallocated to those areas that might experience cost overruns. Similarly, cost savings realized from underruns are able to be applied to other items as needed. Amounts available in any contingency line item that are not used for that line item will be available to pay other Project costs.

### Description of the Design-Build Contractor

The successful Design-Build Contract proposer on the Monroe Expressway was Monroe Bypass Constructors, a joint venture of United Infrastructure, Anderson Columbia and Boggs Paving (the “Design-Build Contractor”). Headquartered in South Carolina, United Infrastructure was founded in 1926 and specializes in bridge and highway construction projects in the southeastern United States. United Infrastructure is the managing partner with 33.34% interest in the joint venture. Anderson Columbia was founded in 1958 as a local contractor in Florida, and has expanded its highway and bridge construction to several states in the Southeast. Boggs Paving was founded in 1994 in Monroe, North Carolina with an emphasis on asphalt paving. At the time of project award, the joint venture collectively had 151 years of highway and bridge construction experience, including 24 completed design-build project valued at more than \$1.5 billion. In addition, the joint venture had significant assets available to be deployed for the Project, including three asphalt plants, one rock quarry, one sand mine, two portable concrete plants, one cement mill within reasonable rail distance, three borrow pits near or adjacent to the project site, one equipment maintenance facility within 36 miles of the project, and an fleet of construction equipment including 70 cranes, 88 excavators, and 33 asphalt pavers.

Rummel, Klepper & Kahl (“RK&K”) is the lead design firm for the Monroe Expressway. Founded in 1923, RK&K provides multi-discipline planning, engineering, environmental, and

construction phase services to NCDOT and other public and private sector clients along the eastern seaboard. RK&K has specific experience with North Carolina toll roads, having served as the lead design firm for the Triangle Parkway, the first phase of the larger Triangle Expressway project. The Triangle Parkway is the first modern toll road in North Carolina.

### **Payment and Performance Bonds**

The Design-Build Contractor was required to provide a payment and performance bond equal to the Design-Build Contract amount, which was \$367,700,000 at the time of project award in November 2011. The performance bond secures the Design-Build Contractor's agreement to construct the Project in accordance with the terms and conditions of the Design-Build Contract, and within the time allowed. Although the original Design-Build Contract has been supplemented and is now valued at \$453.5 million, the payment and performance bond is more than adequate to cover the \$172.7 million in work remaining under the Design-Build Contract. The payment bond protects the laborers, material suppliers and subcontractors against non-payment. Liberty Mutual Insurance Company is serving as the surety for the bonds. The claims paying ability of Liberty Mutual Insurance Company is rated "A" by A.M. Best Company.

### **Warranty**

The Design-Build Contractor is also required to provide a three year warranty on its work, beginning at substantial completion of the Project. The warranty begins after acceptance of the Project at substantial completion, with specific warranty criteria for asphalt pavement and bridge components. The Design-Build Contractor must furnish a warranty bond in the amount of 5% of the total cost of the Design-Build Contract (\$22.7 million) to guarantee that the contract warranty requirements will be satisfied.

### **Liquidated Damages and Incentive Bonuses**

Liquidated damages will be assessable from the Design-Build Contractor for failure to perform within the Design-Build Contract time requirements. In particular, the Design-Build Contractor will be liable for liquidated damages in the amount of \$25,000 per calendar day for each day of delay in achieving substantial completion beyond the projected substantial completion date of November 27, 2018. In addition, if the Design-Build Contractor does not achieve final completion by May 28, 2019, liquidated damages in the amount of \$10,000 per calendar day for each day of delay will be due. Liquidated damages in the amount of \$15,000 per day will be assessed if the Design-Build Contractor does not achieve ITS integration by July 31, 2018. These liquidated damage provisions provide an additional layer of performance protection in the Design-Build Contract. The amount of liquidated damages included in the Design-Build Contract for delay is unlimited.

The Design-Build Contract includes significant incentives for the Design-Build Contractor to meet certain schedule milestones. In the event that substantial completion is achieved by the negotiated completion date (assuming a date no later than November 27, 2018), and toll collection and enforcement technology is fully implemented, a bonus of \$3 million will be paid to the Design-Build Contractor. If the substantial completion date is met, but the toll integrator has not yet completed installation of the toll system, then the Design-Build Contractor will receive a completion bonus of \$2 million. The goal of this tiered completion bonus is to encourage cooperation between the Design-Build Contractor and the toll integrator.

The following table outlines the incentive bonuses and liquidated damage provisions that apply to the Design-Build Contract, based on a Substantial Completion Date of November 27, 2018:

Item	Incentive if Met	Liquidated Damages if Not Met
Substantial Completion Date including Toll Integration	\$3.0 million bonus to Design-Build Team	\$25,000/day
Substantial Complete Date, without Toll Integration	\$2.0 million bonus to Design-Build Team	\$25,000/day
Roadside Toll Collection System (RTCS) by Substantial Completion Date	\$100,000 to RTCS vendor	\$5,000/day
Final Completion Date	N/A	\$10,000/day
Completion of ORT infrastructure and ITS devices by July 31, 2018	N/A	\$15,000/day
Road and lane closures in excess of those permitted in RFP	N/A	Varies by roadway from \$1,000/hour to \$10,000/hour
Environmental Excellence: No Immediate Corrective Actions (ICA) No Continuances of Immediate Corrective Actions (CICA) No Notices of Violation (NOV) No Cease and Desist Orders (C&D)	\$150,000	\$50,000 forfeiture per ICA or CICA \$150,000 forfeiture per NOV or C&D \$12,500 liquidated damages per each follow-up violation

### Insurance Coverage

The Design-Build Contractor for the Monroe Expressway will be required to provide limited amounts of insurance coverage during construction including workers compensation insurance in the amount required by law. Additionally, commercial general liability insurance coverage (including bodily injury, property damage, personal injury and advertising injury), umbrella excess liability coverage, business automobile liability insurance, pollution liability insurance, builders risk insurance are expected to meet or exceed limits required by law, licensing requirements, by the respective surety and/or good business practice. Railroad Protective Liability Insurance for Bodily Injury Liability, Property Damage Liability, and Physical Damage to Property in the amount of \$5,000,000 per occurrence and \$10,000,000 in aggregate coverage per annum is required by the Design-Build Contract. General liability insurance in the amount of \$1,000,000 per occurrence is required by the Professional Engineering Firm prequalification process utilized by the Authority.

## **Status of Permitting**

All major environmental permits and other permits necessary for the construction of the Monroe Expressway have been obtained. While several permits are being modified or amended during construction, such amendments have not resulted in any change in the schedule for Substantial Completion of the Monroe Expressway.

## **Open Road Tolling**

The Authority intends to utilize an all-electronic, non-stop “open road” tolling system for the Monroe Expressway under which there will be no typical toll plazas at which drivers stop and pay cash tolls, but rather free flow “toll zones”, where vehicles will be detected while traveling at highway speeds. All drivers will be welcome to use the Monroe Expressway. Regular customers may pay their tolls by means of a pre-paid transponder based account. Customers using the Monroe Expressway that do not have a transponder will be detected at the toll zones and an image of their license plate will be captured. These customers can pay their tolls by establishing a pre-paid video based account or through a billing process known as Bill-by-Mail (“BBM”). BBM customers will be able to make their payments at service centers throughout the State.

Tolling zones will be located between each interchange across the Monroe Expressway to ensure that all users pay a toll regardless of their entry and exit locations. Under this tolling concept, motorists using the Monroe Expressway from “end to end” would pass through seven mainline tolling zones without having to stop to pay tolls.

## **Selection of Toll Collection System Technology**

Roadside Toll Collection System. The Roadside Toll Collection System (“RTCS”) is the system for detecting use of the roadway, and capturing transactions through license plate images with multiple levels of optical character recognition/automated license plate recognition (“OCR/ALPR”) capabilities. The Roadside Toll Collection System will be a fully automated, multi-lane, free-flow system, specifically designed for high-speed accurate video tolling with strict video and automatic vehicle license plate reading performance requirements. It will include fully automated toll zone plazas, toll facilities host and database.

The Authority is underway with the procurement of the Roadside Toll Collection System for the Monroe Expressway through a request for proposals process that will enable competitive selection of a qualified firm to provide the RTCS. The procurement is designed to allow for extensive testing and trials before the Monroe Expressway is open to toll traffic and revenue collection begins.

Technical proposals and price proposals were received by the Authority on July 11, 2016. The proposals provide a detailed response on how the proposed provider’s solution will comply with the system specifications and the operational and functional requirements outlined in the request for proposals. Following evaluation of these proposals, the Authority shortlisted firms and invited them for oral presentations. Based on the initial proposals received, including pricing details, and information obtained during the oral presentations, the Authority is developing a final ranking and expects to award a contract to the selected vendor in the first quarter of 2017.

Electronic Toll Collection System. The Authority will procure an Electronic Toll Collection (“ETC”) system consisting of the most-current proven transponder and reader/antenna technology. The ETC procurement request for proposals was released in August, 2016. In the request for proposals, the Authority solicited written technical and price proposals that will comply with the system specifications

and the operational and functional requirements. The contract for the ETC system is expected to be awarded to the successful proposer in the first quarter of 2017.

Components of the ETC system will facilitate All Electronic Tolling (“AET”) by processing transponder reads at all speeds, effectively communicating transactions, and assigning reads to the proper vehicles. Further, as part of the ETC Contractor’s responsibilities, it will work directly with the Authority to plan for the ETC system’s maintenance and transponder marketing support.

The selected ETC Contractor will coordinate with the Roadside Toll Collection System contractor to ensure seamless and accurate operation with and within the RTCS. Moreover, the ETC contractor will interface with the Back Office System contractor through the transponder reader for automatic input of the transponders into a transponder inventory application and customer accounts.

During the design, development, and implementation of the ETC system the Authority’s toll management team and toll technology consultants will manage project coordination. The ETC system as a whole will be tested and the transponder technology advertised several months before transponders are made available for purchase by the general public.

Back Office System. The Back Office System will process the roadside toll transactions and post these transactions to the transponder and video based accounts. The Back Office System will include the system host, data bases, and the video processing for customers without registered pre-paid accounts. The Back Office System will interface to payment systems and commercial establishments and be designed to grow into the North Carolina statewide toll clearinghouse as future Authority toll projects come on line.

In connection with the construction of the Triangle Expressway, the Authority underwent a procurement process for the selection of a vendor for the Back Office System for that project. At the completion of the procurement process, the Authority awarded the contract for the Back Office System to Xerox in December, 2009. The Authority has determined to use the same Bank Office System for the Monroe Expressway. A change order to the contract between the Authority and Xerox will be executed to incorporate the provision of the Back Office System for the Monroe Expressway.

Operation Services. The Operation Services contractor will provide for the operations of the customer service center. Such contractor will provide customer service, account management, and traffic management center staffing. This will include operational service for the call center, walk-in counters, mail and e-mail processing, transponder inventory control, and all other activities involving BOS processes.

In connection with the construction of the Triangle Expressway, the Authority underwent a procurement process for the selection of the Operation Services vendor for the Triangle Expressway and awarded the contract for such services to AECOM. The Authority has designated AECOM to also provide the Operation Services for the Monroe Expressway. The Operation Services contract entered into between the Authority and AECOM will be amended to incorporate the provision of services by AECOM for the Monroe Expressway.

Implementation of Toll Collection System Technology. After the award of the contracts for the various components of the toll collection system technology, the Authority toll management team and toll technology consultants will manage the design, development, and implementation of the toll systems and services. The contracts will tie to incentives in the Design-Build Contract for on-time completion. The toll program is scheduled to be ready for testing and toll account advertising/solicitation several months before the beginning of toll operations.

## **Intelligent Transportation System**

The Intelligent Transportation System (“ITS”) for the Monroe Expressway is being designed and constructed by the Design-Build Contractor for the Project. The ITS will provide video and data sharing with the Authority, NCDOT, and Monroe Expressway users.

The Intelligent Transportation System will consist of roadside devices including closed circuit television (“CCTV”) cameras, vehicle detection stations, full-matrix dynamic message signs (“DMS”) and a roadside weather information system (“RWIS”). The Design-Build Contractor will also design and construct a 38-mile fiber-optic communications system using Gigabit Ethernet technology for both the toll collection system and the Intelligent Transportation System.

The Authority currently has traffic management workstations and office space allocated in the North Carolina Traffic Operations Center located in the National Guard Joint Headquarters Building in Raleigh. A small local traffic management center (“TMC”) will also be equipped for the Authority in a Customer Service Center facility near the Monroe Expressway that will be identified and procured through the toll collection system project. This TMC will serve as a location for the Authority to monitor traffic conditions on the Monroe Expressway from the Customer Service Center location.

## **Toll Collection Enforcement**

The Authority will maintain a Customer Service Center in the vicinity of Monroe Expressway for customers to pay tolls with cash if they do not have a pre-paid transponder or video based account.

If a customer uses the Monroe Expressway and a toll is not paid within 30 days after the travel occurs, the Authority will send a bill to the registered owner of the motor vehicle for the amount of the unpaid toll. A person who receives a bill for an unpaid toll must either pay the bill or request a review of the bill by the Authority. If the person billed does not take one of such actions within 30 days after the bill is sent, the Authority will add a processing fee to the toll amount the person owes, currently set at \$6.00, with a maximum of \$48.00 in processing fees allowed against that person in a 12-month period. A person who receives two or more bills for unpaid tolls and who does not pay the amount on these bills within 30-days is subject to a civil penalty of \$25.00. Only one civil penalty may be assessed for a six-month period. The failure of a person to pay a toll billed to the person, including any processing fee and any civil penalty, is grounds to withhold the registration renewal of a motor vehicle registered in that person’s name. When the Authority notifies the North Carolina Commissioner of Motor Vehicles of a person who owes a toll, processing fee or civil penalty, the North Carolina Commissioner of Motor Vehicles must withhold the registration renewal of any motor vehicle registered in that person’s name until the required payment is made.

If a person receiving a bill asks for a review of the bill for use of the Monroe Expressway, then the Authority is to conduct an informal review and determine whether the person is liable for the toll. If the Authority determines that the person is liable for the toll, the person may contest this determination by filing a petition for a contested case hearing at the North Carolina Office of Administrative Hearings.

Under the North Carolina constitution, amounts collected in the form of civil penalties in excess of the cost of collection are required to be paid to the school administrative unit to provide additional support for the public school system. As such, a large portion of the civil penalties the Authority collects will not be treated as Revenues under the Trust Agreement and will not be paid to the Authority. The Authority will be entitled to collect the full amount of all tolls and the processing fees, as well as recover its costs of collections.



## **Toll Rate Policy**

Pursuant to Section 136-89.183 of the North Carolina General Statutes, the Authority has the power to fix, revise, charge, retain, enforce, and collect tolls and fees for the use of Turnpike Projects, including the Monroe Expressway. On September 17, 2008, the Authority adopted a toll rate policy (the “Toll Rate Policy”) which provides guidelines pursuant to which the Authority shall establish toll rate schedules for its turnpike projects. Pursuant to the Toll Rate Policy, the Authority was required to hire the Traffic Consultant to prepare the Traffic and Revenue Report for the Monroe Expressway and forecast the projected traffic for and the toll revenues to be generated from the Monroe Expressway. In accordance with the Toll Rate Policy, prior to the opening of the Monroe Expressway, the Authority will set the initial toll rate schedule for the use of the Monroe Expressway and the Traffic Consultant will issue a report to the effect that, based upon the tolls forecasted to be collected using such toll rate schedule, the Revenues of the Monroe Expressway are forecasted to be at least equal to the amount set forth in the Traffic and Revenue Report. Following the adoption of the initial toll rate schedule, the tolls set forth in such schedule will be increased annually by the Authority on January 1 of each year by the same percentage for each year as assumed in the Traffic and Revenue Report. Under the Toll Rate Policy, such an increase in the toll rates is required in each year unless the Authority provides to the Trustee (1) a resolution of the Authority’s Board directing that the toll rates will not be increased or will be increased in a lesser amount than assumed in the Traffic and Revenue Report; (2) a certificate of an officer of the Authority to the effect that the Authority is in compliance with all applicable rate covenants in the Trust Agreement and all other documents for the bonds issued to finance the Monroe Expressway; and (3) a report of the Traffic Consultant showing that for each succeeding fiscal year through the final maturity date for all indebtedness issued to finance the Monroe Expressway, the forecasted Revenues in each such fiscal year would be such that one dollar of additional senior lien indebtedness could be issued by the Authority in compliance with the requirements of the additional debt limitations set forth in the documents related to all bonds issued to finance the Monroe Expressway. See Table 6.5 in the Traffic and Revenue Report attached hereto as APPENDIX C for the assumed annual rate increases for the Monroe Expressway.

The Authority has followed the Toll Rate Policy described above in setting the toll rates for the Triangle Expressway, and expects to follow the same policy in setting the toll rates for the Monroe Expressway. In addition, so long as the TIFIA Bond is Outstanding, beginning on the Substantial Completion Date, the TIFIA Loan Agreement obligates the Authority to fix, charge and collect tolls, fees, rentals and other charges for the use of, and for services furnished by, the Monroe Expressway (including revising such tolls, fees, rentals and other charges as may be necessary or appropriate), such that toll rates will not be less than the rates assumed in the Traffic and Revenue Study, and imposes tighter restrictions on the Authority’s ability to increase those rates by a lesser amount than those set forth in the Toll Rate Policy.

## **Maintenance of the Project**

Routine maintenance costs include recurring and routine maintenance activities associated with the highway, such as mowing, snow and litter removal, guardrail and signing maintenance, and regular repairs to the pavement structure. Similar to the model used for Triangle Expressway, NCDOT Division 10 will have overall responsibility for the routine maintenance of the Monroe Expressway, and will be responsible for ensuring its safe and efficient operation. The maintenance activities will be performed through a combination of in-house and subcontracted vendors and suppliers. Maintenance will be performed to standards defined in the Authority’s proposed maintenance rating program guidelines, standard operating procedures for roadway elements, and NCDOT performance standards, and will utilize criteria used to measure compliance. Maintenance will be paid for by the Authority out of the Operations and Maintenance Expense Fund.

## **Litigation**

In November 2010, a lawsuit was filed by the Southern Environmental Law Center (“SELC”) in federal court challenging the environmental documentation for the Monroe Expressway. The NCDOT prevailed in the initial lawsuit filed by the SELC in the United States District Court in the opinion published on October 24, 2011; however, SELC filed an appeal to the U.S. Court of Appeals for the Fourth Circuit, and a three-judge panel of the court in May 2012 overturned the lower court decision. Following the Court of Appeal’s ruling against the NCDOT and FHWA, standard right-of-way acquisition and work by the Design-Build Contractor was suspended while additional environmental studies were conducted. Following these studies, the Record of Decision for the Monroe Expressway was signed by FHWA and NCDOT on May 15, 2014, and work on final designs and right-of-way acquisition resumed. On June 23, 2014, SELC again filed suit in United States District Court, challenging the NCDOT and FHWA’s NEPA documentation prepared for the Project. On May 14, 2015, the SELC filed a motion for a temporary restraining order and preliminary injunction in the United States District Court, asking the court to enjoin NCDOT and FHWA from all construction activities to preserve the status quo while the merits of the June 2014 case were considered. On September 10, 2015, the U.S. District Court denied SELC’s motions for summary judgment, temporary restraining order, preliminary injunction, and motion for a hearing. SELC filed a notice of appeal to the Fourth U.S. Circuit Court of Appeals on September 15, 2015. Oral arguments were held on May 12, 2016. On June 9, 2016, the U.S. Court of Appeals for the 4th Circuit ruled in favor of NCDOT/FHWA by holding that the agencies’ environmental study was valid and did not violate any laws. The Plaintiffs did not seek additional appeals within the allowable 90 days. In addition, in July 2015, NCDOT and SELC entered into a settlement agreement regarding the Clean Water Act permit needed for the Project. Under the terms of the agreement, NCDOT has satisfied that settlement by depositing \$850,000 with the Catawba Lands Conservancy, which will use the money to purchase land in Union County for conservation. In return, the SELC is prohibited from filing new lawsuits against the Project.

There is no other pending, or to the Authority’s knowledge, threatened, litigation challenging the construction of the Project.

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## TRAFFIC AND REVENUE REPORT

The Traffic Consultant has prepared the Traffic and Revenue Report (the “Traffic and Revenue Report”) attached hereto as APPENDIX C, which sets forth the estimated traffic and revenue for the Monroe Expressway. The Traffic and Revenue Report has been prepared on the basis of numerous assumptions and other factors described in the Traffic and Revenue Report, and should be read in its entirety and in light of such assumptions and other factors.

*Assumptions.* The traffic and revenue estimates for the Monroe Expressway are predicated on the following basic assumptions, which are considered reasonable for purposes of the base case forecast:

1. The Monroe Expressway, in its entirety, will open to traffic on January 1, 2019.
2. The configuration, number of lanes, and number of access points on the Monroe Expressway will not change during the forecast period.
3. Tolls would be charged for three vehicle classes and two payment types and will be increased annually (see “THE MONROE EXPRESSWAY – Toll Rate Policy” herein). The toll rates and tolling zone locations are shown in Table 6.5 and Figures 6.6 and 6.7 of the Traffic and Revenue Report.
4. No transportation improvement projects, particularly new roads, additional road capacity, or new interchanges on limited access roads will be constructed during the forecast period, other than those in the Metrolina Regional Travel Demand Model 2015 Version 1.1.
5. The annual percentage of electronic toll collection (“ETC”) transactions and Bill by Mail (“BBM”) transactions will match the assumed market shares described in the Traffic and Revenue Report.
6. Economic growth in the project study area by traffic analysis zones will occur as forecast by the independent economist.
7. Revenue leakage due to unreadable or uncollectible ETC or BBM transactions, or any transactions that cannot be processed and payment collected, will occur. The adjustments made to gross toll revenue forecasts, to account for uncollectible toll revenue, are based on actual experience on the Triangle Expressway. If actual experience on the Monroe Expressway differs from the Triangle Expressway with regard to adjustments for uncollectible toll revenue, the resulting net toll revenue forecasts for Monroe Expressway will differ from those forecast in the Traffic and Revenue Report.
8. The leakage estimates contained in the Traffic and Revenue Report are dependent upon the selection of appropriate toll collection technology and the adoption of business rules and enforcement procedures designed to minimize the loss of revenue.
9. Annual inflation rates will average 2.5 percent per year between 2015 and 2019, 2.3 percent between 2019 and 2025, and 2.1 percent after 2025.
10. The Monroe Expressway will be well maintained, efficiently operated, effectively signed, and promoted to encourage maximum usage and to reach the assumed percentage goals for ETC usage.
11. Motor fuel will remain in adequate supply throughout the forecast period.
12. No national or regional emergency will arise that would abnormally restrict the use of motor vehicles.

*Study Process.* Following is a summary of the study process used in developing the Traffic and Revenue Report:

A comprehensive work program was developed to meet the specific objectives of the study. In general, the study was comprised of five major efforts:

1. Data collection and summarization;
2. Corridor growth analyses;
3. Model refinement and calibration;
4. Traffic and toll revenue analysis, and
5. Traffic and toll revenue sensitivity tests.

Data collection included obtaining available traffic counts from the NCDOT and conducting seven-day vehicle classification counts at 13 locations in the study area. An automatic license plate recognition (“ALPR”) survey was also conducted to aid in identifying trip distances primarily on US 74. One year of recent travel speed data was obtained for study-area roads from RITIS.org (“INRIX data”). In addition, CDM Smith conducted travel time runs to validate the INRIX data. Information on current and planned roadway improvements in the study area was collected from NCDOT and various planning agencies.

The officially adopted Metrolina Regional Travel Demand Model 2015 Version 1.1 (“MRM”) was obtained from the Charlotte Department of Transportation. This model was used to develop the traffic and toll revenue forecasts for the Monroe Expressway. The model encompasses eight complete counties in the Charlotte area, including Mecklenburg and Union Counties; two partial counties in NC, and one complete and one partial county in SC. The official base year of the MRM is 2010, which incorporates 2010 US Census data. The MRM supports forecast years 2015, 2025, 2030 and 2040. Each forecast year included socioeconomic forecasts for variables such as population, number of households, and employment for geographic units called Traffic Analysis Zones.

The socioeconomic forecasts in the MRM were analyzed by an independent economist, Dr. Stephen J. Appold, who has expertise in North Carolina economic trends and forecasts. Dr. Appold reviewed the population, households, and employment assumptions for the forecast years supported by the MRM and made recommended adjustments. The adjustments were reviewed by an internal CDM Smith economist prior to accepting the adjustments. New trip tables were subsequently developed by applying the adjusted socioeconomic data to the trip generation, trip distribution, and mode choice modules of the MRM.

The MRM was reviewed in the study area to validate the accuracy of the Monroe Expressway project configuration, the size of the Traffic Analysis Zones, and the level of detail of the roadway network. Adjustments were made where necessary. Roadway improvements assumed in the model were reviewed against NCDOT current plans, and adjusted where necessary. Subsequent to the model refinement and the new trip table generation, the MRM was calibrated in the study area to 2015 existing conditions to achieve the best traffic volume assignments compared to observed traffic counts and travel speeds. In addition, the trip distance distributions acquired through the ALPR survey were used in the calibration to adjust trip distances on US 74. Changes made to the MRM for 2015 calibration were carried forward into future year networks if appropriate.

Based on the refined and calibrated 2015 MRM, a 2019 model year was created, as the Monroe Expressway is assumed to open on January 1, 2019. As part of the traffic and toll revenue analysis, a toll sensitivity analysis was conducted for the opening year (2019), to determine the optimal per mile toll rate. Once the 2019 toll rate was determined, future year toll rates were developed assuming rates would increase annually at a rate to keep pace with inflation forecasts. Rates were developed for both ETC and BBM toll collection.

Once toll rates were selected, toll diversion assignments were run on the MRM for years 2019, 2025, 2030 and 2040 to develop traffic and toll revenue estimates for the Monroe Expressway. Assignments were run for four time periods, by cars and trucks, and for ETC and BBM. The assignments incorporated estimated motorist value-of-time, vehicle operating costs, and ETC/BBM market share. Annual estimates of traffic and gross toll revenue were developed for the Base Condition from opening year 2019 through 2059. Ramp-up adjustments were applied to the first three years of operation to account for a gradual build-up of demand on the new toll facility. Annual net toll revenue forecasts were also developed by including adjustments to account for uncollectible revenue or fee revenue associated with BBM. These adjustments were based on actual experience from the Triangle Expressway, which has been in operation in North Carolina as a toll facility since January 3, 2012.

Lastly, a series of traffic and toll revenue sensitivity tests were conducted for years 2019 and 2040 to provide information on the sensitivity of the forecasts to changes in key parameters. The sensitivity analysis provides information regarding the robustness of the Base Condition forecast to changes in critical assumptions or other independent forecasts such as socioeconomic growth, motorist value of time, ETC and BBM market share, motor fuel prices, etc.

## **GEC REPORT**

The GEC has prepared the GEC's Engineering Report (the "GEC Report") attached hereto as APPENDIX D, which documents and describes the following for the Monroe Expressway:

- Authority organizational structure summary
- Monroe Expressway project technical description
- Project background and history
- Project construction and implementation
- Toll collection operations plan
- Project costs
- Cash flow projections through completion of construction of the Project
- Project implementation schedule
- Operations and maintenance and renewal and replacement program

The GEC Report has been prepared on the basis of numerous assumptions and other factors described in the GEC Report, and should be read in its entirety and in light of such assumptions and other

factors. Specifically, the GEC Report makes the following key assumptions and used the described methodology:

- The GEC Report reflects the estimated cost of the project as of June 30, 2016. At this time, the capital cost of the highway design-build contract was budgeted as \$449.4 million, which included the base contract and all approved change orders. Additionally, a contingency of \$26.2 million has been budgeted to cover future change orders.
- Design-Build Contractor bids were based on fuel and asphalt binder prices as of August 2010. In accordance with the price adjustment clauses as outlined in the Design-Build Contract, the Contractors' invoices will be adjusted either positively or negatively according to the current commodity price at the time certain construction activities occur. Contingency for price escalation of these commodities has been included in the Project budget. However, prices have dropped substantially and the Authority is realizing cost savings via negative adjustments to the Design-Build Contractors' monthly invoices. Additionally, NCDOT purchased a diesel fuel "hedge" in April 2016 to remove the risk of prices rising in the future. The purchase of the hedge served to release approximately \$5 million in Project contingency for other uses that may arise. However, the \$13.8 million contingency remains in place, although at this time it appears unlikely that these reserve funds will be fully utilized.
- The capital cost items that are not included in the Design-Build Contract include landscaping, toll system integration, right of way, dry utility relocation, construction management and oversight, and other Authority expenses such as Design-Build Contractor stipends, financial incentives for on-time completion by the Design-Build Contractor, and management reserves. In summary, these costs were estimated as follows:
  - Landscaping: One and a half percent (1.5%) of the estimated cost for the highway construction contract was set aside for landscaping along the project corridor.
  - Toll System Integration: The tolling equipment needs were based on the number and location of tolling zones assumed during project planning in 2010, as well as anticipated traffic management needs along the corridor. These costs were based on the estimated lane equipment needed, including antennas, loops, cameras for video tolling, traffic surveillance cameras, dynamic message signs, weather stations, and fiber optic communications cable.
  - Right of Way: The Authority enlisted the services of a qualified land appraisal and acquisition firm, Carolina Land Acquisitions (CLA), to prepare estimates for the acquisition of approximately 471 parcels along the corridor. CLA performed initial cost estimates for each parcel, and assumed that 60% of the parcels would settle for an average of 115% of the original appraisal amount. The remaining 40% would go to mediation or condemnation and would settle for, on average, three times the original appraisal amount. These settlement rates were based on historical trends along the corridor and within the surrounding area. During preparation of the GEC Report and the financial plan, right-of-way acquisition was well underway, with virtually all of the parcels being settled or filed for condemnation. Due to the reduced number of parcels and other economic factors, the initial right-of-way budget has been reduced by \$40 million to reflect the likely underrun.
  - Utility Relocation: The Authority enlisted the services of a qualified utility relocation firms, MA Engineering Associates., to assess the utility relocations required, coordinate with the utility owners, and prepare relocation cost estimates.

- Construction Engineering and Inspection (“CEI”): The construction engineering and inspection was originally included in the Design-Build Contractor’s scope of services. However, in May 2014, the Department opted to contract these services directly with Summit Design and Engineering Services. The design-build base contract was adjusted downward via a supplemental agreement, and a cost-plus, not-to-exceed contract with Summit for \$18.2 million was initiated.
- Construction Management and Oversight: Originally budgeted to be performed by an independent construction management consultant, this work is now being performed by NCDOT Division 10 forces. The construction management budget for these services has since been transferred to the NCDOT labor and administration budget.
- NCDOT/Authority Expenses and Reserves: Reserves include the costs of Design-Build stipends to unsuccessful proposers (\$500,000), early completion incentives for Design-Build Contractors (\$3.0 million), incentives for environmental excellence during construction (\$150,000), and construction administration and support (\$16.1 million), public education and outreach (\$3.4 million), administrative reserves (\$18.2 million).
- Operations and Maintenance (O&M) cost estimates were based on the planning level information provided by the Authority and the actual O&M costs incurred by the Triangle Expressway. The operating and maintenance budgets will be updated annually.

See “**THE MONROE EXPRESSWAY – Project Cost Contingencies**” and APPENDIX D – GEC Report – Chapter 9” for a current Project capital cost budget.

## **PROJECTED CASH FLOW AND DEBT SERVICE COVERAGE**

### **Table of Projected Revenues, Operations and Maintenance Expenses, Cash Flows and Debt Service Coverage Ratios**

The table below has been compiled by the Authority to show the projections for estimated Revenues, the debt service requirements for the Series 2016 Bonds and the TIFIA Loan, estimated debt service coverage ratios for Senior Lien Bonds and for Senior Lien Bonds and the TIFIA Loan, projected Operating Expenses, projected deposits to and expenditures from the Renewal and Replacement Fund and remaining deposits to (from) the Unpledged Account of the General Reserve Fund for each of the fiscal years ending June 30, 2017 through June 30, 2055.

Amounts in the “Total Revenue” column are derived from the “Net Toll Revenue” column of the report of the Traffic Consultant set forth in “APPENDIX C – TRAFFIC AND REVENUE REPORT – TABLE 6.14, Estimated Annual Net Toll Revenue for Monroe Expressway,” which should be read in its entirety for a description of the components of such amounts and the methodology followed in estimating these amounts. Amounts in the “Net State Appropriation” consist of the net amount of the scheduled annual State Appropriation of \$24,000,000, less the amount thereof scheduled to be used to pay debt service on the State Appropriation Bonds. Amounts in the “Series 2016 Bonds Debt Service,” “Capitalized Interest,” “Series 2016 Debt Service Fund Earnings” and “Senior Lien Debt Service” columns are estimated as of the date of the Official Statement. Amounts in the “Senior Lien Reserve Fund” column consist of the estimated future deposits to the Senior Lien Reserve Fund to meet the requirement thereof as annual debt service on the Series 2016 Bonds increases. Amounts in the “TIFIA Debt Service” column are estimated as of the date of the Official Statement. Amounts in the “Operations and Maintenance Requirement” and “Renewal and Replacement Requirement” columns are derived from the estimated Operations and Maintenance Expenses and Renewal and Replacement Fund deposits and withdrawals estimated by the GEC in the Report of the GEC. See “APPENDIX D – GEC REPORT –

Exhibit 15.” Amounts shown in the “General Reserve Deposit (Withdrawal)” column represent the surplus deposited to the General Reserve Fund following the application of Total Revenues as described above, or the amount required to be transferred from the General Reserve Fund to fund the Renewal and Replacement Fund Requirement and the Operating Reserve Fund Requirement in the event that Total Revenues are not sufficient for such purposes.

See also “RISK FACTORS – Forward-Looking Statements.”

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**Preliminary Projected Cash Flow and Debt Service Coverage**  
**(Dollars in \$000s)**

Fiscal Year	Total	Net State	Total	Series 2016	Series 2016	Series 2016	Series 2016	Series 2016	Series 2016	Series 2016	Series 2016	Net	Series 2016	Series 2016
June 30	Revenue <sup>(1)</sup>	Appropriation <sup>(2)</sup>	Revenue	Debt Service <sup>(3)</sup>	Debt Service	TIFIA Bond	TIFIA Bond	Operations and	Renewal and	TIFIA Bond	Cashflow for	Series 2016	Bonds + TIFIA	
				Fund Earnings <sup>(4)</sup>	Mandatory	Debt Service	Maintenance	Requirement <sup>(6)</sup>	Replacement	Scheduled	General Fund	DSCR <sup>(7)</sup>	DSCR <sup>(7)</sup>	
2017	-	657	657	-	50	-	50	-	-	-	757	-	-	
2018	258	697	955	-	118	-	119	-	(1,000)	-	192	-	-	
2019	8,038	693	8,731	-	177	-	179	(6,119)	(1,375)	-	1,594	-	-	
2020	18,606	692	19,298	(4,974)	237	-	238	(11,298)	(1,329)	-	2,171	-	4.07x	
2021	24,253	696	24,949	(5,969)	237	(2,428)	238	(13,727)	-	-	3,300	-	4.35x	
2022	28,304	703	29,007	(5,969)	237	(2,226)	238	(15,225)	(764)	-	5,298	-	3.76x	
2023	30,533	707	31,240	(7,109)	237	(4,871)	238	(15,922)	-	-	3,813	-	4.55x	
2024	32,135	-	32,135	(5,912)	237	(6,302)	238	(16,355)	(2,597)	-	1,443	-	2.74x	
2025	32,750	-	32,750	(5,912)	237	(6,850)	238	(16,634)	(2,990)	-	839	-	2.67x	
2026	33,856	-	33,856	(6,827)	237	(7,059)	238	(16,668)	(2,990)	-	786	-	2.52x	
2027	34,890	-	34,890	(7,027)	237	(7,288)	238	(16,786)	(3,072)	-	1,191	-	2.52x	
2028	36,020	-	36,020	(7,497)	237	(7,288)	238	(16,909)	(3,994)	-	807	-	2.52x	
2029	37,137	-	37,137	(7,542)	237	(7,692)	238	(17,031)	(4,390)	(956)	-	-	2.52x	
2030	38,020	-	38,020	(7,727)	237	(7,828)	238	(17,134)	(4,703)	(1,103)	-	-	2.52x	
2031	38,898	-	38,898	(7,862)	237	(7,893)	238	(17,228)	(422)	(5,946)	22	-	2.55x	
2032	40,013	-	40,013	(8,087)	237	(7,916)	238	(17,326)	(422)	(2,455)	4,282	-	2.58x	
2033	41,157	-	41,157	(8,312)	237	(8,025)	238	(17,428)	(4,452)	(2,346)	1,068	-	2.59x	
2034	42,365	-	42,365	(8,547)	237	(8,145)	238	(17,533)	(4,452)	(2,226)	1,937	-	2.61x	
2035	43,645	-	43,645	(8,817)	237	(8,258)	238	(17,641)	(4,452)	(2,113)	2,839	-	2.63x	
2036	44,910	-	44,910	(9,072)	237	(8,378)	238	(17,751)	(4,452)	(1,994)	3,738	-	2.65x	
2037	46,228	-	46,228	(9,312)	237	(8,523)	238	(17,865)	(4,369)	(1,849)	4,785	-	2.66x	
2038	47,706	-	47,706	(9,647)	237	(8,642)	238	(17,982)	(4,369)	(1,729)	5,811	-	2.68x	
2039	49,054	-	49,054	(9,907)	237	(8,777)	238	(18,102)	(5,077)	(1,594)	6,071	-	2.69x	
2040	50,501	-	50,501	(10,197)	237	(8,920)	238	(18,223)	(5,077)	(1,451)	7,107	-	2.71x	
2041	52,009	-	52,009	(10,537)	237	(9,037)	238	(18,336)	(5,077)	(1,334)	8,162	-	2.72x	
2042	53,373	-	53,373	(10,803)	237	(9,171)	238	(18,446)	(5,077)	(1,200)	9,150	-	2.74x	
2043	54,849	-	54,849	(11,092)	237	(9,318)	238	(18,560)	(1,047)	(1,053)	14,254	-	2.75x	
2044	56,405	-	56,405	(11,400)	237	(9,478)	238	(18,676)	(1,047)	(893)	15,386	-	2.76x	
2045	58,029	-	58,029	(11,744)	237	(9,636)	238	(18,793)	(5,517)	(735)	12,080	-	2.78x	
2046	59,620	-	59,620	(12,090)	237	(9,788)	238	(18,895)	(5,517)	(583)	13,221	-	2.79x	
2047	61,140	-	61,140	(12,398)	237	(9,957)	238	(18,989)	(5,517)	(414)	14,340	-	2.79x	
2048	62,714	-	62,714	(12,711)	237	(10,153)	238	(19,085)	(5,517)	(218)	15,505	-	2.80x	
2049	64,358	-	64,358	(13,059)	237	(10,371)	238	(19,183)	(4,470)	-	17,749	-	2.80x	
2050	65,967	-	65,967	(13,728)	237	(10,371)	238	(19,284)	(4,470)	-	18,588	-	2.79x	
2051	67,595	-	67,595	(13,985)	237	(10,371)	238	(19,384)	(4,470)	-	19,860	-	2.83x	
2052	69,368	-	69,368	(14,027)	237	(10,371)	238	(19,484)	(4,470)	-	21,491	-	2.90x	
2053	71,150	-	71,150	(14,498)	237	(10,371)	238	(19,590)	(4,470)	-	22,696	-	2.92x	
2054	72,995	-	72,995	(14,495)	237	-	238	(19,697)	(4,470)	-	34,808	-	-	
2055	74,872	-	74,872	-	237	-	238	(19,807)	-	-	55,539	-	-	

(1) Includes interest earnings on Revenue Fund and Pledged Account of the General Fund in Fiscal Years 2018 through 2024.

(2) Annual Appropriation less debt service on the Series 2010 and 2011 State Appropriation Bonds.

(3) Net of capitalized interest through September 1, 2019.

(4) Interest earnings on Series 2016 Debt Service Fund and Debt Service Reserve Fund.

(5) Assumed debt service on the TIFIA Loan at an interest rate of 3.08% for illustrative purposes only.

(6) Includes operating and maintenance expenses and required deposits to the Operating Reserve Fund.

(7) Coverage calculations are shown pursuant to the Trust Agreement. Pursuant to the TIFIA Loan Agreement, amounts in the Net State Appropriations, Series 2016 Bonds Debt Service Fund Earnings and Series 2016 TIFIA Bond Debt Service Fund Earnings are not included in coverage calculations.

## **RISK FACTORS**

The following is a discussion of certain risk factors that should be considered in evaluating an investment in the Series 2016 Bonds. This discussion does not purport to be either comprehensive or definitive. The order in which risks are presented is not intended to reflect either the likelihood that a particular event will occur or the relative significance of such an event. Moreover, there may well be other risks associated with an investment in the Series 2016 Bonds in addition to those set forth herein.

### **General**

The financial forecasts in this Official Statement are based generally upon certain assumptions relating to the timing and costs of the Monroe Expressway and upon projections as to estimated Revenues and Operations and Maintenance Expenses. See “APPENDIX C – TRAFFIC AND REVENUE REPORT” and “APPENDIX D – GEC REPORT.” Inevitably, some underlying assumptions and projections used to develop the forecasts will not be realized, and unanticipated events and circumstances may occur. Therefore, the actual results achieved during the forecast periods will vary from the forecasts, and such differences may be material.

### **Forward-Looking Statements**

The statements contained in this Official Statement, and in other information provided by the Authority, that are not purely historical, are forward-looking statements, including statements regarding the Authority’s expectations, hopes, intentions or strategies regarding the future and the projections in the GEC Report and the Traffic and Revenue Report. All forward-looking statements included in this Official Statement are based on information available to the Authority on the date hereof, and the Authority assumes no obligation to update any such forward-looking statements.

The forward-looking statements herein are necessarily based on various assumptions and estimates that are inherently subject to numerous risks and uncertainties, including risks and uncertainties relating to the possible invalidity of the underlying assumptions and estimates and possible changes or developments in social, economic, business, industry, market, legal and regulatory circumstances and conditions and actions taken or omitted to be taken by third parties, including customers, suppliers, business partners and competitors, and legislative, judicial and other governmental authorities and officials. Assumptions related to the foregoing involve judgments with respect to, among other things, future economic, competitive and market conditions and future business decisions, all of which are difficult or impossible to predict accurately and, therefore, there can be no assurance that the forward-looking statements included in this Official Statement will prove to be accurate.

### **Costs of Monroe Expressway**

As described in “THE MONROE EXPRESSWAY” herein, the undertaking consists of the planning, designing, engineering and construction of the Monroe Expressway (as described in the GEC Report attached as APPENDIX D). The Authority has entered into the Design-Build Contract with the Design-Build Contractor. The Design-Build Contract is a fixed price, lump sum contract obligating the applicable Design-Build Contractor to perform the design, construction and utility relocation coordination, of the Monroe Expressway by the deadlines set forth therein.

Generally, in development projects of this magnitude, there is a possibility of time delays and cost increases resulting from (i) design and construction problems and resulting change orders, (ii) escalation of prices or wages or shortages of labor or materials, (iii) environmental litigation or environmental administrative matters, (iv) the unavailability or cost of right-of-way, (v) archeological,

historic and unidentified subsurface conditions, (vi) utility relocation problems, (vii) hazardous materials, or (viii) force majeure events. As a result, there can be no assurance that the costs of the Monroe Expressway will not exceed current estimates, or that the completion of the Monroe Expressway will not be delayed beyond the estimated completion date.

Specifically, while the Design-Build Contract shifts to the Design-Build Contractor a significant amount of the risk and responsibility for time delays and cost increases associated with design, engineering, utility relocation coordination and construction, the Design-Build Contract ultimately allows for increases in price and extensions of time for performance in certain cases, including, but not limited to, those involving Authority directed changes, Authority caused delays, hazardous materials and certain defined force majeure events (subject in all extension cases to a requirement that any delay actually extended the duration of a critical path item so as to delay substantial completion or final acceptance of the Project beyond the applicable deadline, as each of such terms is defined in the Design-Build Contract). The Authority is relying on the Design-Build Contractor to design, engineer, manage and construct the highway in accordance with standards, specifications and an agreed-upon scope of work. There is no assurance that the Design-Build Contractor can design and engineer the Monroe Expressway in a manner such that it reasonably can be constructed for the fixed price and by the completion date set forth in the Design-Build Contract. Further, the responsibility of the Design-Build Contractor for all phases of design and engineering under the Design-Build Contract may increase the impact that any financial instability, insolvency or bankruptcy of the Design-Build Contractor, or any entity guaranteeing the obligations of the Design-Build Contractor, could have on the cost of, or completion date for, the Monroe Expressway.

To the extent cost increases result in Costs of the Monroe Expressway exceeding funds available to pay such Costs, NCDOT will contribute funds necessary to complete the Monroe Expressway to the Authority as described above under “PLAN OF FINANCE – Contributions by NCDOT.” The NCDOT’s obligation to make such payments is subject to appropriation of funds therefor. The Authority is required to repay such contributions, except for the first \$55,000,000, to the NCDOT, with interest.

### **Payment and Performance Bonds**

A potential purchaser of the Series 2016 Bonds can have no assurance that the Design-Build Contractor or subcontractor, guarantor, surety or property insurer will be willing or capable of meeting its responsibilities in connection with the Monroe Expressway or that the issuer of any performance or payment bond, any guarantee or any property insurance policy will honor or will be able to honor a claim in a timely manner.

Although the Authority does not expect its payment obligations outstanding at any one time under the Design-Build Contract to exceed the amount of the payment bonds provided by the Design-Build Contractor, there can be no assurance that the payment and performance bonds provided by the Design-Build Contractor will be sufficient to satisfy the Authority’s payment or performance obligations under the Design-Build Contract. Not all events are covered under such payment and performance bonds. The issuer of the Design-Build Contractor’s payment and performance bonds does not guarantee payment or performance under all circumstances, and the issuer of such bonds may assert any defenses it may have for payment or performance. Moreover, in the event that a default occurs under the Design-Build Contract, there is a possibility of litigation between the Authority and the Design-Build Contractor, or between the Authority and the providers of the performance bonds and payment bonds, which could further delay the construction and opening of the Monroe Expressway. In addition, there can be no assurance that the Authority will recover any amounts under the performance bonds and payment bonds provided by the Design-Build Contractor or any other contractor related to the Monroe Expressway.

## **Liquidated Damages**

The amount of liquidated damages the Design-Build Contractor could be required to pay in connection with the Monroe Expressway may be limited by contract and may not be sufficient to cover all of the Authority's losses in the event of a delay or a failure to complete the required work in accordance with the plans and specifications, and other requirements of the contract documents. There are numerous events that could cause an extension of the schedule and that could result in increased costs for the Monroe Expressway. Liquidated damages, however, are payable by the Design-Build Contractor only under certain circumstances and even if paid, may not be sufficient to cover debt service payments on the Series 2016 Bonds. In addition, collection of liquidated damage amounts may require extensive litigation and no assurance can be provided that such amounts will in fact be collected.

## **Events of Force Majeure**

Construction and operation of the Monroe Expressway is at risk from events of force majeure, such as earthquakes, tornados, hurricanes or other natural disasters, epidemics, blockades, rebellions, war, riots, acts of sabotage, terrorism or civil commotion, and spills of hazardous materials, among other events. Construction or operations may also be stopped or delayed from non-casualty events such as discovery of archaeological artifacts, changes in law, delays in obtaining or renewing permits, revocation of such permits and approvals and litigation, among other things. Although the Authority will carry business interruption insurance, there is no assurance that the proceeds from such insurance will cover the loss of revenues resulting from such damage to, or disruption of service, on the Monroe Expressway.

## **Limited Insurance Coverage**

Although the Design-Build Contractor is required to provide insurance during construction of the Monroe Expressway, such required insurance policy will not cover damage and delay from all events that could interrupt construction. Risks that may not be insurable/insured include the following risks that may delay the project without causing property damage: epidemics, blockades, strikes and riots. Other risks that may not be insured/insurable include war, nuclear events, criminal or intentional acts of the insured, pollution, unforeseeable environmental or geological conditions, discovery of archaeological artifacts, changes in law, bankruptcy and acts of terrorism. Insurance policies may not be maintained or obtainable in amounts that would be sufficient or be paid in sufficient time in all events to pay all of the Authority's expenses under the Trust Agreement and the supplements thereto, including debt service on the Series 2016 Bonds.

## **Operating Risks**

When completed, the Monroe Expressway will be a new toll facility having no independent operating history. Accordingly, the ability of the Monroe Expressway to generate Revenues in amounts sufficient to pay debt service on the Series 2016 Bonds when due will be subject to the risks inherent in the establishment of any new toll facilities. The ability to repay the Series 2016 Bonds will be dependent on the volume of traffic that utilizes the Monroe Expressway and the ability of the Authority and its vendor's computer systems to accurately process data. Revenues to be generated through such use will be influenced by numerous factors, including, among others, the ability to manage toll evasion; the ability to control expenses; the availability of adequately-trained personnel; population, employment and income trends within the region; the congestion on alternative freeways, highways, and streets; time savings experienced by utilizing the Monroe Expressway; the toll rates; the availability and price of fuel; and the construction of new or improved competitive roadways or other transit facilities.

Although interest on certain of the Series 2016 Bonds and certain other expenses are being capitalized in an amount that assumes that tolling commencement could be delayed after the scheduled tolling commencement date, no assurances can be given that the amount of capitalized interest will be sufficient if tolling commencement is significantly delayed or if the costs of completing the Monroe Expressway increase substantially and additional debt must be issued to fund such increase.

### **Rate Covenant Not a Guarantee**

The Authority's ability to pay the debt service with respect to the Series 2016 Bonds depends on its ability to generate Revenues at the levels required by the Trust Agreement, which in turn depends on the successful completion of the Monroe Expressway and use of the Monroe Expressway by a sufficient number of toll-paying vehicles. Although the Authority has covenanted in the Trust Agreement to establish toll rates at specified levels as more particularly described herein, and expects that sufficient Revenues will be generated through the imposition and collection of such tolls, the Authority's covenant does not constitute a guarantee that sufficient Revenues will be available to pay debt service with respect to the Series 2016 Bonds.

### **Traffic and Revenue Report Assumptions**

The revenue forecasts in the Traffic and Revenue Report are based upon certain assumptions described above. See "TRAFFIC AND REVENUE REPORT" herein and "APPENDIX C – TRAFFIC AND REVENUE REPORT." Based upon such assumptions, the Traffic Consultant has expressed its opinion that such Revenue forecasts are reasonable and have been prepared in accordance with accepted practice for such studies. As provided in the Traffic and Revenue Report, however, such report is not a guarantee of any future events or trends and the forecasts therein are subject to future economic and social conditions and demographic developments that cannot be predicted with certainty. Further, any of the estimates and assumptions in the Traffic and Revenue Report are inherently subject to significant economic and competitive uncertainties and contingencies, many of which are beyond the control of the Authority. Failure to achieve or realize any of the assumptions described above may have a materially adverse effect upon the Revenues actually realized.

### **Ability to Maintain or Raise Rates**

The Authority may need to raise toll rates in the future above the anticipated scheduled toll rate increases under the projected toll rate schedule to support its debt service requirements. Although the Traffic and Revenue Report suggests there is an ability to raise rates further, the effect of any future rate increase is unknown. It is possible that a future increase in rates could result in reduced usage of the Monroe Expressway, resulting in decreased Revenues. Additionally, political pressure could result in hesitance by the Authority to raise rates further if needed.

### **Technology Risks**

The successful operation of the toll facilities will depend in part upon the successful testing and operation of the electronic toll collection software and equipment and traffic management software and equipment. The Authority is in the process of awarding a contract for the TCMS, which will not occur until after the issuance of the Series 2016 Bonds, and no assurance can be made that any contract will contain liquidated damages provisions or that any such liquidated damages would be sufficient to compensate for the resulting loss of toll revenue or for the higher operating costs should the performance guarantees in such contract not be met on an ongoing basis or at all.

## **Free Alternate Route**

The Authority Act requires NCDOT to maintain an existing, alternate, comparable non-toll route corresponding to each turnpike project undertaken by the Authority. Although the alternate route proposed for the Monroe Expressway is a less desirable route, motorists wishing to avoid tolls may choose this alternate route.

## **Motor Fuel Prices and Taxes**

Among other assumptions, the Revenue Forecasts in the Traffic and Revenue Report are based on: (i) the assumption that motor fuel will remain in adequate supply and retail gasoline prices in the lower Atlantic states will average approximately \$3.36 per gallon in 2019 (in future year dollars). Gasoline prices are assumed to increase, on average, by approximately 5.9% per year from 2019 through 2040, which includes both real increases and inflationary increases that are assumed to average approximately 2.2% annually. (ii) the assumption that federal and State motor fuel taxes will remain at current levels. There is no assurance that motor fuel will remain in adequate supply or that motor fuel prices and federal and State motor fuel taxes will not increase by more than the assumed amounts during the forecast period covered by the Traffic and Revenue Report.

Sensitivity tests conducted by the Traffic and Revenue Consultant indicate that an average retail gasoline price of approximately \$5.04 per gallon in 2019 (a 50% increase from the assumed \$3.36 per gallon) would reduce net toll revenue by approximately 4.6%. See “APPENDIX C – TRAFFIC AND REVENUE REPORT.”

## **Dilution of Senior Lien Security Upon Bankruptcy Related Event**

As detailed under “SECURITY AND SOURCES OF PAYMENT FOR THE SERIES 2016 BONDS – TIFIA Indebtedness Upon Occurrence of Bankruptcy Related Event,” upon the occurrence of an Event of Default that is a Bankruptcy Related Event under the Trust Agreement while USDOT owns the TIFIA Bond, the TIFIA Bond will be deemed to be Senior Lien Indebtedness, and the USDOT will be deemed to be the Owner of such Senior Lien Indebtedness. In such event, the TIFIA Bond would be secured by and payable from the Trust Estate (except for the Senior Lien Reserve Fund) on a basis equal to that of other Outstanding Senior Lien Indebtedness. A Bankruptcy Related Event is defined in the Trust Agreement and the TIFIA Loan Agreement to include voluntary and involuntary proceedings with respect to the Authority under any Insolvency Law, failure by the Authority generally to pay its debts with respect to the Monroe Expressway as they become due, and failure by the Authority to make two (2) consecutive payments on the TIFIA Bond in accordance with the TIFIA Loan Agreement.

## **Holder of Series 2016 Bonds Not Majority Holder**

Under the Trust Agreement, the Holders of a majority of Bonds and Parity Debt then Outstanding have the ability to direct remedies after an Event of Default, and take certain actions under the Trust Agreement. While the TIFIA Bond is Outstanding, it is likely that USDOT will own more than a majority of the Bonds issued under the Trust Agreement, and as a result, will be able to control such remedies and such actions. See “APPENDIX B- Definitions of Certain Terms and Summary of the Trust Agreement – Remedies.”

## **Unpredictability of Investment Earnings**

As described in “SECURITY AND SOURCES OF PAYMENT FOR THE SERIES 2016 BONDS – Project Fund,” the Authority expects to fund a portion of the costs of the Monroe Expressway

from investment earnings on amounts in the Project Fund. No assurance can be given that any such investments will produce a yield equal to that assumed in the Traffic and Revenue Report. A reduction in investment yield could negatively impact the aggregate investment earnings realized during the construction period for the Monroe Expressway. In addition, the expenditure of amounts in the Project Fund at a more rapid rate than is currently anticipated in the GEC Report could reduce both the amount of invested funds available for investment during the construction period for the Monroe Expressway and the length of time that such invested funds could be invested. Any such reduction in amounts available for investment could negatively impact the aggregate investment earnings realized during the construction period for the Monroe Expressway. See “APPENDIX D – GEC REPORT.”

### **Limitation and Enforceability of Remedies**

The remedies available to Owners of the Series 2016 Bonds upon an Event of Default under the Trust Agreement are limited to the seeking of specific performance or a writ of mandamus or other suit, action or proceeding compelling and requiring the Authority and its officers to observe and perform any covenant, condition or obligation prescribed in the Agreement. ACCELERATION IS NOT A REMEDY AVAILABLE TO OWNERS OF THE SERIES 2016 BONDS. Therefore any Event of Default will likely result in delayed payment of principal and interest to the Owners of the Series 2016 Bonds. See “APPENDIX B – “DEFINITIONS OF CERTAIN TERMS AND SUMMARY OF THE TRUST AGREEMENT – Remedies.”

The remedies available under the Trust Agreement are in many respects dependent upon regulatory and judicial actions that are often subject to discretion and delay. Under existing law, such remedies may not be readily available. In addition, enforcement of such remedies (i) may be subject to general principles of equity which may permit the exercise of judicial discretion, (ii) are subject to the exercise in the future by the State and its agencies and political subdivisions of the police power inherent in the sovereignty of the State, (iii) are subject, in part, to the provisions of the United States Bankruptcy Act and other applicable bankruptcy, insolvency, reorganization, moratorium or similar laws relating to or affecting the enforcement of creditors’ rights generally, now or hereafter in effect, and (iv) are subject to the exercise by the United States of the powers delegated to it by the federal Constitution. The various legal opinions to be delivered concurrently with the delivery of the Series 2016 Bonds will be qualified to the extent that the enforceability of certain legal rights related to the Series 2016 Bonds is subject to limitations imposed by bankruptcy, reorganization, insolvency or other similar laws affecting the rights of creditors generally and by equitable remedies and proceedings generally.

### **CONTINUING DISCLOSURE**

In the Trust Agreement, the Authority will undertake, for the benefit of the beneficial owners of the Series 2016 Bonds, to provide to the Municipal Securities Rulemaking Board (the “MSRB”):

(a) by not later than seven months from the end of each Fiscal Year of the Authority, beginning with the Fiscal Year ending June 30, 2016, the audited financial statements of the Authority for such Fiscal Year, if available, or, if such audited financial statements of the Authority are not available by seven months from the end of such Fiscal Year, unaudited financial statements of the Authority for such Fiscal Year to be replaced subsequently by audited financial statements of the Authority to be delivered within fifteen (15) days after such audited financial statements become available for distribution;

(b) by not later than seven months from the end of each Fiscal Year of the Authority, beginning with the Fiscal Year ending June 30, 2016, the financial and statistical data as of the date not earlier than the end of the preceding Fiscal Year evidencing compliance by the Authority with the Rate Covenant as described under the heading “SECURITY AND SOURCES OF PAYMENT FOR THE

SERIES 2016 BONDS – Rate Covenant”, to the extent such information is not included in the audited financial statements referred to in (a) above;

(c) within ten (10) Business Days following the occurrence of an event, notice of any of the following events with respect to the Series 2016 Bonds:

- (1) principal and interest payment delinquencies;
- (2) non-payment related defaults, if material;
- (3) unscheduled draws on debt service reserves reflecting financial difficulties;
- (4) unscheduled draws on credit enhancements reflecting financial difficulties;
- (5) substitution of credit or liquidity providers, or their failure to perform;
- (6) adverse tax opinions, the issuance by the Internal Revenue Service of proposed or final determinations of taxability, Notices of Proposed Issue (IRS Form 5701-TEB) or other material notices or determinations with respect to the tax status of the Series 2016 Bonds or other material events affecting the tax status of the Series 2016 Bonds;
- (7) modification to the rights of the beneficial owners of the Series 2016 Bonds, if material;
- (8) bond calls, other than calls for mandatory sinking fund redemption, if material, and tender offers;
- (9) defeasances;
- (10) release, substitution or sale of any property securing repayment of the Series 2016 Bonds, if material;
- (11) rating changes;
- (12) bankruptcy, insolvency, receivership or similar event of the Authority;
- (13) the consummation of a merger, consolidation, or acquisition involving the Authority or the sale of all or substantially all of the assets of the Authority, other than in the ordinary course of business, the entry into a definitive agreement to undertake such an action or the termination of a definitive agreement relating to any such actions, other than pursuant to its terms, if material;
- (14) appointment of a successor or additional Trustee or the change of name of the Trustee, if material;
- (15) legislation shall be filed with the North Carolina General Assembly by the Governor of North Carolina or legislation is reported out of a committee in either body of the General Assembly which, if adopted in the form so filed or reported, would result in a reduction or delay in the receipt of \$24 million in State Appropriated Revenues in any Bond Year; and



(16) an administrative action is taken by the Governor of North Carolina, NCDOT or any other agency or authority of the State which will result in a reduction or delay in the receipt of \$24 million in State Appropriated Revenues in any Bond Year; and

(d) in a timely manner, notice of a failure of the Authority to provide required annual financial information described in (a) or (b) above on or before the date specified.

The Authority shall provide the documents referred to above to the MSRB through the MSRB's Electronic Municipal Marketplace Access ("EMMA") System, or in any other format as prescribed by the MSRB, accompanied by identifying information as prescribed by the MSRB. The Authority may meet the continuing disclosure filing requirements described above by complying with any other procedure that may be authorized or required by the United States Securities and Exchange Commission.

At present, Section 136-89.193 and Chapter 5A of Chapter 147 of the General Statutes of North Carolina requires the Authority's financial statements to be prepared in accordance with generally accepted accounting principles and to be audited in accordance with generally accepted auditing standards.

The Trust Agreement will also provide that if the Authority fails to comply with the undertaking described above, the Trustee or any beneficial owner of the Series 2016 Bonds may take action to protect and enforce the rights of all beneficial owners with respect to such undertaking, including an action for specific performance; provided, however, that the Authority's failure to comply with the undertaking will not constitute an Event of Default under the Trust Agreement and shall not result in any acceleration of the Series 2016 Bonds. All actions shall be instituted, had and maintained in the manner provided in this paragraph for the benefit of all beneficial owners of the Series 2016 Bonds.

Pursuant to the Trust Agreement, the Authority will reserve the right to modify from time to time the information to be provided to the extent necessary or appropriate in the judgment of the Authority, provided that:

(a) any such modification may only be made in connection with a change in circumstances that arises from a change in legal requirements, change in law, or change in the identity, nature, or status of the Authority;

(b) the information to be provided, as modified, would have complied with the requirements of Rule 15c2-12 issued under the Securities Exchange Act of 1934 ("Rule 15c2-12") as of the date of this Official Statement, after taking into account any amendments or interpretations of Rule 15c2-12, as well as any changes in circumstances; and

(c) any such modification does not materially impair the interests of the Owners of the Series 2016 Bonds, as determined either by the Trustee or bond counsel to the Authority, or by the approving vote of the Owners of a majority in principal amount of the Series 2016 Bonds then Outstanding pursuant to the terms of the Trust Agreement, as it may be amended from time to time, at the time of the amendment.

Any annual financial information containing modified operating data or financial information is required to explain, in narrative form, the reasons for the modification and the impact of the change in the type of operating data or financial information being provided.

The undertaking described above will terminate upon payment, or provision having been made for payment in a manner consistent with Rule 15c2-12, in full of the principal of and interest on all of the Series 2016 Bonds.

During the previous five years, the Authority has not failed to comply, in all material respects, with its other undertakings relating to continuing disclosure of information pursuant to Rule 15c2-12 except as described in the following sentences. Although audited financial statements of the State were otherwise publicly available, the Authority did not link the audited financial statements of the State to certain of its issues for the fiscal years ended June 30, 2012 through 2015, as required under certain of its prior undertakings, and did not file a notice of failure to file such audited financial statements of the State. For each of the past five fiscal years, the Authority failed to file certain required operating data with respect to its outstanding bonds for the Triangle Expressway, and did not file a notice of failure to file such operating data. The Authority has made a notice filing with EMMA with respect to such failures to file and has filed the missing audited financial statements of the State and the missing operating data for each applicable fiscal year. On March 18, 2014, S&P Global Ratings, a business unit of Standard & Poor's Financial Services LLC, upgraded the insured rating on the Authority's Triangle Expressway System Senior Lien Revenue Bonds, Series 2009A and 2009B from "AA-" to "AA". The Authority failed to file timely notice of such rating change. The Authority has since filed notice of such rating change as required by Rule 15c2-12. The Authority has procedures in place to ensure timely filings pursuant to Rule 15c2-12.

## **LITIGATION**

No litigation is now pending or, to the best of the Authority's knowledge, threatened against or affecting the Authority seeking to restrain or enjoin the authorization, execution or delivery of the Series 2016 Bonds or the Trust Agreement or contesting the validity or the authority or proceedings for the authorization, execution or delivery of the Series 2016 Bonds or the Trust Agreement or the Authority's creation, organization or corporate existence, or the title of any of the Authority's present officers to their respective offices, or the Authority's authority to carry out its obligations thereunder.

## **LEGAL MATTERS**

Legal matters related to the authorization, execution, sale and delivery of the Series 2016 Bonds are subject to the approval of Hunton & Williams LLP, Bond Counsel. See the form of the Bond Counsel opinion (the "Bond Opinion") attached hereto as APPENDIX E. The Bond Opinion will be limited to matters relating to authorization and validity of the Series 2016 Bonds and to the tax status of interest thereon, as described in the section "TAX TREATMENT." Bond Counsel has not been engaged to investigate the financial resources of the Authority or its ability to provide for payment of the Series 2016 Bonds, and the Bond Opinion will make no statement as to such matters or as to the accuracy or completeness of this Official Statement or any other information that may have been relied on by anyone in making the decision to purchase Series 2016 Bonds.

Certain legal matters will be passed upon for the Authority by Ebony Pittman, Esq., an Assistant Attorney General for the State, for NCDOT by Elizabeth McKay, Esq., Special Deputy Attorney General, and for the Underwriters by McGuireWoods LLP, Raleigh, North Carolina, counsel to the Underwriters.

## TAX TREATMENT

### **Bond Counsel Opinion**

In the opinion of Bond Counsel, interest on the Series 2016 Bonds (a) is not included in gross income for federal income tax purposes, (b) is not an item of tax preference for purposes of the federal alternative minimum income tax imposed on individuals and corporations; however, with respect to corporations (as defined for federal income tax purposes) subject to the alternative minimum income tax, such interest is taken into account in determining adjusted current earnings for purposes of computing such tax, and (c) under current law, is exempt from all income taxes in the State of North Carolina. Except with respect to original issue discount, no other opinion is expressed by Bond Counsel regarding the tax consequences of the ownership of or the receipt or accrual of interest on the Series 2016 Bonds.

Bond Counsel's opinion with respect to the Series 2016 Bonds will be given in reliance upon certifications by representatives of the Authority as to certain facts relevant to both the opinion and requirements of the Internal Revenue Code of 1986, as amended (the "Code"). Bond Counsel's opinion is subject to the condition that there is compliance subsequent to the issuance of the Series 2016 Bonds with all requirements of the Code that must be satisfied in order for interest thereon to remain excludable from gross income for federal income tax purposes. The Authority has covenanted to comply with the current provisions of the Code regarding, among other matters, the use, expenditure and investment of the proceeds of the Series 2016 Bonds and the timely payment to the United States of any arbitrage rebate amounts with respect to the Series 2016 Bonds. Failure by the Authority to comply with such covenants, among other things, could cause interest on the Series 2016 Bonds to be included in gross income for federal income tax purposes retroactively to their date of issue.

Customary practice in the giving of legal opinions includes not detailing in the opinion all the assumptions, limitations and exclusions which are a part of the conclusions therein. See "Statement on the Role of Customary Practice in the Preparation and Understanding of Third-Party Legal Opinions", 63 Bus. Law. 1277 (2008)" and "Legal Opinion Principles", 53 Bus. Law. 831 (May 1998). Purchasers of the Series 2016 Bonds should seek advice or counsel concerning such matters as they deem prudent in connection with their purchase of Series 2016 Bonds.

Bond Counsel's opinion represents its legal judgment based in part upon the representations and covenants referenced therein and its review of current law, but is not a guarantee of result or binding on the Internal Revenue Service (the "Service") or the courts. Bond Counsel assumes no duty to update or supplement its opinion to reflect any facts or circumstances that may come to Bond Counsel's attention after the date of its opinion or to reflect any changes in law or the interpretation thereof that may occur or become effective after such date.

### **Original Issue Discount**

In the opinion of Bond Counsel, for the Series 2016A Bonds maturing in 2041, and for each maturity of Series 2016C Bonds (together, the "OID Bonds"), the difference between (i) the stated principal amount (maturity value for Series 2016C Bonds) of each maturity of the OID Bonds and (ii) the initial offering price to the public (excluding bond houses and brokers) at which a substantial amount of such maturity is sold, will constitute OID; OID will accrue for federal income tax purposes on a constant-yield-to-maturity method based on regular compounding; and a holder's basis in such a Series 2016 Bond will be increased by the amount of OID treated for federal income tax purposes as having accrued on the Series 2016 Bond while the holder holds the Series 2016 Bond. The offering prices set forth on the inside cover of this Official Statement are expected to be the initial offering prices to the public at which a substantial amount of each maturity of Series 2016 Bonds are sold. Under the Code, the adjusted basis in

an OID Bond will be used to determine taxable gain or loss upon the sale or other disposition (including redemption or payment at maturity) of such OID Bond.

Prospective purchasers of OID Bonds should consult their own tax advisors as to the calculation of accrued OID and the state and local tax consequences of owning or disposing of such Series 2016 Bonds.

### **Original Issue Premium**

Series 2016 Bonds purchased, whether upon issuance or otherwise, for an amount (excluding any amount attributable to accrued interest) in excess of their principal amount will be treated for federal income tax purposes as having amortizable bond premium. A holder's basis in such a Series 2016 Bond must be reduced by the amount of premium which accrues while such Series 2016 Bond is held by the holder. No deduction for such amount will be allowed, but it generally will offset interest on the Series 2016 Bonds while so held. Purchasers of such Series 2016 Bonds should consult their own tax advisors as to the calculation, accrual and treatment of amortizable bond premium and the state and local tax consequences of holding such Series 2016 Bonds.

### **Other Tax Matters**

In addition to the matters addressed above, prospective purchasers of the Series 2016 Bonds should be aware that the ownership of tax-exempt obligations may result in collateral Federal income tax consequences to certain taxpayers, including without limitation financial institutions, property and casualty insurance companies, S corporations, foreign corporations subject to the branch profits tax, recipients of Social Security or Railroad Retirement benefits and taxpayers who may be deemed to have incurred or continued indebtedness to purchase or carry tax-exempt obligations. Prospective purchasers of the Series 2016 Bonds should consult their tax advisors as to the applicability and impact of such consequences.

Prospective purchasers of the Series 2016 Bonds should consult their own tax advisors as to the status of interest on the Series 2016 Bonds under the tax laws of any state other than North Carolina.

The Service has a program to audit state and local government obligations to determine, as applicable, whether the interest thereon is includible in gross income for federal income tax purposes. If the Service does audit the Series 2016 Bonds, under current IRS procedures, the Service will treat the Authority as the taxpayer and the owners of the Series 2016 Bonds will have only limited rights, if any, to participate.

There are many events that could affect the value and liquidity or marketability of the Series 2016 Bonds after their issuance, including but not limited to public knowledge of an audit of the Series 2016 Bonds by the Service, a general change in interest rates for comparable securities, a change in federal or state income tax rates, legislative or regulatory proposals affecting state and local government securities and changes in judicial interpretation of existing law. In addition, certain tax considerations relevant to owners of Series 2016 Bonds who purchase Series 2016 Bonds after their issuance may be different from those relevant to purchasers upon issuance. Neither the opinion of Bond Counsel nor this Official Statement purport to address the likelihood or effect of any such potential events or such other tax considerations and purchasers of the Series 2016 Bonds should seek advice concerning such matters as they deem prudent in connection with their purchase of Series 2016 Bonds.

## **LEGALITY FOR INVESTMENT**

Section 159-140 of the General Statutes of North Carolina provides that the Series 2016 Bonds are securities in which all public officers and public bodies of the State of North Carolina and its political subdivisions and agencies and all insurance companies, trust companies, investment companies, banks, savings banks, building and loan associations, savings and loan associations, credit unions, pension or retirement funds, other financial institutions engaged in business in the State of North Carolina, executors, administrators, trustees and other fiduciaries may properly and legally invest funds, including capital in their control or belonging to them, and the Series 2016 Bonds are securities which may properly and legally be deposited with and received by any State of North Carolina or municipal officer or any agency or political subdivision of the State for any purpose for which the deposit of bonds, notes or obligations of the State is now or may hereafter be authorized by law.

## **VERIFICATION**

The accuracy of (a) the mathematical computations of the adequacy of the maturing principal of and interest on the Escrow Securities to pay interest on the 2011 Bonds through October 1, 2017, a mandatory sinking fund redemption due on July 1, 2017, and the remaining principal amount of the 2011 Bonds on October 1, 2017, and (b) the mathematical computations supporting the conclusion that the Series 2016 Bonds are not “arbitrage bonds” under the Code, will be verified by BondResource Partners, LP, a wholly-owned subsidiary of PFM Asset Management LLC, part of the PFM Group, Harrisburg, Pennsylvania. Such verification will be based, among other things, on mathematical computations supplied by the Underwriter. Bond Counsel will rely on such verification in rendering its opinion as to the exclusion of interest on the Series 2016 Bonds from gross income of the recipients thereof for purposes of federal income taxation.

## **RATINGS**

Moody’s Investors Service (“Moody’s”) and S&P Global Ratings, a business unit of Standard & Poor’s Financial Services LLC (“S&P”) have assigned ratings of “Baa3 (stable outlook)” and “BBB- (stable outlook),” respectively, to the Series 2016 Bonds.

Further explanation of the significance of such ratings may be obtained from Moody’s and S&P. The Authority has provided to Moody’s and S&P certain information not included in this Official Statement. The ratings are not a recommendation to buy, sell or hold the Series 2016 Bonds and should be evaluated independently. The ratings reflect only the view of the particular rating agency, and neither the Authority nor the Local Government Commission makes any representation as to the appropriateness of the ratings. There is no assurance that such ratings will not be withdrawn or revised downward by Moody’s or S&P. Such action may have an adverse effect on the market price of the Series 2016 Bonds. None of the Authority, the Local Government Commission or any Underwriter has undertaken any responsibility after the issuance of the Series 2016 Bonds to assure maintenance of the ratings or to oppose any such revision or withdrawal.

## **UNDERWRITING**

The Underwriters have entered into a Bond Purchase Agreement with the Authority and the Local Government Commission to purchase all of the Series 2016 Bonds, if any of the Series 2016 Bonds are to be purchased, at a purchase price equal to 100% of the principal amount thereof, plus net original issue premium of \$7,331,386, and less an underwriters’ discount of \$507,937.51. The obligation of the Underwriters to pay for the Series 2016 Bonds is subject to certain terms and conditions set forth in the Bond Purchase Agreement.

The Underwriters may offer and sell the Series 2016 Bonds to certain dealers (including dealers depositing the Series 2016 Bonds into investment trusts) and others at prices lower than the initial public offering prices stated on the inside cover page hereof. The public offering prices may be changed from time to time by the Underwriters.

The Underwriters and their respective affiliates are full service financial institutions engaged in various activities, which may include securities trading, commercial and investment banking, financial advisory, investment management, principal investment, hedging, financing and brokerage services. Certain of the Underwriters and their respective affiliates have, from time to time, performed, and may in the future perform, various financial advisory and investment banking services for the Authority, for which they received or will receive customary fees and expenses.

In the ordinary course of their various business activities, the Underwriters and their respective affiliates may make or hold a broad array of investments and actively trade debt and equity securities (or related derivative securities, which may include credit default swaps) and financial instruments (including bank loans) for their own account and for the accounts of their customers and may at any time hold long and short positions in such securities and instruments. Such investment and securities activities may involve securities and instruments of the Authority.

The Underwriters and their respective affiliates may also communicate independent investment recommendations, market color or trading ideas and/or publish or express independent research views in respect of such assets, securities or instruments and may at any time hold, or recommend to clients that they should acquire, long and/or short positions in such assets, securities and instruments.

The Underwriters may offer and sell the Series 2016 Bonds to certain dealers (including dealers depositing the Bonds into investment trusts) and others at prices lower than the initial public offering prices stated on the inside cover hereof. The public offering prices may be changed from time to time by the Underwriters.

J.P. Morgan Securities LLC (“JPMS”), one of the Underwriters of the Series 2016 Bonds, has entered into negotiated dealer agreements (each, a “Dealer Agreement”) with each of Charles Schwab & Co., Inc. (“CS&Co.”) and LPL Financial LLC (“LPL”) for the retail distribution of certain securities offerings at the original issue prices. Pursuant to each Dealer Agreement, each of CS&Co. and LPL may purchase Bonds from JPMS at the original issue price less a negotiated portion of the selling concession applicable to any Bonds that such firm sells.

Citigroup Global Markets Inc., an underwriter of the Series 2016 Bonds, has entered into a retail distribution agreement with each of TMC Bonds L.L.C. (“TMC”) and UBS Financial Services Inc. (“UBSFS”). Under these distribution agreements, Citigroup Global Markets Inc. may distribute municipal securities to retail investors through the financial advisor network of UBSFS and the electronic primary offering platform of TMC. As part of this arrangement, Citigroup Global Markets Inc. may compensate TMC (and TMC may compensate its electronic platform member firms) and UBSFS for their selling efforts with respect to the Series 2016 Bonds.

Wells Fargo Securities is the trade name for certain securities-related capital markets and investment banking services of Wells Fargo & Company and its subsidiaries, including Wells Fargo Bank, National Association, which conducts its municipal securities sales, trading and underwriting operations through the Wells Fargo Bank, NA Municipal Products Group, a separately identifiable department of Wells Fargo Bank, National Association, registered with the Securities and Exchange Commission as a municipal securities dealer pursuant to Section 15B(a) of the Securities Exchange Act of 1934.

Wells Fargo Bank, National Association, acting through its Municipal Products Group (“WFBNA”), one of the underwriters of the Series 2016 Bonds, has entered into an agreement (the “WFA Distribution Agreement”) with its affiliate, Wells Fargo Advisors, LLC (“WFA”), for the distribution of certain municipal securities offerings, including the Series 2016 Bonds. Pursuant to the WFA Distribution Agreement, WFBNA will share a portion of its underwriting or remarketing agent compensation, as applicable, with respect to the Series 2016 Bonds with WFA. WFBNA has also entered into an agreement (the “WFSLLC Distribution Agreement”) with its affiliate Wells Fargo Securities, LLC (“WFSLLC”), for the distribution of municipal securities offerings, including the Series 2016 Bonds. Pursuant to the WFSLLC Distribution Agreement, WFBNA pays a portion of WFSLLC’s expenses based on its municipal securities transactions. WFBNA, WFSLLC, and WFA are each wholly-owned subsidiaries of Wells Fargo & Company.

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**MISCELLANEOUS**

Members of the LGC staff have participated in the preparation of this Official Statement and other documents related to the issuance of the Series 2016 Bonds, but the LGC and its staff assume no responsibility for the accuracy or completeness of any representation or statement in this Official Statement.

The LGC and the Authority have each duly authorized the execution and delivery of this Official Statement.

NORTH CAROLINA LOCAL GOVERNMENT  
COMMISSION

By: /s/ Greg C. Gaskins  
Secretary

NORTH CAROLINA TURNPIKE AUTHORITY

By: /s/ Perry R. Safran  
Vice Chairman



**APPENDIX A**

**ACCREDITED AMOUNTS FOR  
CAPITAL APPRECIATION BONDS**

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**ACCRETED AMOUNTS FOR CAPITAL APPRECIATION BONDS**

Date	Capital Appreciation Bonds 07/01/2026 3.86%	Capital Appreciation Bonds 07/01/2027 4.04%	Capital Appreciation Bonds 07/01/2028 4.22%	Capital Appreciation Bonds 07/01/2029 4.4%	Capital Appreciation Bonds 07/01/2030 4.5%	Capital Appreciation Bonds 07/01/2031 4.62%	Capital Appreciation Bonds 07/01/2032 4.69%	Capital Appreciation Bonds 07/01/2033 4.75%
1/31/2017	3,488.30	3,296.25	3,103.90	2,912.50	2,752.10	2,588.20	2,446.70	2,313.50
7/1/2017	3,544.30	3,351.65	3,158.40	2,965.80	2,803.60	2,637.90	2,494.40	2,359.15
1/1/2018	3,612.70	3,419.35	3,225.00	3,031.05	2,866.70	2,698.85	2,552.90	2,415.20
7/1/2018	3,682.45	3,488.45	3,293.05	3,097.75	2,931.20	2,761.20	2,612.75	2,472.55
1/1/2019	3,753.50	3,558.90	3,362.55	3,165.90	2,997.15	2,824.95	2,674.05	2,531.30
7/1/2019	3,825.95	3,630.80	3,433.50	3,235.55	3,064.60	2,890.25	2,736.75	2,591.40
1/1/2020	3,899.80	3,704.15	3,505.95	3,306.75	3,133.55	2,957.00	2,800.90	2,652.95
7/1/2020	3,975.05	3,778.95	3,579.95	3,379.50	3,204.05	3,025.30	2,866.60	2,715.95
1/1/2021	4,051.75	3,855.30	3,655.45	3,453.85	3,276.15	3,095.20	2,933.80	2,780.45
7/1/2021	4,129.95	3,933.20	3,732.60	3,529.80	3,349.85	3,166.70	3,002.60	2,846.50
1/1/2022	4,209.70	4,012.65	3,811.35	3,607.50	3,425.25	3,239.85	3,073.05	2,914.10
7/1/2022	4,290.95	4,093.70	3,891.80	3,686.85	3,502.30	3,314.70	3,145.10	2,983.30
1/1/2023	4,373.75	4,176.40	3,973.90	3,767.95	3,581.10	3,391.25	3,218.85	3,054.20
7/1/2023	4,458.15	4,260.75	4,057.75	3,850.85	3,661.70	3,469.60	3,294.35	3,126.70
1/1/2024	4,544.20	4,346.80	4,143.35	3,935.55	3,744.05	3,549.75	3,371.60	3,200.95
7/1/2024	4,631.90	4,434.60	4,230.80	4,022.15	3,828.30	3,631.75	3,450.65	3,277.00
1/1/2025	4,721.30	4,524.20	4,320.05	4,110.65	3,914.45	3,715.65	3,531.55	3,354.85
7/1/2025	4,812.40	4,615.60	4,411.20	4,201.05	4,002.55	3,801.45	3,614.40	3,434.50
1/1/2026	4,905.30	4,708.80	4,504.30	4,293.50	4,092.60	3,889.25	3,699.15	3,516.10
7/1/2026	5,000.00	4,803.95	4,599.35	4,387.95	4,184.65	3,979.10	3,785.90	3,599.60
1/1/2027		4,900.95	4,696.40	4,484.50	4,278.80	4,071.05	3,874.65	3,685.05
7/1/2027		5,000.00	4,795.45	4,583.15	4,375.10	4,165.05	3,965.55	3,772.60
1/1/2028			4,896.65	4,684.00	4,473.55	4,261.30	4,058.50	3,862.20
7/1/2028			5,000.00	4,787.05	4,574.20	4,359.70	4,153.70	3,953.90
1/1/2029				4,892.35	4,677.10	4,460.45	4,251.10	4,047.85
7/1/2029				5,000.00	4,782.35	4,563.45	4,350.80	4,143.95
1/1/2030					4,889.95	4,668.90	4,452.80	4,242.40
7/1/2030					5,000.00	4,776.75	4,557.25	4,343.15
1/1/2031						4,887.10	4,664.10	4,446.30
7/1/2031						5,000.00	4,773.45	4,551.90
1/1/2032							4,885.40	4,660.00
7/1/2032							5,000.00	4,770.70
1/1/2033								4,884.00
7/1/2033								5,000.00
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Date	Capital Appreciation Bonds 07/01/2034 4.81%	Capital Appreciation Bonds 07/01/2035 4.86%	Capital Appreciation Bonds 07/01/2036 4.9%	Capital Appreciation Bonds 07/01/2037 4.93%	Capital Appreciation Bonds 07/01/2038 4.94%	Capital Appreciation Bonds 07/01/2039 4.95%	Capital Appreciation Bonds 07/01/2040 4.96%	Capital Appreciation Bonds 07/01/2041 4.97%
1/31/2017	2,184.95	2,064.90	1,953.20	1,849.80	1,758.20	1,670.80	1,587.45	1,507.95
7/1/2017	2,228.65	2,106.60	1,993.00	1,887.75	1,794.30	1,705.20	1,620.20	1,539.10
1/1/2018	2,282.25	2,157.80	2,041.85	1,934.25	1,838.65	1,747.40	1,660.35	1,577.35
7/1/2018	2,337.15	2,210.25	2,091.85	1,981.95	1,884.05	1,790.65	1,701.55	1,616.55
1/1/2019	2,393.35	2,263.95	2,143.10	2,030.80	1,930.60	1,834.95	1,743.75	1,656.70
7/1/2019	2,450.95	2,318.95	2,195.65	2,080.85	1,978.30	1,880.40	1,787.00	1,697.90
1/1/2020	2,509.85	2,375.35	2,249.40	2,132.15	2,027.15	1,926.95	1,831.30	1,740.10
7/1/2020	2,570.25	2,433.05	2,304.55	2,184.70	2,077.20	1,974.60	1,876.70	1,783.35
1/1/2021	2,632.05	2,492.15	2,361.00	2,238.60	2,128.55	2,023.50	1,923.25	1,827.65
7/1/2021	2,695.35	2,552.75	2,418.85	2,293.75	2,181.10	2,073.55	1,970.95	1,873.05
1/1/2022	2,760.20	2,614.75	2,478.10	2,350.30	2,235.00	2,124.90	2,019.85	1,919.60
7/1/2022	2,826.55	2,678.30	2,538.80	2,408.25	2,290.20	2,177.50	2,069.95	1,967.30
1/1/2023	2,894.55	2,743.40	2,601.00	2,467.60	2,346.75	2,231.40	2,121.25	2,016.20
7/1/2023	2,964.15	2,810.05	2,664.75	2,528.45	2,404.70	2,286.60	2,173.90	2,066.30
1/1/2024	3,035.45	2,878.35	2,730.05	2,590.75	2,464.10	2,343.20	2,227.80	2,117.65
7/1/2024	3,108.45	2,948.30	2,796.90	2,654.60	2,525.00	2,401.20	2,283.05	2,170.25
1/1/2025	3,183.20	3,019.90	2,865.45	2,720.05	2,587.35	2,460.65	2,339.65	2,224.20
7/1/2025	3,259.75	3,093.30	2,935.65	2,787.10	2,651.25	2,521.55	2,397.70	2,279.50
1/1/2026	3,338.15	3,168.50	3,007.55	2,855.80	2,716.75	2,583.95	2,457.15	2,336.10
7/1/2026	3,418.45	3,245.45	3,081.25	2,926.20	2,783.85	2,647.90	2,518.10	2,394.20
1/1/2027	3,500.65	3,324.35	3,156.75	2,998.35	2,852.60	2,713.45	2,580.55	2,453.65
7/1/2027	3,584.85	3,405.10	3,234.10	3,072.25	2,923.05	2,780.60	2,644.55	2,514.65
1/1/2028	3,671.05	3,487.85	3,313.30	3,147.95	2,995.25	2,849.40	2,710.10	2,577.15
7/1/2028	3,759.35	3,572.60	3,394.50	3,225.55	3,069.25	2,919.95	2,777.35	2,641.20
1/1/2029	3,849.75	3,659.45	3,477.65	3,305.10	3,145.05	2,992.20	2,846.20	2,706.80
7/1/2029	3,942.35	3,748.35	3,562.85	3,386.55	3,222.75	3,066.25	2,916.80	2,774.10
1/1/2030	4,037.15	3,839.45	3,650.15	3,470.05	3,302.35	3,142.15	2,989.15	2,843.00
7/1/2030	4,134.25	3,932.75	3,739.60	3,555.55	3,383.90	3,219.90	3,063.25	2,913.65
1/1/2031	4,233.70	4,028.30	3,831.20	3,643.20	3,467.50	3,299.60	3,139.25	2,986.05
7/1/2031	4,335.50	4,126.20	3,925.05	3,733.00	3,553.15	3,381.25	3,217.10	3,060.25
1/1/2032	4,439.80	4,226.45	4,021.25	3,825.05	3,640.90	3,464.95	3,296.85	3,136.30
7/1/2032	4,546.55	4,329.15	4,119.75	3,919.35	3,730.85	3,550.70	3,378.65	3,214.25
1/1/2033	4,655.90	4,434.35	4,220.70	4,015.95	3,823.00	3,638.60	3,462.40	3,294.15
7/1/2033	4,767.90	4,542.10	4,324.10	4,114.95	3,917.40	3,728.65	3,548.30	3,376.00
1/1/2034	4,882.55	4,652.50	4,430.05	4,216.35	4,014.20	3,820.95	3,636.30	3,459.90
7/1/2034	5,000.00	4,765.55	4,538.60	4,320.30	4,113.35	3,915.50	3,726.45	3,545.85
1/1/2035		4,881.35	4,649.75	4,426.80	4,214.95	4,012.40	3,818.90	3,634.00
7/1/2035		5,000.00	4,763.70	4,535.90	4,319.05	4,111.70	3,913.60	3,724.30
1/1/2036			4,880.40	4,647.75	4,425.70	4,213.50	4,010.65	3,816.85
7/1/2036			5,000.00	4,762.30	4,535.05	4,317.75	4,110.10	3,911.70
1/1/2037				4,879.70	4,647.05	4,424.65	4,212.05	4,008.90
7/1/2037				5,000.00	4,761.85	4,534.15	4,316.50	4,108.50
1/1/2038					4,879.45	4,646.35	4,423.55	4,210.60
7/1/2038					5,000.00	4,761.35	4,533.25	4,315.25
1/1/2039						4,879.20	4,645.70	4,422.50
7/1/2039						5,000.00	4,760.90	4,532.40
1/1/2040							4,879.00	4,645.00
7/1/2040							5,000.00	4,760.45
1/1/2041								4,878.75
7/1/2041								5,000.00

**APPENDIX B**

**DEFINITIONS OF CERTAIN TERMS AND  
SUMMARY OF THE TRUST AGREEMENT**

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## APPENDIX B

### DEFINITIONS OF CERTAIN TERMS AND SUMMARY OF THE TRUST AGREEMENT

#### Definitions of Certain Terms

The following words and terms as used in the Trust Agreement have the following meanings, unless some other meaning is plainly intended:

*“Act”* means Article 6H of Chapter 136, as amended, of the NCGS.

*“Accreted Amount”* means (a) with respect to Capital Appreciation Bonds of any Series, the amount set forth in the Trust Agreement or in a Supplemental Trust Agreement for such Bonds as the amount representing the initial principal amount, plus the accreted and compounded interest on such Capital Appreciation Bonds, and (b) with respect to Convertible CAB Bonds of any Series, the amount set forth in the Trust Agreement or in a Supplemental Trust Agreement for such Bonds as the amount representing the initial principal amount, plus the accreted and compounded interest on such Capital Appreciation Bonds up to the Convertible CAB Bond Conversion Date therefor and thereafter the Accreted Amount as of such Convertible CAB Bond Conversion Date; provided the Accreted Amount of a Bond may never exceed the maturity amount of such Bond.

*“Additional Bonds”* means, subject to the provisions described under “General Covenants and Representations – *Special TIFIA Provisions*” below for so long as the TIFIA Bond remains Outstanding, revenue bonds issued by the Authority in compliance with the Trust Agreement.

*“Additional Project”* means any addition, acquisition, improvement, betterment, extension or equipping of or relating to either the Initial Project or any previous Additional Project that has become part of the Monroe Expressway; provided (a) an Additional Project must either (i) be any of the NCDOT projects identified on the 2016-2025 State Transportation Improvement Plan as I-5507, I-5718, U-2509 or U-5536 or (ii) (1) connect directly, or be adjacent, to the then existing System or be located within the geographic boundaries of Division 10 of NCDOT and (2) have received the consent of the TIFIA Lender to be designated an Additional Project, and (b) for all Additional Projects under either (i) or (ii), the Authority Board must determine, based on forecasts of Revenues and Operating Expenses for the System after completion of the Additional Project by the Traffic Consultant and General Engineering Consultant, respectively, that the Additional Project will not result in Total Debt Service Coverage Ratios or TIFIA Loan Life Coverage Ratios, in both cases through the Final Maturity Date, that are lower than the projected Total Debt Service Coverage Ratios and TIFIA Loan Life Coverage Ratios through the Final Maturity Date as set forth in the most recently delivered Financial Plan pursuant to the TIFIA Loan Agreement.

*“Additional Secured Indebtedness”* means (a) Senior Lien Parity Debt other than Senior Lien Bonds, (b) Subordinate Lien Parity Debt other than Subordinate Lien Bonds and (c) Junior Indebtedness.

*“Annual Budget”* means the Authority’s budget for the Monroe Expressway for a Fiscal Year adopted pursuant to the Authority’s bylaws, rules and regulations as in effect from time to time, including as it may be amended during a Fiscal Year.

*“Appropriation Bonds”* means the Appropriation Series 2010A Bonds and the Appropriation Series 2011 Bonds.

*“Appropriation Series 2010A Bonds”* means the North Carolina Turnpike Authority Monroe Connector System State Appropriation Revenue Bonds, Series 2010A (Federally Taxable – Build America Bonds) issued in the aggregate principal amount of \$233,920,000 and secured by the State Appropriated Revenues, issued by the Authority under the State Appropriation Trust Agreement.

*“Appropriation Series 2011 Bonds”* means the North Carolina Turnpike Authority Monroe Connector System State Appropriation Revenue Bonds, Series 2011 issued in the aggregate principal amount of \$214,505,000 and secured by the State Appropriated Revenues, issued by the Authority under the State Appropriation Trust Agreement.

*“Authority”* means the North Carolina Turnpike Authority and any successor thereto.

*“Authority Attorney”* means the attorney or law firm designated by the Authority from time to time to perform the duties of counsel to the Authority under the Trust Agreement, including the Attorney General of the State or any assistant or deputy Attorney General of the State.

*“Authority Board”* or *“Board of the Authority”* means the governing body of the Authority.

*“Authority Secretary”* means the person appointed or employed by the Authority to perform the duties imposed on the Secretary of the Authority by the Trust Agreement, including the Secretary of the Authority Board or any assistant or deputy Secretary of the Authority Board.

*“Authorized Officer”* means the Executive Director, the Chief Financial Officer and any other person authorized by resolution of the Authority Board or the Secretary of Transportation to perform the duties imposed on an Authorized Officer by the Trust Agreement whose name and specimen signature is filed pursuant to an Officer’s Certificate or a certificate of the Secretary of Transportation with the Trustee for such purpose.

*“Balloon Long-Term Indebtedness”* means, subject to the provisions described under “General Covenants and Representations – *Special TIFIA Provisions*” below for so long as the TIFIA Bond remains Outstanding, fixed or variable rate Long-Term Indebtedness 25% or more of the principal payments of which are due in a single twelve-month period which portion of the principal is not required by the documents pursuant to which such Indebtedness is incurred to be amortized by redemption or prepayment prior to the expiration of such period.

*“Bankruptcy Related Event”* means, with respect to any Person, (a) an involuntary proceeding shall be commenced or an involuntary petition shall be filed seeking (i) liquidation, reorganization or other relief in respect of such Person or any of its debts, or of a substantial part of the assets thereof, under any Insolvency Laws, or (ii) the appointment of a receiver, trustee, liquidator, custodian, sequestrator, conservator or similar official for such Person or for a substantial part of the assets thereof and, in any case referred to in the foregoing subclauses (i) and (ii), such proceeding or petition shall continue undismissed for sixty (60) days or an order or decree approving or ordering any of the foregoing shall be entered; (b) such Person shall (i) apply for or consent to the appointment of a receiver, trustee, liquidator, custodian, sequestrator, conservator or similar official therefor or for a substantial part of the assets thereof, (ii) generally not be paying its debts or obligations with respect to Monroe Expressway as they become due unless such debts or obligations are the subject of a bona fide dispute, or become unable to pay its debts or obligations generally as they become due, (iii) solely with respect to the Authority, fail to make two (2) consecutive payments of TIFIA Debt Service in accordance with the provisions of the TIFIA Loan Agreement, (iv) make a general assignment for the benefit of creditors, (v) consent to the institution of, or fail to contest in a timely and appropriate manner, any proceeding or petition with respect to described in clause (a) of this definition, (vi) commence a voluntary proceeding under any



Insolvency Law, or file a voluntary petition seeking liquidation, reorganization, an arrangement with creditors or an order for relief under any Insolvency Law, (vii) file an answer admitting the material allegations of a petition filed against it in any proceeding referred to in the foregoing subclauses (i) through (vi), inclusive, of this clause (b) or (viii) take any action for the purpose of effecting any of the foregoing, including seeking approval or legislative enactment by any Governmental Authority to authorize commencement of a voluntary proceeding under any Insolvency Law; (c) solely with respect to the Authority, (i) the Trustee shall commence a process pursuant to which all or a substantial part of the Trust Estate may be sold or otherwise disposed of in a public or private sale or disposition pursuant to a foreclosure of the Liens thereon securing the Senior Lien Indebtedness, or (ii) the Trustee shall commence a process pursuant to which all or a substantial part of the Trust Estate may be sold or otherwise disposed of pursuant to a sale or disposition of such Trust Estate in lieu of foreclosure; or (d) solely with respect to the Authority, the Trustee shall transfer, pursuant to directions issued by the Holders, funds on deposit in any of the Project Accounts upon the occurrence and during the continuation of an event of default under the Trust Agreement Documents (as such term is defined in the TIFIA Loan Agreement) for application to the prepayment or repayment of any principal amount of the Senior Lien Indebtedness other than in accordance with the provisions of the Trust Agreement.

*“Base Case Financial Model”* means a financial model prepared by the Authority forecasting the revenues and expenditures of the Initial Project for time periods through the latest maturity date of the Series 2016 Bonds or the TIFIA Bond and based upon assumptions and methodology provided by the Authority and acceptable to the TIFIA Lender as of the date of issuance of the TIFIA Bond.

*“Bond”* or *“Bonds”* means, collectively, the Series 2016 Bonds, the TIFIA Bond and any Additional Bonds.

*“Bond Counsel”* means, subject to the provisions described under “General Covenants and Representations – *Special TIFIA Provisions*” below for so long as the TIFIA Bond remains Outstanding, Hunton & Williams LLP or another independent firm nationally recognized on the subject of municipal bonds.

*“Bond Insurance Policy”* means a municipal bond insurance policy or similar arrangement permitted by the Act and the Revenue Bond Act and obtained or established in connection with the issuance of any Bonds or the incurrence of Additional Secured Indebtedness.

*“Bond Insurer”* means the Person providing a Bond Insurance Policy.

*“Bond Order”* or *“Bond Orders”* means the Bond Orders adopted by the Authority on November 14, 2011, for the Series 2011 Bonds and November 3, 2016, for the Series 2016 Bonds and the TIFIA Bond, pursuant to the Revenue Bond Act.

*“Bond Registrar”* means, with respect to any Series of Bonds, the Bond Registrar at the time serving as such under the Trust Agreement or the Supplemental Trust Agreement relating to such Series, whether the original or a successor Bond Registrar.

*“Bond Year”* means, for the Series 2016 Bonds, the 12 months ending on each January 1, or if such January 1 is not a Business Day, the next succeeding Business Day.

*“Business Day”* means any day other than a Saturday, a Sunday or a day on which the offices of the United States of America, its departments and agencies, the Trustee, the applicable Bond Registrar or the State are authorized to be closed or on which commercial banks are authorized or required by law,

regulation or executive order to be closed in New York, New York, Raleigh, North Carolina, or Jacksonville, Florida.

“*Calculation Date*” means each January 1 and July 1, occurring after the date of execution of the TIFIA Loan Agreement.

“*Calculation Period*” means a twelve (12) month period ending on a Calculation Date.

“*Capital Appreciation Bonds*” means Bonds the interest on which is compounded at the rates and on the dates set forth in the Trust Agreement or a Supplemental Trust Agreement for such Bonds and is payable upon redemption or on the maturity date of such Bonds; provided, however, that nothing in the Trust Agreement shall prohibit the Authority from designating in the appropriate Supplemental Trust Agreement any such Additional Bonds by a name other than Capital Appreciation Bonds.

“*Capital Improvements Plan*” for any Fiscal Year means the budget or plan for capital improvements adopted by the Authority.

“*Chief Financial Officer*” means the person appointed or employed by the Authority or NCDOT to perform the duties imposed on the Chief Financial Officer of the Authority or NCDOT, as applicable, by the Trust Agreement.

“*Code*” means the Internal Revenue Code of 1986, as amended, and applicable regulations promulgated thereunder.

“*Completion Indebtedness*” means, subject to the provisions described under “General Covenants and Representations – *Special TIFIA Provisions*” below for so long as the TIFIA Bond remains Outstanding, any Long-Term Indebtedness incurred for the purpose of financing the completion of any Additional Project for which Long-Term Indebtedness has theretofore been incurred in accordance with the provisions of the Trust Agreement, to the extent necessary to complete such Additional Project, in the manner and scope contemplated at the time that such Long-Term Indebtedness theretofore incurred was originally incurred, and, to the extent the same shall be applicable, in accordance with the general plans and specifications for such Additional Project, as originally prepared with only such changes as have been made in conformance with the documents pursuant to which such Long-Term Indebtedness theretofore incurred was originally incurred; provided, however, that such Long-Term Indebtedness shall not exceed 5% of the aggregate principal amount of the Long-Term Indebtedness originally incurred by the Authority to finance the costs of such Additional Project. Completion Indebtedness is not authorized for the Initial Project.

“*Convertible CAB Bond Conversion Date*” or “*Dates*” means the dates identified for particular Convertible CAB Bonds in the Trust Agreement.

“*Convertible CAB Bonds*” means Bonds the interest on which is compounded at the accretion rates and on the dates set forth in the Trust Agreement or a Supplemental Trust Agreement for such Bonds until the Convertible CAB Bond Conversion Date for such Bonds, with interest payable semiannually thereafter on each Interest Payment Date at payment interest rates, with the accreted interest through the Convertible CAB Bond Conversion Date for such Bonds treated as principal on such Bonds thereafter, and with the principal of such Bonds payable upon redemption or on the maturity date of such Bonds.

“*Cost*,” as applied to the Initial Project or any Additional Project, means, without intending thereby to limit or restrict any proper definition of such word under the provisions of the Act or the Trust Agreement.

“*Credit Facility*” means, subject to the provisions described under “General Covenants and Representations – *Special TIFIA Provisions*” below for so long as the TIFIA Bond remains Outstanding, a line of credit, letter of credit, standby bond purchase agreement or similar liquidity or credit facility permitted by the Act (but excluding a Bond Insurance Policy) and established or obtained in connection with the issuance of any Bonds or the incurrence of any Indebtedness that provides for a term out of such Indebtedness.

“*Credit Provider*” means the Person providing a Credit Facility. If and to the extent permitted by law, the Authority may be a Credit Provider for the sole purpose of providing liquidity support for Indebtedness.

“*Current Interest Bonds*” means Bonds (other than the TIFIA Bond) the interest on which is payable on the Interest Payment Dates provided therefor in the Trust Agreement or in any Supplemental Trust Agreement, including the Series 2016A Bonds.

“*Default*” means any Event of Default and any event that, after notice or lapse of time or both, would become an Event of Default.

“*Defaulted Interest*” means Defaulted Interest as defined in the Trust Agreement.

“*Defeasance Obligations*” means noncallable (a) Government Obligations and (b) Defeased Municipal Obligations.

“*Defeased Municipal Obligations*” means obligations of state or local government municipal bond issuers which are rated the highest rating category by S&P, Fitch or Moody’s, respectively, provision for the payment of the principal of, premium, if any, and interest on which shall have been made by deposit with a trustee or escrow agent of Government Obligations, the maturing principal of and interest on which, when due and payable, shall provide sufficient money to pay the principal of, premium, if any, and interest on such obligations of state or local government municipal bond issuers. References in this definition to state or local government bond issuers shall mean the State and North Carolina local government bond issuers, and, to the extent permitted by law, states other than the State and local government bond issuers other than North Carolina local government bond issuers.

“*Depository*” means the State Treasurer of the State and one or more banks or trust companies or other institutions, including the Trustee, duly authorized by law to engage in the banking business and designated by the Authority as a depository of moneys under the Trust Agreement.

“*Derivative Agreement*” means, subject to the provisions described under “General Covenants and Representations – *Special TIFIA Provisions*” below for so long as the TIFIA Bond remains Outstanding, an interest rate swap, cap, collar, floor, forward, option, put, call or other agreement, arrangement or security however denominated, entered into in order to hedge interest rate fluctuations on all or a portion of any Indebtedness or to provide debt management by changing payments to be made by the Authority with respect to all or a portion of any Indebtedness.

“*Derivative Agreement Additional Payments*” means payments required to be paid by the Authority under a Derivative Agreement other than Derivative Agreement Regularly Scheduled Payments, including termination payments required to be paid in connection with the termination of a

Derivative Agreement, whether voluntarily or upon the occurrence of an event of default, termination event or similar event thereunder.

*“Derivative Agreement Regularly Scheduled Payments”* means regularly scheduled payments required to be paid by the Authority under a Derivative Agreement that are based upon a fixed or variable imputed rate on a notional amount set forth in the Derivative Agreement and which are intended by the Authority to correspond to interest payments on the underlying Derivative Indebtedness.

*“Derivative Indebtedness”* means, subject to the provisions described under “General Covenants and Representations – *Special TIFIA Provisions*” below for so long as the TIFIA Bond remains Outstanding, the portion of any Indebtedness meeting the requirements set forth in clauses (a) and (b) below:

(a) in connection with such Indebtedness, the Authority shall have entered into a Derivative Agreement in respect of all or a portion of such Indebtedness, and

(b) if such Indebtedness bears interest at a variable rate, such Derivative Agreement provides that during the Derivative Period, the Authority shall pay to the provider of the Derivative Agreement a fixed rate (the *“Synthetic Fixed Rate”*) and the provider of the Derivative Agreement shall pay (i) to the Authority a variable rate on a notional amount equal to all or a portion of the Outstanding principal amount of such Indebtedness, or (ii) if such Indebtedness bears interest at a fixed rate, such Derivative Agreement provides that during the Derivative Period, the Authority shall pay to the provider of the Derivative Agreement a variable rate (the *“Synthetic Variable Rate”*) and the provider of the Derivative Agreement shall pay to the Authority a fixed rate on a notional amount equal to all or a portion of the Outstanding principal amount of such Indebtedness.

*“Derivative Period”* means the period during which a Derivative Agreement is in effect.

*“Eminent Domain”* means the eminent domain or condemnation power by which all or any part of the Monroe Expressway may be taken for another public use or any agreement that is reached in lieu of proceedings to exercise such power.

*“Event of Default”* means each of those events of default set forth in Section 802 of the Trust Agreement.

*“Event of Loss”* means any event or series of events that causes any portion of the Monroe Expressway to be damaged, destroyed or rendered unfit for normal use for any reason whatsoever, including through a failure of title, or any loss of such property, or a condemnation.

*“Final Maturity Date”* shall have the meaning given to such term in the TIFIA Loan Agreement.

*“Fiscal Year”* means the period commencing on the first day of July of any year and ending on the last day of June of the following year.

*“Fitch”* means Fitch Inc., a corporation organized and existing under the laws of the State of Delaware, its successors and assigns, and if such corporation shall be dissolved or liquidated or shall no longer perform the functions of a securities rating agency, *“Fitch”* shall be deemed to refer to any other nationally recognized securities rating agency identified as such by the Securities and Exchange Commission and designated by the Authority by notice to the Trustee.

*“General Engineering Consultant”* means HNTB North Carolina, P.C. or, subject to the provisions described under “General Covenants and Representations – *Special TIFIA Provisions*” below for so long as the TIFIA Bond remains Outstanding, any independent engineer or independent firm of engineers prequalified to do work in the State, in accordance with the established guidelines of the NCDOT, who is retained by the Authority to assist it in assessing the status of operation and maintenance of the Monroe Expressway, the costs associated therewith and the expected cost of unusual or extraordinary maintenance, repairs, renewals, or replacements or capital improvements related to the System and advising the Authority, inter alia, regarding the level of operation and renewal and replacement reserves that should be maintained to assure that funds will be available when needed for that purpose for the current and each of the next nine (9) Fiscal Years.

*“General Reserve Fund”* means the fund created and designated the North Carolina Turnpike Authority Monroe Expressway General Reserve Fund in the Trust Agreement.

*“Government Obligations”* means direct obligations of, or obligations the principal of and the interest on which are fully and unconditionally guaranteed by, the United States of America in either certificated or book-entry form, including stripped Government Obligations stripped by the United States Treasury itself.

*“Grant Anticipation Notes”* means, subject to the provisions described under “General Covenants and Representations – *Special TIFIA Provisions*” below for so long as the TIFIA Bond remains Outstanding, any grant anticipation notes issued by the Authority in compliance with the provisions the Trust Agreement.

*“Guarantee Repayments”* means the obligated repayment by the Authority to the NCDOT from Revenues of certain amounts paid into the Trust Agreement for construction costs, operating and maintenance expenses and renewal and replacement costs, if necessary, with interest thereon at the rate provided for in Section 136-176(b) of the NCGS.

*“Holder”* means the holder or owner of Bonds or other indebtedness or obligations secured by a lien on Revenues under the Trust Agreement.

*“Indebtedness”* means all obligations incurred or assumed by the Authority in connection with the construction, ownership or operation of the Monroe Expressway:

(a) for payments of principal and interest with respect to borrowed money, including the Bonds, any obligation to repay a Credit Provider for moneys drawn to pay and retire or purchase Indebtedness, and the continuing obligation to pay principal and interest with respect to any Bonds pursuant to the subrogation provisions of a Bond Insurance Policy following the payment to the Owner of such Bonds of the insured principal and interest from amounts paid by the Bond Insurer under such Bond Insurance Policy; and

(b) for payments under leases which are required to be capitalized in accordance with generally accepted accounting principles and under installment or lease purchase or conditional sale contracts;

provided, however, that (i) Indebtedness must be incurred or issued in accordance with the terms of the Trust Agreement and shall include only such obligations as are secured by Revenues or other assets of the Monroe Expressway, (ii) Indebtedness shall not include any Appropriation Bonds, and (iii) any obligation to pay a Credit Provider for moneys drawn to purchase, but not pay and retire, Indebtedness shall constitute Indebtedness only to the extent such payments are in excess of any scheduled payments of

principal and interest required to be made to such Credit Provider as an Owner or Holder of such Indebtedness.

The issuance and incurrence of Indebtedness and certain calculations with respect thereto for purposes of the TIFIA Loan Agreement are subject to the terms and provisions described under “General Covenants and Representations – *Special TIFIA Provisions*” below for so long as the TIFIA Bond remains Outstanding.

“*Initial Project*” means the land, easements, rights of way, capital improvements and equipment constituting a turnpike project of the Authority known as the “Monroe Expressway” and generally consisting of a controlled access roadway extending approximately 19.73 miles from US Highway 74 at Interstate 485 in eastern Mecklenburg County, North Carolina, near the Town of Matthews to US Highway 74 near the Town of Marshville in Union County, North Carolina.

“*Insolvency Laws*” means the United States Bankruptcy Code, 11 U.S.C. § 101 et seq., as from time to time amended and in effect, and any state bankruptcy, insolvency, receivership or similar law now or hereafter in effect.

“*Insurance and Condemnation Award Fund*” means the fund created and designated the North Carolina Turnpike Authority Monroe Expressway Insurance and Condemnation Award Fund in the Trust Agreement.

“*Insurance Consultant*” means the Risk Manager for the State Department of Insurance, or, subject to the provisions described under “General Covenants and Representations – *Special TIFIA Provisions*” below for so long as the TIFIA Bond remains Outstanding, any independent Person or firm (a) having all licenses and permits required by the State and a favorable reputation in the State for skill and experience in dealing with the insurance requirements of road and highway systems similar to the Monroe Expressway and in performing the duties to be imposed upon the Insurance Consultant by the Trust Agreement, and (b) if there are any established NCDOT guidelines for such consultants, prequalified to so act under such guidelines.

“*Interest Account*” means the respective accounts in the Senior Lien Debt Service Fund and the Subordinate Lien Debt Service Fund created and so designated in the Trust Agreement.

“*Interest Payment Date*” means, (a) with respect to the Series 2016 Bonds which are Current Interest Bonds, each January 1 and July 1, beginning July 1, 2017, (b) with respect to any Series of Additional Bonds, each of the interest payment dates provided for in the Supplemental Trust Agreement relating to such Series, (c) with respect to Additional Secured Indebtedness, each of the interest payment dates provided for in the agreement relating to such Additional Secured Indebtedness and (d) with respect to the TIFIA Bond, each of the interest payment dates provided for in the TIFIA Loan Agreement.

“*Investment Obligations*” means, subject to the provisions described under “General Covenants and Representations – *Special TIFIA Provisions*” below for so long as the TIFIA Bond remains Outstanding, to the extent permitted by law, any investment authorized by Section 159-30 of the NCGS, as such statute may be amended from time to time, or any successor statute.

“*Junior Indebtedness*” means, subject to the provisions described under “General Covenants and Representations – *Special TIFIA Provisions*” below for so long as the TIFIA Bond remains Outstanding, Indebtedness or obligations of the Authority secured by Revenues with payment fully subordinated to Senior Lien Indebtedness and Subordinate Lien Indebtedness and payable only from the Pledged

Account. Junior Indebtedness is not secured by the Senior Lien Reserve Fund, the Subordinate Lien Reserve Fund or the TIFIA Reserve Fund.

“*Local Government Commission*” means the North Carolina Local Government Commission, a division of the Department of the State Treasurer of the State.

“*Long-Term Debt Service Requirement*” means, for any period of twelve (12) consecutive calendar months for which such determination is made, the aggregate of the required deposits to be made in respect of Principal and interest (whether or not separately stated) on Outstanding Long-Term Indebtedness, or a particular subcategory thereof, during such period, also taking into account:

(a) with respect to Balloon Long-Term Indebtedness, the amount of principal which would be payable in such period if such principal were amortized from the date of incurrence thereof over a period of twenty (20) years (or the actual number of years over which such Balloon Long-Term Indebtedness is being amortized, if greater than twenty (20) years, but in no event greater than forty (40) years) on a level debt service basis at an interest rate equal to the current market rate for an obligation with such assumed amortization as set forth in an opinion of a financial advisor or an investment banking institution knowledgeable in financing of Monroe Expressway delivered to the Trustee as the interest rate at which the Authority could reasonably expect to borrow the same by incurring Indebtedness with the same term as assumed above; provided, however, that if the date of calculation is within twelve (12) calendar months of the actual final maturity date of such Indebtedness, the full amount of principal payable at maturity shall be included in such calculation, unless a binding commitment by an institutional lender or municipal underwriting firm exists, which binding commitment may contain typical and customary conditions, to provide financing to refinance such Indebtedness and such commitment provides for the refinancing of such Indebtedness on terms which would, if such commitment was implemented, constitute Long-Term Indebtedness, then in such case the payment terms contained in such commitment shall be utilized for purposes of calculating the Long-Term Debt Service Requirement with respect to such Balloon Long-Term Indebtedness;

(b) with respect to Long-Term Indebtedness which is Variable Rate Indebtedness, the interest on such Indebtedness shall be calculated at the rate which is equal to the average of the actual interest rates which were in effect (weighted according to the length of the period during which each such interest rate was in effect) for the most recent twelve (12) month period immediately preceding the date of calculation for which such information is available (or shorter period if such information is not available for a twelve (12) month period), except that with respect to new Variable Rate Indebtedness proposed to be incurred, the interest rate for such Variable Rate Indebtedness shall be equal to the running average of the SIFMA Municipal Index for the most recent 52 weeks immediately preceding the date of calculation for which such information is available;

(c) with respect to any Credit Facility, (i) to the extent that such Credit Facility has not been used or drawn upon, the principal and interest relating to such Credit Facility shall not be included in the Long-Term Debt Service Requirement and (ii) to the extent that the Authority has reimbursed a Credit Provider for a drawing on a Credit Facility to pay principal or interest on Indebtedness that is already included in the Long-Term Debt Service Requirement, only the portion of the reimbursement payment that is in excess of the payment of principal and interest paid from the drawing shall be included in the Long-Term Debt Service Requirement; and

(d) with respect to Derivative Indebtedness, during any Derivative Period and for so long as the provider of the Derivative Agreement has not defaulted on its payment obligations under the Derivative Agreement, the amount of interest payable on such Derivative Indebtedness shall be calculated as follows:

(i) for any historical computation of the Long-Term Debt Service Requirement:

(A) if such Derivative Indebtedness bears interest at a variable rate, the amount derived by adding (1) the amount of interest paid by the Authority on such Derivative Indebtedness at such variable rate (calculated as provided in subparagraph (b) above) and (2) the amount paid by the Authority to the provider of the Derivative Agreement relating to such Derivative Indebtedness at the Synthetic Fixed Rate, and subtracting (3) the amount received by the Authority from the provider of such Derivative Agreement at the variable rate specified in the Derivative Agreement (calculated as provided in subparagraph (b) above); and

(B) if such Derivative Indebtedness bears interest at a fixed rate, the amount derived by adding (1) the amount of interest paid by the Authority on such Derivative Indebtedness at such fixed rate and (2) the amount paid by the Authority to the provider of the Derivative Agreement relating to such Derivative Indebtedness at the Synthetic Variable Rate (calculated as provided in subparagraph (b) above) and subtracting (3) the amount received by the Authority from the provider of such Derivative Agreement at the fixed rate specified in the Derivative Agreement; and

(ii) for any projected computation of the Long-Term Debt Service Requirement:

(A) if such Derivative Indebtedness bears interest at a variable rate, at the Synthetic Fixed Rate; and

(B) if such Derivative Indebtedness bears interest at a fixed rate, at the Synthetic Variable Rate (calculated as provided in subparagraph (b) above);

provided, however, that notwithstanding the foregoing, (a) accrued and capitalized interest shall be excluded from the determination of Long-Term Debt Service Requirement to the extent the same is provided from the proceeds of the Long-Term Indebtedness or otherwise provided so as to be available for deposit into an account for capitalized interest or similar account not later than the date of delivery of and payment for such Long-Term Indebtedness; (b) the aggregate amount of payments made with respect principal or interest on Outstanding Long-Term Indebtedness shall not include principal or interest payable from investment earnings on the Senior Lien Debt Service Fund, the Subordinate Lien Debt Service Fund, the Senior Lien Reserve Fund, the Subordinate Lien Reserve Fund, the TIFIA Reserve Fund or any other fund or account established by the Authority that are required to be used, or required to be available to be used, to pay the principal of or interest on Indebtedness; (c) the aggregate of the payments to be made with respect to principal and interest on Outstanding Long-Term Indebtedness shall not include principal or interest payable from Qualified Escrow Funds; and (d) in calculating the Long-Term Debt Service Requirement on Indebtedness, no investment earnings required to be considered by (b) of the Trust Agreement shall be taken into account for periods during which the investments producing such earnings have not been entered into.

Certain calculations with respect to debt service requirements for purposes of the TIFIA Loan Agreement are subject to the terms and provisions described under “General Covenants and Representations – *Special TIFIA Provisions*” below for so long as the TIFIA Bond remains Outstanding.

“*Long-Term Indebtedness*” means all Indebtedness for any of the following:

(a) money borrowed for an original term, or renewable at the option of the Authority for a period from the date originally incurred, of longer than one year;



(b) leases which are required to be capitalized in accordance with generally accepted accounting principles having an original term, or renewable at the option of the Authority for a period from the date originally incurred, of longer than one year; and

(c) installment purchase, installment financing or conditional sale contracts having an original term in excess of one year.

Long-Term Indebtedness shall include Short-Term Indebtedness if a Credit Facility exists to provide financing to retire such Short-Term Indebtedness and such Credit Facility provides for the repayment of principal on terms which would, if such commitment were implemented, constitute Long-Term Indebtedness. Long-Term Indebtedness shall also include the current portion of Long-Term Indebtedness. Long-Term Indebtedness shall only include the obligations described in (a), (b) and (c) to the extent that such obligations are Indebtedness, as defined in the Trust Agreement.

The issuance and incurrence of Long-Term Indebtedness and certain calculations with respect thereto for purposes of the TIFIA Loan Agreement are subject to the terms and provisions described under “General Covenants and Representations – *Special TIFIA Provisions*” below for so long as the TIFIA Bond remains Outstanding.

“*Loss Proceeds*” means any proceeds of insurance resulting from any Event of Loss.

“*Maximum Long-Term Debt Service Requirement*” for a category of debt service means the highest Long-Term Debt Service Requirement for the present Fiscal Year and any succeeding Fiscal Year for the Indebtedness in such category.

Certain calculations with respect to debt service requirements for purposes of the TIFIA Loan Agreement are subject to the terms and provisions of the Trust Agreement for so long as the TIFIA Bond remains Outstanding.

“*Members*” or “*members*” means the individuals appointed to the Authority Board.

“*Moody’s*” means Moody’s Investors Service, Inc., a corporation organized and existing under the laws of the State of Delaware, its successors and assigns, and if such corporation shall be dissolved or liquidated or shall no longer perform the functions of a securities rating agency, “*Moody’s*” shall be deemed to refer to any other nationally recognized securities rating agency identified as such by the Securities and Exchange Commission and designated by the Authority by notice to the Trustee.

“*Monroe Expressway*” or “*System*” means, collectively, the Initial Project and any Additional Projects.

“*Monroe Traffic and Revenue Study*” means the Final Traffic and Revenue Study with respect to the Monroe Expressway, dated November 30, 2016, as it may be amended.

“*NCDOT*” means the North Carolina Department of Transportation, a department of the State, and any successor to its functions.

“*NCGS*” means the North Carolina General Statutes as compiled pursuant to the authority of the General Assembly of the State. Reference to any section, article or chapter of the NCGS includes reference to any amended or successor provision.

*“Net Eminent Domain Proceeds”* means the gross proceeds paid to the Authority or NCDOT as a final award for the taking by Eminent Domain of any of the Monroe Expressway less payment of attorneys’ and other fees and expenses properly incurred in the collection of such gross proceeds.

*“Net Insurance Proceeds”* means the gross proceeds paid to the Authority as a result of any casualty insurance policy with respect to the Monroe Expressway or as a result of any liability insurance policy less payment of attorneys’ and other fees and expenses properly incurred in the collection of such gross proceeds.

*“Non-System Project”* means, subject to the provisions described under “General Covenants and Representations – *Special TIFIA Provisions*” below for so long as the TIFIA Bond remains Outstanding, any additions, acquisitions, improvements, betterments, land, buildings, structures or other facilities, including equipment, acquired or constructed, and the preparation and grading of land, relating to the Monroe Expressway which either are located outside the geographic boundaries of Division 10 of NCDOT or, if located inside the geographic boundaries of Division 10 of NCDOT, have been specifically designated by resolution of the Authority Board as not being part of the Monroe Expressway and are not otherwise thereafter designated as an Additional Project pursuant to Section 715. The term “Non-System Project” does not include any other “Turnpike Project” of the Authority under NCGS Section 136-89.183(a)(2).

*“Officer’s Certificate”* means a certificate signed by an Authorized Officer.

*“Operating Expenses”* means the Authority’s actual expenses for the operation, maintenance and repair of the Monroe Expressway as determined on a cash basis, except as modified by this definition, including, without limiting the generality of the foregoing:

- (a) all ordinary and usual expenses of operation, toll collection, maintenance and repair, which may include expenses not annually recurring;
- (b) direct administrative expenses allocable to the Monroe Expressway;
- (c) salaries, benefits and other compensation allocable to the Monroe Expressway;
- (d) operating lease payments; provided that such lease payments are payable only as an Operating Expense from amounts on deposit in the Operations and Maintenance Expense Fund and are not separately secured by, or payable from Revenues or the Trust Estate;
- (e) payments to any pension or retirement plan or plans properly chargeable to the Authority;
- (f) insurance premiums and expenses;
- (g) engineering and architectural expenses relating to the operation, maintenance or repair of the Monroe Expressway;
- (h) fees and expenses of the Trustee or its counsel, any Bond Registrar, Depository, Traffic Consultant, tender agent, paying agent or Bond Insurer, fees and expenses payable to, or on behalf of, the USDOT, the TIFIA Lender, reasonable legal expenses, Credit Facility fees, remarketing fees and reasonable fees of consultants or professionals, in each case relating to the Monroe Expressway or the Trust Estate;

(i) a share of any toll collection system expenses covering more than just the Monroe Expressway allocated to the Monroe Expressway in accordance with generally accepted accounting principles; and

(j) any other similar-type operating expenses required to be paid by the Authority under the Trust Agreement or by law;

but Operating Expenses shall not include:

(i) any reserves for extraordinary replacements or repairs, including payments from the Renewal and Replacement Fund;

(ii) noncash charges, including any allowance for depreciation or obsolescence charges or reserves therefor, amortization of financing expense, intangibles or other bookkeeping entries of a similar nature;

(iii) any deposits to any fund, account and subaccount created under the Trust Agreement, including the Operating Reserve Fund, or any Supplemental Trust Agreement, or a comparable agreement for Additional Secured Indebtedness and payments of principal, premium, if any, and interest on Indebtedness from such funds, accounts and subaccounts;

(iv) any debt service payments or reserves or deposits for debt service payments in respect of Indebtedness or any lease-purchase or installment financing contracts or any other indebtedness of the Authority not secured by a pledge of and lien on the Revenues; or

(v) any payments made under any Derivative Agreement, whether regularly scheduled payments, termination payments or other payments.

*“Operating Reserve Fund”* means the fund created and designated the North Carolina Turnpike Authority Monroe Expressway Operating Reserve Fund in the Trust Agreement.

*“Operating Reserve Fund Requirement”* means, beginning four (4) months after the Substantial Completion Date, one-fourth (1/4) of the total budgeted Operating Expenses of the Monroe Expressway for the current Fiscal Year, as set forth in the Annual Budget; provided if the Annual Budget for the next succeeding Fiscal Year has been adopted by the Authority and approved by the Secretary of Transportation, the Operating Reserve Fund Requirement shall be the greater of one-fourth (1/4) of the total budgeted Operating Expenses of the Monroe Expressway for the succeeding Fiscal Year or one-fourth (1/4) of the total budgeted Operating Expenses of the Monroe Expressway for the current Fiscal Year.

*“Operations and Maintenance Expense Fund”* means the fund created and designated the North Carolina Turnpike Authority Monroe Expressway Operations and Maintenance Expense Fund in the Trust Agreement.

*“Opinion of Bond Counsel”* means an opinion of Bond Counsel with respect to the matter in question and including, unless the Trustee or the Authority otherwise requests, an opinion to the effect the actions to be taken will have no adverse effect on the federal income tax status of any Bonds the interest on which is intended to exempt from inclusion in gross income for federal income tax purposes.

*“Original Trust Agreement”* means the Trust Agreement dated as of November 1, 2011, between the Authority and the Trustee providing for the issuance of the Series 2011 Bonds.

“*Outstanding*” when used with reference to Bonds means, as of a particular date, all Bonds theretofore authenticated and delivered under the Trust Agreement or a Supplemental Trust Agreement, except:

- (a) Bonds theretofore canceled by the Bond Registrar or delivered to the Bond Registrar for cancellation;
- (b) Bonds which have been redeemed or for which money is on hand and the redemption date has passed;
- (c) Bonds in exchange for or in lieu of which other Bonds have been authenticated and delivered under the Trust Agreement;
- (d) Bonds deemed to have been paid in accordance as a result of defeasance;
- (e) Bonds constituting Put Indebtedness deemed to have been purchased in accordance with the provisions of the applicable Supplemental Trust Agreement in lieu of which other Bonds have been delivered under such Supplemental Trust Agreement; and
- (f) For purposes of exercising rights under the Trust Agreement, Bonds held by or for the benefit of the Authority or NCDOT.

When used with reference to Indebtedness other than Bonds, “*Outstanding*” means, as of a particular date, all such Indebtedness except:

- (i) Indebtedness theretofore canceled by the Authority;
- (ii) Indebtedness for the payment or redemption of which money, Defeasance Obligations, or a combination of both, in an amount sufficient to pay on the date when such Indebtedness is to be paid or redeemed the principal amount of or Redemption Price of, and the interest accruing to such date on, the Indebtedness to be paid or redeemed, has been deposited with an escrow agent in trust for the Holders of such Indebtedness; Defeasance Obligations shall be deemed to be sufficient to pay or redeem Indebtedness on a specified date if the principal and the interest on such Defeasance Obligations, when due, together with any money left uninvested, will be sufficient to pay on such date the principal amount of or Redemption Price of, and the interest accruing on, such Indebtedness to such date;
- (iii) Indebtedness in exchange for or in lieu of which other Indebtedness has been delivered under the documentation securing such Indebtedness;
- (iv) Indebtedness deemed to have been paid in accordance with the defeasance or like provisions of the agreement providing for the issuance of the Indebtedness;
- (v) Indebtedness constituting Put Indebtedness deemed to have been purchased in accordance with the provisions of the applicable agreement in lieu of which other Indebtedness has been incurred under the agreement; and
- (vi) For purposes of exercising rights under the Trust Agreement, Indebtedness held by or for the benefit of the Authority or NCDOT.

“*Outstanding TIFIA Loan Balance*” means the aggregate principal amount drawn by the Authority and then Outstanding (including capitalized interest) with respect to the TIFIA Loan, as determined in accordance with the TIFIA Loan Agreement.

“*Owner*” means a Person in whose name a Bond is registered in the registration books provided for in the Trust Agreement.

“*Parity Debt*” means, collectively, Senior Lien Parity Debt and Subordinate Lien Parity Debt. The issuance and incurrence of Parity Debt other than the Bonds and certain calculations with respect thereto for purposes of the TIFIA Loan Agreement are subject to the terms and provisions described under “General Covenants and Representations – *Special TIFIA Provisions*” below for so long as the TIFIA Bond remains Outstanding.

“*Parity Debt Resolution*” means the resolution and any other documentation adopted or executed and delivered by the Authority providing for the incurrence of Parity Debt. If any Senior Lien Indebtedness is to be the subject of a Credit Facility providing for repayments for draws under the Credit Facility on a parity basis with such Senior Lien Indebtedness, then the term Parity Debt Resolution shall include any reimbursement agreement or similar repayment agreement executed and delivered by the Authority in connection with the provision of a Credit Facility for such Senior Lien Indebtedness. If any Subordinate Lien Indebtedness is to be the subject of a Credit Facility providing for repayments for draws under the Credit Facility on a parity basis with such Subordinate Lien Indebtedness, then the term Parity Debt Resolution shall include any reimbursement agreement or similar repayment agreement executed and delivered by the Authority in connection with the provision of a Credit Facility for such Subordinate Lien Indebtedness.

“*Permitted Encumbrances*” means, subject to the provisions described under “General Covenants and Representations – *Special TIFIA Provisions*” below for so long as the TIFIA Bond remains Outstanding, in addition to any charge created or permitted by the Trust Agreement upon the Monroe Expressway or any part thereof or on the Revenues:

(a) liens for taxes or other governmental charges or levies not delinquent or that are being contested in good faith by the Authority;

(b) (i) covenants, easements, encumbrances, defects of title, reservations, restrictions and conditions existing at the time of delivery of the Series 2016 Bonds and the TIFIA Bond and (ii) defects, irregularities, encumbrances, easements, including easements for roads and public utilities and similar easements, rights of way, mineral conveyances, mineral reservations, and clouds on title, none of which materially impairs the use of the property affected thereby for its intended purposes;

(c) mechanics’, workers’, repairmen’s, architects’, engineers’, surveyors’, or carriers’ liens or other similar liens provided that the same shall be discharged in the ordinary course of business and without undue delay or the validity of the same shall be contested in good faith with any pending execution thereof appropriately stayed;

(d) other liens, charges and encumbrances that, in the written opinion of the Authority Attorney, a copy of which is filed with the Trustee, do not prevent or materially impair the use of the Monroe Expressway (the Authority Attorney may rely upon a certificate of any engineer or any architect as to whether such liens, charges and encumbrances prevent or materially impair the use of the Monroe Expressway);

(e) liens on any Non-System Projects;

(f) encumbrances on property, plant and equipment comprising a part of the Monroe Expressway to the extent permitted by the Trust Agreement;

(g) the pledge of State Appropriated Revenues under the State Appropriation Trust Agreement to secure the Appropriation Bonds; and

(h) any contracts, leases or other agreements to the extent permitted by the Trust Agreement.

*“Permitted Liens”* means:

(a) Liens imposed pursuant to agreements related to the TIFIA Loan Agreement;

(b) Liens imposed by law for taxes that are not yet due or are being contested in compliance with the TIFIA Loan Agreement;

(c) Carriers’, warehousemen’s, mechanics’, materialmen’s, repairmen’s and other similar liens imposed by law, arising in the ordinary course of business and securing obligations that are not overdue by more than thirty (30) days or are being contested in compliance with the TIFIA Loan Agreement;

(d) Pledges and deposits made in the ordinary course of business in compliance with workers’ compensation, unemployment insurance, and other social security laws or regulations;

(e) Deposits to secure the performance of bids, trade contracts, leases, statutory obligations, surety and appeal bonds, performance bonds and other obligations of a like nature, in each case in the ordinary course of business;

(f) Judgment liens in respect of judgments that do not constitute an Event of Default under the TIFIA Loan Agreement;

(g) Easements, zoning restrictions, rights-of-way and similar encumbrances on real property imposed by law or arising in the ordinary course of business that, in any case, do not secure any monetary obligations and do not materially detract from the value of the affected property or interfere with the ordinary conduct of business of the Authority;

(h) any lien on any property or asset of the Authority existing on the date of issuance of the TIFIA Bond; provided that (i) such lien shall not apply to any other property or asset of the Authority and (ii) such lien shall secure only those obligations which it secures on the date of issuance of the TIFIA Bond and extensions, renewals and replacements thereof that do not increase the outstanding principal amount thereof;

(i) any lien existing on any property or asset prior to the acquisition thereof by the Authority; provided that (i) such lien is not created in contemplation of or in connection with such acquisition, (ii) such lien shall apply solely to the acquired asset and not to any other property or assets of the Authority, and (iii) such lien shall secure only those obligations which it secures on the date of such acquisition, and extensions, renewals and replacements thereof that do not increase the outstanding principal amount thereof; and

(j) purchase money security interests in equipment hereafter acquired by the Authority; provided that (i) such security interests secure indebtedness for borrowed money permitted by the TIFIA Loan Agreement, (ii) such security interests are incurred, and the indebtedness secured thereby is created,

within ninety (90) days after such acquisition, (iii) the indebtedness secured thereby does not exceed the fair market value of such equipment at the time of such acquisition, and (iv) such security interests do not apply to any other property or assets (other than accessions to such equipment) of the Authority.

“*Person*” includes corporations, firms, associations, partnerships, joint ventures, joint stock companies, trusts, unincorporated organizations, and public bodies, as well as natural persons.

“*Pledged Account*” means the account of that name within the General Reserve Fund.

“*Predecessor Bonds*” of any particular Bond means every previous Bond evidencing all or a portion of the same debt as that evidenced by such particular Bond; and, for purposes of this definition, any Bond authenticated and delivered under the Trust Agreement in lieu of a lost, destroyed or stolen Bond shall be deemed to evidence the same debt as the lost, destroyed or stolen Bond.

“*Principal*” or “*principal*” means (a) with respect to any Current Interest Bond, the principal amount of such Bond payable at maturity or in satisfaction of a Sinking Fund Requirement, if applicable, (b) with respect to any Convertible CAB Bond, the Accreted Amount thereof through and after the respective Convertible CAB Bond Conversion Date, except as used in connection with the authorization and issuance of Bonds and with the order of priority of payments of Bonds after an Event of Default, in which cases “*Principal*” or “*principal*” means, if on or before the Convertible CAB Bond Conversion Date, the initial principal amount of a Convertible CAB Bond and the difference between the Accreted Amount and the initial principal amount shall be deemed to be interest, or, if after the Convertible CAB Bond Conversion Date, the Accreted Amount as of such Convertible CAB Bond Conversion Date, and (c) with respect to any Capital Appreciation Bond, the Accreted Amount thereof (the difference between the stated amount to be paid at maturity and the Accreted Amount being deemed unearned interest), except as used in connection with the authorization and issuance of Bonds and with the order of priority of payments of Bonds after an Event of Default, in which cases “*Principal*” or “*principal*” means the initial principal amount of a Capital Appreciation Bond and the difference between the Accreted Amount and the initial principal amount shall be deemed to be interest.

“*Principal Account*” means the respective accounts in the Senior Lien Debt Service Fund and the Subordinate Lien Debt Service Fund created and so designated in the Trust Agreement.

“*Principal Payment Date*” means any date established by the Trust Agreement, the TIFIA Loan Agreement or any Supplemental Trust Agreement, or comparable agreement for Additional Secured Indebtedness for the payment of principal of Bonds or such Additional Secured Indebtedness, whether upon redemption, at maturity or pursuant to an amortization requirement or otherwise.

“*Principal Project Contracts*” means (a) the main construction agreement, for the Monroe Expressway, also known as the Design-Build Contract; (b) the major agreements with third parties as to tolling service; (c) any other contract to complete the construction of the Project or for operation and maintenance of the Monroe Expressway or capital improvements to the Monroe Expressway, in any such case, requiring payments by the Authority or NCDOT in excess of \$5,000,000, as adjusted, per annum; (d) any other contract entered into by the Authority relating to the Monroe Expressway designated as a Principal Project Contract by both the TIFIA Lender and the Authority or NCDOT; and (e) any document that replaces or supplements any of the agreements listed above.

“*Project Accounts*” means the Project Fund, Revenue Fund, Senior Lien Debt Service Fund, Senior Lien Reserve Fund, Subordinated Lien Debt Service Fund, Subordinated Lien Reserve Fund, TIFIA Reserve Fund, Renewal and Replacement Fund, Operations and Maintenance Expense Fund, Operating Reserve Fund, TIFIA Scheduled Prepayment Fund, General Reserve Fund (other than the

Unpledged Account therein) and Insurance and Condemnation Award Fund, and the accounts and subaccounts in any of the foregoing.

“*Project Fund*” means the fund created and designated the North Carolina Turnpike Authority Monroe Expressway Project Fund in the Trust Agreement.

“*Put Indebtedness*” means, subject to the provisions described under “General Covenants and Representations – *Special TIFIA Provisions*” below for so long as the TIFIA Bond remains Outstanding, fixed or variable rate Long-Term Indebtedness 25% or more of the principal of which may, at the option of the Owner or Holder thereof, be tendered to the Authority, the Trustee, a Depository or a paying agent or other fiduciary, or an agent of any of the foregoing, for payment or purchase at one time.

“*Qualified Escrow Funds*” means amounts deposited in a segregated escrow fund or other similar fund or account in connection with the issuance of Long-Term Indebtedness which fund or account is required by the documents establishing such fund or account to be applied toward the Authority’s payment obligations with respect to principal or interest on (a) the Long-Term Indebtedness which is incurred under the documents establishing such fund or account or (b) Long-Term Indebtedness which is incurred prior to the establishment of such fund or account.

“*Ramp-Up Reserve Account*” means the account of that name within the General Reserve Fund.

“*Redemption Account*” means the respective accounts in the Senior Lien Debt Service Fund and the Subordinate Lien Debt Service Fund created and so designated in the Trust Agreement.

“*Redemption Price*” means, with respect to any Indebtedness or portion thereof, the principal amount of such Indebtedness or portion called for redemption plus the applicable premium, if any, payable upon redemption thereof.

“*Regular Record Date*” means, with respect to any Series of Bonds, the regular record date, if any, provided for the Trust Agreement or in the Supplemental Trust Agreement relating to such Series.

“*Renewal and Replacement Fund*” means the fund created and designated the North Carolina Turnpike Authority Monroe Expressway Renewal and Replacement Fund in the Trust Agreement.

“*Renewal and Replacement Fund Requirement*” means, beginning in the first full Fiscal Year after the Substantial Completion Date, an amount equal to (a) one hundred percent (100%) of the total budgeted renewal and replacement costs for the Monroe Expressway for the current Fiscal Year plus (b) one-tenth (1/10) of the total budgeted renewal and replacement costs from Revenues for the Monroe Expressway for the next succeeding nine Fiscal Years as set forth in the Annual Budget and Capital Improvement Plan adopted by the Authority and approved by the Secretary of Transportation.

“*Reserve Alternative Instrument*” means, subject to the provisions described under “General Covenants and Representations – *Special TIFIA Provisions*” below for so long as the TIFIA Bond remains Outstanding, an unconditional insurance policy or surety bond or irrevocable letter of credit or guaranty deposited in the Senior Lien Reserve Fund, the Subordinate Lien Reserve Fund, the TIFIA Reserve Fund or a separate reserve account created solely for a Series of Bonds as provided in a Supplemental Trust Agreement in lieu of or in partial substitution for the deposit of cash and Investment Obligations in satisfaction of all or a portion of the Senior Lien Reserve Requirement, the Subordinate Lien Reserve Requirement, the TIFIA Reserve Fund Requirement or a comparable requirement under a Supplemental Trust Agreement or the TIFIA Loan Agreement. The Reserve Alternative Instrument shall be payable (upon the giving of notice as required thereunder) to remedy any deficiency in the appropriate



subaccounts in the Interest Account, the Principal Account and the Sinking Fund Account of the Senior Lien Debt Service Fund or the Subordinate Lien Debt Service Fund, as the case may be, in order to provide for the timely payment of interest and principal (whether at maturity or pursuant to Sinking Fund Requirements therefor). Except as may be provided in a Supplemental Trust Agreement, the provider of a Reserve Alternative Instrument shall be (a) an insurer that has been assigned either (i) one of the two highest policyholder ratings accorded insurers by A. M. Best & Co. or any comparable service or (ii) for bonds insured by the provider of the Reserve Alternative Instrument, a rating by Fitch, Moody's or S&P in one of the two highest rating categories (without regard to gradations within such categories) or (b) a commercial bank, insurance company or other financial institution the bonds payable or guaranteed by which have been assigned a rating by either Fitch, Moody's or S&P in one of the two highest rating categories (without regard to gradations within such categories).

*"Reserve Funds"* means the Senior Lien Reserve Fund, the Subordinate Lien Reserve Fund, the TIFIA Reserve Fund, the Renewal and Replacement Fund and the Operating Reserve Fund.

*"Restricted Payment Conditions"* means each of the following conditions:

(a) no event of default under the TIFIA Loan Agreement, or any event that with the giving of notice or the passage of time, or both, would constitute an event of default, has occurred and is continuing under the TIFIA Loan Agreement, any other related document or documentation for other Secured Indebtedness (if any), or, in each case, would occur as a direct result of the applicable transfer;

(b) the reserve funds are each fully funded at their respective requirements;

(c) (i) the Senior Debt Service Coverage Ratio as of the most recent Calculation Date is, and was for each of the two previous Calculation Dates, equal to at least 140%, (ii) the Total Debt Service Coverage Ratio as of such Calculation Date is, and was for each of the two previous Calculation Dates, equal to at least 130% and (iii) the TIFIA Loan Life Coverage Ratio as of such Calculation Date is, and was for each of the two previous Calculation Dates, equal to at least 130%;

(d) (i) the Senior Debt Service Coverage Ratio projected for each Calculation Date through the Final Maturity Date for the TIFIA Bond is equal to at least 140%, (ii) the Total Debt Service Coverage Ratio projected for each Calculation Date through the Final Maturity Date for the TIFIA Bond is equal to at least 130% and (iii) the TIFIA Loan Life Coverage Ratio projected for each Calculation Date through the Final Maturity Date is equal to at least 130%;

(e) no event of default under the Principal Project Contracts;

(f) the Authority is not insolvent and would not be rendered insolvent by the making of the proposed payment; and

(g) the fifth anniversary of the Substantial Completion Date has occurred.

*"Revenue Bond Act"* means Article 5 of Chapter 159, as amended, of the NCGS.

*"Revenue Bond Anticipation Notes"* means, subject to the provisions described under "General Covenants and Representations – *Special TIFIA Provisions*" below for so long as the TIFIA Bond remains Outstanding, any revenue bond anticipation notes issued by the Authority in compliance with the provisions of the Trust Agreement.

“*Revenue Fund*” means the fund created and designated the North Carolina Turnpike Authority Monroe Expressway Revenue Fund in the Trust Agreement.

“*Revenues*” for purposes of the Trust Agreement means revenues of the Monroe Expressway, as determined in accordance with generally accepted accounting principles; provided, however, that “*Revenues*” shall include, without limiting the generality of the foregoing:

(a) all toll revenues, payments, proceeds, fees, charges, rents and all other income derived by or for the Authority from the ownership and operation of the Monroe Expressway, and all other income derived by the Authority from the operation or ownership of the Monroe Expressway, and all rights to receive the same, whether in the form of accounts receivable, contract rights or other rights, and the proceeds of such rights whether now owned or held or hereafter coming into existence;

(b) proceeds of use and occupancy or business interruption insurance and amounts received by the Authority from any contractor as liquidated damages for failures of such contractor to complete its contractual commitment in accordance with the terms of the contract;

(c) proceeds of any appropriation made by the federal government or any agency or instrumentality thereof or the State or any agency, instrumentality or political subdivision thereof for use in connection with the Monroe Expressway, to the extent such proceeds are deposited in the Revenue Fund and are available for use in the same manner as other Revenues under the provisions of the Trust Agreement, including, without limitation, the State Appropriated Revenues with respect to Appropriation Bonds; provided, however, that the State Appropriated Revenues with respect to Appropriation Bonds shall not constitute Revenues under the Trust Agreement until such time as such amounts are withdrawn from the State Appropriation Trust Agreement and deposited to the Revenue Fund and cannot be included in projections of any Revenues;

(d) the net proceeds from the sale or disposition of all or any part of the Monroe Expressway;

(e) any Derivative Agreement Regularly Scheduled Payments or Derivative Agreement Additional Payments received by the Authority under any Derivative Agreement; and

(f) the investment income realized on, and the income and gains realized upon the maturity or sale of, securities held by or on behalf of the Authority in the Revenue Fund;

but there shall not be included in “*Revenues*”:

(i) the proceeds of any gifts, grants, bequests, contributions or donations (except as provided in clause (c) above in this definition);

(ii) reimbursements received by the Authority of advances made by it in respect of (i) the Initial Project, (ii) any Additional Project, (iii) any refinancing of Indebtedness and (iv) any capital improvements;

(iii) the investment income realized on, and the income and gains realized upon the maturity or sale of, securities held by or on behalf of the Authority in any funds, accounts and subaccounts established pursuant to the Trust Agreement (other than the Revenue Fund), except to the extent that such investment income is transferred by the Authority to the Revenue Fund;

(iv) any payments received or revenues derived from the ownership or operation of any Non-System Project, except to the extent expressly included as Revenues by resolution adopted by the Authority Board;

(v) Net Insurance Proceeds or Net Eminent Domain Proceeds other than the net proceeds of any use and occupancy or business interruption insurance;

(vi) proceeds of any appropriation made by the federal government or any agency or instrumentality thereof or the State or any agency, instrumentality or political subdivision thereof to the extent the use of such funds is limited to a use that is inconsistent with their use as Revenues under the provisions of the Trust Agreement;

(vii) the income from the investment of Qualified Escrow Funds to the extent such income is applied to the payment of the principal of or the interest on Long-Term Indebtedness which is excluded from the determination of the Long-Term Debt Service Requirement;

(viii) the proceeds of any security deposits or moneys received to make refunds to users of the Monroe Expressway;

(ix) the proceeds of any Indebtedness of the Authority; and

(x) any amounts paid to NCDOT and not the Authority unless there are specific indications such amounts are with respect to the Monroe Expressway.

“S&P” means S&P Global Ratings, a business unit of Standard & Poor’s Financial Services LLC, and its successors and assigns, and if such entity shall be dissolved or liquidated or shall no longer perform the functions of a securities rating agency, “S&P” shall be deemed to refer to any other nationally recognized securities rating agency identified as such by the Securities and Exchange Commission and designated by the Authority by notice to the Trustee.

“*Secretary of Transportation*” means the Secretary of Transportation of the State acting as the head of the NCDOT.

“*Securities Depository*” means the Depository Trust Company, New York, New York, or any other recognized securities depository selected by the Authority, which maintains a book-entry system in respect of a Series of Bonds, and shall include any substitute for or successor to the securities depository initially acting as Securities Depository.

“*Securities Depository Nominee*” means, as to any Securities Depository, such Securities Depository or the nominee of such Securities Depository in whose name there shall be registered on the registration books maintained by the Bond Registrar the Bond certificates to be delivered to and immobilized at such Securities Depository during the continuation with such Securities Depository of participation in its book-entry system.

“*Senior Debt Service*” means, with respect to the Senior Lien Indebtedness, for any period, as of any date of calculation, an amount equal to the sum of all interest and principal of Senior Lien Indebtedness due and payable in respect of such period.

“*Senior Debt Service Coverage Ratio*” means (a) for any historical calculation, for any Calculation Period, the ratio of (i) the sum of (A) the Project Revenues, as defined in the TIFIA Loan Agreement, for such Calculation Period, and (B) the State Appropriated Revenues deposited in the

Revenue Fund during such Calculation Period to (ii) Senior Debt Service for such Calculation Period and (b) projected, for any Calculation Period, the ratio of (x) Project Revenues for such Calculation Period to (y) Senior Debt Service for such Calculation Period.

“*Senior Lien Bonds*” means the Series 2016 Bonds and any Additional Bonds issued under the provisions of the Trust Agreement and secured on a parity basis with such Series 2016 Bonds, each other and any Senior Lien Parity Debt and Senior Lien Derivative Agreement Regularly Scheduled Payments by the Trust Agreement. “Senior Lien Bonds” includes the TIFIA Bond upon the occurrence of a Bankruptcy Related Event relating to the Authority.

“*Senior Lien Debt Service Fund*” means the fund created and designated the North Carolina Turnpike Authority Monroe Expressway Senior Lien Debt Service Fund in the Trust Agreement.

“*Senior Lien Derivative Agreement Regularly Scheduled Payments*” means any Derivative Agreement Regularly Scheduled Payments with respect to Derivative Indebtedness constituting Senior Lien Indebtedness.

“*Senior Lien Indebtedness*” means, collectively, the Senior Lien Bonds and Senior Lien Parity Debt.

“*Senior Lien Parity Debt*” means all Indebtedness incurred by the Authority in respect of the Monroe Expressway and not evidenced by Bonds which is secured on a parity basis (as so designated in the Parity Debt Resolution) with the Senior Lien Bonds by a pledge, charge and lien upon the Revenues as provided in the Trust Agreement.

“*Senior Lien Reserve Fund*” means the fund created and designated the North Carolina Turnpike Authority Monroe Expressway Senior Lien Reserve Fund in the Trust Agreement.

“*Senior Lien Reserve Requirement*” means, initially, as of the time of issuance of the Series 2016 Bonds, \$11,833,180.22, and after the issuance of any Additional Bonds which are Senior Lien Bonds, the least of (i) the Maximum Long-Term Debt Service Requirement for all Outstanding Senior Lien Bonds, (ii) 125% of the average annual Long-Term Debt Service Requirement for all Outstanding Senior Lien Bonds and (iii) 10% of the stated principal amount of all Outstanding Senior Lien Bonds; provided, however, that if any Series of Senior Lien Bonds has an original issue discount or premium that exceeds 2% of the stated redemption price at maturity plus any original issue premium attributable exclusively to underwriter’s compensation, the initial offering prices to the public shall be used in lieu of the stated principal amount for purposes of the 10% limitation; and provided further, for purposes of this definition, “Long-Term Debt Service Requirement” shall be calculated as including debt service on any Short-Term Indebtedness. The Senior Lien Reserve Requirement may be composed of cash, Investment Obligations or Reserve Alternative Instruments, or any combination of the foregoing, as the Authority may determine.

“*Senior Lien Resolution*” means the Trust Agreement and any Supplemental Trust Agreement for Senior Lien Bonds or Parity Debt Resolution for Senior Lien Parity Debt, or both, as the case may be, authorizing the issuance of a Series of Senior Lien Bonds or the incurrence of Senior Lien Parity Debt or relating thereto. For as long as the TIFIA Bond is a Senior Lien Bond, “Senior Lien Resolution” includes the TIFIA Loan Agreement.

“*Separate Reserve Fund*” means any reserve fund or account securing Senior Lien Indebtedness or Subordinate Lien Indebtedness, which is not secured by the Senior Lien Reserve Fund, the Subordinate Lien Reserve Fund or the TIFIA Reserve Fund.

“*Serial Bonds*” means the TIFIA Bond and the Bonds of any other Series that are stated to mature in consecutive annual installments.

“*Series*” whenever used in the Trust Agreement with respect to Bonds, means all of the Bonds designated as being of the same series.

“*Series 2011 Bonds*” means the Authority’s Monroe Connector System Senior Lien Turnpike Revenue Bonds, Series 2011 issued under the Original Trust Agreement in the aggregate principal amount or \$10,000,000 and refunded on the date of issuance of the Series 2016 Bonds.

“*Series 2011 Escrow Fund*” means the fund created and designated the North Carolina Turnpike Authority Monroe Expressway Series 2011 Escrow Fund in the Trust Agreement.

“*Series 2016 Bonds*” means the Series 2016A Bonds and the Series 2016C Bonds.

“*Series 2016A Bonds*” means the Authority’s Monroe Expressway Toll Revenue Bonds, Series 2016A in the aggregate principal amount of \$119,455,000.

“*Series 2016A Term Bonds*” means the Series 2016A Bonds maturing in 2047, 2051 and 2054.

“*Series 2016C Bonds*” means the Authority’s Monroe Expressway Toll Revenue Bonds, Series 2016C (Capital Appreciation Bonds), in the initial aggregate principal amount of \$17,596,904.35 and an aggregate maturity amount of \$41,860,000.

“*Short-Term Indebtedness*” means, subject to the provisions described under “General Covenants and Representations – *Special TIFIA Provisions*” below for so long as the TIFIA Bond remains Outstanding, all Indebtedness incurred for borrowed money other than the current portion of Long-Term Indebtedness for any of the following:

- (a) money borrowed for an original term, or renewable at the option of the borrower for a period from the date originally incurred, of one year or less;
- (b) leases which are capitalized in accordance with generally accepted accounting principles having an original term, or renewable at the option of the lessee for a period from the date originally incurred, of one year or less; and
- (c) installment purchase, installment financing or conditional sale contracts having an original term of one year or less.

“*Sinking Fund Account*” means the respective accounts in the Senior Lien Debt Service Fund and the Subordinate Lien Debt Service Fund created and so designated by the provisions the Trust Agreement.

“*SIFMA Municipal Index*” means The Securities Industry and Financial Markets Association Municipal Swap Index or such other weekly, high-grade index comprised of seven-day, tax-exempt multi-modal notes produced by Municipal Market Data, Inc., or its successor, or as otherwise designated by The Securities Industry and Financial Markets Association; provided, however, that if such index is no longer produced by Municipal Market Data, Inc. or its successor, then “*SIFMA Municipal Index*” means such other reasonably comparable index selected by the Authority.

“*Sinking Fund Requirement*” means, with respect to the Term Bonds which are Series 2016 Bonds and for any Bond Year, the principal amount fixed or computed for retirement by purchase or

redemption on or prior to January 1 and, with respect to the Term Bonds which are Additional Bonds, the Sinking Fund Requirement provided in the Supplemental Trust Agreement relating to such Series.

The Sinking Fund Requirements for the Term Bonds which are Series 2016 Bonds shall be initially the respective principal amounts of such Term Bonds for retirement on each July 1 as fixed in Section 302. If during any Bond Year, the total principal amount of Term Bonds retired by purchase or redemption under the provisions of the Trust Agreement shall be greater than the amount of the Sinking Fund Requirement for such Term Bonds, the subsequent Sinking Fund Requirements for such Term Bonds shall be reduced in such amount aggregating the amount of such excess as shall be specified in an Officer's Certificate filed with the Trustee on or prior to November 15 of the next ensuing Bond Year.

*"Special Record Date"* means a date fixed by the Trustee for determining the Owner of Bonds for the payment of Defaulted Interest pursuant to the Trust Agreement.

*"State"* means the State of North Carolina.

*"State Appropriated Revenues"* means any funds appropriated by the State pursuant to NCGS 136-176 or other legislation enacted by the General Assembly of the State providing for the annual appropriation of funds to the Authority to pay debt service on bonds or other indebtedness issued or incurred to finance the construction of the Monroe Expressway or to fund debt service reserves, operating reserves or similar reserves in connection therewith. State Appropriated Revenues do not constitute Revenues except to the extent such are transferred from the State Appropriation Trust Agreement to the Trust Estate.

*"State Appropriation Trust Agreement"* means the Trust Agreement, dated as of October 1, 2010, as supplemented, between the Authority and the Trustee as trustee thereunder, authorizing, among other things, the issuance of Appropriation Bonds thereunder secured by the State Appropriated Revenues to pay a portion of the Costs of the Initial Project.

*"STIP Funds"* means the \$22,000,000 in funds from the NCDOT State Transportation Improvement Plan for the Monroe Expressway. The contribution of the STIP Funds is not a loan or Indebtedness under the Trust Agreement.

*"Subordinate Debt Service"* means, with respect to the Subordinate Lien Indebtedness, for any period, as of any date of calculation, an amount equal to the sum of all interest and principal of additional Subordinate Lien Indebtedness due and payable in respect of such period.

*"Subordinate Lien Bonds"* means, (a) unless a Bankruptcy Related Event relating to the Authority has occurred, the TIFIA Bond and (b) any Additional Bonds issued under the provisions of the Trust Agreement and secured on a parity basis with any Subordinate Lien Parity Debt and Subordinate Lien Derivative Agreement Regularly Scheduled Payments by the Trust Agreement. Upon the occurrence of a Bankruptcy Related Event relating to the Authority, the TIFIA Bond shall be a Senior Lien Bond.

*"Subordinate Lien Debt Service Fund"* means the fund created and designated the North Carolina Turnpike Authority Monroe Expressway Subordinate Lien Debt Service Fund by Section 501.

*"Subordinate Lien Derivative Agreement Regularly Scheduled Payments"* means any Derivative Agreement Regularly Scheduled Payments with respect to Derivative Indebtedness constituting Subordinate Lien Indebtedness.

*“Subordinate Lien Indebtedness”* means, collectively, the Subordinate Lien Bonds and Subordinate Lien Parity Debt.

*“Subordinate Lien Parity Debt”* means all Indebtedness incurred by the Authority in respect of the Monroe Expressway and not evidenced by Subordinate Lien Bonds which is secured on parity (as so designated in the Parity Debt Resolution) with the Subordinate Lien Bonds by a pledge, charge and lien upon the Revenues as provided in the Trust Agreement.

*“Subordinate Lien Reserve Fund”* means the fund created and designated the North Carolina Turnpike Authority Monroe Expressway Subordinate Lien Reserve Fund by Section 501.

*“Subordinate Lien Reserve Requirement”* means the amount described in the Supplemental Trust Agreement providing for the issuance of Subordinate Lien Bonds under the Trust Agreement.

*“Subordinate Lien Resolution”* means the Trust Agreement and any Supplemental Trust Agreement for Subordinate Lien Bonds or Parity Debt Resolution for Subordinate Lien Parity Debt, or both, as the case may be, authorizing the issuance of a Series of Subordinate Lien Bonds or the incurrence of Subordinate Lien Parity Debt. For so long as the TIFIA Bond is a Subordinate Lien Bond, “Subordinate Lien Resolution” includes the TIFIA Loan Agreement.

*“Substantial Completion Date”* means (a) for the Initial Project, the date on which the Initial Project is open to vehicular or passenger traffic, and (b) for any Additional Project, the date it is opened to vehicular or passenger traffic or made available for use by the Authority, as certified by the Authority pursuant to Section 407.

*“Supplemental Trust Agreement”* means an order or resolution of the Authority authorizing any particular Series of Bonds, together with a supplemental trust agreement executed and delivered by the Authority in connection with the issuance of such Series of Bonds that is required to be executed and delivered by the Trust Agreement prior to the issuance of any such Series.

*“Synthetic Fixed Rate”* means Synthetic Fixed Rate as defined in the definition of Derivative Indebtedness.

*“Synthetic Variable Rate”* means Synthetic Variable Rate as defined in the definition of Derivative Indebtedness.

*“System”* or *“Monroe Expressway”* means, collectively, the Initial Project and any Additional Projects.

*“Term Bonds”* means the Bonds of any Series, other than Serial Bonds, that are designated as such in the Trust Agreement or the Supplemental Trust Agreement for such Series.

*“TIFIA Bond”* means the bond of the Authority evidencing the obligation of the Authority to repay the TIFIA Indebtedness. Prior to the occurrence of a Bankruptcy Related Event relating to the Authority, the TIFIA Bond is a Subordinate Lien Bond and upon and after the occurrence of a Bankruptcy Related Event relating to the Authority the TIFIA Bond is a Senior Lien Bond.

*“TIFIA Debt Service”* means the principal portion of the Outstanding TIFIA Loan Balance and any interest payable thereon (including interest accruing after the date of any filing by the Authority of any petition in bankruptcy or the commencement of any bankruptcy, insolvency or similar proceeding with respect to the Authority), in each case, (a) as set forth in the TIFIA Loan Agreement, and (b) due and

payable on any payment date therefor in accordance with the provisions of the TIFIA Loan Agreement. Any reference in the Trust Agreement to “TIFIA Debt Service” does not include TIFIA Scheduled Prepayment Amounts.

“*TIFIA Debt Service Payment Commencement Date*” the first Interest Payment Date immediately following the second anniversary of the Substantial Completion Date.

“*TIFIA Indebtedness*” means the loan from the TIFIA Lender, to the Authority, as borrower, pursuant to the Transportation Infrastructure Finance and Innovation Act of 1998, as codified as 23 U.S.C. §601 *et seq.*, in an initial aggregate principal amount of up to \$166,500,000 pursuant to the TIFIA Loan Agreement, as the same may be amended from time to time, with respect to the Monroe Expressway, and secured by a pledge, charge and lien on the Revenues. Prior to the occurrence of a Bankruptcy Related Event relating to the Authority, the TIFIA Indebtedness is a Subordinate Lien Bond and upon and after the occurrence of a Bankruptcy Related Event relating to the Authority the TIFIA Indebtedness is a Senior Lien Bond.

“*TIFIA Lender*” means the United States Department of Transportation, acting by and through the Executive Director of the Build America Bureau.

“*TIFIA Loan Agreement*” means the loan agreement between the Authority and the TIFIA Lender with respect to the Monroe Expressway dated January 31, 2017, as the same may be amended from time to time.

“*TIFIA Loan Life Coverage Ratio*” means, as of each applicable Calculation Date, the ratio of (a) the present value of all projected Project Revenues, as defined in the TIFIA Loan Agreement, for each Calculation Date from and including such Calculation Date to the final maturity date under the TIFIA Loan Agreement, in each case, discounted at the Weighted Average Interest Cost, using the most recent revised financial model (or in the Base Case Financial Model to the extent that no revised financial model has been approved by the TIFIA Lender), adjusted to take into account (i) actual results and updated revenue and traffic projections based on a certified independent forecast provided by the Traffic Consultant and (ii) additional projected Project Revenues and Senior Debt Service and Subordinate Debt Service in connection with Additional Secured Indebtedness; to (b) the aggregate Outstanding principal amount of all Senior Lien Indebtedness and Subordinate Lien Indebtedness on such Calculation Date.

“*TIFIA Reserve Fund*” means the fund created and designated the North Carolina Turnpike Authority Monroe Expressway TIFIA Reserve Fund in the Trust Agreement.

“*TIFIA Reserve Fund Requirement*” means, on the date of issuance of the TIFIA Bond, the amounts set forth in the TIFIA Loan Agreement, and on the date the final draw is disbursed on the TIFIA Loan and thereafter, the least of (i) the maximum annual debt service requirement for the TIFIA Bond, (ii) 125% of the average annual TIFIA Debt Service and (iii) 10% of the Outstanding TIFIA Loan Balance.

“*TIFIA Scheduled Prepayment Amount*” means the amount shown for a period on the schedule of such amounts set forth in the TIFIA Loan Agreement.

“*TIFIA Scheduled Prepayment Fund*” means the fund created and designated the North Carolina Turnpike Authority Monroe Expressway TIFIA Scheduled Prepayment Fund in the Trust Agreement.

“*Total Debt Service Coverage Ratio*” means (a) for any historical calculation, for any Calculation Period, the ratio of (i) the sum of (A) the Project Revenues (as such term is defined in the TIFIA Loan



Agreement) for such Calculation Period, and (B) the State Appropriated Revenues deposited in the Revenue Fund during such Calculation Period to (ii) the sum of (A) Senior Debt Service for such Calculation Period and (B) Subordinate Debt Service for such Calculation Period and (b) projected, for any Calculation Period, the ratio of (x) Project Revenues for such Calculation Period to (y) the sum of (I) Senior Debt Service for such Calculation Period and (II) Subordinate Debt Service for such Calculation Period.

“*Traffic Consultant*” means CDM Smith or, subject to the provisions described under “General Covenants and Representations – *Special TIFIA Provisions*” below for so long as the TIFIA Bond remains Outstanding, any independent traffic and revenue consultant or firm of traffic and revenue consultants (1) having a favorable reputation for skill and experience in performing the duties for which such consultant is required to be employed pursuant to the provisions of the Trust Agreement, and (2) if there are any established NCDOT guidelines for such consultants, prequalified to so act under such guidelines.

“*Treasury Secretary*” means the Secretary of the Treasury of the United States or a designee.

“*Trust Agreement*” means the Original Trust Agreement as supplemented by the Trust Agreement amending and restating the Original Trust Agreement, and any supplements and amendments thereto permitted; provided, however, that the Trust Agreement shall not include any Supplemental Trust Agreement executed and delivered by the Authority and the Trustee with respect to a particular Series of Bonds to the extent it has provisions relating solely to such Series.

“*Trust Agreement Documents*” means the Trust Agreement, each Supplemental Trust Agreement, the Appropriation Trust Agreement, each Credit Facility, and each other agreement, instrument and document executed and delivered pursuant to or in connection with any of the foregoing, and any amendments thereto.

“*Trust Estate*” means (a) the money and Investment Obligations in the Project Fund, the Revenue Fund, the Senior Lien Debt Service Fund, the Subordinate Lien Debt Service Fund, the Senior Lien Reserve Fund, the Subordinate Lien Reserve Fund, the TIFIA Reserve Fund, the Insurance and Condemnation Award Fund, the TIFIA Scheduled Prepayment Fund, the Ramp-Up Reserve Account and the Pledged Account under the Trust Agreement and accounts established under the Supplemental Trust Agreements relating to their issuance, except that the Senior Lien Debt Service Fund and the Senior Lien Reserve Fund shall be held solely for the benefit of the Senior Lien Parity Debt secured thereby, the Subordinate Lien Debt Service Fund and Subordinate Lien Reserve Fund shall be held solely for the benefit of the Subordinate Lien Parity Debt secured thereby, the TIFIA Reserve Fund and the TIFIA Scheduled Prepayment Fund shall be held solely for the benefit of the holder of the TIFIA Bond, the Series 2011 Escrow Fund shall be held solely for the benefit of the holders of the Series 2011 Bonds, and any fund or account created by a Supplemental Trust Agreement to the extent such Supplemental Trust Agreement expressly excludes such fund or account, (b) the Revenues and the right to receive the same, (c) unless otherwise provided in the Trust Agreement or in a Supplemental Trust Agreement, the rights to the amounts payable to the Authority under any Credit Facility and (d) the rights to amounts payable to the Authority or the Trustee pursuant to any Derivative Agreement.

“*Trustee*” means the Trustee serving as such under the Trust Agreement, whether original or successor.

“*Unpledged Account*” means the account of that name within the General Reserve Fund.

“*USDOT*” means the United States Department of Transportation.

*“Variable Rate Indebtedness”* means, subject to the provisions described under “General Covenants and Representations – *Special TIFIA Provisions*” below for so long as the TIFIA Bond remains Outstanding, any portion of Indebtedness the interest rate on which is not established at the time of incurrence at a fixed or constant rate.

*“Weighted Average Interest Cost”* means, for each semiannual Interest Payment Date, a rate calculated as follows: the sum of (a) the applicable true interest cost(s) for the Senior Lien Indebtedness multiplied by the ratio of (i) the current Senior Lien Indebtedness principal amount then outstanding to (ii) the aggregate principal amount of each of the Senior Lien Indebtedness and the Subordinate Lien Indebtedness as of such Interest Payment Date; and (b) the interest rate on the Subordinate Lien Indebtedness multiplied by the ratio of (i) the Subordinate Lien Indebtedness principal amount then outstanding to (ii) the aggregate principal amount of each of the Senior Lien Indebtedness and the Subordinate Lien Indebtedness as of such Interest Payment Date.

## **Summary of the Trust Agreement**

### **Bond Terms**

*Details of Bonds.* Wells Fargo Bank, N.A., Jacksonville, Florida is the appointed Bond Registrar for the Series 2016 Bonds. Series 2016 Bonds are issuable in fully registered form in denominations (maturity amount for Capital Appreciation Bonds) of \$5,000 or any whole multiple thereof, shall be lettered “R-” and shall be numbered from 1 consecutively upward.

The Series 2016A Bonds shall be dated the date of their delivery, shall bear interest (computed on the basis of a 360 day year consisting of 12 months of 30 days each) until their payment payable on Interest Payment Dates at rates, and shall mature on July 1, subject to the right of prior redemption, as described in the section of the Official Statement titled “THE SERIES 2016 BONDS.”

The Series 2016C Bonds shall be dated the date of their delivery. Interest on the Series 2016C Bonds will not be paid currently, but will accrue from the date of issuance thereof, compounded semiannually on each January 1 and July 1 over the life of such Bonds, and be paid at maturity or upon earlier redemption. The Series 2016C Bonds will mature on July 1 of the years, subject to prior redemption, have the aggregate initial principal amounts, have the aggregate maturity amounts and have interest rates as described in the section of the Official Statement titled “THE SERIES 2016 BONDS.”

Bonds authorized under the Trust Agreement may be issued in one or more Series that may be delivered from time to time. The Authority shall, either in the Trust Agreement or in a Supplemental Trust Agreement, authorize such Series and shall specify, to the extent appropriate, (a) the authorized principal amount of such Series, (b) the Initial Project or Additional Project to be financed from the Bonds or other indebtedness to be refunded or refinanced with the proceeds thereof, including costs of issuance; (c) whether such Bonds shall constitute Senior Lien Bonds or Subordinate Lien Bonds, (d) the creation or funding of a debt service reserve fund for such Series, if any; (e) the date and terms of maturity or maturities of the Bonds of such Series, or the dates of payment of the Bonds on the demand of the Owner; (f) the interest rate or rates of the Bonds of such Series, which may include variable, adjustable, convertible or other rates, original issue discount, Capital Appreciation Bonds, municipal multipliers or other deferred interest arrangements and zero interest rate Bonds, provided that the interest cost of such Series shall never exceed for such Series the maximum interest rate, if any, permitted by law in effect at the time such Series is issued; (g) the Interest Payment Dates for such Series of Bonds; (h) the denominations, numbering, lettering and series designation of such Series of Bonds; (i) the Bond Registrar or paying agents and place or places of payment of such Bonds; (j) the redemption dates and

Redemption Prices for such Series of Bonds and any terms of redemption not inconsistent with the provisions of the Trust Agreement, which may include mandatory redemption at the election of the Owner thereof to the extent permitted by law; (k) the terms of any optional or mandatory tender requirement, if any, for such Series of Bonds; (l) the use to be made of proceeds of such Series of Bonds, including, without limitation, deposits required to be made into the appropriate account or subaccount of the Project Fund, the Senior Lien Debt Service Fund, the Subordinate Lien Debt Service Fund, the Senior Lien Reserve Fund, or the Subordinate Lien Reserve Fund; and (m) any other terms or provisions applicable to the Series of Bonds not inconsistent with the provisions of the Trust Agreement or the Act. All of the foregoing may be added by Supplemental Trust Agreements adopted at any time or from time to time prior to the issuance of such Series of Bonds.

Each Current Interest Bond shall bear interest from the Interest Payment Date next preceding the date on which it is authenticated unless it is (a) authenticated upon an Interest Payment Date, in which event it shall bear interest from such Interest Payment Date, or (b) authenticated prior to the first Interest Payment Date, in which event it shall bear interest from its date or such later date as is specified in a Supplemental Trust Agreement providing for its issuance, or (c) authenticated prior to the first Interest Payment Date after the applicable Convertible CAB Bond Conversion Date, in which event it shall bear interest from such Convertible CAB Bond Conversion Date or such later date as is specified in a Supplemental Trust Agreement providing for its issuance; provided, however, that if at the time of authentication of any Bond interest is in default, such Bond shall bear interest from the date to which interest has been paid.

Unless provided to the contrary in a Supplemental Trust Agreement, and as permitted by law, the principal of and the interest and premium, if any, on the Bonds shall be payable in any coin or currency of the United States of America that is legal tender for the payment of public and private debts on the respective dates of payment thereof. The payment of interest on each Bond shall be made (a) by the Bond Registrar on each Interest Payment Date to the person appearing on the registration books of the Bond Registrar as the registered owner thereof as of the Regular Record Date by check mailed to the registered owner at his address as it appears on such registration books, or (b) by such additional or alternative means as is provided in any Supplemental Trust Agreement providing for the issuance of such Bond. Unless otherwise provided in a Supplemental Trust Agreement, payment of the principal of all Bonds shall be made upon the presentation and surrender of such Bonds at the designated corporate trust office of the Bond Registrar as the same become due and payable (whether at maturity, by redemption or otherwise).

Any interest on any Bond of any Series which is payable, but is not paid or duly provided for, on any Interest Payment Date (in the Trust Agreement called "*Defaulted Interest*") shall forthwith cease to be payable to the Owner on the relevant Regular Record Date solely by virtue of such Owner having been such Owner; and such Defaulted Interest may be paid by the Authority, at its election in each case, as provided in Subsection A or B below:

A. The Authority may elect to make payment of any Defaulted Interest on the Bonds of any Series to the persons in whose names such Bonds (or their respective Predecessor Bonds) are registered at the close of business on a Special Record Date for the payment of such Defaulted Interest, which shall be fixed in the following manner. The Authority shall notify the Trustee in writing of the amount of Defaulted Interest proposed to be paid on each Bond and the date of the proposed payment (which date shall be such as will enable the Trustee to comply with the next sentence of the Trust Agreement), and at the same time, the Authority shall deposit with the Trustee an amount of money equal to the aggregate amount proposed to be paid in respect of such Defaulted Interest or shall make arrangements satisfactory to the Trustee for such deposit prior to the date of the proposed payment, such money when deposited to be held in trust for the benefit of the persons entitled to such Defaulted Interest as in this

Subsection provided. Thereupon, the Trustee shall fix a Special Record Date for the payment of such Defaulted Interest which shall be not more than fifteen (15) nor less than ten (10) days prior to the date of the proposed payment and not less than ten (10) days after the receipt by the Trustee of the notice of the proposed payment. The Trustee shall promptly notify the Authority of such Special Record Date and, in the name and at the expense of the Authority, such expense to be paid solely from Revenues, shall cause notice of the proposed payment of such Defaulted Interest and the Special Record Date therefor to be mailed, first-class postage prepaid, to each Owner at his address as it appears in the registration books maintained under Section 205 not less than ten (10) days prior to such Special Record Date. Notice of the proposed payment of such Defaulted Interest and the Special Record Date therefor having been mailed as aforesaid, such Defaulted Interest shall be paid to the persons in whose names the Bonds (or their respective Predecessor Bonds) are registered on such Special Record Date and shall no longer be payable pursuant to the following subsection B below.

B. The Authority may make payment of any Defaulted Interest on the Bonds of any Series in any other lawful manner not inconsistent with the requirements of any securities exchange on which such Bonds may be listed and upon such notice as may be required by such exchange, if, after notice given by the Authority to the Trustee of the proposed payment pursuant to this Subsection, such method of payment shall be deemed practicable by the Trustee.

Subject to the foregoing provisions, each Bond delivered under the Trust Agreement upon transfer of or in exchange for or in lieu of any other Bond shall carry all the rights to interest accrued and unpaid, and to accrue, which were carried by such other Bond and each such Bond shall bear interest from such date, that neither gain nor loss in interest shall result from such transfer, exchange or substitution.

Notwithstanding the foregoing provisions, the terms and provisions of the TIFIA Bond and its payment and similar provisions shall be as set forth below under “*TIFIA Bond Provisions*,” the form of the TIFIA Bond and in the TIFIA Loan Agreement.

*Exchange of Bonds.* Bonds, upon surrender thereof at the designated corporate trust office of the Bond Registrar, together with an assignment duly executed by the Owner or his attorney or legal representative, or legal representative of his estate if the Owner is deceased, in such form as shall be satisfactory to the Bond Registrar, may, at the option of the Owner thereof, be exchanged for an equal aggregate principal amount of Bonds of the same Series and maturity, of any denomination or denominations authorized by the Trust Agreement or by the Supplemental Trust Agreement pursuant to which such Bonds were issued, bearing interest at the same rate and in the same form as the Bonds surrendered for exchange.

The Authority shall make provision for the exchange of Bonds at the designated corporate trust office of the Bond Registrar.

*Transfer and Registration of Transfer of Bonds.* Unless provided to the contrary in a Supplemental Trust Agreement, and as permitted by law, the Bond Registrar shall keep books for the registration and the registration of transfer of the Series of Bonds as to which it is Bond Registrar as provided in the Trust Agreement. The registration books shall be available at all reasonable times for inspection by the Authority and any Owner of such Bonds and may be copied by either of the foregoing and their agents or representatives.

The transfer of any Bond may be registered only upon the books kept for the registration and registration of transfer of Bonds upon presentation thereof to the Bond Registrar together with an assignment duly executed by the Owner or his attorney or legal representative, or legal representative of his estate if the Owner is deceased, in such form as shall be satisfactory to the Bond Registrar. No

transfer of any Bond shall alter the ownership of such Bond for purposes of the Trust Agreement unless such transfer is registered with the Bond Registrar. Upon any such registration of transfer, the Authority shall, if necessary, execute and the Bond Registrar shall authenticate and deliver in exchange for such Bond a new Bond or Bonds, registered in the name of the transferee, of any denomination or denominations authorized by the Supplemental Trust Agreement pursuant to which such Bond was issued, in the aggregate principal amount equal to the principal amount of such Bond surrendered or exchanged, of the same maturity and bearing interest at the same rate.

In all cases in which Bonds shall be exchanged or the transfer of Bonds shall be registered under the Trust Agreement, the Authority shall, if necessary, execute and the Bond Registrar shall authenticate and deliver at the earliest practicable time Bonds in accordance with the provisions of the Trust Agreement. All Bonds surrendered in any such exchange or registration of transfer shall forthwith be canceled by the Bond Registrar. No service charge shall be made for any registration, transfer or exchange of Bonds, but the Authority and the Bond Registrar may require payment of a sum sufficient to cover any tax or other governmental charge that may be imposed in connection with any transfer or exchange of Bonds. Unless otherwise required by the applicable Supplemental Trust Agreement, neither the Authority nor the Bond Registrar shall be required (a) to issue, transfer or exchange Bonds during a period beginning at the opening of business fifteen (15) days before the day of the mailing of a notice of redemption of Bonds and ending at the close of business on the day of such mailing or (b) to transfer or exchange any Bond so selected for redemption in whole or in part.

Ownership of Bonds. The Authority, the Trustee, the Bond Registrar and any agent of the Authority, the Trustee or the Bond Registrar, may treat the person in whose name any Bond is registered, including, without limitation, any Securities Depository Nominee, as the Owner of such Bond for the purpose of receiving payment of principal of and premium, if any, and interest on such Bond, and for all other purposes whatsoever, whether or not such Bond be overdue, and, to the extent permitted by law, neither the Authority, the Trustee, the Bond Registrar nor any such agent shall be affected by notice to the contrary.

Authentication of Bonds. Only such Bonds as have endorsed thereon a certificate of authentication substantially in the form set forth in the Trust Agreement or the Supplemental Trust Agreement pursuant to which such Bonds are issued, duly executed as provided in the Trust Agreement or the Supplemental Trust Agreement, shall be entitled to any benefit or security under the Trust Agreement. No Bond shall be valid or obligatory for any purpose unless and until such certificate of authentication on the Bond has been duly executed and dated as provided in the Trust Agreement or the Supplemental Trust Agreement, and such certificate upon any such Bond shall be conclusive evidence that such Bond has been duly authenticated and delivered under the Trust Agreement. The certificate of authentication on any Bond shall be deemed to have been duly executed and dated if signed by an authorized officer of the party authorized under the Trust Agreement or the Supplemental Trust Agreement but it shall not be necessary that the same officer sign the certificate of authentication on all of the Bonds or any Series thereof that may be issued under the Trust Agreement at any one time.

Terms and Conditions for Issuance of Additional Bonds. Before any Additional Bonds shall be issued, the Authority shall adopt and execute and deliver a Supplemental Trust Agreement authorizing the issuance of such Bonds, fixing the amount and the details thereof as provided in the Trust Agreement and describing in brief and general terms the purpose for issuing such Bonds. Bonds may be issued for the purpose of providing funds for paying, together with any other available funds,

- (a) all or any part of the Cost of any Additional Project;

- (b) deposits to reserve funds for debt service or other uses related to the Initial Project or any Additional Project;
- (c) all or any part of completing payment of any Additional Project; and
- (d) the cost (including financing costs) of refunding any Bonds, Parity Debt or any other indebtedness of the Authority.

Any Supplemental Trust Agreement for Senior Lien Bonds may determine to use the Senior Lien Reserve Fund or to establish a Separate Reserve Fund or account for such Series of Bonds and fix the provisions with respect thereto or not to establish any debt service reserve account. Unless named otherwise in the Supplemental Trust Agreement, the Senior Lien Bonds of each Series shall be designated “Monroe Expressway Toll Revenue Bonds, Series \_\_\_” (inserting the year such Bonds are issued and any other distinctive letter or number), shall be stated to mature, subject to the right of prior redemption as therein set forth, on the date or dates specified therein, in such year or years not later than forty (40) years from their date, shall bear interest at a rate or rates not exceeding the maximum rate then permitted by law, shall be numbered and shall have such redemption provisions (subject to the provisions of Article III), all as provided in the Supplemental Trust Agreement. Except as to any differences in the maturities thereof or in the rate or rates of interest or the provisions for redemption or the provisions regarding the respective subaccounts within the Interest Account, the Principal Account, the Sinking Fund Account and the Redemption Account of the Senior Lien Debt Service Fund, and any provisions with respect to the Senior Lien Reserve Fund or a separate reserve fund or account, all such Senior Lien Bonds shall be payable on a parity basis with each other and any Senior Lien Parity Debt and Senior Lien Derivative Agreement Regularly Scheduled Payments and shall be entitled to the same benefit and security of the Trust Agreement, including, in particular, the pledge, charge and lien upon the Revenues in the priority and manner provided in the Trust Agreement. The Holders of Senior Lien Bonds shall have no rights in, or claim to, any amounts held in the TIFIA Reserve Fund.

Any Supplemental Trust Agreement for Subordinate Lien Bonds may determine to use the Subordinate Lien Reserve Fund or to establish a separate reserve fund or account for such Series of Bonds and fix the provisions with respect thereto or not to establish any debt service reserve account Unless named otherwise in the Supplemental Trust Agreement, the Subordinate Lien Bonds of each Series shall be designated “Monroe Expressway Subordinate Toll Revenue Bonds, Series \_\_\_” (inserting the year such Bonds are issued and any other distinctive letter or number), shall be stated to mature, subject to the right of prior redemption as therein set forth, on the date or dates specified therein, in such year or years not later than forty (40) years from their date, shall bear interest at a rate or rates not exceeding the maximum rate then permitted by law, shall be numbered and shall have such redemption provisions (subject to the provisions of Article III), all as provided in the Supplemental Trust Agreement Except as to any differences in the maturities thereof or in the rate or rates of interest or the provisions for redemption or the provisions regarding the respective subaccounts within the Interest Account, the Principal Account, the Sinking Fund Account and the Redemption Account of the Subordinate Lien Debt Service Fund, and any provisions with respect to the Subordinate Lien Reserve Fund or a separate reserve fund or account, all such Subordinate Lien Bonds shall be payable on a parity basis with each other and any Subordinate Lien Parity Debt and Subordinate Lien Derivative Agreement Regularly Scheduled Payments and shall be entitled to the same benefit and security of the Trust Agreement, including, in particular, the pledge, charge and lien upon the Revenues in the priority and manner provided in the Trust Agreement. The Holders of Subordinate Lien Bonds shall have no rights in, or claim to, any amounts held in the TIFIA Reserve Fund.

The Bonds shall be executed substantially in the form and in the manner set forth in the Trust Agreement or in the Supplemental Trust Agreement and shall be deposited with the Bond Registrar for

authentication, but before the Bonds shall be authenticated and delivered to the purchasers thereof, there shall be filed with the Trustee the following:

- (i) an executed copy of the Trust Agreement;
- (ii) an executed copy of the Supplemental Trust Agreement adopted or executed and delivered by the Authority for the particular Series of Additional Bonds;
- (iii) evidence of the approval of the Bonds by the Local Government Commission as required by Section 159-86 of the General Statutes of North Carolina;
- (iv) a copy, certified by the Authority Secretary, of the resolution of the Authority (which resolution may be incorporated in the Supplemental Trust Agreement for the particular Series of Bonds), approving the award of the Bonds and directing the authentication and delivery of such Bonds to or upon the order of the purchasers therein named upon payment of the purchase price therein set forth plus the accrued interest thereon;
- (v) for any Series of Senior Lien Bonds other than the Series 2016 Bonds, evidence of compliance with the provisions of the Trust Agreement, or for any Series of Subordinate Lien Bonds other than the TIFIA Bond, evidence of compliance with the provisions of the Trust Agreement;
- (vi) if the TIFIA Bond is then Outstanding, the prior written approval of the TIFIA Lender in accordance with the provisions described under “General Covenants and Representations – *Special TIFIA Provisions*” below; and
- (vii) such other documents as are required to be delivered to the Trustee pursuant to the Supplemental Trust Agreement.

When the documents mentioned in subsections (i) to (vii), inclusive, of this Section shall have been filed with the Trustee and when the Bonds shall have been executed and authenticated as required by the Trust Agreement, the Trustee shall deliver the Bonds at one time to or upon the order of the purchasers named in the resolution mentioned in subsection (iv) of this Section, but only upon payment to the Trustee of the purchase price of the Bonds and the accrued interest, if any, thereon to the date of delivery. The Trustee shall be entitled to rely upon the resolutions and documents mentioned in subsections (i) to (vii) of this Section as to all matters stated therein.

The proceeds (including accrued interest, if any) of the Bonds shall be deposited with and applied by the Trustee simultaneously with the delivery of the Bonds as provided in the Supplemental Trust Agreement.

See “General Covenants and Representations – *Special TIFIA Provisions*” below.

*Mutilated, Destroyed, Lost or Stolen Bonds.* The Authority shall cause to be executed, and the Bond Registrar shall authenticate and deliver a new Bond of like date, number and tenor in exchange and substitution for and upon the cancellation of any mutilated Bond, or in lieu of and in substitution for any destroyed, lost or stolen Bond, and the Owner shall pay the reasonable expenses and charges of the Authority in connection therewith. Prior to the delivery of a substitute Bond, the Owner of any Bond which was destroyed, lost or stolen shall file with the Bond Registrar evidence satisfactory to it of the destruction, loss or theft of such Bond and of the Owner’s ownership thereof and shall furnish to the

Authority and to the Bond Registrar such security or indemnity as may be required by them to save each of them harmless from all risks, however remote.

Revenue Bond Anticipation Notes. Revenue Bond Anticipation Notes may be issued by the Authority from time to time for any purpose for which Additional Bonds may be issued. Revenue Bond Anticipation Notes may be issued as Senior Lien Indebtedness or Subordinate Lien Indebtedness and, except to the extent otherwise expressly provided in the Trust Agreement, shall be issued in compliance, to the extent applicable, with the provisions setting forth certain terms and conditions for the issuance of Bonds.

Revenue Bond Anticipation Notes may be issued provided the following conditions are met:

(a) The Authority Board shall adopt a resolution authorizing the issuance of such Revenue Bond Anticipation Notes and setting forth the amount and details thereof, which resolution shall designate such Revenue Bond Anticipation Notes as Senior Lien Indebtedness or Subordinate Lien Indebtedness. The maximum aggregate principal amount of Revenue Bond Anticipation Notes of an issue at any one time Outstanding shall not exceed the aggregate principal amount of Senior Lien Indebtedness or Subordinate Lien Indebtedness allowed by subsection (d) of this Section.

(b) The Revenue Bond Anticipation Notes shall be issued pursuant to the provisions of the Act and the Revenue Bond Act.

(c) The interest on and the principal of any such Revenue Bond Anticipation Notes may be made payable from Revenues in the manner provided in Section 503 or from the proceeds of other Revenue Bond Anticipation Notes, Senior Lien Indebtedness, Subordinate Lien Indebtedness or any other legally available source.

(d) Prior to or simultaneously with the delivery of and payment for any such Revenue Bond Anticipation Notes then proposed to be issued, there shall be filed with the Trustee evidence, based on the assumptions in the Trust Agreement after mentioned in this paragraph, of compliance with the provisions for Revenue Bond Anticipation Notes are issued as Senior Lien Indebtedness or of compliance with the provisions for Revenue Bond Anticipation Notes are issued as Subordinate Lien Indebtedness. In showing compliance with such provisions, as the case may be, the principal amount of such assumed Senior Lien Indebtedness or Subordinate Lien Indebtedness shall be deemed to be equal to the principal amount of such Revenue Bond Anticipation Notes being issued, and the Authority shall be entitled to assume that such Senior Lien Indebtedness or Subordinate Lien Indebtedness will mature at such times and in such principal amounts as if such principal were amortized from the date of incurrence thereof over a period of forty (40) years on a level debt service basis and bear such interest rates as it may in its best judgment determine. The Traffic Consultant shall be entitled in his or her best judgment to make such other assumptions as may be necessary in respect of matters that cannot be otherwise ascertained at such time in order to determine whether or not the assumed Senior Lien Indebtedness or Subordinate Lien Indebtedness could be incurred at such time. Any assumptions made by the Traffic Consultant to show compliance with this paragraph shall be binding and conclusive upon the Trustee and any Owner of Bonds and Holders of Parity Debt or the providers of any Derivative Agreements.

See “General Covenants and Representations – *Special TIFIA Provisions*” below.

Grant Anticipation Notes. Grant Anticipation Notes may be issued by the Authority from time to time for any purpose for which Bonds may be issued in anticipation of the receipt of moneys from firm grant commitments for such purpose from the State or the United States or any agencies of either. Grant Anticipation Notes shall constitute Subordinate Lien Indebtedness and, except to the extent otherwise



expressly provided in the Trust Agreement, shall be issued in compliance, to the extent applicable, with the provisions setting forth certain terms and conditions for the issuance of Bonds.

Grant Anticipation Notes may be issued provided the following conditions are met:

(a) The Authority shall adopt a resolution authorizing the issuance of the Grant Anticipation Notes and setting forth the amount and details thereof.

(b) The Grant Anticipation Notes shall be issued pursuant to the provisions of the Act.

(c) The interest on and the principal of the Grant Anticipation Notes may be made payable from Revenues or from the proceeds of the grant, other Grant Anticipation Notes, Senior Lien Indebtedness, Subordinate Lien Indebtedness or any other legally available source.

(d) The maximum aggregate principal amount of the Grant Anticipation Notes at any time Outstanding shall not exceed the maximum amount of the grant.

(e) Grant Anticipation Notes may be issued without showing compliance with the appropriate provisions of Sections 716 or 717.

(f) A copy of the resolution of the Authority authorizing the issuance of the Grant Anticipation Notes shall be filed with the Trustee.

See “General Covenants and Representations – *Special TIFIA Provisions*” below.

Parity Debt.

(a) Senior Lien Parity Debt and Subordinate Lien Parity Debt may be incurred by the Authority from time to time for any purpose for which Bonds may be issued. Except to the extent otherwise expressly provided in the Trust Agreement, Parity Debt shall be incurred in compliance, to the extent applicable, with the provisions setting forth certain terms and conditions for the issuance of Bonds.

(b) Parity Debt may be incurred provided the following conditions are met:

(i) The Authority shall adopt a resolution authorizing the incurrence of any such Parity Debt and setting forth the amount and details thereof.

(ii) Any such Parity shall be incurred pursuant to the provisions of the Act or the Revenue Bond Act.

(iii) The interest on and the principal of any such Parity Debt shall be made payable from Revenues.

(iv) There shall be filed with the Trustee evidence of compliance with the appropriate provisions in the case of Senior Lien Parity Debt or in the case of Subordinate Lien Parity Debt.

(c) Subordinate Lien Parity Debt shall be secured by and payable from Revenues on a junior and subordinated basis to Senior Lien Indebtedness and, prior to an Event of Default, shall be paid as set forth under “Revenues and Funds – *Application of Money in Revenue Fund*” below. In the event an Event of Default shall occur and be continuing and for so long as it continues, payments of any amounts for Subordinate Lien Parity Debt will be as described under “Defaults and Remedies – *Pro Rata Application of Funds*” below.

(d) Junior Indebtedness may be secured by and payable from Revenues on a basis junior and subordinate to Senior Lien Indebtedness and Subordinate Lien Indebtedness and, prior to an Event of Default, shall be paid as set forth under “Revenues and Funds – *Application of Money in Revenue Fund*” below. In the event an Event of Default shall occur and be continuing and for so long as it continues, payment of any amounts for Junior Indebtedness will be as described under “Defaults and Remedies – *Pro Rata Application of Funds*” below.

*TIFIA Bond Provisions.* The TIFIA Bond is issued in a maximum aggregate principal amount of not to exceed \$166,500,000, such amount to be calculated from time to time in accordance with the terms of the TIFIA Loan Agreement, pursuant to which amounts are advanced to the Authority from time to time pursuant to the TIFIA Loan Agreement, with the principal amount owed to the TIFIA Lender increasing in the amount of such advances. In addition, following the disbursement of the initial loan amount under the TIFIA Loan Agreement, the principal amount of the TIFIA Bond may increase further from time to time in the manner provided by the TIFIA Loan Agreement. The TIFIA Bond shall bear interest, including defaulted interest, be payable and be subject to redemption as set forth in the form thereof.

Upon the occurrence of a Bankruptcy Related Event relating to the Authority, the TIFIA Bond shall automatically and without notice be deemed to constitute a Senior Lien Bond. The Holder of the TIFIA Bond shall have no rights in, or claim to, any amounts held in the Senior Lien Reserve Fund, the Subordinate Lien Reserve Fund or any Separate Reserve Fund.

### **The Project Fund**

*Project Fund: Initial Deposit to Project Fund.* The proceeds of the Series 2016 Bonds to be used for payment of the Costs of the Initial Project shall be deposited by the Trustee in the Initial Project Account within the Project Fund. Unless otherwise provided in a Supplemental Trust Agreement, the proceeds of any Series of Bonds to be used for providing any Additional Project shall be deposited upon the delivery of such Series of Bonds into a separate account in the Project Fund to be created by the Supplemental Trust Agreement providing for the issuance of the Bonds financing such Additional Project. In addition, the STIP Funds (after any other initial deposits therefrom) and any amounts paid by NCDOT shall be deposited in the Initial Project Account within the Project Fund.

The money in the respective accounts within the Project Fund shall be held by the Trustee in trust and, pending application to the payment of the refinancing of, the reimbursement for or the Costs of the Initial Project or the Cost of any Additional Project, as the case may be, or transfer as provided in the Trust Agreement, shall, to the extent permitted by law, be subject to a lien and charge in favor of the Owners of Bonds issued with respect to the Initial Project or Additional Project and Outstanding under the Trust Agreement and shall be held for the security of such Owners.

*Payments from Project Fund.* Payments to accomplish the refinancing of, the reimbursement for or for the Costs of the Initial Project shall be made from the Initial Project Account and payment of the Costs of any Additional Project shall be made from the applicable account within the Project Fund. Separate accounts shall be maintained for the Initial Project and each Additional Project. All payments from the Project Fund shall be subject to the provisions and restrictions set forth in the Trust Agreement, and the Authority shall not cause or agree to permit to be paid from the accounts within the Project Fund any sums except in accordance with such provisions and restrictions. Amounts drawn under the TIFIA Loan Agreement shall be deposited in the Initial Project Account.

In order to assure that the Authority will have sufficient funds to provide for the completion of the Initial Project, NCDOT has agreed that in the event the proceeds of the Appropriation Bonds, the

Series 2016 Bonds, the STIP Funds and the TIFIA Bond and any investment earnings thereon will not be sufficient for such purpose, NCDOT will deposit to the Initial Project Account amounts to make the aggregate therein, when combined with amounts yet to be drawn under the TIFIA Loan Agreement, sufficient for such purpose. Such payments shall be deposited as received to the Project Fund and applied to pay Costs of the Initial Project.

Cost of Project and Additional Projects. For the purpose of the Trust Agreement, the Costs of the Initial Project or any Additional Project, as the case may be, shall include such costs as are eligible costs within the purview of the Act, and, without intending to limit or restrict any proper definition of such Cost, shall include the following:

(a) obligations incurred for labor, materials, services provided by contractors, builders and materialmen in connection with the construction, acquisition, and equipping of the Initial Project or Additional Projects, machinery and equipment, for the restoration of property damaged or destroyed in connection with such construction and acquisition, for the demolition, removal or relocation of any structures and for the clearing of lands;

(b) interest accruing upon any Bonds prior to the Substantial Completion Date or for any additional period as may be authorized by law and provided in the Trust Agreement or in the Supplemental Trust Agreement authorizing the issuance of such Bonds;

(c) the cost of acquiring by purchase, and the amount of any award or final judgment in any proceeding to acquire by Eminent Domain, such land, structures and improvements, property, property rights, rights-of-way, franchises, easements and other interests in lands as may be deemed necessary or convenient in connection with such construction or operation of the Monroe Expressway;

(d) expenses of administration properly chargeable to such construction or acquisition, legal, trustee, architectural and engineering expenses and fees, cost of audits and of preparing and issuing the Bonds, fees and expenses of consultants, financing charges, premiums of insurance in connection with construction, bond insurance premiums, the cost of funding any debt service reserve account requirements, and all other items of expense that are incident to the financing, construction or acquisition of the Initial Project or any Additional Projects and the placing of the same in operation; and

(e) reimbursement of any obligation or expense incurred by the Authority or NCDOT for any of the foregoing purposes prior to the date of delivery of the Bonds, including reimbursement to any Persons for advances made to the Authority or NCDOT, and also including the cost of materials, supplies or equipment furnished by the Authority or NCDOT in connection with the construction of the Initial Project or any Additional Project and paid for by the Authority or NCDOT out of funds other than money in the Project Fund.

Requisitions from Project Fund. Payments from the Project Fund shall be made in accordance with the provisions of this Section.

Upon request of the Authority, the Trustee shall pay Costs, or reimburse the Authority or NCDOT for Costs paid thereby, directly from the Project Fund, but before any payment shall be made there shall be filed with the Trustee a requisition signed by an Authorized Officer and stating:

- (a) the Requisition number;
- (b) the name of the person to whom such payment is due;

- (c) the amount to be paid;
- (d) the purpose for which the obligation to be paid was incurred;
- (e) that the obligation in the stated amount has been incurred by the Authority, is presently due and payable and is a proper charge against the Project Fund that has not been paid
- (f) that no notice of any lien, right to lien or attachment upon, or claim affecting the right of any such Person to receive payment of, the amount stated in such requisition has been filed or attached or, if any of the foregoing has been filed or attached, that the same either has been or will be satisfied or discharged or that provisions have been made (which shall be specified) to protect adequately the Trustee and the Owners from incurring any loss as a result of the same;
- (g) that such requisition contains no item representing payment on account of any retainage to which the Authority is entitled at the date of such requisition;
- (h) the account from which such Cost shall be paid; and
- (i) to the extent that such requisition contains any payment of the purchase price or cost of any lands, property, property rights, rights-of-way, easements, franchises or interests in or relating to lands, that such lands, property, property rights, rights-of-way, easements, franchises or interests are being acquired by the Authority in furtherance of the construction or acquisition of the Initial Project or any Additional Project.

Upon receipt of each requisition, the Trustee shall pay the obligations set forth in such requisition out of money in the applicable account or subaccount in the Project Fund, and each such obligation shall be paid by check or wire transfer. If for any reason the Authority should decide prior to the payment of any item in a requisition not to pay such item, it shall give written notice of such decision to the Trustee, and thereupon the Trustee shall not make such payment.

Notwithstanding the remainder of the above-described provision, when amounts are drawn under the TIFIA Loan Agreement, such amounts may be requisitioned by the Authority from the Initial Project Account by filing copies of the evidence submitted to the TIFIA Lender for the corresponding disbursement under the TIFIA Loan Agreement.

Reliance upon Requisitions. All requisitions, opinions and notices received by the Trustee as conditions of payment from the Project Fund may be relied upon by the Trustee. Such requisitions, opinions and notices shall be retained by the Trustee for so long as the Bonds are Outstanding and shall be subject at all reasonable times to examination by the Authority and the Owners of Bonds then Outstanding.

Progress Reports. The Authority covenants that at least quarterly during the construction of the Initial Project and any Additional Project, it will cause a General Engineering Consultant to prepare a progress report in connection with such construction with respect to:

- (a) the date on which the Initial Project or such Additional Project, as the case may be, is expected to be opened for traffic unless such project has been opened for traffic prior to the date of such report;
- (b) the date on which the construction of the Initial Project or such Additional Project, as the case may be, is expected to be substantially completed; and

(c) the amount of funds required each six month during the remaining estimated period of construction to pay the Costs of the Initial Project or Additional Project, as the case may be, exclusive of construction contingencies, and accompanied by a progress schedule for such construction, and further including, as to construction, comparisons between actual times elapsed and the actual costs and the original estimates of such time and costs.

A copy of such report shall be filed with the Trustee and the TIFIA Lender, provided to any Owner who requests a copy thereof and, upon the request of the Commission, filed with the Commission.

Completion of Initial Project or any Additional Project and Disposition of Project Fund Balance.

The Substantial Completion Date for the Initial Project or any Additional Project, or any segment thereof, shall be evidenced to the Trustee by an Officer's Certificate (a) setting forth the Cost of the Initial Project or the Additional Project, or such segment, whichever is applicable, and stating that, except for amounts not then due and payable or the liability for the payment of which is being contested or disputed by the Authority, which amounts shall be set forth in such Officer's Certificate, all costs and expenses incurred in connection therewith have been paid, and (b) stating that (i) the acquisition, construction and equipping of the Initial Project or the Additional Project, or such segment, whichever is applicable, have been completed substantially in accordance with the plans and specifications therefor and the Cost of the same has been paid, (ii) all other facilities necessary in connection with the Additional Project, or such segment, have been acquired, constructed and installed in accordance with the plans and specifications therefor, and (iii) the Initial Project is open to vehicular or passenger traffic or the Additional Project is open to vehicular or passenger traffic and available for use by the Authority; provided amounts may be reserved in the applicable account within the Project Fund for specific portions of the Initial Project, the Additional Project or directly related facilities which are under or planned for construction but the inoperability of which prior to their completion will not adversely affect Revenues.

Upon the later of (a) the Final Completion Date (as defined in the Contract and Contract Bonds for Contract No. 202587, executed on November 21, 2011, as amended, by and between the Authority and Monroe Bypass Constructors LLC) and (b) the date of final disbursement of the TIFIA Loan, and receipt of such certificate, the Trustee shall withdraw all money then remaining in the Initial Project Account in excess of the amount then needed for completion of the remainder of the Initial Project and apply the same, subject to certain tax rules, one-half to the Ramp-Up Reserve Account and one-half to the Unpledged Account.

**Other Funds Under the Trust Agreement**

Establishment of Funds. In addition to the Project Fund, the Trust Agreement establishes the following funds:

- (a) North Carolina Turnpike Authority Monroe Expressway Revenue Fund;
- (b) North Carolina Turnpike Authority Monroe Expressway Senior Lien Debt Service Fund, in which there are established four special accounts to be known as the Interest Account, the Principal Account, the Sinking Fund Account and the Redemption Account;
- (c) North Carolina Turnpike Authority Monroe Expressway Subordinate Lien Debt Service Fund, in which there are established four special accounts to be known as the Interest Account, the Principal Account, the Sinking Fund Account and the Redemption Account;
- (d) North Carolina Turnpike Authority Monroe Expressway Renewal and Replacement Fund;

- (e) North Carolina Turnpike Authority Monroe Expressway Operations and Maintenance Expense Fund;
- (f) North Carolina Turnpike Authority Monroe Expressway Operating Reserve Fund;
- (g) North Carolina Turnpike Authority Monroe Expressway General Reserve Fund in which there are established three special accounts to be known as the Ramp-Up Reserve Account, the Pledged Account and the Unpledged Account;
- (h) North Carolina Turnpike Authority Monroe Expressway Insurance and Condemnation Award Fund;
- (i) North Carolina Turnpike Authority Monroe Expressway Senior Lien Reserve Fund;
- (j) North Carolina Turnpike Authority Monroe Expressway Subordinate Lien Reserve Fund;
- (k) North Carolina Turnpike Authority Monroe Expressway TIFIA Reserve Fund;
- (l) North Carolina Turnpike Authority Monroe Expressway Series 2011 Escrow Fund; and
- (m) North Carolina Turnpike Authority Monroe Expressway TIFIA Scheduled Prepayment Fund.

All such funds and the accounts and subaccounts therein shall be held by the Trustee.

A Senior Lien Resolution may provide for the creation of a Separate Reserve Fund for the Senior Lien Indebtedness authorized by such Senior Lien Resolution and for the deposit of moneys to and withdrawal of moneys from such Fund. A Separate Reserve Fund created for any Series of Bonds shall be held and maintained by the Trustee; provided, however, that if a Series of Bonds is placed with the purchaser thereof and not publicly offered, then such purchaser or a Depositary may hold the Separate Reserve Fund created for such Senior Lien Indebtedness as provided for in the Senior Lien Resolution authorizing such Senior Lien Indebtedness.

A Subordinate Lien Resolution may provide for the creation of a Separate Reserve Fund for the Subordinate Lien Indebtedness authorized by such Subordinate Lien Resolution and for the deposit of moneys to and withdrawal of moneys from such Fund. A Separate Reserve Fund created for any Series of Bonds shall be held and maintained by the Trustee; provided, however, that if a Series of Bonds is placed with the purchaser thereof and not publicly offered, then such purchaser or a Depositary may hold the Separate Reserve Fund created for such Subordinate Lien Indebtedness as provided for in the Subordinate Lien Resolution authorizing such Subordinate Lien Indebtedness.

A Senior Lien Resolution may also provide for the creation of such other funds and accounts, as the Authority may determine, for the Senior Lien Indebtedness authorized by such Senior Lien Resolution. A Subordinate Lien Resolution may also provide for the creation of such other funds and accounts, as the Authority may determine, for the Subordinate Lien Indebtedness authorized by such Subordinate Lien Resolution.

The money in all of the funds, accounts and subaccounts established with and held by the Trustee shall be held in trust and applied as in the Trust Agreement after provided and, pending such application, the money in such funds, accounts and subaccounts therein shall be subject to a pledge, charge and lien in favor of the Owners of the respective Series of Bonds issued and Outstanding under the Trust Agreement

and for the further security of such Owners, except as otherwise provided in the Trust Agreement or in any Supplemental Trust Agreement.

The Trustee is directed under the Trust Agreement to establish separate subaccounts within the Interest Account, the Principal Account, the Redemption Account and the Sinking Fund Account of the Senior Lien Debt Service Fund and the Subordinate Lien Debt Service Fund for the Series 2016 Bonds and the TIFIA Bond, as applicable, which subaccounts shall bear the designation of such Series of Bonds. Upon the occurrence of a Bankruptcy Related Event relating to the Authority, the subaccounts established for the TIFIA Bonds within the Subordinate Lien Debt Service Fund shall become subaccounts for the benefit of the TIFIA Bond within the Senior Lien Debt Service Fund.

Each Supplemental Trust Agreement shall provide, to the extent applicable, for the creation of a separate subaccount within the Interest Account, the Principal Account, the Redemption Account and the Sinking Fund Account of the Senior Lien Debt Service Fund or the Subordinate Lien Debt Service Fund, as the case may be, with respect to each Series of Bonds, which subaccounts shall bear the designation of such Series of Bonds. A Supplemental Trust Agreement for Senior Lien Bonds may provide that such Senior Lien Bonds authorized thereby may be additionally secured by the Senior Lien Reserve Fund or a Separate Reserve Fund or it may provide that there shall not be any debt service reserve fund in respect of such Series of Bonds. If a Series of Senior Lien Bonds is secured by a Separate Reserve Fund or is not secured by any debt service reserve fund, such Series of Senior Lien Bonds shall have no claim on the Senior Lien Reserve Fund or any other Separate Reserve Fund. A Supplemental Trust Agreement for Subordinate Lien Bonds may provide that such Subordinate Lien Bonds authorized thereby may be additionally secured by the Subordinate Lien Reserve Fund or a Separate Reserve Fund or it may provide that there shall not be any debt service reserve fund in respect of such Series of Bonds. If a Series of Subordinate Lien Bonds is secured by a Separate Reserve Fund or is not secured by any debt service reserve fund, such Series of Subordinate Lien Bonds shall have no claim on the Subordinate Lien Reserve Fund or any other Separate Reserve Fund.

Each Parity Debt Resolution for Senior Lien Parity Debt may provide for the creation of such funds and accounts as it may determine, including, without limiting the generality of the foregoing, an account for the payment of interest, or an account or accounts for the payment of principal, whether at maturity or pursuant to an amortization requirement. A Parity Debt Resolution for Senior Lien Parity Debt may provide that the Senior Lien Parity Debt authorized thereby may be additionally secured by the Senior Lien Reserve Fund or a Separate Reserve Fund or it may provide that there shall not be any debt service reserve account in respect of such Senior Lien Parity Debt. If Senior Lien Parity Debt is secured by a Separate Reserve Fund or is not secured by any debt service reserve account, such Senior Lien Parity Debt shall have no claim on the Senior Lien Reserve Fund.

Each Parity Debt Resolution for Subordinate Lien Parity Debt may provide for the creation of such funds and accounts as it may determine, including, without limiting the generality of the foregoing, an account for the payment of interest, or an account or accounts for the payment of principal, whether at maturity or pursuant to an amortization requirement. A Parity Debt Resolution for Subordinate Lien Parity Debt may provide that the Subordinate Lien Parity Debt authorized thereby may be additionally secured by the Subordinate Lien Reserve Fund or a Separate Reserve Fund or it may provide that there shall not be any debt service reserve account in respect of such Subordinate Lien Parity Debt. If Subordinate Lien Parity Debt is secured by a Separate Reserve Fund or is not secured by any debt service reserve account, such Subordinate Lien Parity Debt shall have no claim on the Subordinate Lien Reserve Fund.

## **Revenue Fund; Flow of Revenues**

*Funds Received by the Authority.* Except as otherwise expressly provided for in the Trust Agreement, all Revenues shall be deposited on a daily basis when received in the Revenue Fund.

All Derivative Agreement Regularly Scheduled Payments received by the Authority shall be deposited in the Revenue Fund upon receipt. The Authority shall provide the Trustee with written schedules of all Derivative Agreement Regularly Scheduled Payments prior to any such deposits in the Revenue Fund. Any Derivative Agreement Additional Payments received by the Authority from any counterparty under a Derivative Agreement shall be deposited in the Revenue Fund upon receipt; provided that such deposit shall be made to another fund or account as directed by the Authority (a) if the Authority has delivered an Opinion of Bond Counsel with respect to such deposit and (b) if the TIFIA Bond is Outstanding, the TIFIA Lender consents to such deposit.

The Authority has issued Appropriation Bonds pursuant to the State Appropriation Trust Agreement to pay certain Costs of the Monroe Expressway not being funded with the STIP Funds, funds drawn under the TIFIA Loan Agreement or the proceeds of Bonds and Parity Debt issued under the Trust Agreement. Pursuant to the State Appropriation Trust Agreement, the Authority has provided that all State Appropriated Revenues shall be deposited as received in the Revenue Fund of the State Appropriation Trust Agreement to be used to pay principal and interest on the Appropriation Bonds. The State Appropriation Trust Agreement further provides that amounts in excess of the amount needed to pay such debt service are to be withdrawn from the State Appropriation Trust Agreement and deposited to the Revenue Fund under the Trust Agreement. Upon such deposit, but not prior to such deposit, such State Appropriated Revenues shall constitute "Revenues" for all purposes of the Trust Agreement including being subject to the lien and pledge of the Trust Estate as provided in the Trust Agreement.

In order to assure that the Authority will have sufficient funds to pay Operating Expenses as the same become due, NCDOT has agreed to, and by its execution of the Trust Agreement has confirmed it will, provide additional funding for the deposits to be made to the Operating Reserve Fund in the event the Revenues are not sufficient to make the deposits thereto as provided in the Trust Agreement.

In order to assure that the Authority will have sufficient funds to maintain the quality and sustainability of the Monroe Expressway, NCDOT has agreed to, and by its execution of the Trust Agreement has confirmed it will, provide additional funding for the deposits to be made to the Renewal and Replacement Fund in the event the Revenues are not sufficient to make the deposits thereto as provided in the Trust Agreement.

*Application of Money in Revenue Fund.* On the last Business Day of each month, the Trustee shall withdraw all Revenues and other amounts held in the Revenue Fund and apply the same in the following manner and order:

(a) (1) for deposit in the appropriate subaccounts of the Interest Account of the Senior Lien Debt Service Fund an amount equal to the amount of interest payable on each Series of Senior Lien Bonds, including the TIFIA Bond if a Bankruptcy Related Event relating to the Authority has occurred, on the next Interest Payment Date for each such Series of Senior Lien Bonds (if such Interest Payment Date is within seven months of such deposit) divided by the number of monthly deposits to be made to such subaccounts with respect to interest on such Senior Lien Bonds on or prior to the next Interest Payment Date for each such Series of Senior Lien Bonds; (2) to the Persons entitled thereto an amount equal to the amount of interest payable on each issue of Senior Lien Parity Debt on the next Interest Payment Date for each such issue of Senior Lien Parity Debt (if such Interest Payment Date is within seven months of such payment) divided by the number of such payments to be made to such Persons with



respect to interest on such Senior Lien Parity Debt on or prior to the next Interest Payment Date for each such issue of Senior Lien Parity Debt; and (3) to the Persons entitled thereto the amount of any Senior Lien Derivative Agreement Regularly Scheduled Payments required by a Derivative Agreement to be paid by the Authority on or prior to the last Business Day of the next succeeding month; provided, however, that if there shall not be sufficient Revenues to satisfy all such deposits and payments, such deposits and payments shall be made to the Trustee and to each appropriate Person designated in such Senior Lien Parity Debt Resolutions or Derivative Agreements ratably according to the amount so required to be deposited or paid;

(b) (1) for deposit in the appropriate subaccounts of the Principal Account and the Sinking Fund Account of the Senior Lien Debt Service Fund an amount equal to the amount of Principal payable on each Series of Senior Lien Bonds, including the TIFIA Bond if a Bankruptcy Related Event relating to the Authority has occurred, on the next Principal Payment Date for each such Series of Senior Lien Bonds (if such Principal Payment Date is within thirteen months of such deposit) divided by the number of monthly deposits to be made to such subaccounts with respect to Principal on such Senior Lien Bonds on or prior to the next Principal Payment Date for each such Series of Senior Lien Bonds; and (2) to the Persons entitled thereto an amount equal to the amount of Principal payable on each issue of Senior Lien Parity Debt on the next Principal Payment Date for each such issue of Senior Lien Parity Debt (if such Principal Payment Date is within thirteen months of such payment) divided by the number of such payments to be made to such Persons with respect to Principal on such Senior Lien Parity Debt on or prior to the next Principal Payment Date for each such issue of Senior Lien Parity Debt; provided, however, that if there shall not be sufficient Revenues to satisfy all such deposits and payments, such deposits and payments shall be made to the Trustee and to each appropriate Person designated in such Senior Lien Parity Debt Resolutions ratably according to the amount so required to be deposited or paid;

(c) if no Bankruptcy Related Event relating to the Authority has occurred and the amount in the Senior Lien Reserve Fund is less than the Senior Lien Reserve Requirement or the amount in any Separate Reserve Fund for Senior Lien Indebtedness is less than the applicable reserve requirement therefor, (1) an amount, determined such that the deficiency is paid on or before the next Interest Payment Date in equal monthly payments beginning with the month in which the deficiency is identified for deposit in the Senior Lien Reserve Fund and (2) to the Trustee or other Person holding a Separate Reserve Fund for Senior Lien Indebtedness, an amount, determined such that the deficiency is paid on or before the next Interest Payment Date in equal monthly payments beginning with the month in which the deficiency is identified, to make up any deficiencies in any Separate Reserve Fund as provided in the Supplemental Trust Agreement or Parity Debt Resolution creating any such Separate Reserve Funds for deposit in such Separate Reserve Funds; provided, however, that if there shall not be sufficient Revenues to satisfy all such deposits and payments, such deposits and payments shall be made for deposit to the Senior Lien Reserve Fund and each such Separate Reserve Fund ratably according to the amount so required to be deposited or paid;

(d) if a Bankruptcy Related Event relating to the Authority has occurred and the amount in the Senior Lien Reserve Fund or the TIFIA Reserve Fund or any Separate Reserve Fund for Senior Lien Indebtedness is less than the applicable reserve requirement therefor, (1) an amount, determined such that the deficiency is paid on or before the next Interest Payment Date in equal monthly payments beginning with the month in which the deficiency is identified for deposit in the Senior Lien Reserve Fund or the TIFIA Reserve Fund and (2) to the Trustee or other Person holding a Separate Reserve Fund for Senior Lien Indebtedness, an amount, determined such that in each case the deficiency is paid on or before the next Interest Payment Date in equal monthly payments beginning with the month in which the deficiency is identified as provided in the Supplemental Trust Agreement or Parity Debt Resolution creating any such Separate Reserve Funds for deposit in such Separate Reserve Funds; provided, however, that if there shall not be sufficient Revenues to satisfy all such deposits and payments, such deposits and payments

shall be made for deposit to the Senior Lien Reserve Fund, the TIFIA Reserve Fund and each such Separate Reserve Fund ratably according to the amount so required to be deposited or paid;

(e) (1) for deposit in the appropriate subaccounts of the Interest Account of the Subordinate Lien Debt Service Fund an amount equal to the amount of interest payable on each Series of Subordinate Lien Bonds including the TIFIA Bond if a Bankruptcy Related Event relating to the Authority has not occurred on the next Interest Payment Date for each such Series of Subordinate Lien Bonds (if such Interest Payment Date is within seven months of such deposit) divided by the number of monthly deposits to be made to such subaccounts with respect to interest on such Subordinate Lien Bonds on or prior to the next Interest Payment Date for each such Series of Subordinate Lien Bonds; (2) to the Persons entitled thereto an amount equal to the amount of interest payable on each issue of Subordinate Lien Parity Debt on the next Interest Payment Date for each such issue of Subordinate Lien Parity Debt (if such Interest Payment Date is within seven months of such payment) divided by the number of such payments to be made to such Persons with respect to interest on such Subordinate Lien Parity Debt on or prior to the next Interest Payment Date for each such issue of Subordinate Lien Parity Debt; and (3) to the Persons entitled thereto the amount of any Subordinate Lien Derivative Agreement Regularly Scheduled Payments required by a Derivative Agreement to be paid by the Authority on or prior to the last Business Day of the next succeeding month; provided, however, that if there shall not be sufficient Revenues to satisfy all such deposits and payments, such deposits and payments shall be made to the Trustee and to each appropriate Person designated in such Subordinate Lien Parity Debt Resolutions or Derivative Agreements ratably according to the amount so required to be deposited or paid;

(f) (1) for deposit in the appropriate subaccounts of the Principal Account and the Sinking Fund Account of the Subordinate Lien Debt Service Fund an amount equal to the amount of Principal payable on each Series of Subordinate Lien Bonds including the TIFIA Bond if a Bankruptcy Related Event relating to the Authority has not occurred on the next Principal Payment Date for each such Series of Subordinate Lien Bonds (if such Principal Payment Date is within thirteen months of such deposit) divided by the number of monthly deposits to be made to such subaccounts with respect to Principal on such Subordinate Lien Bonds on or prior to the next Principal Payment Date for each such Series of Subordinate Lien Bonds; and (2) to the Persons entitled thereto an amount equal to the amount of Principal payable on each issue of Subordinate Lien Parity Debt on the next Principal Payment Date for each such issue of Subordinate Lien Parity Debt (if such Principal Payment Date is within thirteen months of such payment) divided by the number of such payments to be made to such Persons with respect to Principal on such Subordinate Lien Parity Debt on or prior to the next Principal Payment Date for each such issue of Subordinate Lien Parity Debt; provided, however, that if there shall not be sufficient Revenues to satisfy all such deposits and payments, such deposits and payments shall be made to the Trustee and to each appropriate Person designated in such Subordinate Lien Parity Debt Resolutions ratably according to the amount so required to be deposited or paid;

(g) if no Bankruptcy Related Event relating to the Authority has occurred and the amount in the Subordinate Lien Reserve Fund, the TIFIA Reserve Fund or any Separate Reserve Fund for Subordinate Lien Indebtedness is less than the applicable Requirement therefor, (1) an amount, determined such that the deficiency is paid on or before the next Interest Payment Date in equal monthly payments beginning with the month in which the deficiency is identified as provided under "*Deposit and Application of Money in Senior Lien Reserve Fund, Subordinate Lien Reserve Fund, the TIFIA Reserve Fund and any Separate Reserve Fund; Determination of Deficiencies*" in the case of the TIFIA Reserve Fund for deposit therein or in the Supplemental Trust Agreement or Parity Debt Resolution providing for the initial funding of the Subordinate Lien Reserve Fund for deposit in the Subordinate Lien Reserve Fund and (2) to the Trustee or other Person holding a Separate Reserve Fund for Subordinate Lien Indebtedness, an amount, determined such that the deficiency is paid on or before the next Interest Payment Date in equal monthly payments beginning with the month in which the deficiency is identified

as provided in the Supplemental Trust Agreement or Parity Debt Resolution creating any such Separate Reserve Fund for deposit in such Separate Reserve Funds; provided, however, that if there shall not be sufficient Revenues to satisfy all such deposits and payments, such deposits and payments shall be made for deposit to the Subordinate Lien Reserve Fund, the TIFIA Reserve Fund and each such Separate Reserve Fund ratably according to the amount so required to be deposited or paid;

(h) if a Bankruptcy Related Event relating to the Authority has occurred and the amount in the Subordinate Lien Reserve Fund is less than the Subordinate Lien Reserve Requirement or the amount in any Separate Reserve Fund for Subordinate Lien Indebtedness is less than the applicable Requirement therefor, (1) an amount, determined such that the deficiency is paid on or before the next Interest Payment Date in equal monthly payments beginning with the month in which the deficiency is identified as provided in the Supplemental Trust Agreement or Parity Debt Resolution providing for the initial funding of the Subordinate Lien Reserve Fund for deposit in the Subordinate Lien Reserve Fund and (2) to the Trustee or other Person holding a Separate Reserve Fund for Subordinate Lien Indebtedness, an amount, determined such that the deficiency is paid on or before the next Interest Payment Date in equal monthly payments beginning with the month in which the deficiency is identified as provided in the Supplemental Trust Agreement or Parity Debt Resolution creating any such Separate Reserve Fund for deposit in such Separate Reserve Funds; provided, however, that if there shall not be sufficient Revenues to satisfy all such deposits and payments, such deposits and payments shall be made for deposit to the Subordinate Lien Reserve Fund and each such Separate Reserve Fund ratably according to the amount so required to be deposited or paid;

(i) to the credit of the Operations and Maintenance Expense Fund an amount equal to the next succeeding month's budgeted Operating Expenses as set forth in the Annual Budget;

(j) to the credit of the Operating Reserve Fund such amount as shall be necessary to make the amount on deposit therein equal to the Operating Reserve Fund Requirement;

(k) beginning in the first month after the Substantial Completion Date, to the credit of the Renewal and Replacement Fund, such amount as shall be necessary to make the amount on deposit therein equal to the Renewal and Replacement Fund Requirement;

(l) beginning in the first month of each payment period for which a TIFIA Scheduled Prepayment Amount is to be paid, to the credit of the TIFIA Scheduled Prepayment Fund until the amount on deposit therein equals the TIFIA Scheduled Prepayment Amount due at the end of such payment period; and

(m) after all deposits are made in accordance with subsections (a) through (l) above, any remaining moneys shall be deposited in the Ramp-Up Reserve Account.

The Authority shall provide to the Trustee such certifications, documentation, agreements and other information as may be necessary for the Trustee to determine the amounts required to be deposited or paid as provided above in this Section. In making such determinations for subsections (a) through (l), the Authority may take into account interest earnings or other amounts to remain in such funds or accounts after the deposit.

With respect to any deposits or credits due pursuant to subsections (i) through (l) above, the Authority shall provide the Trustee with specific written direction as to the amounts to be paid or credited to such accounts and the Trustee shall be permitted to conclusively rely on such direction by the Authority.

On or before the 45th day next preceding any date on which Serial Bonds are to mature or Term Bonds are to be redeemed pursuant to Sinking Fund Requirements therefor or are to mature, the Authority may satisfy all or a portion of its obligation to make the payments required by subsections (a)(1) and (b)(1) or by subsections (e)(1) and (f)(1) of this Section by delivering to the Trustee Serial Bonds maturing or Term Bonds maturing or required to be redeemed on such date. The price paid to purchase any such Bond, including accrued interest to the date of purchase, shall not exceed the principal or Redemption Price plus accrued interest to the date of purchase. Upon such delivery, the Authority shall receive a credit against amounts required to be deposited into the Interest Account, the Principal Account or Sinking Fund Account, as the case may be, on account of such Bonds with respect to all interest payments for the remainder of the Fiscal Year and in the amount of 100% of the principal amount of any such Serial Bonds or Term Bonds so delivered.

On or before the 45th day next preceding any date on which Parity Debt is to mature or is to be redeemed pursuant to an amortization requirement, the Authority may satisfy all or a portion of its obligation to make the payments required by subsections (a)(2) and (b)(2) or by subsections (e)(2) and (f)(2) of this Section by delivering to the Trustee Parity Debt maturing or required to be so redeemed on such date. The price paid to purchase any such Parity Debt, including accrued interest to the date of purchase, shall not exceed the principal or Redemption Price plus accrued interest to date of purchase. Upon such delivery, the Authority shall receive a credit against amounts required to be deposited or paid with respect to interest or principal on account of such Parity Debt with respect to all interest payments for the remainder of the Fiscal Year and in the amount of 100% of the principal amount of any such Parity Debt so delivered.

### **Provisions for Other Funds**

*Application of Money in Interest Accounts; Draws on Reserve Funds.* Not later than 10:00 A.M. on each Interest Payment Date, date for the payment of Defaulted Interest or date upon which Bonds are to be redeemed, or on such other date as may be specified in the Trust Agreement or in the applicable Supplemental Trust Agreement, the Trustee shall withdraw from the applicable subaccount in the respective Interest Accounts and wire transfer to the Bond Registrar, in federal reserve or other immediately available funds, the amounts required for paying interest on the respective Bonds on such Interest Payment Date. The Bond Registrar shall remit or otherwise set aside the amount due and payable to the Owners as provided in the Trust Agreement or in the Supplemental Trust Agreements.

If the Authority fails to deposit with the Trustee the amounts required to be deposited in the applicable subaccount of all Interest Accounts, or if the balance in the applicable subaccount of all Interest Accounts on the Business Day next preceding an Interest Payment Date is insufficient to pay interest coming due on such Interest Payment Date, then the Trustee shall notify the Authority and the TIFIA Lender of the amount of the deficiency and request the Authority to immediately cure such deficiency. Upon failure of the Authority to cure such deficiency and in any event not later than such Interest Payment Date, the Trustee shall:

(a) transfer an amount sufficient to cure the deficiency for Senior Lien Indebtedness, drawing only upon funds (i) in the case of Senior Lien Bonds secured by the Senior Lien Reserve Fund, from the Senior Lien Reserve Fund, (ii) in the case of Senior Lien Bonds secured by a Separate Reserve Fund, from such Separate Reserve Fund, if any, securing such Series of Senior Lien Bonds, and (iii) if the TIFIA Bond is a Senior Lien Bond, from the TIFIA Reserve Fund; and

(b) transfer an amount sufficient to cure the deficiency for Subordinate Lien Indebtedness, drawing only upon funds (i) in the case of Subordinate Lien Bonds secured by the Subordinate Lien Reserve Fund, from the Subordinate Lien Reserve Fund, (ii) in the case of Subordinate Lien Bonds

secured by a Separate Reserve Fund, from such Separate Reserve Fund, if any, securing such Series of Subordinate Lien Bonds, and (iii) if the TIFIA Bond is a Subordinate Lien Bond, from the TIFIA Reserve Fund.

*Application of Money in Principal Accounts; Draws on Reserve Funds.* Not later than 10:00 A.M. on each Principal Payment Date, the Trustee shall withdraw from the applicable subaccount in the respective Principal Accounts and wire transfer to the Bond Registrar, in federal reserve or other immediately available funds, the amount necessary to pay the principal of the respective Bonds for their respective maturities and principal payments. The Bond Registrar shall remit or otherwise set aside the amount due and payable to the Owners as provided in the Supplemental Trust Agreements.

(a) If on any date there is money in the Principal Account of the Senior Lien Debt Service Fund and no Serial Bonds are then Outstanding or if on any Principal Payment Date money remains therein after the payment of the principal of Serial Bonds then due, the Trustee shall withdraw such money therefrom and shall apply the same in the following order: (a) deposit into the Sinking Fund Account of the Senior Lien Debt Service Fund the amount then required to be paid thereto by the Authority, (b) deposit, if and to the extent determined by the Authority, into the Senior Lien Reserve Fund, the TIFIA Reserve Fund, if a Bankruptcy Related Event relating to the Authority has occurred, or any Separate Reserve Fund for Senior Lien Indebtedness such amounts as may be determined by the Authority in order to make the amounts on deposit therein equal to the Senior Lien Reserve Requirement, the TIFIA Reserve Fund Requirement or the Separate Reserve Fund requirement, as the case may be, and (c) deposit to the credit of the Revenue Fund.

(b) If on any date there is money in the Principal Account of the Subordinate Lien Debt Service Fund and no Serial Bonds are then Outstanding or if on any Principal Payment Date money remains therein after the payment of the principal of Serial Bonds then due, the Trustee shall withdraw such money therefrom and shall apply the same in the following order: (a) deposit into the Sinking Fund Account of the Subordinate Lien Debt Service Fund the amount then required to be paid thereto by the Authority, (b) deposit, if and to the extent determined by the Authority, into the Subordinate Lien Reserve Fund, the TIFIA Reserve Fund, if no Bankruptcy Related Event relating to the Authority has occurred, or any Separate Reserve Fund for Subordinate Lien Indebtedness such amounts as may be determined by the Authority in order to make the amounts on deposit therein equal to the Subordinate Lien Reserve Requirement, the TIFIA Reserve Fund Requirement or the Separate Reserve Fund requirement, as the case may be, and (c) deposit to the credit of the Revenue Fund.

(c) If the Authority fails to deposit with the Trustee the amounts required to be deposited in the applicable subaccounts of the respective Principal Accounts, or if the balance in the applicable subaccount of all Principal Accounts on the Business Day next preceding a Principal Payment Date is insufficient to pay the Principal coming due on the Bonds on such Principal Payment Date, the Trustee shall notify the Authority and the TIFIA Lender of the amount of the deficiency and request the Authority to immediately cure such deficiency. Upon failure of the Authority to cure such deficiency and in any event not later than such Principal Payment Date, the Trustee shall:

(a) transfer an amount sufficient to cure the deficiency for Senior Lien Indebtedness, drawing only upon funds (i) in the case of Senior Lien Bonds secured by the Senior Lien Reserve Fund, from the Senior Lien Reserve Fund, (ii) in the case of Senior Lien Bonds secured by a Separate Reserve Fund, from such Separate Reserve Fund, if any, securing such Series of Senior Lien Bonds, and (iii) if the TIFIA Bond is a Senior Lien Bond, from the TIFIA Reserve Fund; and

(b) transfer an amount sufficient to cure the deficiency for Subordinate Lien Indebtedness, drawing only upon funds (i) in the case of Subordinate Lien Bonds secured by the Subordinate Lien

Reserve Fund, from the Subordinate Lien Reserve Fund, (ii) in the case of Subordinate Lien Bonds secured by a Separate Reserve Fund, from such Separate Reserve Fund, if any, securing such Series of Subordinate Lien Bonds, and (iii) if the TIFIA Bond is a Subordinate Lien Bond, from the TIFIA Reserve Fund.

*Application of Money in Sinking Fund Accounts; Draws on Reserve Funds.* Money held for the credit of the subaccounts in the Sinking Fund Account shall be applied to the retirement, purchase, redemption or payment of Term Bonds in the manner provided in the applicable Supplemental Trust Agreement.

If the Authority fails to deposit with the Trustee the amounts required to be deposited in the applicable subaccounts of the respective Sinking Fund Accounts, or if the balance in the applicable subaccount of the respective Sinking Fund Accounts on the Business Day next preceding a Principal Payment Date is insufficient to pay the Principal coming due on the Bonds on such Principal Payment Date, the Trustee shall notify the Authority and the TIFIA Lender of the amount of the deficiency and request the Authority to immediately cure such deficiency. Upon failure of the Authority to cure such deficiency and in any event not later than such Principal Payment Date, the Trustee shall:

(a) transfer an amount sufficient to cure the deficiency for Senior Lien Indebtedness, drawing only upon funds (i) in the case of Senior Lien Bonds secured by the Senior Lien Reserve Fund, from the Senior Lien Reserve Fund, (ii) in the case of Senior Lien Bonds secured by a Separate Reserve Fund, from such Separate Reserve Fund, if any, securing such Series of Senior Lien Bonds, and (iii) if the TIFIA Bond is a Senior Lien Bond, from the TIFIA Reserve Fund; and

(b) transfer an amount sufficient to cure the deficiency for Subordinate Lien Indebtedness, drawing only upon funds (i) in the case of Subordinate Lien Bonds secured by the Subordinate Lien Reserve Fund, from the Subordinate Lien Reserve Fund, (ii) in the case of Subordinate Lien Bonds secured by a Separate Reserve Fund, from such Separate Reserve Fund, if any, securing such Series of Subordinate Lien Bonds, and (iii) if the TIFIA Bond is a Subordinate Lien Bond, from the TIFIA Reserve Fund.

*Deposit and Application of Money in Senior Lien Reserve Fund, Subordinate Lien Reserve Fund, the TIFIA Reserve Fund and any Separate Reserve Fund; Determination of Deficiencies.* If a Senior Lien Resolution provides that the Senior Lien Indebtedness incurred thereunder is to be secured by the Senior Lien Reserve Fund, the Authority must fund, from the proceeds of such Senior Lien Indebtedness or from any other available sources, concurrently with the delivery of and payment for such Senior Lien Indebtedness, the Senior Lien Reserve Fund in an amount equal to the Senior Lien Reserve Requirement. If a Senior Lien Resolution provides that the Senior Lien Indebtedness incurred thereunder is to be secured by a Separate Reserve Fund, the Authority must fund, from the proceeds of such Senior Lien Indebtedness or from any other available sources, at the time or times and in the manner specified in the applicable Senior Lien Resolution, such Separate Reserve Fund in an amount equal to the requirement for such Senior Lien Indebtedness.

If a Subordinate Lien Resolution provides that the Subordinate Lien Indebtedness incurred thereunder is to be secured by the Subordinate Lien Reserve Fund, the Authority must fund, from the proceeds of such Subordinate Lien Indebtedness or from any other available sources, concurrently with the delivery of and payment for such Subordinate Lien Indebtedness, the Subordinate Lien Reserve Fund in an amount equal to the Subordinate Lien Reserve Requirement. If a Subordinate Lien Resolution provides that the Subordinate Lien Indebtedness incurred thereunder is to be secured by a Separate Reserve Fund, the Authority must fund, from the proceeds of such Subordinate Lien Indebtedness or from any other available sources, at the time or times and in the manner specified in the applicable Subordinate

Lien Resolution, such Separate Reserve Fund in an amount equal to the requirement for such Subordinate Lien Indebtedness.

(a) The Trustee shall use amounts in the Senior Lien Reserve Fund to make transfers, or use moneys provided under a Reserve Alternative Instrument to make deposits in respect of all Senior Lien Indebtedness secured by the Senior Lien Reserve Fund, first, to the appropriate subaccounts of the Interest Account, and second, to the Principal Account and the Sinking Fund Account of the Senior Lien Debt Service Fund to remedy any deficiency therein as of any Interest Payment Date or Principal Payment Date (or any earlier date as set forth in a Senior Lien Resolution), or to pay the interest on or the principal of or amortization requirements in respect of any Senior Lien Parity Debt secured by the Senior Lien Reserve Fund when due, whenever and to the extent the money on deposit for such purposes is insufficient. In the event there are insufficient funds in the Senior Lien Reserve Fund to make the transfers required by the first sentence of this subsection, all the available funds will be used to make pro rata transfers based on the principal amounts of Senior Lien Indebtedness secured thereby and then Outstanding.

(b) The Trustee shall use amounts in the Subordinate Lien Reserve Fund to make transfers, or use moneys provided under a Reserve Alternative Instrument to make deposits, first, in respect of all Subordinate Lien Indebtedness secured by the Subordinate Lien Reserve Fund, and second, to the appropriate subaccounts of the Interest Account, the Principal Account and the Sinking Fund Account of the Subordinate Lien Debt Service Fund to remedy any deficiency therein as of any Interest Payment Date or Principal Payment Date (or any earlier date as set forth in a Subordinate Lien Resolution), or to pay the interest on or the principal of or amortization requirements in respect of any Subordinate Lien Parity Debt secured by the Subordinate Lien Reserve Fund when due, whenever and to the extent the money on deposit for such purposes is insufficient. In the event there are insufficient funds in the Subordinate Lien Reserve Fund to make the transfers required by the first sentence of this subsection, all the available funds will be used to make pro rata transfers based on the principal amounts of Subordinate Lien Indebtedness secured thereby and then Outstanding.

(c) The Trustee shall use amounts in any Separate Reserve Fund for Senior Lien Indebtedness held by it to make transfers or use moneys provided under a Reserve Alternative Instrument to make deposits, in respect of the particular Senior Lien Indebtedness secured by such Separate Reserve Fund, first, to the appropriate subaccounts of the Interest Account, and second, to the Principal Account and the Sinking Fund Account of the Senior Lien Debt Service Fund to remedy any deficiency therein as of any Interest Payment Date or Principal Payment Date (or any earlier date as set forth in a Senior Lien Resolution) or to pay the interest on or the principal of or amortization requirement in respect thereof on Senior Lien Parity Debt secured by such Separate Reserve Fund when due, whenever and to the extent the money on deposit for such purposes is insufficient. In the event there are insufficient funds in the Separate Reserve Fund to make the transfers required by the first sentence of this subsection, all the available funds will be used to make pro rata transfers based on the principal amounts of Senior Lien Indebtedness secured thereby and then Outstanding.

(d) The Trustee shall use amounts in the TIFIA Reserve Fund to make transfers, or use moneys provided under a Reserve Alternative Instrument to make deposits, first, to the subaccount of the Interest Account relating to the TIFIA Bond of the Senior Lien Debt Service Fund (if a Bankruptcy Related Event relating to the Authority has occurred) or the Subordinate Lien Debt Service Fund (if no Bankruptcy Related Event relating to the Authority has occurred) to remedy any deficiency therein as of any Interest Payment Date, and second, to the subaccount of the Principal Account of the Senior Lien Debt Service Fund (if a Bankruptcy Related Event relating to the Authority has occurred) or the Subordinate Lien Debt Service Fund (if no Bankruptcy Related Event relating to the Authority has occurred) as of any Principal Payment Date.

(e) The Trustee shall use amounts in any Separate Reserve Fund for Subordinate Lien Indebtedness held by it to make transfers or use moneys provided under a Reserve Alternative Instrument to make deposits, in respect of the particular Subordinate Lien Indebtedness secured by such Separate Reserve Fund, first, to the appropriate subaccounts of the Interest Account, and second, to the Principal Account and the Sinking Fund Account of the Subordinate Lien Debt Service Fund to remedy any deficiency therein as of any Interest Payment Date or Principal Payment Date (or any earlier date as set forth in a Subordinate Lien Resolution) or to pay the interest on or the principal of or amortization requirement in respect thereof on Subordinate Lien Parity Debt secured by such Separate Reserve Fund when due, whenever and to the extent the money on deposit for such purposes is insufficient. In the event there are insufficient funds in the Separate Reserve Fund to make the transfers required by the first sentence of this subsection, all the available funds will be used to make pro rata transfers based on the principal amounts of Subordinate Lien Indebtedness secured thereby and then Outstanding.

(f) Subject to (g) below, any deficiency in the Senior Lien Reserve Fund, the Subordinate Lien Reserve Fund, the TIFIA Reserve Fund and any Separate Reserve Fund resulting from the withdrawal of moneys therein or from the amount on deposit in such fund on any date of valuation pursuant to Section 603 being less than the applicable requirement therefor shall be made up immediately with transfers first from the Pledged Account and second from the Ramp-Up Reserve Account. To the extent a deficiency still exists, on or prior to the next Interest Payment Date immediately following the month in which such withdrawal is made by equal monthly deposits, such deposits to be made pursuant to Section 503(c), (d), (g) or (h), as applicable. Any deficiency resulting from a draw on a Reserve Alternative Instrument shall be made up as provided in such Reserve Alternative Instrument or documentation relating thereto, but any such deficiency must be made up by not later than the final date when such deficiency would have been required to be made up if there had been a withdrawal of moneys from the Senior Lien Reserve Fund, the Subordinate Lien Reserve Fund, the TIFIA Reserve Fund or any Separate Reserve Fund rather than a draw on a Reserve Alternative Instrument. Deficiencies may be satisfied through the deposit of additional moneys or the providing of an additional, or increase in a, Reserve Alternative Instrument.

(g) If there are insufficient funds in the Pledged Account and the Ramp-Up Reserve Account to immediately transfer the total amount of all deficiencies in the Senior Lien Reserve Fund, the Subordinate Lien Reserve Fund, the TIFIA Reserve Fund and any Separate Reserve Fund resulting from the withdrawal of moneys therein or there being less than applicable requirement on a date of valuation, then the total of amounts in such accounts shall be transferred as follows:

first, an amount sufficient to cure the deficiency for (i) Senior Lien Bonds secured by the Senior Lien Reserve Fund, (ii) Senior Lien Bonds secured by a Separate Reserve Fund, and (iii) if the TIFIA Bond is a Senior Lien Bond, from the TIFIA Reserve Fund; provided if there are not enough amounts in the Pledged Account and Ramp-Up Reserve Account to fully make all payments required under (i), (ii) and (iii), such payments shall be made pro rata based on the deficiency in such Senior Lien Reserve Fund, Separate Reserve Fund or TIFIA Reserve Fund and the principal amount of Bonds of each Series then Outstanding, secured by such Senior Lien Reserve Fund, Separate Reserve Fund or TIFIA Reserve Fund, respectively; and

second, an amount sufficient to cure the deficiency for (i) Subordinate Lien Bonds secured by the Subordinate Lien Reserve Fund, (ii) Subordinate Lien Bonds secured by a Separate Reserve Fund, and (iii) if the TIFIA Bond is a Subordinate Lien Bond, from the TIFIA Reserve Fund; provided if there are not enough amounts in the Pledged Account and Ramp-Up Reserve Account to fully make all payments required under (i), (ii) and (iii), such payments shall be made pro rata based on the deficiency in such Subordinate Lien Reserve Fund, Separate Reserve Fund or TIFIA Reserve Fund and the principal amount



of Bonds of each Series then Outstanding, secured by such Subordinate Lien Reserve Fund, Separate Reserve Fund or TIFIA Reserve Fund, respectively.

(h) Moneys or Investment Obligations on deposit in the Senior Lien Reserve Fund, the Subordinate Lien Reserve Fund, TIFIA Reserve Fund, or any Separate Reserve Fund shall be used to satisfy deficiencies prior to any draw on a Reserve Alternative Instrument.

Application of Money in the Redemption Accounts. The Trustee shall apply money in the respective Redemption Accounts of the Senior Lien Debt Service Fund and the Subordinate Lien Debt Service Fund, as the case may be, for the purchase or redemption of Senior Lien Bonds or Subordinate Lien Bonds, as applicable, as follows:

(a) Subject to the provisions of subsection (c) of this Section, and if instructed to do so in writing by an Authorized Officer, the Trustee shall endeavor to purchase and cancel Bonds or portions thereof, whether or not such Bonds or portions thereof are then subject to redemption, at the written direction of an Authorized Officer, provided that the purchase price of each Bond, plus accrued interest to the date of purchase, shall not exceed the Redemption Price that would be payable on the next redemption date to the Owners of such Bonds under the provisions of the applicable Supplemental Trust Agreement plus accrued interest to the redemption date if such Bond or such portion thereof were called for redemption on such redemption date from the money in the applicable subaccount of the Redemption Account. The Trustee shall pay the interest accrued on such Bonds or portions thereof to the date of settlement from the applicable subaccount of the respective Interest Account and the purchase price from the applicable subaccount of the respective Redemption Account, but no such purchase shall be made by the Trustee from money in the applicable subaccount of the respective Redemption Account within the period of forty-five (45) days immediately preceding any date on which such Bonds or portions thereof are to be redeemed except from moneys other than the moneys set aside in the applicable subaccount of the respective Redemption Account for the redemption of Bonds.

(b) Subject to the provisions of subsection (c) of this Section, the Trustee shall call for redemption on a date permitted by the Trust Agreement or by the applicable Supplemental Trust Agreement such amount of Bonds or portions thereof as, with the redemption premium, if any, will exhaust the moneys then held in the applicable subaccount of the respective Redemption Account as nearly as may be; provided, however, that not less than Fifty Thousand Dollars (\$50,000) principal amount of Bonds shall be called for redemption at any one time unless the Trustee is so instructed in writing by the Authority. The Trustee shall pay the accrued interest on the Bonds or portions thereof to be redeemed to the date of redemption from the applicable subaccount of the respective Interest Account or any other available funds of the Authority and the Redemption Price of such Bonds or portions thereof from the applicable subaccount of the respective Redemption Account. On or before the redemption date, the Trustee shall withdraw from the applicable subaccounts of the respective Redemption Account and the Interest Account, as applicable, and transfer to the Bond Registrar the respective amounts required to pay the Redemption Price and accrued interest to the redemption date of the Bonds or portions thereof so called for redemption.

(c) Money in the respective Redemption Accounts may be applied by the Trustee in each Fiscal Year to the purchase or the redemption of Bonds of anyone or more Series then Outstanding in accordance with the latest Officer's Certificate filed with the Trustee (i) designating one or more Series of Bonds to be purchased or redeemed, (ii) if more than one Series of Bonds is so designated, setting forth the aggregate principal amount of Bonds of each Series to be purchased or redeemed, and (iii) unless the Supplemental Trust Agreement relating to the Bonds to be redeemed specifies the order of redemption, designating the Bonds to be redeemed within each Series, and if such Bonds are Term Bonds, the years in which future Sinking Fund Requirements are to be reduced as a result of such redemption and the amount

of such reduction in each such year. In the event no such certificate is filed and unless the Trust Agreement or the Supplemental Trust Agreement relating to the Bonds to be redeemed specifies otherwise, (A) the Trustee shall apply such money to the purchase of one or more Series of Bonds as it shall determine or to the redemption of Bonds bearing the highest rate of interest, (B) if Bonds of more than one maturity bear the same interest rate, the Trustee will redeem such Bonds in the inverse order of maturities, and (C) if the Bonds bearing the highest rate of interest are Term Bonds, the Trustee will reduce Sinking Fund Requirements for such Term Bonds in inverse order of the scheduled redemption of such Term Bonds. All Bonds shall be redeemed as provided in the applicable Supplemental Trust Agreement.

(d) Money held for the credit of the applicable subaccounts in the respective Redemption Accounts shall be applied to the purchase or redemption of Bonds in the manner provided in the applicable Supplemental Trust Agreement.

Application of Money in Operations and Maintenance Expense Fund. Moneys held for the credit of the Operations and Maintenance Expense Fund shall be used by the Authority only to pay all or a portion of the cost of any Operating Expenses in accordance with the applicable procedures used in the payment of Operating Expenses.

Application of Money in Operating Reserve Fund. Moneys held for the credit of the Operating Reserve Fund shall be used by the Authority only to pay all or a portion of the cost of any Operating Expenses in accordance with the applicable procedures used in the payment of Operating Expenses or as provided in the Capital Improvements Plan, but only to the extent that amount held in the Operations and Maintenance Expense Fund are not sufficient for such purpose. Subject to the availability of funds, NCDOT will pay to the Trustee for deposit to the Operating Reserve Fund amounts equal to (i) the amount necessary to replenish the Operating Reserve Fund for any transfer so made up to the Operating Reserve Fund Requirement at the time the transfer is so made and (ii) the amount required to be transferred from the Operating Reserve Fund to the Operations and Maintenance Expense Fund to the extent that there are not sufficient Revenues held in the Operating Reserve Fund for such purpose.

Application of Money in Renewal and Replacement Fund. Moneys held for the credit of the Renewal and Replacement Fund shall be used by the Authority only to pay all or a portion of the cost of unusual or extraordinary maintenance, repairs, renewals or replacements or capital improvements related to the Monroe Expressway as provided in the Capital Improvements Plan.

If at any time the amounts in the Renewal and Replacement Fund shall not be equal to the Renewal and Replacement Fund Requirement, then subject to the availability of funds, upon request of the Authority NCDOT will pay the amount necessary so that amounts in the Renewal and Replacement Fund shall be equal to the Renewal and Replacement Fund Requirement. If at any time the amounts in the Renewal and Replacement Fund are in excess of the Renewal and Replacement Fund Requirement, then, upon delivery of an Officer's Certificate making a request therefor, such excess shall be transferred to the Revenue Fund.

Insurance and Condemnation Award Fund. The Trustee shall deposit Net Insurance Proceeds or Net Eminent Domain Proceeds into the Insurance and Condemnation Award Fund when and as received by the Trustee from the Authority, and they shall be disbursed pursuant to the provisions hereafter described for the use such net proceeds.

General Reserve Fund.

(a) Prior to the first Calculation Date immediately succeeding the fifth anniversary of the Substantial Completion Date, amounts on deposit in the Ramp-Up Reserve Account shall only be applied in accordance with the Trust Agreement to the reimbursement of the Senior Lien Reserve Fund, the Subordinate Lien Reserve Fund, the TIFIA Reserve Fund or a Separate Reserve Fund for deficiencies therein. On the first Calculation Date immediately succeeding the fifth anniversary of the Substantial Completion Date, any portion of the Original Ramp-Up Reserve Account Deposit remaining on deposit in the Ramp-Up Reserve Account on such date shall be transferred to the Unpledged Account. On each Calculation Date thereafter, amounts on deposit in the Ramp-Up Reserve Account may be applied at the direction of the Authority (A) (I) to the payment of Senior Debt Service or Subordinate Debt Service to the extent there are insufficient funds on deposit in the Senior Debt Service Fund or the Subordinate Debt Service Fund to make such payments when due, (II) to any other Project Account (other than the Pledged Account) to satisfy any deficiency in any such Project Account, or (III) to the redemption or prepayment of Senior Lien Indebtedness and the TIFIA Bond, whether or not a Bankruptcy Related Event relating to the Authority has occurred, providing such prepayment or redemption shall be made pro rata among the Senior Lien Indebtedness and the TIFIA Bond on the basis of Outstanding principal amounts which may be currently prepaid or redeemed, and (B) after any deposits required pursuant to subclause (A) and upon satisfaction by the Authority of the Restricted Payment Conditions, to the Pledged Account and the Unpledged Account; provided, however, that no transfer shall be made to the Unpledged Account unless the requirements in (c) below are complied with.

(b) If the Senior Reserve Fund, the Subordinate Lien Reserve Fund, the TIFIA Reserve Fund and each Separate Reserve Fund are fully funded at the respective requirements therefor, at the direction of the Authority, amounts on deposit in the Pledged Account may be (A) applied at any time to the payment of (I) Guarantee Repayments, (II) principal and interest on Junior Indebtedness or (III) deficiencies in debt service due on Appropriation Bonds resulting from sequestration and non-payment of the federal interest subsidies thereon or (B) upon satisfaction of the requirements in the following sentence, transferred at any time to a new account within the Project Fund to pay costs of improvements to the Initial Project or any Additional Project. The Authority shall only apply amounts on deposit in the Pledged Account for costs of an Additional Project in accordance with the provisions of the TIFIA Loan Agreement and the Trust Agreement. Amounts in the Pledged Account may also be transferred at any time to the Ramp-Up Reserve Account at the direction of the Authority.

(c) Moneys held for the credit of the Unpledged Account may be used by the Authority for any legally available purpose, provided, however, that in accordance with the TIFIA Loan Agreement, the Authority shall simultaneously deposit funds from the Ramp-Up Reserve Account to the redemption account relating to the TIFIA Bond to prepay the TIFIA Bond in an amount equal to the amounts deposited in the Unpledged Account from the Ramp-Up Reserve Account which do not represent a portion of the Original Ramp-Up Reserve Account Deposit.

*“Original Ramp-Up Reserve Account Deposit”* means the \$25,000,000 deposited in the Ramp-Up Reserve Account on the date of issuance of the Bonds. For purposes of determining whether amounts transferred from the Ramp-Up Reserve Account to the Unpledged Account represent a portion of the Original Ramp-Up Reserve Account Deposit, transfers from the Ramp-Up Reserve Account shall be treated as paid from the sources of deposits thereto on a first-in first-out basis with Original Ramp-Up Reserve Deposit being the first such source. Therefore the first transfers (and all subsequent until \$25,000,000 has been disbursed) from the Ramp-Up Reserve Account for any purpose are treated as representing a portion of the Original Ramp-up Reserve Deposit.

Escheat. All money that the Trustee shall have withdrawn from the Senior Lien Debt Service Fund or the Subordinate Lien Debt Service Fund shall have received from any other source and set aside or delivered to the Bond Registrar for the purpose of paying any of the Bonds, either at maturity or by purchase or call for redemption, shall be held in trust for the respective Owners.

Any money that is so set aside and that remains unclaimed by the Owners for a period of five (5) years after the date on which such Bonds have become payable shall be treated as abandoned property pursuant to the provisions of Section 116B-53 of the NCGS, and the Trustee or the Bond Registrar shall report and remit this property to the Escheat Fund established by, according to the requirements of Chapter 116B of the NCGS, and thereafter the Owners shall look only to the Escheat Fund for payment and then only to the extent of the amounts so received, without any interest thereon, and the Trustee, the Bond Registrar and the Authority shall have no responsibility with respect to such money.

NCDOT Contingent Guarantees; Repayments Thereof. The obligation of NCDOT in the Trust Agreement for construction funds is to be funded from amounts in the State Highway Fund and the obligations of NCDOT for operating and renewal and replacement funds are to be funded from the State Highway Fund or the State Highway Trust Fund. Each such payment is subject to appropriation by the State and the availability of amounts in the respective source fund. All such payments, except for the first \$55,000,000 paid for construction, shall be repaid by the Authority to NCDOT as Guarantee Repayments. All amounts so repaid, as a part of the obligated Guarantee Repayments, shall include simple interest calculated at the rate determined pursuant to Section 136-176(b) of the NCGS. Any repayments made which are less than all of the Guarantee Repayments shall be credited to principal and interest components of Guarantee Repayments in proportion to the total of principal and interest owed on the date of repayment.

See “General Covenants and Representations – *Special TIFIA Provisions*” below.

Disposition of Fund Balances. After provision is made for the payment of all Outstanding Senior Lien Indebtedness, Subordinate Lien Indebtedness and Junior Indebtedness, including the interest thereon, and for the payment of all and Senior Lien Derivative Agreement Regularly Scheduled Payments, Subordinate Lien Derivative Agreement Regularly Scheduled Payments and all other obligations, expenses and charges required to be paid under or in connection with the Trust Agreement, and receipt by the Trustee of an Officer’s Certificate to the effect that there are no other indentures, resolutions, bond orders, Supplemental Trust Agreements, Parity Debt Resolutions, Subordinate Lien Resolutions, Derivative Agreements or other agreements that impose a continuing lien on the balances in the Trust Agreement after mentioned, the Trustee shall pay all amounts in any fund, account or subaccount then held by it under the Trust Agreement to the Authority. If a continuing lien has been imposed on such balance by another resolution, bond order, any other agreement, by court order or decree, or by law, the Trustee shall pay such balance to such person as is entitled to receive the same by law or under the terms of such resolution, bond order, agreement, court order, or decree.

Security. As security for the payment of all Bonds and other Indebtedness issued or incurred under the Trust Agreement and the interest thereon, and as security for the payments of amounts due under any Derivative Agreement, but in each case solely as provided in the Trust Agreement, the Authority grants to the Trustee, for the benefit of the Owners and Holders of such indebtedness and the counterparty to any such Derivative Agreement, a pledge, charge and lien upon the Trust Estate.

(a) Any Revenues disbursed by the Trustee for deposit in the Operations and Maintenance Expense Fund, the Operating Reserve Fund, the Renewal and Replacement Fund or the Unpledged Account, and any Revenues disbursed to NCDOT pursuant to the Trust Agreement as Guarantee Repayments or otherwise shall no longer constitute Revenues within the meaning of the Trust Agreement

and shall no longer be subject to the pledge, charge and lien upon the Trust Estate created by the Trust Agreement.

(b) The pledge, charge and lien upon the Trust Estate shall be effective and operate immediately, without any recording or filing of any financing statement or other notice, and the Trustee shall have the right to collect and receive the Revenues in accordance with the provisions of the Trust Agreement at all times during the period from and after the date of delivery of the Series 2016 Bonds issued under the Trust Agreement until all Bonds, Parity Debt, Senior Lien Derivative Agreement Regularly Scheduled Payments, Subordinate Lien Derivative Agreement Regularly Scheduled Payments and Junior Indebtedness have been fully paid and discharged, including, without limitation, at all times after the institution and during the pendency of bankruptcy or similar proceedings.

(c) The aforementioned pledge, charge and lien upon the Trust Estate shall not inhibit the sale or disposition of any portion of the Monroe Expressway in accordance with the Trust Agreement and the TIFIA Loan Agreement and shall not impair or restrict the ability of the Authority to invest in securities and other forms of investment, subject to the provisions of the Trust Agreement.

(d) The pledge, charge and lien upon the Trust Estate shall be (1) first for the security for the payment of the Owners or Holder of Senior Lien Indebtedness, including the interest thereon, and the payment of any Senior Lien Derivative Agreement Regularly Scheduled Payments, (2) second for the security for the payment of the Subordinate Lien Indebtedness, including the interest thereon, and the payment of all Subordinate Lien Derivative Agreement Regularly Scheduled Payments, for which such pledge, charge and lien upon the Trust Estate is junior and subordinate to the pledge charge and lien upon the Trust Estate securing the Senior Lien Indebtedness and the Senior Lien Derivative Agreement Regularly Scheduled Payments, (3) third for the security of any Guarantee Repayments, and (4) fourth, for the security for the payment of the Junior Indebtedness, including the interest thereon, which is junior and subordinate to the pledge charge and lien upon the Trust Estate securing the Senior Lien Indebtedness, the Senior Lien Derivative Agreement Regularly Scheduled Payments, the Subordinate Lien Indebtedness, the Subordinate Lien Derivative Agreement Regularly Scheduled Payments and any Guarantee Repayments.

Use of Available Funds. Nothing in the Trust Agreement shall be construed to prevent the Authority or NCDOT from, with funds not derived from Revenues, (a) paying all or any part of the Operating Expenses, (b) depositing in any fund or account created under, or subaccount created pursuant to, the provisions of the Trust Agreement, any Supplemental Trust Agreement or any Parity Debt Resolution, (c) paying the principal of, premium, if any, and interest on Senior Lien Indebtedness, Subordinate Lien Indebtedness or Junior Indebtedness or (d) from making any payment required by a Derivative Agreement from any moneys available to the Authority for such purpose, except to the extent the Authority is prohibited from making such deposit by the Trust Agreement, any Senior Lien Resolution, any Subordinate Lien Resolution, the TIFIA Loan Agreement or otherwise.

TIFIA Scheduled Prepayment Fund. Amounts in the TIFIA Scheduled Prepayment Fund shall be used solely to pay TIFIA Scheduled Prepayment Amounts on the due dates therefor, including increases in amounts due under the TIFIA Loan Agreement resulting from insufficient funds on prior due dates or for delay in payment resulting from provisions in the TIFIA Loan Agreement; provided the failure of such amounts to be sufficient therefor shall not be a default under the Trust Agreement if the terms and conditions of the Trust Agreement with respect to the flow of Revenues from the Revenue Fund have been complied with.

## **Investment of Proceeds**

*Security for Deposits.* Any and all money received by the Authority under the Trust Agreement shall be deposited as received with the Trustee or one or more other Depositories and all money so deposited with the Trustee shall be trust funds under the terms of the Trust Agreement, and, to the extent permitted by law in the case of the Project Fund, shall not be subject to any lien or attachment by any creditor of the Authority.

All money deposited with the Trustee or any Depository under the Trust Agreement in excess of the amount guaranteed by the Federal Deposit Insurance Corporation or other federal agency shall be continuously secured, for the benefit of the Authority and the Owners and Holders of Bonds and Parity Debt, either (a) by lodging with a bank or trust company chosen by the Trustee or Depository or, if then permitted by law, by setting aside under control of the trust department of the bank or trust company holding such deposit, as collateral security, Government Obligations or other marketable securities eligible as security for the deposit of trust funds under regulations of the Comptroller of the Currency of the United States or applicable State law or regulations, having a market value (exclusive of accrued interest) not less than the amount of such deposit, or (b) if the furnishing of security as provided in clause (a) above is not permitted by applicable law, then in such other manner as may then be required or permitted by applicable State or federal laws and regulations regarding the security for, or granting a preference in the case of, the deposit of trust funds; provided, however, that it shall not be necessary for the Trustee or any Depository to give security for the deposit of any money with it for the payment of the principal of or the redemption premium or the interest on any Bonds, or for the Trustee or any Depository to give security for any money that shall be represented by Investment Obligations purchased under the provisions of the Trust Agreement as an investment of such money.

All money deposited with the Trustee or any Depository shall be credited to the particular fund, account or subaccount to which such money belongs.

*Investment of Money.* Money held for the credit of all funds, accounts and subaccounts shall be continuously invested and reinvested by the Trustee or the Depositories, whichever is applicable, in Investment Obligations or held as cash to the extent investment or reinvestment in Investment Obligations is not practicable. Except as in the Trust Agreement with respect to the disposition of investment income, the particular investments to be made and other related matters in respect of investments may, as to each Series of Bonds other than the Series 2016 Bonds and the TIFIA Bond, be provided in the applicable Supplemental Trust Agreement.

Investment Obligations shall mature or be redeemable at the option of the holder thereof in amounts and not later than the respective dates when the money held for the credit of such funds, accounts and subaccounts in such amounts will be required for the purposes intended.

Notwithstanding the forgoing, no Investment Obligations pertaining to any Series in any fund, account or subaccount shall mature on a date beyond the latest maturity date of the respective Series of Bonds Outstanding at the time such Investment Obligations are deposited. For purposes of this Section, the maturity date of any repurchase agreement shall be deemed to be the stated maturity date of such agreement and not the maturity dates of the underlying obligations.

Absent an Opinion of Bond Counsel, investment of amounts in the Ramp-Up Reserve Account or the Pledged Account may not be made in Investment Obligations with a yield, calculated in compliance with arbitrage regulations under the Code, in excess of the lowest yield on any Series of Outstanding Bonds the interest on which is exempt from income taxation under the Code.

An Authorized Officer or his designee shall give to the Trustee or any Depository written directions respecting the investment of any money required to be invested under the Trust Agreement, subject, however, to the provisions of the Trust Agreement, and the Trustee or such Depository shall then invest such money as so directed. If no such directions are given, then any uninvested funds shall be invested by the Trustee in Government Obligations having the shortest maturity available, but in no event exceeding a maturity of thirty (30) days from the date of investment in the case of funds held in the Project Fund, and the date funds are required to be used to pay debt service on Bonds in the case of funds held in the Senior Lien Debt Service Fund or the Subordinate Lien Debt Service Fund. The Trustee or any Depository shall have no liability for investments made in accordance with this Section.

Investment Obligations acquired with money in or credited to any fund, account or subaccount established under the Trust Agreement shall be deemed at all times to be part of such fund, account or subaccount. Any loss realized upon the disposition or maturity of such Investment Obligations shall be charged against such funds, accounts or subaccounts. The interest accruing on any such Investment Obligations and any profit realized upon the disposition or maturity of such Investment Obligations shall be credited to the particular fund, account or subaccount to which such Investment Obligation relates (and, if such account is part of the Trust Estate, shall be subject to the pledge of the Trust Estate in accordance with Section 517) except as follows:

Any investment earnings received on amounts deposited in the Senior Lien Debt Service Fund or the Senior Lien Reserve Fund, to the extent that the amount on deposit in the Senior Lien Reserve Fund is equal to the Senior Lien Reserve Requirement, shall be transferred to the Interest Account of the Senior Lien Debt Service Fund. Any investment earnings received on amounts deposited in the Subordinate Lien Reserve Fund, to the extent that the amount on deposit in the Subordinate Lien Reserve Fund is equal to the Subordinate Lien Reserve Requirement, shall be transferred to the Interest Account of the Subordinate Lien Debt Service Fund. Any investment earnings on any Special Reserve Account shall be transferred or deposited in the manner specified in the Supplemental Trust Agreement or Parity Debt Resolution establishing such Special Reserve Account. Any investment earnings received on amounts deposited in the TIFIA Reserve Fund, to the extent that the amount on deposit in the TIFIA Reserve Fund is equal to the TIFIA Reserve Fund Requirement, shall be transferred to the applicable Interest Account of the Senior Lien Debt Service Fund or the Subordinate Lien Debt Service Fund depending on whether a Bankruptcy Related Event relating to the Authority has occurred. Any investment earnings received on amounts deposited in the Ramp-Up Reserve Account or the Pledged Account shall be transferred to the Revenue Fund.

Any such interest accruing and any such profit realized shall not be credited or transferred to any other fund, account or subaccount unless there shall be no deficiency in the respective fund, account or subaccount. If there shall be a deficiency in any fund, account or subaccount, any such interest or profit shall remain in such fund, account or subaccount until such deficiency has been made up.

Any such interest accruing and any such profit realized that is required to be transferred to any other fund, account or subaccount shall be transferred upon the receipt thereof by the Depositories or the Trustee, as the case may be, pursuant to the provisions of the Trust Agreement.

The Trustee shall sell or reduce to cash a sufficient amount of such Investment Obligations whenever it is necessary to do so to provide money to make any payment from any such fund, account or subaccount in accordance with the provisions of the Trust Agreement. The Trustee shall not be liable or responsible for any loss resulting from any such action.

Whenever a transfer of money between two or more of the funds, accounts or subaccounts established under the Trust Agreement is permitted or required, such transfer may be made as a whole or

in part by transfer of one or more Investment Obligations at a value determined at the time of such transfer in accordance with the Trust Agreement, provided that the Investment Obligations transferred are those in which money of the receiving fund, account or subaccount could be invested at the date of such transfer.

*Valuation.* For the purpose of determining the amount on deposit in any fund, account or subaccount, Investment Obligations in which money in such fund, account or subaccount is invested shall be valued by the Trustee (a) at face value if such Investment Obligations mature within twelve (12) months from the date of valuation thereof and (b) if such Investment Obligations mature more than twelve (12) months after the date of valuation thereof, at the price at which such Investment Obligations are redeemable by the holder at its option, if so redeemable, or, if not so redeemable, at the lesser of (i) the cost of such Investment Obligations minus the amortization of any premium or plus the amortization of any discount thereon and (ii) the market value of such Investment Obligations.

All Investment Obligations in all of the funds, accounts and subaccounts created under the Trust Agreement, except the Renewal and Replacement Fund, the Operating Reserve Fund, the Operations and Maintenance Expense Fund and the Unpledged Account, shall be valued as of each Calculation Date. When a valuation is made by the Trustee, the Trustee shall report the result of such valuation to the Authority within thirty (30) days after such valuation. In addition, Investment Obligations shall be valued at any time requested by the Authority on reasonable notice to the Trustee (which period of notice may be waived or reduced by the Trustee); provided, however, that the Trustee shall not be required to value Investment Obligations more than once in any calendar month.

Whenever, following a valuation on a Calculation Date as described above, the value of the cash and Investment Obligations in the Senior Lien Reserve Fund held by the Trustee, plus accrued interest to the date of valuation, is less than 100% of the Senior Lien Reserve Requirement, the Trustee shall compute the amount by which the Senior Lien Reserve Requirement exceeds the balance in the Senior Lien Reserve Fund and shall immediately give the Authority and the TIFIA Lender notice of such deficiency and the amount necessary to cure the same.

Whenever the value of the cash and Investment Obligations in the Senior Lien Reserve Fund held by the Trustee, plus accrued interest to the date of valuation, is greater than the Senior Lien Reserve Requirement, the Trustee shall compute the amount by which the balance in the Senior Lien Reserve Fund exceeds the Senior Lien Reserve Requirement, and the Authority shall be entitled to transfer such excess to the credit of the Interest Account of the Senior Lien Debt Service Fund; provided, however, that nothing in the Trust Agreement shall require the Authority to liquidate or sell any Investment Obligation held in the Senior Lien Reserve Fund for purposes of making such transfer.

Whenever, following a valuation on a Calculation Date as described above, the value of the cash and Investment Obligations in the Subordinate Lien Reserve Fund held by the Trustee, plus accrued interest to the date of valuation, is less than 100% of the Subordinate Lien Reserve Requirement, the Trustee shall compute the amount by which the Subordinate Lien Reserve Requirement exceeds the balance in the Subordinate Lien Reserve Fund and shall immediately give the Authority and the TIFIA Lender notice of such deficiency and the amount necessary to cure the same.

Whenever the value of the cash and Investment Obligations in the Subordinate Lien Reserve Fund held by the Trustee, plus accrued interest to the date of valuation, is greater than the Subordinate Lien Reserve Requirement, the Trustee shall compute the amount by which the balance in the Subordinate Lien Reserve Fund exceeds the Subordinate Lien Reserve Requirement, and the Authority shall be entitled to transfer such excess to the credit of the Interest Account of the Subordinate Lien Debt Service Fund; provided, however, that nothing in the Trust Agreement shall require the Authority to liquidate or



sell any Investment Obligation held in the Subordinate Lien Reserve Fund for purposes of making such transfer.

Whenever, following a valuation on a Calculation Date as described above, the value of the cash and Investment Obligations in the TIFIA Reserve Fund held by the Trustee, plus accrued interest to the date of valuation, is less than 100% of the TIFIA Reserve Fund Requirement, the Trustee shall compute the amount by which the TIFIA Reserve Fund Requirement exceeds the balance in the TIFIA Reserve Fund and shall immediately give the Authority and the TIFIA Lender notice of such deficiency and the amount necessary to cure the same.

Whenever the value of the cash and Investment Obligations in the TIFIA Reserve Fund held by the Trustee, plus accrued interest to the date of valuation, is greater than the TIFIA Reserve Fund Requirement, the Trustee shall compute the amount by which the balance in the TIFIA Reserve Fund exceeds the TIFIA Reserve Fund Requirement, and the Authority shall be entitled to transfer such excess to the subaccount for the TIFIA Bond within the Interest Account of the Senior Lien Debt Service Fund (if a Bankruptcy Related Event relating to the Authority has occurred) or the subaccount for the TIFIA Bond within the Subordinate Lien Debt Service Fund (if no Bankruptcy Related Event relating to the Authority has occurred); provided, however, that nothing in the Trust Agreement shall require the Authority to liquidate or sell any Investment Obligation held in the TIFIA Reserve Fund for purposes of making such transfer.

*Covenant as to Arbitrage.* The Authority covenants that so long as any of the Bonds remain Outstanding, money on deposit in any fund, account or subaccount maintained in connection with the Bonds, regardless of whether such money was derived from the proceeds of the sale of the Bonds or from any other sources, will not be used in a manner that would cause any of the Bonds to be “arbitrage bonds” within the meaning of Section 148 of the Code, except for moneys on deposit in such funds, accounts or subaccounts with respect to any Series of Bonds not intended to be tax-exempt under the provisions of the Code. The Authority further covenants and agrees to comply with the requirements of Section 148 of the Code and applicable regulations promulgated from time to time thereunder with respect to any Series of Bonds intended to be tax-exempt under the provisions of the Code.

### **General Covenants and Representations**

*Payment of Principal, Interest, Premium and Other Amounts.* The Authority shall cause to be paid, when due, the principal of (whether at maturity, by redemption or otherwise) and the premium, if any, and interest on the Bonds, Additional Secured Indebtedness and the Derivative Agreement Regularly Scheduled Payments at the places, on the dates and in the manner provided in the Trust Agreement and in the Bonds, Additional Secured Indebtedness and the documentation authorizing and securing such Bonds, Additional Secured Indebtedness and in any Derivative Agreement, according to the true intent and meaning thereof.

**The Bonds and Additional Secured Indebtedness are special obligations of the Authority payable solely from the Trust Estate. The Bonds and Additional Secured Indebtedness shall be secured as provided in the Trust Agreement. The Bonds and Additional Secured Indebtedness shall not be deemed to a debt, liability or obligation of the State or of any other public body in the State secured by a pledge of the faith and credit of the State or of any other public body in the State, respectively, but shall be payable solely from the Revenues and other income or assets pledged under the Trust Agreement. The Authority shall not be obligated to pay the principal of, premium, if any, or interest on the Bonds and Additional Secured Indebtedness except from the Revenues and other income or assets pledged under the Trust Agreement, and neither the faith and credit nor the taxing power of the State or of any other public body in the State, including the**

**Authority, is pledged for the payment of the principal of, premium, if any, or interest on the Bonds and Additional Secured Indebtedness. The Authority has no taxing power.**

Acquisition, Construction and Equipping of the Initial Project and Additional Projects. The Authority shall acquire, construct and equip the Initial Project and any Additional Project for which Bonds and Additional Secured Indebtedness are issued or for which money repayable from the proceeds of Bonds and Additional Secured Indebtedness are advanced by the Authority for such purpose. The Authority covenants to acquire, construct, equip and complete the Initial Project and any Additional Project in conformity with applicable law and all other requirements of all governmental authorities having jurisdiction thereover, and that the Authority will complete the acquisition, construction and equipping of the Initial Project and any Additional Project with all expedition practicable.

The Authority shall require each person, firm or corporation with whom it may contract for such construction to (a) furnish a payment and performance bond in the full amount of any contract or (b) deposit with an Authorized Officer marketable securities that are eligible as security for the deposit of trust funds in the full amount of any contract. The proceeds of any such payment or performance bond or securities shall be deposited in the applicable account or subaccount of the Project Fund and applied toward the completion of the Initial Project or Additional Project in connection with which such payment or performance bond or securities are furnished. The Authority shall diligently exercise its rights for the enforcement of any such payment and performance bond.

Maintenance of Existence; Operation of the Monroe Expressway.

(a) The Authority shall take all actions within its power to maintain its existence as a part of the NCDOT with the necessary power and authority to issue tax-exempt bonds under the laws of the State.

(b) The Authority will employ a General Engineering Consultant for the purposes described in the Trust Agreement including with respect to the Annual Budget. The Authority covenants that it will cause the General Engineering Consultant to make an inspection of the Monroe Expressway on or before the 90th day prior to the end of each Fiscal Year and to submit to the Authority a report setting forth (a) their findings whether the Monroe Expressway have been maintained in good repair, working order and condition and (b) their advice and recommendations as to the proper maintenance, repair, and operation of the Monroe Expressway during the ensuing Fiscal Year and an estimate of the amount of money necessary for such purposes, including their recommendations as to the total amounts and classifications of items and amounts that should be provided for Operating Expenses, the Operating Reserve Fund Requirement and costs of unusual or extraordinary maintenance, repairs, renewals, or replacements or capital improvements in respect of the Renewal and Replacement Fund in the Annual Budget for the next ensuing Fiscal Year and for capital expenditures for the next following nine Fiscal Years. Copies of such reports shall be filed with the Trustee.

(c) The Authority shall establish and enforce reasonable rules and regulations governing the operation and use of the Monroe Expressway, operate the Monroe Expressway in an efficient and economical manner, maintain the properties constituting the Monroe Expressway in good repair and in sound operating condition for so long as the same are necessary for the operation of the Monroe Expressway, and be in compliance with all valid acts, rules, regulations, orders and directions of any legislative, executive, administrative or judicial body that are applicable to the Monroe Expressway and the Authority. The Authority's obligation to maintain and operate the Monroe Expressway is an obligation only upon Revenues, and no Owner or Holder of Indebtedness has the right to compel the exercise of the taxing power by the State or any other public body in the State, including the Authority, or

the forfeiture of any of their respective property in connection with any such obligation except as in the Trust Agreement provided.

(d) The Authority covenants that it will serve as the exclusive procuring agent for the acquisition, installation, operation and maintenance of all property, plant and equipment designed to calculate the tolls to be charged to users of the Initial Project and any Additional Project and that it will institute such administrative procedures and enter into such agreements with third party service providers as shall be necessary to assure that the tolls so charged are collected to the extent reasonably practicable. Notwithstanding the foregoing, in selecting the toll identification and collection technology to be utilized, the equipment and service vendors to utilize, the technology hardware and software to be utilized, including all processes used for revenue collection, the Authority may take into consideration such factors as the Authority shall determine to be necessary, such as compatibility of the systems used for the Initial Project and Additional Projects with the systems used elsewhere by the Authority and other toll road operators, emerging technologies and the adaptability of the systems utilized to emerging technologies, customer costs associated with the systems selected, the accuracy of the systems selected in computing and assessing tolls and such other factors and the Authority shall determine relevant.

Rate Covenants; Permitted Reduction of Rates. The following rate covenants apply whether the TIFIA Bond is or is not Outstanding.

(a) The Authority covenants to fix, charge and collect tolls, fees, rentals and other charges for the use of and for services furnished or to be furnished by the Monroe Expressway, and that from time to time and as often as it shall appear necessary, to revise such tolls, fees, rentals and other charges as may be necessary or appropriate, in order that for each Fiscal Year, beginning with the first full Fiscal Year in which the Initial Project is in operation, the Revenues in such Fiscal Year will not be less than 130% of the Long-Term Debt Service Requirement for Senior Lien Indebtedness only for such Fiscal Year.

(b) The Authority covenants to fix, charge and collect tolls, fees, rentals and other charges for the use of and for services furnished or to be furnished by the Monroe Expressway, and that from time to time and as often as it shall appear necessary, to revise such tolls, fees, rentals and other charges as may be necessary or appropriate, in order that for each Fiscal Year, beginning with the first full Fiscal Year in which the Initial Project is in operation, the Revenues in such Fiscal Year will not be less than 110% of the Long-Term Debt Service Requirement for Parity Debt for such Fiscal Year.

(c) In addition to the covenants set forth in subsections (a) and (b), the Authority also covenants to fix, charge and collect tolls, fees, rentals and other charges for the use of and for services furnished or to be furnished by the Monroe Expressway, and that from time to time and as often as it shall appear necessary, to revise such tolls, fees, rentals and other charges as may be necessary or appropriate, in order that the Revenues will be sufficient in each Fiscal Year to make all of the deposits required by Section 503(a) through (m), inclusive.

(d) The Authority covenants that all users will pay for use of and services furnished by the Monroe Expressway at the tolls, rates, fees and charges established by the Authority from time to time in accordance with the Authority's customary tolling and billing practices and policies.

(e) If the Authority fails to comply with the covenants set forth in subsections (a) and (b) above, it shall, within thirty (30) days of the receipt by the Authority of an audit report, request a Traffic Consultant to make available within 180 days of the receipt of the audit its recommendations, if any, as to a revision of the Authority's tolls, fees, rentals and charges, its Operating Expenses or the method of operation of the Monroe Expressway in order to satisfy the foregoing requirements of this Section.

Copies of such request and of the recommendations of the Traffic Consultant, if any, shall be filed by the Authority with the Trustee. Promptly upon its receipt of the recommendations of the Traffic Consultant, the Authority shall, after giving due consideration to the recommendations, revise its tolls, fees, rentals and charges or its Operating Expenses or alter its methods of operation, which revisions or alterations need not comply with the Traffic Consultant's recommendations but which are projected by the Authority to result in compliance with the covenants set forth in subsections (a) and (b) of this Section. The Authority and the Traffic Consultant shall advise the Trustee of the actions taken by the Authority with respect to the recommendations of the Traffic Consultant. If the Authority shall comply with all of the recommendations of the Traffic Consultant, failure to comply with the provisions of subsections (a) and (b) above shall not constitute an Event of Default under the principal payment provisions of the Trust Agreement. Compliance with all of the recommendations of the Traffic Consultant shall have no effect on any Event of Default other than an Event of Default under such principal payment provisions. If there is compliance with all the recommendations of the Traffic Consultant and the coverage requirements of this section are still not met within three (3) years after the receipt of the audit which required engagement of a Traffic Consultant, an Event of Default may be declared. In the event of any failure to comply with the provisions of subsections (a) and (b) above and the failure of the Authority to comply with all of the recommendations of the Traffic Consultant, and in addition to the remedies elsewhere provided in the Trust Agreement, the Trustee may, and upon the request of the Owners or Holders of not less than a majority in aggregate principal amount of the Senior Lien Indebtedness and the TIFIA Bond (whether or not a Bankruptcy Related Event relating to the Authority has occurred) then Outstanding and upon being indemnified to its satisfaction, shall institute and prosecute in a court of competent jurisdiction an appropriate action to compel the Authority to comply with all of the recommendations of the Traffic Consultant in order to satisfy the foregoing requirements of this Section. The Authority covenants that it will adopt and charge tolls, fees, rentals and charges and revise its Operating Expenses or the method of operation of the Monroe Expressway in compliance with any final order, decree or judgment entered in any such proceeding or modification thereof.

(f) Subject to some limitations, the Authority may enter into contracts or agreements or amend or rescind existing contracts or agreements for the use of the Monroe Expressway on such terms and for such periods of time as the Authority shall determine to be proper.

(g) The Authority also covenants to fix and charge tolls, fees, rentals and charges for each component of the Monroe Expressway which tolls, fees, rentals and charges shall be reasonable and non-discriminatory.

(h) Nothing contained in this Section shall obligate the Authority to take any action in violation of any applicable requirements imposed by law.

**So long as the TIFIA Bond is Outstanding, the Authority additionally must comply with the following rate covenants:**

(a) The Authority shall fix, charge and collect rates and charges for use of the Monroe Expressway such that Project Revenues, as defined in the TIFIA Loan Agreement, in the first Calculation Period after the Substantial Completion Date and for each Calculation Period through the final maturity date of the TIFIA Bond are sufficient to produce):

(i) a Senior Debt Service Coverage Ratio of at least one hundred thirty five percent (135%) in each such Calculation Period;

(ii) a Total Debt Service Coverage Ratio of at least one hundred twenty five percent (125%) in each such Calculation Period;

(iii) a TIFIA Loan Life Coverage Ratio of at least one hundred thirty percent (130%);  
and

(iv) an amount equal to one hundred percent (100%) of the monthly deposits required to be made from the Revenue Fund other than to the TIFIA Scheduled Prepayment Fund.

(b) Commencing on the first Calculation Date after the Substantial Completion Date and on each Calculation Date thereafter, the Authority shall calculate each of the ratios contained in subsection (a) as of such Calculation Date and for each of the two (2) immediately preceding Calculation Dates and for each Calculation Date or Calculation Period, as applicable, through the final maturity date of the TIFIA Bond.

(c) For purposes of the Rate Coverage Test calculations set forth in (b) above, the Authority shall be credited with amounts available in the Ramp-Up Reserve Account, notwithstanding the fact that such amounts are not included within the definition of Project Revenues until the fifth anniversary of the Substantial Completion Date. Each such credit against the Ramp-Up Reserve Account shall be deemed a release therefrom, such that the amount credited will not be available for any future credit.

(d) Beginning on the Substantial Completion Date, the Authority shall fix, charge and collect tolls, fees, rentals and other charges for the use of, and for services furnished by, the Monroe Expressway (including revising such tolls, fees, rentals and other charges as may be necessary or appropriate), such that toll rates for each such Calculation Period will not be less than the rates for such Calculation Period assumed in the Monroe Traffic and Revenue Study. Notwithstanding the preceding sentence, the Authority may reduce such toll rates or fees if the Authority delivers a report from the Traffic Consultant stating that Project Revenues in each Calculation Date through the final maturity date of the TIFIA Bond are projected to produce (x) not less than one hundred seventy five percent (175%) of the sum of Senior Debt Service, (y) the Total Debt Service Coverage Ratio is at least one hundred fifty percent (150%) and (z) the TIFIA Loan Life Coverage Ratio is at least one hundred fifty percent (150%).

Budgets and Covenant as to Operating Expenses. The Authority shall adopt an Annual Budget for the Monroe Expressway for each Fiscal Year. To the extent possible, the Authority shall prepare its Annual Budget so that it will be possible to determine from such Annual Budget (a) the amount of State Appropriated Revenues budgeted for deposit in the Revenue Fund during such Fiscal Year, (b) the amount of Revenues budgeted for deposit in the Revenue Fund during such year, (c) the amounts to be deposited or paid under Section 503, including Operating Expenses, (d) the amount of Operating Expenses expected to have to be paid from NCDOT, if any, (e) the amount of any deposits to be made to the Renewal and Replacement Fund from Revenues and (f) the amount of any deposits expected to have to be made to the Renewal and Replacement Fund. In preparing its Annual Budget, the Authority shall give due consideration to the rate covenants. Expense estimates and requirements shall be based on a report of the General Engineering Consultant.

The Authority shall also adopt a Capital Improvements Plan for the Monroe Expressway for each Fiscal Year which will show, in addition to such other matters as the Authority may determine to include, (a) the amounts, if any, to be expended during such Fiscal Year from moneys, if any, deposited to the credit of the Project Fund, the Renewal and Replacement Fund or the Pledged Account or the Unpledged Account, together with a statement of the purposes for which the amounts to be deposited in the Project Fund and the Renewal and Replacement Fund are to be expended in each case and (b) the amount estimated by the Authority to be necessary for the renovation, extension, improvement, enlargement, renewal or replacement of the Monroe Expressway, whether the same are to be commenced, continued or completed during such Fiscal Year or in the next nine (9) Fiscal Years thereafter. The Capital Improvements Plan may be part of the Annual Budget.

If the Annual Budget is amended during any Fiscal Year, adjustments shall be made in amounts deposited into various accounts from the Revenue Fund. The General Engineering Consultant shall provide a report on the Annual Budget, with its approval thereof.

Records, Accounts and Audits. The Authority shall keep the funds, accounts, subaccounts, money and investments of the Monroe Expressway separate from all other funds, accounts, money and investments, if any, of the Authority and shall keep accurate records and accounts of all items of costs and of all expenditures relating to the Monroe Expressway and of the revenues collected and the application of such revenues. Such records and accounts shall be open to the inspection of the Trustee.

The Authority shall cause its accountant, which may be the State Auditor, to prepare and deliver to the Authority within 180 days after the close of each Fiscal Year an audit of the Authority's books and accounts relating to the Monroe Expressway. Reports of each such audit shall be filed with the Trustee and the Local Government Commission, and copies of each such report shall be mailed by the Authority to any person requesting the same in writing and shall be made available for inspection at the office of the Chief Financial Officer. Each such audit report shall be accompanied by an opinion of the accountant stating that the examination of the financial statements was conducted in accordance with generally accepted auditing standards and stating whether such financial statements present fairly the financial position of the Monroe Expressway and the results of its operations and a statement of cash flows for the period covered by such audit report in conformity with generally accepted accounting principles applied on a consistent basis.

If for any reason beyond its control, the Authority is unable to obtain the foregoing opinion as to compliance with generally accepted accounting principles, the Authority shall be deemed to be in compliance with this Section if it is taking all reasonable and feasible action to obtain such opinion in subsequent Fiscal Years, and if, in lieu of a statement as to compliance and conformity, such opinion states the reasons for such noncompliance or non-conformity.

Each audit report shall contain data setting forth in respect of said Fiscal Year a calculation to determine compliance with the applicable rate covenants.

Insurance.

(a) The Authority covenants that it will maintain or cause to be maintained an insurance program that includes, but is not limited to:

(i) For maximum probable property loss, as identified by the General Engineering Consultant, to the extent not covered by the NCDOT Guarantees, caused by damage to or destruction of the Monroe Expressway or any part thereof, property and casualty insurance;

(ii) For the period of maximum probable Revenue loss, as identified by the General Engineering Consultant, by reason of necessary interruption, total or partial, in the use of the facilities of the Monroe Expressway, due to loss or damage to any such facility, business interruption insurance in such amount as the Insurance Consultant determines will provide income computed on the basis of Revenues for the preceding Fiscal Year (or the estimated Revenues for the current Fiscal Year if the Monroe Expressway was not in operation during the preceding Fiscal Year);

(iii) Excess liability insurance for State employees of at least \$5 million per claim;

(iv) Tort liability coverage up to the amount above which the State claims sovereign immunity; and

(v) Workers compensation.

The insurance required in (i) and (ii) above must be in effect no later than the Substantial Completion Date. All insurance policies shall be carried by a responsible insurance company or companies, whose claims paying ability is rated at least "A" by S&P, authorized and qualified to assume the risks thereof, or by the North Carolina Department of Insurance; except that (iv) and (v) may be provided by NCDOT and the State respectively.

(b) Any insurance coverage pursuant to this Section may be subject to such deductible limitations as the Authority shall deem appropriate. Net Insurance Proceeds shall be applied as provided in Section 709.

(c) The policies of insurance required in (i) and (ii) above shall be for the benefit of the Trustee, shall be made payable to the Trustee and shall remain with the Trustee, and the Trustee shall have the sole right to receive the proceeds of such insurance and to collect and receipt for claims thereunder.

(d) Within sixty (60) days of the end of each Fiscal Year, an Authorized Officer shall file with the Trustee a report listing the policies of insurance, State insurance programs or self-insurance programs currently in force, the names of any companies issuing such insurance, the amounts and expiration date or dates of such insurance, the risks covered thereby, that such insurance complies with the provisions of this Section, whether an Insurance Consultant was employed during such Fiscal Year and a copy of all such reports filed by the Insurance Consultant. Any such report may be relied upon by the Trustee as' conclusive.

*Notice of Taking; Cooperation of Parties.* If any public authority or entity attempts to take all or any part of the Monroe Expressway through Eminent Domain proceedings, the Authority shall take prompt and appropriate measures to protect and enforce its rights and interests and those of the Trustee and the Owners and Holders of Bonds and Additional Secured Indebtedness and in connection with such proceedings.

*Insurance and Eminent Domain Proceeds.*

(a) Upon any casualty occurring to any part of the Monroe Expressway or any taking by Eminent Domain of any part of the Monroe Expressway, all Net Insurance Proceeds received by the Authority and all Net Eminent Domain Proceeds received by the Authority, as the case may be, shall be delivered to the Trustee for deposit in the Insurance and Condemnation Award Fund and shall be applied, to the extent permitted by law, to replace, repair, rebuild or restore the Monroe Expressway to substantially the same condition as that which existed prior to such damage, destruction or taking, with such alterations and additions as the Authority may determine and as will not impair or otherwise adversely affect the revenue-producing capability of the Monroe Expressway, provided that prior to the commencement of such replacement, repair, rebuilding or restoration, the Authority shall deliver to the Trustee and the TIFIA Lender a report of the General Engineering Consultant setting forth (A) an estimate of the total cost of the same, (B) the estimated date upon which such replacement, repair, rebuilding or restoration will be substantially completed, and (C) a statement to the effect that Net Insurance Proceeds or Net Eminent Domain Proceeds, as the case may be, together with other funds made available or to be made available by the Authority, are projected to be sufficient to pay the costs of the replacement, repair, rebuilding or restoration of the Monroe Expressway.

(b) If the Authority delivers to the Trustee and the TIFIA Lender a report of the General Engineering Consultant stating that not using such proceeds for such repair or replacement will not have an adverse effect on Revenues, or if, after such repair and replacement a portion of such funds remains, then such amounts shall be applied first, to the redemption or prepayment of Senior Lien Indebtedness which may then be redeemed or prepaid without payment of a premium, if any, pro rata to the extent practicable in the manner provided in the Senior Lien Resolutions; provided, however, that the TIFIA Bond shall be considered a Senior Lien Bond for this purpose, and second, to the redemption or prepayment of Subordinate Lien Indebtedness which may then be redeemed or prepaid without payment of a premium, if any, pro rata to the extent practicable in the manner provided in the Subordinate Lien Resolutions; and third, to the Revenue Fund.

(c) If the Authority elects to apply Net Insurance Proceeds or Net Eminent Domain Proceeds, or cause them to be applied, to replace, repair, rebuild, or restore the Monroe Expressway, as provided in above, the Authority shall cause the Trustee to make disbursements from the Insurance and Condemnation Award Fund, to the extent practicable, in accordance with the procedures and requirements for requisitions from the Project Fund.

Compliance with Applicable Law. So long as any Bond or Additional Secured Indebtedness is Outstanding, the Authority shall comply or cause there to be compliance with all applicable laws, orders, rules, regulations and requirements of any municipal or other governmental authority relating to the construction, use and operation of the Monroe Expressway. Nothing contained in this Section shall prevent the Authority from contesting in good faith the applicability or validity of any law, ordinance, order, rules regulation, or requirement so long as its failure to comply with the same during the period of such contest will not materially impair the operation or revenue-producing capability of the Monroe Expressway.

Payment of Charges and Covenant Against Encumbrances. Except as otherwise provided in the Trust Agreement, the Authority shall not create or suffer to be created any lien or charge upon the Monroe Expressway or any part thereof, or on the Revenues, except for Permitted Encumbrances. The Authority shall discharge or cause to be discharged, or shall make adequate provision to satisfy and discharge, within sixty (60) days after the same become due and payable, all lawful costs, expenses, liabilities and charges relating to the maintenance, repair, replacement or improvement of the properties constituting the Monroe Expressway and the operation of the Monroe Expressway and lawful claims and demands for labor, materials, supplies or other objects that might by law become a lien upon the Monroe Expressway or Revenues if unpaid. Nothing contained in this Section shall require the Authority to pay or cause to be discharged, or make provision for the payment, satisfaction and discharge of, any lien, charge, cost, liability, claim or demand so long as the validity thereof is contested in good faith and by appropriate legal proceedings.

Covenant Against Sale or Disposition and Exceptions Thereto. The Authority covenants that, with certain exceptions, it will not sell, exchange or otherwise dispose of the Monroe Expressway or any part thereof.

The Authority may from time to time sell, exchange or otherwise dispose of any equipment, motor vehicles, machinery, fixtures, apparatus, tools, instruments or other movable property if it determines that such articles are no longer needed or are no longer useful in connection with the Monroe Expressway, and the proceeds thereof, if the TIFIA Bond is Outstanding, shall be deposited in the Revenue Fund, and if the TIFIA Bond is not Outstanding may be used for any lawful purpose determined by the Authority.



The Authority may from time to time sell, exchange or otherwise dispose of (but not lease, contract or agree for the use thereof) any other property of the Monroe Expressway if it determines by resolution:

(a) that the sale, exchange or other disposition thereof, in the opinion of the General Engineering Consultant, would not materially adversely affect the operating efficiency of the Monroe Expressway or materially reduce Revenues; or

(b) that the sale, exchange or other disposition thereof would not materially adversely affect the ability of the Authority to comply with both the rate covenants prior to the final maturity of any Outstanding Indebtedness.

*Additional Projects: Additions to the Monroe Expressway.* All buildings, structures and items of personal property that are constructed, placed or installed in or upon the properties constituting the Monroe Expressway as an addition or improvement to, as a substitute for, or in renewal, replacement or alteration of, any buildings, structures, and personal property constituting part of the Monroe Expressway, and all real property acquired as an addition to, in replacement of, or as a substitute for real property constituting a part of the Monroe Expressway shall thereupon become part of the Monroe Expressway.

*Contracts, Leases and Other Agreements.* Subject to the provisions described under “General Covenants and Representations – *Special TIFIA Provisions*” below for so long as the TIFIA Bond remains Outstanding, the Authority may lease, as lessor, all or any part of the Monroe Expressway, or contract or agree for the performance by others, of operations or services on or in connection with the Monroe Expressway or any part thereof, for any lawful purpose, provided, that:

(a) the Authority shall remain fully obligated and responsible under the Trust Agreement to the same extent as if such lease, contract or agreement, or any amendment or rescission thereof, had not been executed, and

(b) the obligation of the Authority under such lease, contract or agreement shall not impair the performance of the Authority’s obligations under the Trust Agreement.

*Financing of Non-System Projects, Addition of Non-System Projects to the Monroe Expressway.* Nothing in the Trust Agreement expressed or implied shall be construed as prohibiting the Authority, if then authorized or permitted by law, from financing the acquisition or construction of any Non-System Project in accordance with the provisions of this Section and the provisions described under “General Covenants and Representations – *Special TIFIA Provisions*” below.

Non-System Projects shall not be financed by the Authority unless there shall be filed with the Authority, the TIFIA Lender and the Trustee:

(a) an opinion of counsel to the Authority to the effect that the Non-System Project and the indebtedness or other obligations incurred to finance such Non-System Project are not, directly or indirectly, secured by or payable from Revenues or issued under or secured by the provisions of the Trust Agreement and that the financing of the Non-System Project will not materially conflict with or constitute on the part of the Authority a breach of or default under any of the covenants or provisions of the Trust Agreement,

(b) a statement, signed by a Traffic Consultant, to the effect that in its opinion the acquisition or construction of such Non-System Project will not materially adversely affect the Revenues or impair the operating efficiency of the Monroe Expressway;

(c) a statement, signed by a Traffic Consultant, to the effect that in its opinion the estimated gross revenues to be received from the operation of the Non-System Project, when combined with any grants, designated appropriations, designated STIP funds or other contributed amounts from any source, are expected to be sufficient to pay the estimated operating and maintenance expenses of such Non-System Project, any debt service or reserve requirements with respect thereto and any other necessary related costs and expenses; and

(d) an Opinion of Bond Counsel.

If Non-System Projects are financed, in whole or in part, by the Authority, the Authority shall put in place necessary measures in order to account for, and keep separate and apart from Revenues and Operating Expenses, the gross revenues received from the operation of such Non-System Projects and any grants, designated appropriations, designated STIP funds or other contributed amounts from any source, as well as the operating and maintenance expenses of such Non-System Projects, any debt service or reserve requirements with respect thereto and any other necessary related costs and expenses.

Upon compliance with the following conditions and subject to the provisions described under “General Covenants and Representations – *Special TIFIA Provisions*” below for so long as the TIFIA Bond remains Outstanding, the Authority may determine that a Non-System Project shall be redesignated as an Additional Project within the meaning of the Trust Agreement upon which such Non-System Project shall become a part of the Monroe Expressway:

(i) the Authority Board shall adopt a resolution redesignating such Non-System Project as an Additional Project and a part of the Monroe Expressway;

(ii) there shall be filed with the Trustee and the TIFIA Lender a certificate or report of a Traffic Consultant stating that for the last succeeding Fiscal Year for which audited financial statements are available, the revenues received by the Authority with respect to such Non-System Project (to the extent that such revenues would have constituted Revenues if such Non-System Project were part of the Monroe Expressway) equaled or exceeded for such period the sum of (A) the operating expenses paid by the Authority with respect to such Non-System Project (to the extent that such operating expenses would have constituted Operating Expenses if such Non-System Project were part of the Monroe Expressway), (B) any additional Operating Expenses that would have been incurred by the Authority if such Non-System Project had been a part of the Monroe Expressway (as estimated by the Traffic Consultant) and (C) a reasonable renewal and replacement reserve deposit with respect to such Non-System Project, as determined by such Traffic Consultant;

(iii) an Officer’s Certificate stating that any Outstanding indebtedness relating to such Non-System Project has been duly paid or defeased; provided, however, that the Authority may incur Senior Lien Indebtedness or Subordinate Lien Indebtedness for the purpose of refinancing any Outstanding indebtedness incurred to finance a Non-System Project; and

(iv) an Opinion of Bond Counsel.

*Limitation on Senior Lien Indebtedness.* Subject to the conditions hereinafter provided and the provisions described under “General Covenants and Representations – *Special TIFIA Provisions*” below for so long as the TIFIA Bond remains Outstanding, the Authority shall have the right to incur Senior Lien Indebtedness, subsequent to the issuance of the Series 2016 Bonds, for any purpose for which Bonds may be issued.

(a) Long-Term Indebtedness constituting Senior Lien Indebtedness may be incurred if prior to incurrence there is delivered to the Trustee:

(i) an Officer's Certificate certifying that the Authority was in compliance with the rate covenants for the most recent Fiscal Year for which audited financial statements are available;

(ii) a report of a Traffic Consultant stating that for each Fiscal Year next succeeding the date on which such Long-Term Indebtedness is incurred through the final maturity date of any Long-Term Indebtedness, the forecasted Revenues in each such Fiscal Year is at least 140% of the Long-Term Debt Service Requirement with respect to all Outstanding Long-Term Indebtedness constituting Senior Lien Indebtedness (excluding any Long-Term Indebtedness constituting Senior Lien Indebtedness to be refunded by the Long-Term Indebtedness to be incurred) and the Long-Term Indebtedness proposed to be incurred;

(iii) a report of a Traffic Consultant stating that for each Fiscal Year next succeeding the date on which such Long-Term Indebtedness is incurred through the final maturity date of any Long-Term Indebtedness, the forecasted Revenues is at least 130% of the sum of the Long-Term Debt Service Requirement with respect to all Outstanding Parity Debt in such Fiscal Year;

(iv) a report of a Traffic Consultant showing that for each Fiscal Year next succeeding the date on which such Long-Term Indebtedness is incurred through the final maturity date of any Long-Term Indebtedness, the forecasted Revenues in each Fiscal Year will be sufficient to make all of the deposits in each such Fiscal Year required from the Revenue Fund; and

(v) evidence that such Senior Lien Indebtedness will be rated at an investment grade rating by Fitch, Moody's or S&P.

(b) Completion Indebtedness constituting Senior Lien Indebtedness may be incurred in an amount not exceeding 5% of the aggregate principal amount of the Long-Term Indebtedness constituting Senior Lien Indebtedness originally incurred by the Authority to finance the costs of any Additional Project; provided, however, that prior to the incurrence of such Completion Indebtedness, the Authority shall furnish to the Trustee (i) a certificate of a licensed architect or engineer estimating the costs of completing the facilities for which such Completion Indebtedness is to be incurred and (ii) an Officer's Certificate certifying that the amount of such Completion Indebtedness to be incurred will be sufficient, together with other funds, if applicable, to complete construction of the facilities as estimated by the architect or engineer in respect of which such Completion Indebtedness is to be incurred and (iii) evidence that such Senior Lien Indebtedness will be rated at an investment grade rating by such credit rating agency.

(c) Long-Term Indebtedness constituting Senior Lien Indebtedness may be incurred for the purpose of refunding all or any part of any Outstanding Long-Term Indebtedness constituting Senior Lien Indebtedness so as to render it no longer Outstanding if prior to incurrence thereof, an Officer's Certificate is delivered to the Trustee (i) stating that the proceeds of such Long-Term Indebtedness, together with interest earnings on the Defeasance Obligations to be acquired and other available funds, will be sufficient to pay the principal of and interest and any premium on the Long-Term Indebtedness to be refunded to the redemption or maturity date or dates and the expenses incident to the refunding, and (ii) stating that either (A) the Long-Term Debt Service Requirement for each Fiscal Year thereafter on account of all Long-Term Indebtedness constituting Senior Lien Indebtedness to be Outstanding after the incurrence of such Long-Term Indebtedness to accomplish the refunding and after the refunding of such

Long-Term Indebtedness will not be greater than as determined immediately prior to the incurrence of such Long-Term Indebtedness to accomplish such refunding, or (B) the incurrence of such Long-Term Indebtedness to accomplish the refunding will satisfy the requirements of subsection (a) of this Section and (iii) evidence that such Senior Lien Indebtedness will be rated at an investment grade rating by at least one nationally recognized securities credit rating agency.

(d) Short-Term Indebtedness constituting Senior Lien Indebtedness may be incurred if, (i) immediately after the incurrence of such Short-Term Indebtedness, the Outstanding principal amount of all Short-Term Indebtedness constituting Senior Lien Indebtedness does not exceed \$5,000,000; provided, however, that for a period of twenty (20) consecutive calendar days in each Fiscal Year, no such Short-Term Indebtedness shall be Outstanding, (ii) the proceeds of the Short-Term Indebtedness are to be used to pay Operating Expenses, and (iii) evidence that such Senior Lien Indebtedness will be rated at an investment grade rating by Fitch, Moody's or S&P nationally recognized securities credit rating agency.

(e) Put Indebtedness constituting Senior Lien Indebtedness may be incurred if prior to the incurrence of such Put Indebtedness (i) the conditions described in subsections (a), (b) or (c) of this Section are met and (ii) a Credit Facility exists to provide financing sufficient to pay the purchase price or principal of such Put Indebtedness on any date on which the Owner or Holder of such Put Indebtedness may demand payment thereof pursuant to the terms of such Put Indebtedness.

Whenever subsection (a) requires a certification for the most recent Fiscal Year preceding the date of incurrence of the Senior Lien Indebtedness in question for which audited financial statements are available, the Authority may, in its discretion, provide a certificate, opinion or report of an independent accountant, in lieu of the audit for such Fiscal Year, on financial statements covering twelve (12) consecutive calendar months of the eighteen (18) full consecutive calendar months preceding the date of incurrence of the Senior Lien Indebtedness in question.

See "General Covenants and Representations – *Special TIFIA Provisions*" below.

Limitation on Subordinate Lien Indebtedness. Subject to the conditions hereinafter provided, and the provisions described under "General Covenants and Representations – *Special TIFIA Provisions*" below for so long as the TIFIA Bond remains Outstanding, the Authority shall have the right to incur Subordinate Lien Indebtedness, subsequent to the issuance of the Series 2016 Bonds, for any purpose for which Bonds may be issued.

(a) Long-Term Indebtedness constituting Subordinate Lien Indebtedness may be incurred if prior to incurrence there is delivered to the Trustee:

(i) an Officer's Certificate certifying that the Authority was in compliance with the rate covenants and (b) for the most recent Fiscal Year for which audited financial statements are available;

(ii) a report of a Traffic Consultant stating that for each Fiscal Year next succeeding the date on which such Long-Term Indebtedness is incurred through the final maturity date of any Long-Term Indebtedness, the forecasted Revenues in each such Fiscal Year is at least 120% of the Long-Term Debt Service Requirement with respect to all Outstanding Senior Lien Indebtedness and the TIFIA Bond (excluding any Long-Term Indebtedness to be refunded by the Long-Term Indebtedness to be incurred) and the Long-Term Indebtedness to be incurred; and

(iii) a report of a Traffic Consultant stating that for each Fiscal Year next succeeding the date on which such Long-Term Indebtedness is incurred through the final maturity date of any Long-Term Indebtedness, the forecasted Revenues in each Fiscal Year will be sufficient to make all of the deposits in each such Fiscal Year required from the Revenue Fund.

(b) Completion Indebtedness constituting Subordinate Lien Indebtedness may be incurred in an amount not exceeding 5% of the aggregate principal amount of the Long-Term Indebtedness constituting Subordinate Lien Indebtedness originally incurred by the Authority to finance the costs of any Additional Project; provided, however, that prior to the incurrence of such Completion Indebtedness, the Authority shall furnish to the Trustee (i) a certificate of a licensed architect or engineer estimating the costs of completing the facilities for which such Completion Indebtedness is to be incurred and (ii) an Officer's Certificate certifying that the amount of such Completion Indebtedness to be incurred will be sufficient, together with other funds, if applicable, to complete construction of the facilities as estimated by the architect or engineer in respect of which such Completion Indebtedness is to be incurred.

(c) Long-Term Indebtedness constituting Subordinate Lien Indebtedness may be incurred for the purpose of refunding all or any part of any Outstanding Long-Term Indebtedness constituting Senior Lien Indebtedness or Subordinate Lien Indebtedness so as to render it no longer Outstanding if prior to incurrence thereof, an Officer's Certificate is delivered to the Trustee (i) determining that the proceeds of such Long-Term Indebtedness, together with interest earnings on the Defeasance Obligations to be acquired and other available funds, will be sufficient to pay the principal of and interest and any premium on the Long-Term Indebtedness to be refunded to the redemption or maturity date or dates and the expenses incident to the refunding, and (ii) stating that either (A) the Long-Term Debt Service Requirement for each Fiscal Year thereafter on account of all Long-Term Indebtedness to be Outstanding after the incurrence of such Long-Term Indebtedness to accomplish the refunding and after the refunding of such Long-Term Indebtedness will not be greater than the Long-Term Debt Service Requirement on account of all Long-Term Indebtedness Outstanding as determined immediately prior to the incurrence of such Long-Term Indebtedness to accomplish such refunding, or (B) the incurrence of such Long-Term Indebtedness to accomplish the refunding will satisfy the requirements of subsection (a).

(d) Short-Term Indebtedness constituting Subordinate Lien Indebtedness may be incurred if, immediately after the incurrence of such Short-Term Indebtedness, the Outstanding principal amount of all Short-Term Indebtedness constituting Subordinate Lien Indebtedness does not exceed 25% of the General Reserve Fund balance at the end of the most recent Fiscal Year preceding the date of incurrence of such Short-Term Indebtedness for which audited financial statements are available; provided, however, that for a period of twenty (20) consecutive calendar days in each Fiscal Year, no such Short-Term Indebtedness shall be Outstanding.

(e) Put Indebtedness constituting Subordinate Lien Indebtedness may be incurred if prior to the incurrence of such Put Indebtedness (i) the conditions described in subsections (a), (b) or (c) of this Section are met and (ii) a Credit Facility exists to provide financing sufficient to pay the purchase price or principal of such Put Indebtedness on any date on which the Owner or Holder of such Put Indebtedness may demand payment thereof pursuant to the terms of such Put Indebtedness.

Whenever subsection (a) requires a certification for the most recent Fiscal Year preceding the date of incurrence of the Subordinate Lien Indebtedness in question for which audited financial statements are available, the Authority may, in its discretion, provide a certificate, opinion or report of an independent accountant, in lieu of the audit for such Fiscal Year, on financial statements covering twelve (12) consecutive calendar months of the eighteen (18) full consecutive calendar months preceding the date of incurrence of the Subordinate Lien Indebtedness in question.

See “General Covenants and Representations – *Special TIFIA Provisions*” below.

Limitations on Junior Indebtedness. Subject to the provisions described under “General Covenants and Representations – *Special TIFIA Provisions*” below for so long as the TIFIA Bond remains Outstanding, Junior Indebtedness may be incurred without restriction.

Employment of Consultants. For the purpose of performing and carrying out the duties imposed upon an Insurance Consultant under the Trust Agreement, the Authority shall from time to time employ an Insurance Consultant. A signed copy of any reports of any Insurance Consultant required shall be filed with the Authority and the Trustee. Except for any fees and expenses incurred under the provisions of Section 403, the cost of employing any Insurance Consultant shall be treated as an Operating Expense of the Monroe Expressway.

Except for any fees and expenses incurred under the provisions with respect to Costs, the cost of employing any Traffic Consultant or General Engineering Consultant shall be treated as an Operating Expense of the Monroe Expressway. The Insurance Consultant, Traffic Consultant and General Engineering Consultant shall at all times have free access to all properties constituting the Monroe Expressway for the purposes of inspection and examination, and the books, public records and accounts of the Authority relating to the Monroe Expressway may be examined by such consultants at all reasonable times.

Use of Revenues and Inconsistent Actions. The Authority covenants and agrees that, so long as any of the Bonds or Additional Secured Indebtedness are Outstanding or any Derivative Agreement relating to Bonds or Additional Secured Indebtedness is in effect, none of the Revenues will be used for any purpose other than as provided in the Trust Agreement; and that no contract or contracts will be entered into or any action taken by which the rights of Owners or Holder of Bonds and Additional Secured Indebtedness or the payee of any such Derivative Agreement Regularly Scheduled Payments might be impaired or diminished.

State Appropriated Revenues. The Authority and NCDOT covenant that they will prepare all proposed and actual budgets including, and submit materials and requests as necessary to all parties for, the continuance of State Appropriated Revenues in an annual amount of at least \$24,000,000 and for any appropriations necessary to provide the guaranteed amounts with respect to construction costs, operating expenses and renewal and replacement expenses.. The Authority and NCDOT covenant that as part its preparation of the next fiscal year’s Annual Budget they will budget, subject to receipt, for debt service on Indebtedness issued or incurred under the Trust Agreement, the amount of the State Appropriated Revenues expected to be deposited to the Revenue Fund from the State Appropriation Trust Agreement.

Special TIFIA Provisions. **So long as the TIFIA Bond remains Outstanding:**

**(a) The Authority shall provide the TIFIA Lender with the following notifications:**

**(i) The selection by the Authority of any firm other than Hunton & Williams LLP as Bond Counsel will not be effective if objected to by the TIFIA Lender within fifteen (15) Business Days after receiving notice from the Authority of the name of the proposed bond counsel firm, together with supporting information regarding the qualifications of the proposed bond counsel firm;**

**(ii) The retention by the Authority of any General Engineering Consultant other than HNTB North Carolina, P.C. will not be effective if objected to by the TIFIA Lender within fifteen (15) Business Days after receiving notice from the Authority of the name of**

**the proposed General Engineering Consultant, together with supporting information regarding the qualifications of the proposed firm;**

**(iii) The selection by the Authority of any Insurance Consultant other than the Risk Manager for the State Department of Insurance will not be effective if objected to by the TIFIA Lender within fifteen (15) Business Days after receiving notice from the Authority of the name of the proposed Insurance Consultant, together with supporting information regarding the qualifications of the proposed Insurance Consultant; and**

**(iv) The retention by the Authority of any firm as Traffic Consultant other than CDM Smith will not be effective if objected to by the TIFIA Lender within fifteen (15) Business Days after receiving notice from the Authority of the name of the proposed Traffic Consultant, together with supporting information regarding the qualifications of the proposed firm.**

**(b) The prior written approval of the TIFIA Lender shall be required as follows:**

**(i) For the issuance or incurrence of any Additional Bonds, Parity Debt or other Indebtedness (including but not limited to Derivative Indebtedness, Grant Anticipation Notes, Long-Term Indebtedness, Put Indebtedness, Revenue Bond Anticipation Notes, Short-Term Indebtedness, and Variable Rate Indebtedness);**

**(ii) Any Reserve Alternative Instrument;**

**(iii) Any Credit Facility;**

**(iv) Any Derivative Agreement;**

**(v) For purposes of calculating debt service or determining reserve requirements or compliance with the covenants contained herein and in the TIFIA Loan Agreement, the method of calculation of debt service on any Additional Bonds, Parity Debt or other Indebtedness including but not limited to Derivative Indebtedness, Grant Anticipation Notes, Long-Term Indebtedness, Put Indebtedness, Revenue Bond Anticipation Notes, Short-Term Indebtedness, and Variable Rate Indebtedness;**

**(vi) For purposes of calculating debt service or determining reserve requirements or compliance with the covenants contained herein and in the TIFIA Loan Agreement, the method of calculating payment obligations with respect to Derivative Agreement Additional Payments, Derivative Agreement Regularly Scheduled Payments, Reserve Alternate Instruments and Credit Facilities;**

**(vii) Any lease or contract with respect to a substantial portion of the assets, operations or services on or in connection with the Monroe Expressway permitted under the Trust Agreement;**

**(viii) The redesignation of a Non-System Project as an Additional Project under the Trust Agreement;**

**(ix) The amendment or modification of the Trust Agreement Documents or Authority's organizational documents (other than any amendment or modification that is of**

a ministerial nature and that is not adverse to the interests of any Owner or Holder or in the Trust Estate).

(c) **Controlling Provisions.**

(i) **In addition to the covenants set forth in Article VII of the Trust Agreement, including but not limited to Section 704, the Authority must comply also with the covenants set forth in the TIFIA Loan Agreement, including in Section 16 and 17 of the TIFIA Loan Agreement.**

(ii) **Obligations only meet the definition of Investment Obligations if they are permitted by the TIFIA Loan Agreement and authorized by Section 159-30 of the NCGS as such statute may be amended from time to time.**

(iii) **Permitted Encumbrances means “Permitted Lien” as defined in the TIFIA Loan Agreement.**

(iv) **The TIFIA Bond may not be defeased without the prior written consent of the TIFIA Lender.**

(v) **To the extent any term or provision in the Trust Agreement relating to the TIFIA Bond is in conflict with terms or provisions in the TIFIA Loan Agreement, then the terms and provisions in the TIFIA Loan Agreement shall control unless such action would have a material adverse effect upon the security for, or the timing or amount of payments to be made to, holders of any Secured Indebtedness or the methodology for remedies and payments resulting therefrom set forth in the Trust Agreement.**

**Defaults; Remedies**

*Events of Default.* Each of the following events is declared an Event of Default:

(a) payment of the principal of and the redemption premium, if any, on any of the Bonds, is not made when the same are due and payable, either at maturity or by redemption or otherwise;

(b) payment of the interest on any of the Bonds is not made when the same is due and payable;

(c) final judgment for the payment of money in excess of \$1,000,000 is rendered against the Monroe Expressway, the Authority or NCDOT as a result of the ownership, control or operation of the Monroe Expressway, and any such judgment is not discharged within thirty (30) days from the entry thereof or an appeal is not taken therefrom or from the order, decree or process upon which or pursuant to which such judgment shall have been granted or entered, in such manner as to stay the execution of or levy under such judgment, order, decree or process or the enforcement thereof;

(d) the occurrence of a Bankruptcy Related Event relating to the Authority;

(e) receipt by the Trustee of written notice from the Holder of any Additional Secured Indebtedness that any event of default has occurred and is continuing under such Parity Debt or Parity Debt Resolution or agreement with respect to Junior Indebtedness, including the failure to pay when due and payable the principal of, premium, if any, and interest on such and Additional Secured Indebtedness;



(f) the failure of the State to appropriate the State Appropriation Revenues or a failure of NCDOT to pay a payment required to be paid by NCDOT under Sections 402, 510 and 511;

(g) receipt by the Trustee of written notice from the counterparty under any Derivative Agreement that the Authority has failed to make any Senior Lien Derivative Agreement Regularly Scheduled Payment or Subordinate Lien Derivative Agreement Regularly Scheduled Payment when due; and

(h) the Authority defaults in the due and punctual performance of any other of the covenants, conditions, agreements and provisions contained in the Bonds or the Trust Agreement, including any Supplemental Trust Agreement, and such default continues for thirty (30) days after receipt by the Authority of a written notice from the Trustee specifying such default and requesting that it be cured, provided that if prior to the expiration of such 30-day period the Authority institutes action reasonably designed to cure such default, no "Event of Default" shall be deemed to have occurred upon the expiration of such 30-day period for so long as the Authority pursues such curative action with reasonable diligence.

No Acceleration of Maturities. Notwithstanding anything in the Trust Agreement or in any Supplemental Trust Agreement, Parity Debt Resolution or agreement with respect to Junior Indebtedness to the contrary, in no event shall there be any acceleration of payment of principal of or interest on any Bonds or Additional Secured Indebtedness as a result of the occurrence of any Event of Default under Section 802 or otherwise.

Remedies. Upon the happening and continuance of any Event of Default specified in the Trust Agreement, then and in every such case the Trustee may, and upon the written request of the Owners or Holders of not less than a majority in aggregate principal amount of the Senior Lien Indebtedness and the TIFIA Bond (whether or not a Bankruptcy Related Event relating to the Authority has occurred) then Outstanding shall, proceed to protect and enforce its rights and the rights of the Owners or Holders of the Bonds and Additional Secured Indebtedness under applicable laws and under the Trust Agreement by such suits, actions or special proceedings in equity or at law, or by proceedings in the office of any board or officer having jurisdiction, either for the specific performance of any covenant or agreement contained in the Trust Agreement or in aid or execution of any power in the Trust Agreement granted or for the enforcement of any proper legal or equitable remedy, as the Trustee, being advised by counsel, chosen by the Trustee, shall deem most effectual to protect and enforce such rights.

In the enforcement of any remedy under the Trust Agreement, the Trustee shall be entitled to sue for, enforce payment of and receive any and all amounts then or during any Event of Default becoming, and at any time remaining, due from the Authority for principal, interest or otherwise under any of the provisions of the Trust Agreement or of the Bonds and Additional Secured Indebtedness and unpaid, with interest on overdue payments of principal at the rate or rates of interest specified in such Bonds or Additional Secured Indebtedness together with any and all costs and expenses of collection and of all proceedings under the Trust Agreement and under such Bonds and Additional Secured Indebtedness without prejudice to any other right or remedy of the Trustee or of the Owners or Holders of the Bonds or Additional Secured Indebtedness (except to the extent provided in the Trust Agreement), and to recover and enforce any judgment or decree against the Authority, but solely as provided in the Trust Agreement and in such Bonds or Additional Secured Indebtedness for any portion of such amounts remaining unpaid and interest, costs and expenses as above provided, and to collect (but solely from moneys in the funds and accounts pledged to secure the Bonds and Additional Secured Indebtedness under the provisions of the Trust Agreement and any Supplemental Trust Agreement, Parity Debt Resolution or agreement with respect to Junior Indebtedness and any other moneys available for such purpose) in any manner provided by law, the moneys adjudged or decreed to be payable.

If an Event of Default shall occur and be continuing, then, unless the same shall then be prohibited under applicable law, a court of competent jurisdiction may appoint a receiver to administer and operate the Monroe Expressway on behalf of the Authority, with full power to pay and to provide for the payment of principal of and interest on the Bonds, Additional Secured Indebtedness and Derivative Agreement Regularly Scheduled Payments as the same shall become due, whether at maturity, pursuant to mandatory sinking fund redemption or otherwise, out of the funds and accounts available therefor, and the Operating Expenses of the Monroe Expressway, to apply Revenues derived from such operation in accordance with the provisions of the Trust Agreement and any Supplemental Trust Agreement, Parity Debt Resolution, agreement with respect to Junior Indebtedness or Derivative Agreement, and to take such action to the extent permitted by law to cause to be remedied any Event of Default which shall occur or shall have occurred and be continuing; and with such other powers, subject to the direction of said court, as are accorded to receivers in general equity cases and under the applicable provisions of the laws of North Carolina; provided, that the power of such receiver to make provisions for the payment of principal of and interest on Bonds, Additional Secured Indebtedness and Derivative Agreement Regularly Scheduled Payments as aforesaid shall not be construed as including the power to pledge the general credit of the Authority to such payments. Any appointment of a receiver under the foregoing provision shall not, by itself, constitute a separate Event of Default.

*Pro Rata Application of Funds.*

(a) Anything in the Trust Agreement to the contrary notwithstanding, if at any time the money in the Interest Account, the Principal Account and the Sinking Fund Account of the Senior Lien Debt Service Fund is not sufficient to pay the interest on or the principal of the Senior Lien Indebtedness as the same become due and payable, such money, together with any money then available or thereafter becoming available for such purposes (except for such money that has already been deposited in subaccounts of the Interest Account, Principal Account or Sinking Fund Account for a particular Series of Senior Lien Indebtedness), whether through the exercise of the remedies provided for in the Trust Agreement or otherwise, shall be applied, after payment of the reasonable fees and expenses of the Trustee (which fees and expenses shall be treated as Operating Expenses under the Trust Agreement except for purposes of the order of their payment) in exercising its rights and remedies under the Trust Agreement:

first: to the payment to the persons entitled thereto of all installments of interest on Senior Lien Indebtedness then due and payable in the order in which such installments became due and payable and, if the amount available shall not be sufficient to pay in full any particular installment, then to the payment, ratably according to the amounts due on such installment, to the persons entitled thereto, without any discrimination or preference except as to any difference in the respective rates of interest specified in such Senior Lien Indebtedness;

second: to the payment to the persons entitled thereto of the unpaid principal of any Senior Lien Indebtedness that shall have become due and payable (other than Indebtedness deemed to have been paid pursuant to the defeasance provisions of the Trust Agreement), in the order of their due dates, with interest on the overdue principal at a rate equal to the rate on such Senior Lien Indebtedness, and, if the amount available shall not be sufficient to pay in full all of the amounts due on the Senior Lien Indebtedness on any date, together with such interest, then to the payment ratably according to the amount of such principal due on such date, to the persons entitled thereto, without any discrimination or preference;

third: to the payment to the persons entitled thereto of all installments of interest on Subordinate Lien Indebtedness then due and payable in the order in which such installments became due and payable and, if the amount available shall not be sufficient to pay in full any

particular installment, then to the payment, ratably according to the amounts due on such installment, to the persons entitled thereto, without any discrimination or preference except as to any difference in the respective rates of interest specified in such Subordinate Lien Indebtedness;

fourth: to the payment to the persons entitled thereto of the unpaid principal of any Subordinate Lien Indebtedness that shall have become due and payable (other than Bonds deemed to have been paid pursuant to the defeasance provisions of the Trust Agreement), in the order of their due dates, with interest on the overdue principal at a rate equal to the rate on such Subordinate Lien Indebtedness, and, if the amount available shall not be sufficient to pay in full all of the amounts due on the Subordinate Lien Indebtedness on any date, together with such interest, then to the payment ratably according to the amount of such principal due on such date, to the persons entitled thereto, without any discrimination or preference; and

fifth: only after the Event of Default has ceased to be existing, for other purposes.

(b) Whenever money is to be applied by the Trustee pursuant to such provisions, (i) such money shall be applied by the Trustee at such times and from time to time as the Trustee in its sole discretion shall determine, having due regard for the amount of money available for such application and the likelihood of additional money becoming available for such application in the future, (ii) setting aside such money as provided in the Trust Agreement in trust for the proper purpose shall constitute proper application by the Trustee and (iii) the Trustee shall incur no liability whatsoever to the Authority, to any Owner or to any other person for any delay in applying any such money so long as the Trustee acts with reasonable diligence, having due regard for the circumstances, and ultimately applies the same in accordance with such provisions of the Trust Agreement as may be applicable at the time of application by the Trustee. Whenever the Trustee exercises such discretion in applying such money, it shall fix the date (which shall be an Interest Payment Date unless the Trustee shall deem another date more suitable) upon which such application is to be made and upon such date interest on the amounts of principal to be paid on such date shall cease to accrue. The Trustee shall give such notice as it may deem appropriate of the fixing of any such date and shall not be required to make payment to the Owner of any Bond until such Bond is surrendered to the Trustee for appropriate endorsement or for cancellation if fully paid.

Effect of Discontinuance of Proceedings. If any proceeding taken by the Trustee or Owners or Holders of Bonds or Additional Secured Indebtedness on account of any Event of Default is discontinued or abandoned for any reason, then and in every such case, the Authority, the Trustee and the Owners and the Holders of Bonds and Additional Secured Indebtedness shall be restored to their former positions and rights under the Trust Agreement, and all rights, remedies, powers and duties of the Trustee shall continue as though no proceedings had been taken; provided however that upon the occurrence of a Bankruptcy Related Event relating to the Authority, the TIFIA Bond shall be a Senior Lien Bond and the TIFIA Reserve Fund shall be funded pro rata with the Senior Lien Reserve Fund.

Control of Proceedings. Anything in the Trust Agreement to the contrary notwithstanding, the Owners or Holders of a majority in aggregate principal amount of Senior Lien Indebtedness and the TIFIA Bond (whether or not a Bankruptcy Related Event relating to the Authority has occurred) then Outstanding shall have the right, by an instrument or concurrent instruments in writing executed and delivered to the Trustee, to direct the method and place of conducting all remedial proceedings to be taken by the Trustee under the Trust Agreement, provided that such direction shall be in accordance with law and the provisions of the Trust Agreement.

Restrictions Upon Action. Except on the specific terms and conditions provided in the Bond or Indebtedness for payment time and place, no Owner or Holder of Bonds or Additional Secured Indebtedness shall have any right to institute any suit, action or proceeding in equity or at law on any

Bonds or Additional Secured Indebtedness or for the execution of any trust under the Trust Agreement or for any other remedy under the Trust Agreement unless such Owner or Holder of Bonds or Additional Secured Indebtedness previously shall (a) have given to the Trustee written notice of the Event of Default on account of which suit, action or proceeding is to be instituted, (b) have requested the Trustee to take action after the right to exercise such powers or right of action, as the case may be, shall have accrued, (c) have afforded the Trustee a reasonable opportunity either to proceed to exercise the powers in the Trust Agreement above granted or to institute such action, suit or proceedings in its or their name, and (d) have offered to the Trustee reasonable security and satisfactory indemnity against the costs, expenses and liabilities to be incurred therein or thereby, and the Trustee shall have refused or neglected to comply with such request within a reasonable time. Such notification, request and offer of indemnity are declared in every such case, at the option of the trustee, to be conditions precedent to the execution of the powers and trusts of the Trust Agreement or to any other remedy under the Trust Agreement. Notwithstanding the foregoing provisions of this Section and without complying therewith, the Owners or Holders of not less than a majority in aggregate principal amount of Senior Lien Indebtedness and the TIFIA Bond (whether or not a Bankruptcy Related Event relating to the Authority has occurred) then Outstanding may institute any such suit, action or proceeding in their own names for the benefit of all Owners or Holders of Bonds and Additional Secured Indebtedness. It is understood and intended that, except as otherwise above provided, no one or more Owners or Holders of Bonds or Additional Secured Indebtedness shall have any right in any manner whatsoever by his or their action to affect, disturb or prejudice the security of the Trust Agreement or to enforce any right under the Trust Agreement except in the manner provided, that all proceedings at law or in equity shall be instituted, had and maintained in the manner in the Trust Agreement provided and for the benefit of all Owners and Holders of Bonds and Additional Secured Indebtedness, and that any individual rights of action or other right given to one or more of such Owners or Holders by law are restricted by the Trust Agreement to the rights and remedies in the Trust Agreement provided.

*Enforcement of Rights of Action.* All rights of action (including the right to file proof of claim) under the Trust Agreement or under any Bonds or Additional Secured Indebtedness, may be enforced by the Trustee without the possession of any Bonds or Additional Secured Indebtedness or the production thereof in any proceedings relating thereto, and any such suit or proceedings instituted by the Trustee shall be brought in its name as Trustee, without the necessity of joining as plaintiffs or defendants any Owners or Holders of Bonds or Additional Secured Indebtedness and any recovery of judgment shall be for the equal benefit of the Owners or Holders of Bonds and Additional Secured Indebtedness subject to the provisions of the Trust Agreement.

*No Remedy Exclusive.* No remedy in the Trust Agreement conferred upon or reserved to the Trustee or to the Owners or Holders of Bonds or Additional Secured Indebtedness is intended to be exclusive of any other remedy or remedies in the Trust Agreement provided, and each and every such remedy shall be cumulative and shall be in addition to every other remedy given under the Trust Agreement or now or hereafter existing at law or in equity.

*Delay Not a Waiver.* No delay or omission by the Trustee or of any Owner or Holder of Bonds or Additional Secured Indebtedness in the exercise of any right or power accruing upon any default shall impair any such right or power or shall be construed to be a waiver of any such default or any acquiescence therein, and every power or remedy given by the Trust Agreement to the Trustee and to the Owners or Holders of Bonds or Additional Secured Indebtedness may be exercised from time to time and as often as may be deemed expedient.

The Trustee may, and upon written request of the Owners or Holder of not less than a majority in principal amount of the Senior Lien Indebtedness and the TIFIA Bond (whether or not a Bankruptcy Related Event relating to the Authority has occurred) then Outstanding shall, waive any Event of Default

which in its opinion has been remedied before the entry of final judgment or decree in any suit, action or proceeding instituted by it under the provisions of the Trust Agreement or before the completion of the enforcement of any other remedies under the Trust Agreement, but no such waiver shall extend to or affect any other existing or subsequent Event of Default or impair any rights or remedies consequent thereon.

*Notice of Default.* The Trustee shall mail to (a) all Owners of Bonds at their addresses as they appear on the registration books and (b) all Holders of Additional Secured Indebtedness and counterparties under Derivative Agreements providing for Derivative Agreement Regularly Scheduled Payments who shall have filed their name with the Trustee for such purpose, written notice of the occurrence of any Event of Default within thirty (30) days after the Trustee has notice of the same pursuant to the provisions of the Trust Agreement that any such Event of Default shall have occurred; provided, however that, except upon the happening of an Event of Default specified in clauses (a) and (b) above, the Trustee may withhold such notice to the Owners, Holders and counterparties under Derivative Agreements if in its opinion such withholding is in the interest of such Owners, Holders and Derivative Agreement counterparties. The Trustee shall not be subject to any liability to any such Owner, Holder or Derivative Agreement counterparty by reason of its failure to mail any such notice.

*Right to Enforce Payment of Bonds Unimpaired.* Nothing in the Trust Agreement shall affect or impair the right of any Owner or Holder of Bonds or Additional Secured Indebtedness to enforce the payment of the principal of and interest on his Bond or Additional Secured Indebtedness or the obligation of the Authority to pay the principal of and interest on each Bond or Additional Secured Indebtedness to the Owner or Holder thereof at the time and place specified in said Bond or Additional Secured Indebtedness.

*Special Rights of Holders of Subordinate and Junior Indebtedness.* If there is no Senior Lien Indebtedness or TIFIA Bond (whether or not a Bankruptcy Related Event relating to the Authority has occurred) then Outstanding, the provisions of the Trust Agreement which provide for certain rights of a percentage of Holders of Senior Lien Indebtedness and the TIFIA Bond (whether or not a Bankruptcy Related Event relating to the Authority has occurred), shall be read as providing those same rights to Holders of Subordinate Lien Indebtedness. If there is no Senior Lien Indebtedness, Subordinate Lien Indebtedness or TIFIA Bond (whether or not a Bankruptcy Related Event relating to the Authority has occurred) then Outstanding, the provisions of the Trust Agreement which provide for certain rights of a percentage of Holders of Senior Lien Indebtedness and the TIFIA Bond (whether or not a Bankruptcy Related Event relating to the Authority has occurred), shall be read as providing those same rights to Holders of Junior Indebtedness.

### **Concerning the Trustee**

*Acceptance of Trusts.* The Trustee by execution of the Trust Agreement accepts and agrees to fulfill the trusts imposed upon it by the Trust Agreement, but only upon the terms and conditions set forth therein and subject to the provisions of the Trust Agreement, to all of which the Authority, the Trustee and the respective Owners of the Bonds and any Holders of Additional Secured Indebtedness and Derivative Agreement counterparties agree. Prior to the occurrence of any Event of Default and after the curing of all such Events of Default that may have occurred, the Trustee shall perform such duties and only such duties of the Trustee as are specifically set forth in the Trust Agreement. Upon the occurrence and during the continuation of any Event of Default, the Trustee shall use the same degree of care and skill in their exercise as a prudent person would exercise or use under the circumstances in the conduct of such person's own affairs.

No provision of the Trust Agreement or any Indebtedness or Derivative Agreement shall be construed to relieve the Trustee from liability for its own negligent action, its own negligent failure to act, or its own willful misconduct, except that:

(a) prior to any such Event of Default under the Trust Agreement, and after the curing of any Event of Default that may have occurred:

(i) the duties and obligations of the Trustee shall be determined solely by the express provisions of the Trust Agreement, and the Trustee shall not be liable except for the performance of such duties and obligations of the Trustee as are specifically set forth in the Trust Agreement, and no implied covenants or obligations shall be read into the Trust Agreement against the Trustee and no permissive right of the Trustee under the Trust Agreement shall impose any duty on the Trustee to take such action, and

(ii) in the absence of willful misconduct on its part, the Trustee may conclusively rely, as to the accuracy of the statements and the correctness of the opinions expressed therein, upon any certificate or opinion furnished to it conforming to the requirements of the Trust Agreement, but in the case of any such certificate or opinion by which any provision of the Trust Agreement is specifically required to be furnished to the Trustee, the Trustee shall be under a duty to examine the same to determine whether or not on its face it conforms to the requirements of the Trust Agreement; and

(b) at all times, regardless of whether or not any such Event of Default shall exist:

(i) the Trustee shall not be liable for any error of judgment made in good faith by a responsible officer or officers of the Trustee unless it shall be proved that the Trustee was negligent in ascertaining the pertinent facts, and

(ii) the Trustee shall not be liable with respect to any action taken or omitted to be taken by it in accordance with the direction of the Owners and Holders of not less than a majority, as the Trust Agreement shall require, in aggregate principal amount of the Senior Lien Indebtedness and the TIFIA Bond (whether or not a Bankruptcy Related Event relating to the Authority has occurred) then Outstanding relating to the time, method and place of conducting any proceeding for any remedy available to the Trustee, or exercising any power conferred upon the Trustee under the Trust Agreement.

None of the provisions contained in the Trust Agreement shall require the Trustee to expend or risk its own funds or otherwise incur individual financial liability in the performance of any of its duties or in the exercise of any of its rights or powers.

*Indemnification of Trustee as Condition for Remedial Action.* The Trustee shall be under no obligation to institute any suit or to take any remedial proceeding (including, but not limited to, the appointment of a receiver) or to enter any appearance or in any way defend in any suit in which it may be made defendant, or to take any steps in the execution of any of the trusts created or in the enforcement of any rights and powers under the Trust Agreement, until it shall be indemnified to its satisfaction against any and all costs and expenses, outlays and counsel fees and other reasonable disbursements, and against all liability. The Trustee nevertheless may begin suit, or appear in and defend suit, or do anything else in its judgment proper to be done by it as such Trustee, without indemnity, and in such case the Authority, at the request of the Trustee, shall reimburse the Trustee from Revenues for all costs, expenses, outlays and counsel fees and other reasonable disbursements properly incurred in connection therewith. If the Authority shall fail to make such reimbursement, the Trustee may reimburse itself from any money in its

possession under the provisions of the Trust Agreement and shall be entitled to a preference therefor over any Indebtedness Outstanding.

Limitations on Obligations and Responsibilities of Trustee. The Trustee shall be under no obligation to effect or maintain insurance or to renew any policies of insurance or to inquire as to the sufficiency of any policies of insurance carried by the Authority, or to report, or make or file claims or proof of loss for, any loss or damage insured against or that may occur, or to keep itself informed or advised as to the payment of any taxes or assessments, or to require any such payment to be made. Except as to the acceptance of the trusts under the Trust Agreement, the Trustee shall have no responsibility in respect of the validity or sufficiency of the Trust Agreement, or in respect of the validity of Bonds or Additional Secured Indebtedness or the due issuance or execution and delivery thereof. The Trustee shall be under no obligation to see that any duties in the Trust Agreement imposed upon the Authority, any Bond Registrar, any consultant, any Depository (other than a Depository in which money shall have been deposited by the Trustee under the provisions of the Trust Agreement) or any party other than itself, or any covenants in the Trust Agreement contained on the part of any party other than itself to be performed, shall be done or performed, and the Trustee shall be under no obligation for failure to see that any such duties or covenants are so done or performed.

Trustee Not Liable for Failure of Authority to Act. The Trustee shall not be liable or responsible because of the failure of the Authority or of any of its employees or agents to make any collections or deposits or to perform any act in the Trust Agreement required of the Authority or because of the loss of any money arising through the insolvency or the act or default or omission of any Depository (other than the Trustee or a Depository in which such money shall have been deposited by the Trustee under the provisions of the Trust Agreement). The Trustee shall not be responsible for the application of any of the proceeds of Bonds or any other money deposited with it and invested, paid out, withdrawn or transferred under the Trust Agreement if such application, investment, payment, withdrawal or transfer shall be made in accordance with the provisions of the Trust Agreement. The immunities and exemptions from liability of the Trustee under the Trust Agreement shall extend to its directors, officers, employees and agents.

Compensation and Indemnification of Trustee and Bond Registrar. Subject to the provisions of any contract between the Authority and the Trustee or any Bond Registrar relating to the compensation of the Trustee or such Bond Registrar, the Authority shall pay to the Trustee and each Bond Registrar from Revenues reasonable compensation for all services performed by them under the Trust Agreement and also all their reasonable expenses, charges and other disbursements and those of their attorneys, agents and employees incurred in and about the administration and the performance of their powers and duties under the Trust Agreement and, to the extent permitted by law, shall indemnify and save the Trustee and each Bond Registrar harmless against any liabilities that they may incur in the proper exercise and performance of their powers and duties under the Trust Agreement. If the Authority shall fail to cause any payment required by this Section to be made, the Trustee and each Bond Registrar may make such payment from any money in its possession under the provisions of the Trust Agreement and shall be entitled to a preference therefor over any Bonds or Additional Secured Indebtedness Outstanding under the Trust Agreement. The Authority covenants that it shall promptly deposit or cause to be deposited to the credit of the respective fund or account the amount withdrawn therefrom by the Trustee to make any such payment.

Monthly Statements from Trustee. It shall be the duty of the Trustee, on or before the 15th day of each month, to file with the Authority a statement setting forth in respect of the preceding calendar month:

- (a) the amount withdrawn or transferred by it and the amount deposited with it on account of each fund, account or subaccount held by it under the provisions of the Trust Agreement or any Supplemental Trust Agreement,
- (b) the amount on deposit with it at the end of such month in each such fund, account or subaccount,
- (c) a brief description of all obligations held by it as an investment of money in each such fund, account or subaccount,
- (d) the amount applied to the payment, purchase or redemption of Bonds, Parity Debt and Junior Indebtedness and a description of the Bonds or portions thereof so paid, purchased or redeemed, and
- (e) any other information that the Authority may reasonably request.

All records and files pertaining to Bonds, Additional Secured Indebtedness and the Monroe Expressway in the custody of the Trustee not otherwise restricted or excluded from disclosure by the terms of the Trust Agreement shall be open at all reasonable times to the inspection of the Authority and its agents and representatives.

*Trustee May Rely on Certificates.* If at any time it shall be necessary or desirable for the Trustee to make any investigation respecting any fact preparatory to taking or not taking any action or doing or not doing anything as such Trustee, and in any case in which the Trust Agreement provides for permitting or taking any action, the Trustee may rely upon any certificate required or permitted to be filed with it under the provisions of the Trust Agreement, and any such certificate shall be evidence of such fact or protect the Trustee in any action that it may or may not take or in respect of anything it may or may not do, in absence of willful misconduct, by reason of the supposed existence of such fact. Except as otherwise provided in the Trust Agreement, any request, notice, certificate or other instrument from the Authority to the Trustee shall be deemed to have been signed by the proper party or parties if signed by any Authorized Officer, and the Trustee may accept and rely upon a certificate signed by any Authorized Officer as to any action taken by the Authority.

*Notice of Default.* Except upon the occurrence of any Event of Default specified in subsections (a), (b), (e) or (f) above, the Trustee shall not be obliged to take notice or be deemed to have notice of any Event of Default under the Trust Agreement unless specifically notified in writing of such Event of Default by the Authority or the Owners and Holders of not less than a majority in aggregate principal amount of Senior Lien Indebtedness and the TIFIA Bond (whether or not a Bankruptcy Related Event relating to the Authority has occurred) then Outstanding.

*Trustee Not Responsible for Recitals.* The recitals, statements and representations contained in the Trust Agreement and in the Bonds shall be taken and construed as made by and on the part of the Authority and not by the Trustee, and the Trustee assumes and shall be under no responsibility for the correctness of the same.

*Trustee Protected in Relying on Certain Documents.* The Trustee shall be protected and shall incur no liability in acting or proceeding, or in not acting or not proceeding, in absence of willful misconduct, reasonably and in accordance with the terms of the Trust Agreement, upon any resolution, order, notice, request, consent, waiver, certificate, statement, affidavit, requisition, bond or other paper or document that it shall in good faith reasonably believe to be genuine and to have been adopted or signed by the proper board or person or to have been prepared and furnished pursuant to any of the provisions of



the Trust Agreement, or upon the written opinion of any attorney, engineer or accountant believed by the Trustee to be qualified in relation to the subject matter, and the Trustee shall be under no duty to make any investigation or inquiry as to any statements contained or matters referred to in any such instrument. The Trustee shall not be under any obligation to see to the recording or filing of the Trust Agreement or otherwise to the giving to any person of notice of the provisions of the Trust Agreement.

Trustee May Pay Taxes and Assessments. In case the Authority shall fail to pay or cause to be paid any lawful tax, assessment or governmental charge or other charge upon any part of the Authority to the extent, if any, that the Authority may be deemed by the Trustee liable for same, the Trustee may pay such tax, assessment or governmental charge, without prejudice, however, to any rights of the Trustee or the Owners or Holders of Bonds or Additional Secured Indebtedness arising in consequence of such failure; and any amount at any time so paid under this Section shall be repaid upon demand by the Trustee by the Authority, but the Trustee shall be under no obligation to make any such payment from sources provided in the Trust Agreement unless it shall have available or be provided with adequate funds for the purpose of such payment.

Resignation and Removal of Trustee Subject to Appointment of Successor. No resignation or removal of the Trustee and no appointment of a successor Trustee pursuant to the Trust Agreement shall become effective until the acceptance of appointment by the successor Trustee.

Resignation of Trustee. The Trustee may resign and thereby become discharged from the trusts created, by notice in writing given to the Authority, and mailed, postage prepaid, at the Trustee's expense, to each Owner and Holder of Bonds and Additional Secured Indebtedness, not less than sixty (60) days before such resignation is to take effect, but such resignation shall take effect immediately upon the appointment of a new Trustee under the Trust Agreement if such new Trustee shall be appointed before the time limited by such notice and shall then accept the trusts of the Trust Agreement.

Removal of Trustee. The Trustee may be removed at any time by an instrument or concurrent instruments in writing, (i) executed by the Owners and Holders of not less than a majority in aggregate principal amount of Senior Lien Indebtedness and the TIFIA Bond (whether or not a Bankruptcy Related Event relating to the Authority has occurred) then Outstanding and filed with the Authority, or (ii) executed by an Authorized Officer, so long as no Event of Default shall have occurred and be continuing, in either case not less than sixty (60) days before such removal is to take effect as stated in said instrument of instruments. A photographic copy of any order, instrument or instruments filed with the Authority under the provisions of this paragraph, duly certified by the Authority Secretary as having been received by the Authority, shall be delivered promptly by the Authority Secretary to the Trustee.

The Trustee may also be removed at any time for acting or proceeding in violation of, or for failing to act or proceed in accordance with, any provisions of the Trust Agreement with respect to the duties and obligations of the Trustee by any court of competent jurisdiction upon the application of the Authority or the Owners and Holders of not less than a majority in aggregate principal amount of Senior Lien Indebtedness and the TIFIA Bond (whether or not a Bankruptcy Related Event relating to the Authority has occurred) then Outstanding.

Appointment of Successor Trustee. If at any time hereafter the Trustee shall resign, be removed, be dissolved or otherwise become incapable of acting, or the bank or trust company acting as Trustee shall be taken over by any governmental official, agency, department or board, the positions of Trustee shall thereupon become vacant. If the position of Trustee shall become vacant for any reason, the Authority shall appoint a Trustee to fill such vacancy. A successor Trustee shall not be required if the Trustee shall sell or assign substantially all of its trust business and the vendee or assignee shall continue in the trust business, or if a transfer of the trust department of the Trustee is required by operation of law,

provided that such vendee, assignee or transferee is (i) a bank or trust company within or without the State which is duly authorized to exercise corporate trust powers and subject to examination by federal or State authority, (ii) of good standing, and (iii) having a combined capital, surplus and undivided profits aggregating not less than One Hundred Million Dollars (\$100,000,000). The Authority shall mail notice of any such appointment made by it, postage prepaid, to all Owners and Holders of Bonds and Additional Secured Indebtedness.

At any time within sixty (60) days after any such vacancy shall have occurred, the Owners and Holders of not less than a majority in principal amount of Senior Lien Indebtedness and the TIFIA Bond (whether or not a Bankruptcy Related Event relating to the Authority has occurred) then Outstanding, by an instrument or concurrent instruments in writing, executed by such Owners and filed with the Authority, may nominate a successor Trustee, which the Authority shall appoint and which shall supersede any Trustee theretofore appointed by the Authority. Photographic copies, duly certified by the Authority Secretary as having been received by the Authority, of each such instrument shall be delivered promptly by the Authority Secretary to the predecessor Trustee and to the Trustee so appointed by such Owners and Holders.

If no appointment of a successor Trustee shall be made pursuant to the foregoing provisions of this Section, any Owner or Holder of Bonds or Additional Secured Indebtedness or any retiring Trustee may apply to any court of competent jurisdiction to appoint a successor Trustee. Such court may thereupon, after such notice, if any, as such court may deem proper and prescribe, appoint a successor Trustee.

Any successor Trustee hereafter appointed shall be (i) a bank or trust company within or without the State which is duly authorized to exercise corporate trust powers and subject to examination by federal or State authority, (ii) of good standing and (iii) having a combined capital, surplus and undivided profits aggregating not less than One Hundred Million Dollars (\$100,000,000).

*Vesting of Duties in Successor Trustee.* Every successor Trustee appointed under the Trust Agreement shall execute, acknowledge and deliver to its predecessor, and also to the Authority, an instrument in writing accepting such appointment under the Trust Agreement, and thereupon such successor Trustee, without any further act, shall become fully vested with all the rights, immunities and powers, and subject to all the duties and obligations, of its predecessor; but such predecessor shall nevertheless, on the written request of its successor or of the Authority and upon payment of the expenses, charges and other disbursements of such predecessor that are payable pursuant to the provisions of Section 905, execute and deliver an instrument transferring to such successor Trustee all the rights, immunities and powers of such predecessor under the Trust Agreement; and every predecessor Trustee shall deliver all property and money held by it under the Trust Agreement to its successor. Should any instrument in writing from the Authority be required by any successor Trustee for more fully and certainly vesting in such Trustee the rights, immunities, powers and trusts vested or intended to be vested in the predecessor Trustee, any such instrument in writing shall and will, on request, be executed, acknowledged and delivered by the Authority.

*Removal and Resignation of Bond Registrar.* A Bond Registrar may be removed at any time, with or without cause, by the Authority upon forty-five (45) days' written notice by the Authority to such Bond Registrar. A copy of such written notice shall be delivered promptly by the Authority to the Trustee. Upon receipt of such notice, the Trustee shall cause notice of such removal to be mailed, postage prepaid, to the Owners not less than thirty (30) days before such removal is to take effect. All costs in connection with such notice shall be borne by the Authority.

A Bond Registrar may resign and thereby become discharged from the duties, obligations and responsibilities of Bond Registrar under the Trust Agreement and the applicable Supplemental Trust Agreement, by written notice delivered to the Authority and the Trustee. Upon receipt of such notice the Trustee shall cause notice of such resignation to be mailed, postage prepaid, at such Bond Registrar's expense, to the Owners not less than sixty (60) days before such resignation is to take effect, but such resignation shall take effect immediately upon the appointment of a new Bond Registrar under the Trust Agreement if such new Bond Registrar shall be appointed before the time limited by such notice and shall then accept the duties, obligations and responsibilities of Bond Registrar under the Trust Agreement and the applicable Supplemental Trust Agreement. If at any time thereafter a Bond Registrar shall resign, be removed, be dissolved or otherwise become incapable of acting, or the entity acting as Bond Registrar shall be taken over by any governmental official, agency, department or board, the position of Bond registrar shall thereupon become vacant. If the position of Bond Registrar shall become vacant for any reason, the Authority shall appoint a Bond Registrar to fill such vacancy. A successor Bond Registrar shall not be required if a Bond Registrar shall sell or assign substantially all of its business and the vendee or assignee shall be qualified in the sole judgment of the Authority to carry out the duties, obligations and responsibilities of Bond Registrar under the Trust Agreement. The Authority shall promptly deliver written notice of any such appointment by it to the Trustee and mail such notice, postage prepaid, to all Owners of the applicable Bonds.

### **Execution of Instruments**

*Execution of Instruments.* Any request, direction, consent or other instrument in writing required or permitted by the Trust Agreement to be signed or executed by any Owners or Holders of Bonds or Additional Secured Indebtedness may be in any number of concurrent instruments of similar tenor and may be signed or executed by such Owners or Holders or their attorneys or legal representatives or legal representative of his estate if the Owner or Holder is deceased. Proof of the execution of any such instrument and of the ownership of Bonds or Additional Secured Indebtedness shall be sufficient for any purpose of the Trust Agreement and shall be conclusive in favor of the Trustee and the Authority with regard to any action taken by either under such instrument if made in the following manner:

(a) The fact and date of the execution by any person of any such instrument may be proved by the verification, by any officer in any jurisdiction who by the laws thereof has power to take affidavits within such jurisdictions, to the effect that such instrument was subscribed and sworn to before him or by an affidavit of a witness to such execution. Where such execution is on behalf of a person other than an individual, such verification or affidavit shall also constitute sufficient proof of the authority of the signer thereof.

(b) The ownership of Bonds shall be proved by the registration books. The ownership or holding of Parity Debt or Junior Indebtedness shall be proved as provided in the related Parity Debt Resolution or other agreement as the case may be.

Nothing shall be construed as limiting the Trustee to such proof, it being intended that the Trustee may accept any other evidence of the matters in the Trust Agreement stated which it may deem sufficient. Any request or consent of any Owner or Holder of Bonds or Additional Secured Indebtedness shall bind every future Owner or Holder of the same Bonds or Additional Secured Indebtedness in respect of anything done by the Trustee in pursuance of such request or consent.

Notwithstanding any of the foregoing provisions of this Section, the Trustee shall not be required to recognize any person as an Owner or Holder of Bonds or Additional Secured Indebtedness or to take any action at such an Owner's or Holder's request unless such Bonds or Additional Secured Indebtedness shall be deposited with it.

Preservation of Information; Communications.

(a) The Trustee shall preserve, in as current a form as is reasonably practicable, the names and addresses of Owners received by the Trustee from the Bond Registrar.

(b) If an Owner which is a Securities Depository Nominee or three or more Owners which are not Securities Depository Nominees (in the Trust Agreement after collectively referred to as “applicants”) apply in writing to the Trustee and furnish reasonable proof that each such applicant has owned a Bond for a period of at least six months preceding the date of such application, and such application states that the applicants desire to communicate with other Owners with respect to their rights under the Trust Agreement or under the Bonds and such application, at its election, either

(i) afford such applicants access to the information preserved at the time by the Trustee in accordance with subsection (a) of this Section, or

(ii) inform such applicants as to the approximate number of Owners whose names and addresses appear in the information preserved at the time by the Trustee in accordance with subsection (a), and as to the approximate cost of mailing to such Owners the form of communication, if any, specified in such application.

If the Trustee shall elect not to afford such applicants access to such information, the Trustee shall, upon the written request of such applicants, mail to each Owner whose name and address appears in the information preserved at the time by the Trustee in accordance with subsection (a) a copy of the form of communication which is specified in such request, with reasonable promptness after a tender to the Trustee of the material to be mailed and of payment, or provision for the payment, of the reasonable expenses of mailing.

(c) Every Owner, by receiving and holding one or more Bonds, agrees with the Authority and the Trustee that neither the Authority nor the Trustee shall be held accountable by reason of the disclosure of any such information as to the names and addresses of the Owners in accordance with subsection (b) of this Section, regardless of the source from which such information was derived, and that the Trustee shall not be held accountable by reason of mailing any material pursuant to a request made under such subsection.

**Supplemental Trust Agreements**

*Supplemental Trust Agreement Without Consent.* The Authority and the Trustee may, without the consent of any Owners or Holders other than the TIFIA Lender, from time to time and at any time, execute and deliver supplemental trust agreements hereto (which supplemental trust agreements shall thereafter form a part of the Trust Agreement) as shall be substantially consistent with the terms and provisions of the Trust Agreement and, in the opinion of the Trustee, who may rely upon a written opinion of legal counsel, shall not materially and adversely affect the interest of the Owners and Holders:

(a) to cure any ambiguity or formal defect or omission, to correct or supplement any provision in the Trust Agreement that may be inconsistent with any other provision in the Trust Agreement, to make any other provisions with respect to matters or questions arising under the Trust Agreement, or to modify, alter, amend, add to or rescind, in any particular, any of the terms or provisions contained in the Trust Agreement, or

(b) to grant or to confer upon the Trustee, for the benefit of the Owners or Holders, any additional rights, remedies, powers, authority or security that may lawfully be granted to or conferred upon the Owners, the Holders or the Trustee, or

(c) to add to the provisions of the Trust Agreement other conditions, limitations and restrictions thereafter to be observed, or

(d) to add to the covenants and agreements of the Authority in the Trust Agreement other covenants and agreements thereafter to be observed by the Authority or to surrender any right or power in the Trust Agreement reserved to or conferred upon the Authority, or

(e) to permit the qualification of the Trust Agreement under any federal statute now or hereafter in effect or under any state blue sky law, and, in connection therewith, if the Authority so determines, to add to the Trust Agreement or any supplemental trust agreement such other terms, conditions and provisions as may be permitted or required by such federal statute or blue sky law; or

(f) to make changes to the Trust Agreement which facilitate the issuance of Revenue Bond Anticipation Notes, Grant Anticipation Notes, Additional Bonds or Parity Debt otherwise permitted by the requirements and limitations in the Trust Agreement; or

(g) to make any other change in the Trust Agreement which, in the opinion of the Trustee, who may rely upon a written opinion of legal counsel, shall not materially and adversely affect the interest of the Owners.

At least thirty (30) days prior to the execution and delivery of any supplemental trust agreement for any of the purposes of this Section, the Trustee shall cause a notice of the proposed execution and delivery of such supplemental trust agreement to be mailed, postage prepaid, to all Owners of Bonds and Holders of Additional Secured Indebtedness. Such notice shall briefly set forth in the nature of the proposed supplemental trust agreement and shall state that copies thereof are on file at the designated corporate trust office of the Trustee for inspection by all Owners of Bonds and Holders of Additional Secured Indebtedness. A failure on the part of the Trustee to mail the notice required by this Section shall not affect the validity of such supplemental trust agreement.

Supplemental Trust Agreement with Consent. Subject to the terms and provisions contained in this Section, and not otherwise, the Owners and Holders of not less than a majority in aggregate principal amount of Senior Lien Indebtedness and the TIFIA Bond (whether or not a Bankruptcy Related Event relating to the Authority has occurred) then Outstanding shall have the right, from time to time, anything contained in the Trust Agreement to the contrary notwithstanding, to consent to and approve the execution and delivery of such supplemental trust agreements as are deemed necessary or desirable by the Authority for the purpose of modifying, altering, amending, adding to or rescinding, in any particular, any of the terms or provisions contained in the Trust Agreement or in any supplemental trust agreement; provided, however, that nothing in the Trust Agreement contained shall permit, or be construed as permitting (a) an extension of the maturity of the principal of or the interest on any Bonds, Parity Debt or Junior Indebtedness without the consent of the Owner or Holder of such Bonds, Parity Debt or Junior Indebtedness, (b) a reduction in the principal amount of any Bonds, Parity Debt or Junior Indebtedness or the redemption premium or the rate of interest on any Bonds, Parity Debt or Junior Indebtedness without the consent of the Owner or Holder of such Bonds, Parity Debt or Junior Indebtedness, (c) the creation of a pledge, charge and lien upon the Revenues other than the pledge, charge and lien created by the Trust Agreement without the consent of all of the Owners and Holders of Bonds and Parity Debt then Outstanding, (d) a preference or priority of any Bonds, Parity Debt or Junior Indebtedness over any other Senior Lien Indebtedness, Subordinate Lien Indebtedness or Junior Indebtedness except as expressly

provided by the Trust Agreement without the consent of all of the Owners and Holders of Bonds, Parity Debt and Junior Indebtedness then Outstanding or (e) a reduction in the aggregate principal amount of any Parity Debt or Junior Indebtedness required for consent to such supplemental trust agreement without the consent of all of the Owners and Holders of Bonds, Parity Debt and Junior Indebtedness then Outstanding. For purposes of clauses (a) through (e) of this paragraph, notwithstanding any provisions in the Trust Agreement or in any Supplemental Trust Agreement or Parity Debt Resolution to the contrary, a Bond Insurer or Credit Provider shall not be deemed to be the Owner or Holder of Bonds, Parity Debt or Junior Indebtedness.

Nothing in the Trust Agreement contained, however, shall be construed as making necessary the approval by Owners or Holders of Bonds, Parity Debt or Junior Indebtedness of the execution and delivery of any supplemental trust agreement as authorized under the provision for supplements without consent. Furthermore, notwithstanding for the foregoing provisions, to the extent that the Holders or Owners of Bonds, Parity Debt or Junior Indebtedness, as the case may be, are not “affected” by the proposed supplemental trust agreement, the consent of such Owners and Holders shall not be required as provided in the preceding paragraph.

If at any time the Authority and the Trustee determines that it is necessary or desirable to execute and deliver any supplemental trust agreement for any of the purposes described, the Trustee shall cause notice of the proposed supplemental trust agreement to be mailed, postage prepaid, to all Owners of Bonds affected thereby at their addresses as they appear on the registration books and to all Holders of Additional Secured Indebtedness affected thereby in accordance with the related Parity Debt Resolution or other agreement as of the date of mailing such notice. Such notice shall briefly set forth the nature of the proposed supplemental trust agreement and shall state that copies thereof are on file at the designated corporate trust office of the Trustee for inspection by all such Owners and Holders of Bonds and Additional Secured Indebtedness. The Trustee shall not, however, be subject to any liability to any Owner or Holder of Bonds or Additional Secured Indebtedness by reason of its failure to cause the notice required by this Section to be mailed, and any such failure to cause the notice required by this Section to be mailed and any such failure shall not affect the validity of such supplemental trust agreement when consented to and approved as provided in this Section.

Whenever, at any time within three (3) years after the date of the mailing of such notice, the Authority delivers to the Trustee an instrument or instruments in writing purporting to be executed by the Owners or Holders of not less than a majority in aggregate principal amount of Senior Lien Indebtedness and the TIFIA Bond (whether or not a Bankruptcy Related Event relating to the Authority has occurred) then Outstanding, which instrument or instruments shall refer to the proposed supplemental trust agreement described in such notice and shall specifically consent to and approve the execution and delivery thereof in substantially the form of the copy thereof referred to in such notice, thereupon, but not otherwise, the Authority and the Trustee may execute and deliver such supplemental trust agreement in substantially such form, without liability or responsibility to any Owner or Holder of any Bonds, Parity Debt or Junior Indebtedness whether or not such Owner or Holder shall have consented thereto.

If the Owners or Holders of not less than a majority in aggregate principal amount of any Senior Lien Indebtedness and the TIFIA Bond (whether or not a Bankruptcy Related Event relating to the Authority has occurred) then Outstanding at the time of the execution and delivery of such supplemental trust agreement and, if required, all other Bonds and Additional Secured Indebtedness that are affected by a proposed supplemental trust agreement have consented to and approved the execution and delivery thereof as in the Trust Agreement provided, to the extent permitted by law, no Owner or Holder of any Bonds, Parity Debt or Junior Indebtedness shall have any right to object to the execution and delivery of such supplemental trust agreement, to object to any of the terms and provisions contained therein or the operation thereof, to question the propriety of the execution and delivery thereof, or to enjoin or restrain

the Authority and the Trustee from executing and delivering the same or from taking any action pursuant to the provisions thereof.

*Senior Lien Indebtedness, Subordinate Lien Indebtedness and Junior Indebtedness Affected.* For purposes of the Trust Agreement, Senior Lien Indebtedness, Subordinate Lien Indebtedness or Junior Indebtedness shall be deemed to be “affected” by a supplemental trust agreement if the same adversely affects or diminishes the rights of the Owners or Holders of such Senior Lien Indebtedness, Subordinate Lien Indebtedness or Junior Indebtedness against the Authority or the rights of such Owners or Holders in the security for such Senior Lien Indebtedness, Subordinate Lien Indebtedness or Junior Indebtedness. The Trustee who may rely upon a written opinion of legal counsel, may in its discretion determine whether any Senior Lien Indebtedness, Subordinate Lien Indebtedness or Junior Indebtedness would be affected by any supplemental trust agreement, and any such determination shall be conclusive upon the Owners and Holders of all Senior Lien Indebtedness, Subordinate Lien Indebtedness or Junior Indebtedness, whether theretofore or thereafter issued or incurred. The Trustee shall not be liable for any such determination made in good faith.

*Supplemental Trust Agreements Part of Trust Agreement.* Any supplemental trust agreement executed and delivered in accordance with the provisions of the Trust Agreement shall thereafter form a part of the Trust Agreement, and the Trust Agreement shall be and be deemed to be modified and amended in accordance therewith. Thereafter the respective rights, duties and obligations under the Trust Agreement of the Authority, the Trustee and all Owners of Bonds and Holders of Additional Secured Indebtedness then Outstanding shall thereafter be determined, exercised and enforced in all respects under the provisions of the Trust Agreement as so modified and amended. If any supplemental trust agreement is executed and delivered, Bonds issued thereafter and Additional Secured Indebtedness incurred thereafter may contain an express reference to such supplemental trust agreement, if deemed necessary or desirable by the Authority.

*Not a Supplemental Trust Agreement.* A Supplemental Trust Agreement, Parity Debt Resolution or other agreement that relates only to a particular Series of Bonds issued under the Trust Agreement or Parity Debt incurred under a Parity Debt Resolution or Junior Indebtedness incurred under an agreement therefor and that does not purport to alter or amend the rights or security of any Owners of any Bonds of any other Series issued under the Trust Agreement or any Holder of any other Additional Secured Indebtedness incurred under the Trust Agreement shall not be deemed or considered to be a supplemental trust agreement for purposes of the Trust Agreement.

*Restrictions on Amendments to the TIFIA Loan Agreement.* The Authority agrees that it will not consent to any amendment, modification, termination or waiver of any provision of the TIFIA Loan Agreement if such amendment, modification, termination or waiver would be materially adverse to the Holders of Bonds or Parity Debt, unless such amendment is made with the consent of Owners and Holders of Parity Debt and Junior Indebtedness.

## **Defeasance**

*Release of Trust Agreement.* When:

(a) the Bonds and Additional Secured Indebtedness shall have become due and payable in accordance with their terms or otherwise as provided in the Trust Agreement, and the whole amount of the principal and the interest and premium, if any, and other amounts so due and payable thereon shall be paid; and

(b) if the Bonds and Additional Secured Indebtedness shall not have become due and payable in accordance with their terms, the Trustee or any Bond Registrar shall hold, sufficient (i) money or (ii) Defeasance Obligations or a combination of (i) and (ii) of this clause (b), the principal of and the interest on which, when due and payable, will provide sufficient money to pay the principal of, and the interest and redemption premium, if any, on all Bonds and Additional Secured Indebtedness then Outstanding to the maturity date or dates of such Bonds and Additional Secured Indebtedness or to the date or dates specified for the redemption thereof, as verified by a verification agent acceptable to the Trustee; and

(c) if Bonds or Additional Secured Indebtedness are to be called for redemption or prepayment, irrevocable instructions to call the Bonds or Additional Secured Indebtedness for redemption or prepayment shall have been given by the Authority to the Trustee; and

(d) sufficient funds shall also have been provided or provision made for paying all other obligations payable under the Trust Agreement by the Authority, including any Derivative Agreement Regularly Scheduled Payments and Guarantee Repayments;

then and in that case the right, title and interest of the Trustee in the funds, accounts and subaccounts mentioned in the Trust Agreement shall thereupon cease, determine and become void and, upon being furnished with an opinion, in form, and substance satisfactory to the Trustee, of counsel approved by the Trustee, to the effect that all conditions precedent to the release of the Trust Agreement have been satisfied, the Trustee shall release the Trust Agreement and shall execute such documents to evidence such release as may be required by such counsel, and the Trustee shall turn over to the Authority any surplus in, and all balances remaining in, all funds, accounts and subaccounts other than money held for the redemption or payment of Bonds or Additional Secured Indebtedness. Otherwise, the Trust Agreement shall be, continue and remain in full force and effect; provided, however, that in the event Defeasance Obligations shall be deposited with and held by the Trustee or the Bond Registrar as in the Trust Agreement provided, (i) the Trustee, within thirty (30) days after such Defeasance Obligations shall have been deposited with it, shall cause a notice signed by the Trustee to be mailed, postage prepaid, to all Owners and to all Holders of Bonds and Additional Secured Indebtedness setting forth (a) the date or dates, if any, designated for the redemption of the Bonds and Additional Secured Indebtedness, (b) a description of the Defeasance Obligations so held by it, and (c) that the Trust Agreement has been released, and (ii) (a) the Trustee shall nevertheless retain such rights, powers and privileges under the Trust Agreement as may be necessary and convenient in respect of the Bonds and Additional Secured Indebtedness for the payment of the principal, interest and any premium for which such Defeasance Obligations have been deposited and (b) each Bond Registrar shall retain such rights, powers and privileges under the Trust Agreement as may be necessary and convenient for the registration, transfer and exchange of Bonds; provided, however, that failure to mail such notice to any Owner or to the Owners, or to any such Holder or to such Holders, or any defect in such notice so mailed, shall not affect the validity of the release of the Trust Agreement.

All money and Defeasance Obligations held by the Trustee or any Bond Registrar pursuant to this Section shall be held in trust and applied to the payment, when due, of the obligations payable therewith.

**The TIFIA Bond may not be defeased without the consent of the TIFIA Lender.**

### **Miscellaneous**

*Successorship of Authority.* In the event the Authority for any reason shall be dissolved or its legal existence shall otherwise be terminated, all of the covenants, stipulations, obligations and agreements contained in the Trust Agreement by or on behalf of or for the benefit of the Authority shall



bind or inure to the benefit of the successor or Authority from time to time and any officer, board, commission, authority, agency or instrumentality to whom or to which any power or duty affecting such covenants, stipulations, obligations and agreements shall be transferred by or in accordance with law, and the term “Authority” as used in the Trust Agreement shall include such successor or successors.

Successorship of Depository and Bond Registrar. Any bank or trust company with or into which a Depository or Bond Registrar may be merged or consolidated, or to which the assets and business of such Depository or Bond Registrar may be sold, shall be deemed the successor of such Depository or Bond Registrar for the purposes of the Trust Agreement.

Substitute Mailing. If, because of the temporary or permanent suspension of postal service, the Authority or the Trustee shall be unable to mail any notice required to be given by the provisions of the Trust Agreement, the Authority or the Trustee shall give notice in such other manner as in the judgment of the Authority or the Trustee shall most effectively approximate mailing, and the giving of notice in such manner shall for all purposes of the Trust Agreement be deemed to be in compliance with the requirement for the mailing thereof.

Parties, Bond Registrar, Owners and Holders Alone Have Rights under Trust Agreement. Except as in the Trust Agreement or in a Supplemental Trust Agreement otherwise expressly provided, nothing in the Trust Agreement, express or implied, is intended or shall be construed to confer upon any person, firm or corporation, other than the Trustee, each Bond Registrar, the Authority, the Owners of Bonds, the Holders of Parity Debt and Junior Indebtedness, each Bond Insurer and the providers of any Derivative Agreement any right, remedy or claim, legal or equitable, under or by reason of the Trust Agreement or any provision being intended to be and being for the sole and exclusive benefit of the Trustee, the Authority, each Bond Registrar, the Owners of Bonds and the Holders of Parity Debt and Junior Indebtedness and the providers of any Derivative Agreement.

Effect of Partial Invalidity. In case anyone or more of the provisions of the Trust Agreement, any Supplemental Trust Agreement or any Parity Debt Resolution or other agreement, or any Bonds or any Additional Secured Indebtedness shall for any reason be held to be illegal or invalid, such illegality or invalidity shall not affect any other provisions of the Trust Agreement or such other documents or instruments, but the Trust Agreement and such other documents or instruments shall be construed and enforced as if such illegal or invalid provisions had not been contained therein. In case any covenant, stipulation, obligation or agreement contained in the Trust Agreement such other documents or instruments shall for any reason be held to be in violation of law, then such covenant, stipulation, obligation or agreement shall be deemed to be the covenant, stipulation, obligation or agreement of the Authority to the full extent permitted by law.

Effect of Covenants; Governing Law. All covenants, stipulations, obligations and agreements of the Authority contained in the Trust Agreement, any Supplemental Trust Agreement or any Parity Debt Resolution or other agreement shall be deemed to be covenants, stipulations, obligations and agreements of the Authority to the full extent permitted by the Constitution and laws of the State. The Trust Agreement is executed and delivered with the intent that the laws of the State shall govern its construction.

No Recourse Against Members, Officers or Employees of Authority. No recourse under, or upon, any statement, obligation, covenant or agreement contained in the Trust Agreement, or in any Bond or Additional Secured Indebtedness, or in any document or certification whatsoever, or under any judgment obtained against the Authority, or by the enforcement of any assessment, or by any legal or equitable proceeding by virtue of any constitution or statute or otherwise or under any circumstances, shall be had against any member of the Authority Board, officer or employee of the Authority, either directly or

through the Authority for the payment for or to, the Authority or any receiver of the Authority, or for, or to, any Owner of Bonds, Holder of Additional Secured Indebtedness or otherwise, of any sum that may be due and unpaid upon any such Bond or Additional Secured Indebtedness. Any and all personal liability of every nature, whether at common law or in equity or by statute or by constitution or otherwise, of any such member of the Authority Board, officer or employee to respond by reason of any act or omission on his or her part or otherwise, for the payment for, or to, the Authority or any receiver of the Authority, or for, or to, any Owner of Bonds, Holder of the Additional Secured Indebtedness or otherwise, of any sum that may remain due and unpaid upon the Bonds or Additional Secured Indebtedness secured or any of them, is expressly waived and released as an express condition of, and in consideration for, the adoption of the Trust Agreement and the issuance of Bonds and the incurrence of Parity Debt or Junior Indebtedness.

Dealing in Bonds or Parity Debt. The Trustee and any Bond Registrar, and their directors, officers, employees or agents, and any officer, employee or agent of the Authority, may in good faith, buy, sell, own, hold and deal in any Bonds or Parity Debt and may join in any action which any Owner or Holder thereof may be entitled to take with like effects as if such Trustee were not a Trustee and such bank or trust company were not the Bond Registrar under the Trust Agreement or as if such officer, employee or agent of the Authority did not serve in such capacity.

Further Authority. The officers of the Authority, attorneys, engineers and other agents or employees of the Authority are authorized to do all acts and things required of them by the Trust Agreement for the full, punctual and complete performance of all of the terms, covenants and agreements contained in the Bonds and the Trust Agreement.

Payment Due on Holidays. If the date for making any payment or the last day for performance of any act or the exercising of any right as provided in the Trust Agreement is not a Business Day, such payment may be made or act performed or right exercised on the next Business Day with the same force and effect as if done on the date provided in the Trust Agreement.

Treatment of Derivative Agreements. Anything in the Trust Agreement to the contrary notwithstanding, the counterparty under any Derivative Agreement providing for Senior Lien Derivative Agreement Regularly Scheduled Payments, Subordinate Lien Derivative Agreement Regularly Scheduled Payments or otherwise shall have no rights under the Trust Agreement to direct the method and place of conducting any remedial proceedings to be taken by the Trustee under the Trust Agreement and shall have no voting rights with respect thereto or for any other purpose under the Trust Agreement, but shall only have the right to enforce those specific rights granted to such counterparties under the Trust Agreement.

Calculations with respect to Capital Appreciation Bonds, Convertible CAB Bonds and the TIFIA Bond. Whenever in the Trust Agreement a vote or percentage test is applied to the principal amount of Outstanding Bonds, the Accreted Amount of each Outstanding Capital Appreciation Bond and Convertible CAB Bond shall be used as its principal amount. The Outstanding TIFIA Loan Balance shall be used as the principal amount of the TIFIA Bond.

**APPENDIX C**

**TRAFFIC AND REVENUE REPORT**

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# North Carolina Monroe Expressway Traffic and Toll Revenue Study *Final Report*



November, 2016

Prepared for  
**North Carolina  
Department of Transportation**



**CDM  
Smith**

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# Chapter 1

## Introduction

This report documents the methodology and findings of the Monroe Expressway Traffic and Revenue Study conducted for the North Carolina Department of Transportation (NCDOT) and the North Carolina Turnpike Authority (NCTA). The purpose of the study is to develop a forty-year annual traffic and toll revenue forecast for the proposed Monroe Expressway (the Project) from its assumed opening year (2019) through 2059. The traffic and toll revenue forecasts are suitable for use in support of bond financing.

### 1.1 General Project Description

The proposed Monroe Expressway, shown in **Figure 1.1**, will be a controlled-access toll road, roughly parallel with US 74, extending from US 74 near I-485 in Mecklenburg County to US 74 between the towns of Wingate and Marshville in Union County, a distance of approximately 19.7 miles.

US 74 is a major east–west roadway that connects southeastern North Carolina, including the Port of Wilmington, to the Charlotte metropolitan area and points beyond. US 74 is a primary transportation corridor between Union County and Charlotte/Mecklenburg County. In addition, US 74 provides access to many retail, commercial and employment centers. Due to its important regional and local roles, US 74 traffic volumes have increased and traffic congestion occurs during weekday peak time periods. The Monroe Expressway would provide a high-speed alternative to US 74 for area motorists.

### 1.2 Project Alignment and Toll Concept

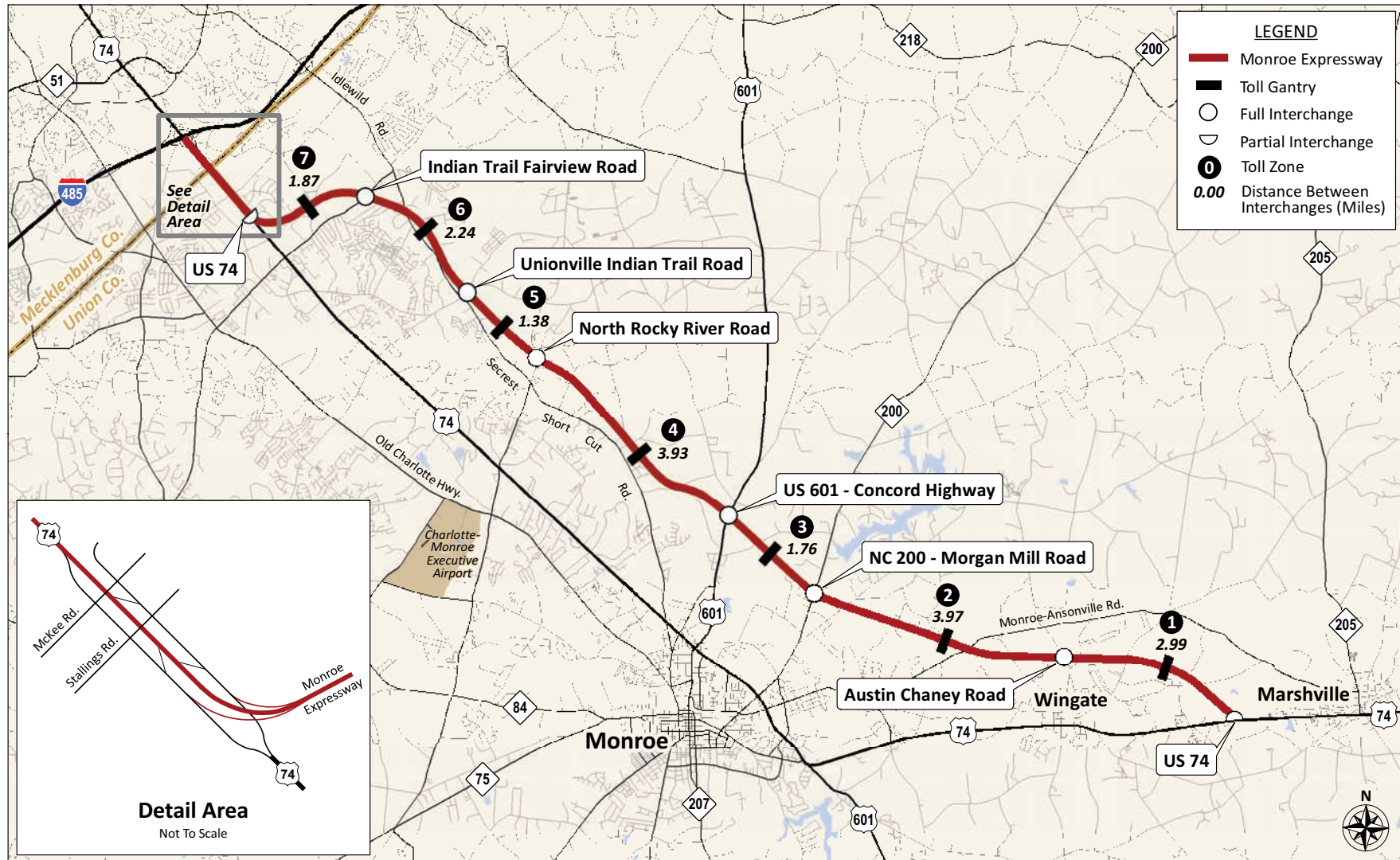
Figure 1.1 shows the general alignment of the proposed Monroe Expressway and the toll concept. The project alignment will follow the existing US 74 for approximately one mile from east of I-485 to the east side of Stallings Road (SR 1365) and continue on a new southeasterly alignment to the terminus with US 74 between the towns of Wingate and Marshville. The project is almost entirely contained in Union County, NC, although the westernmost portion is located in Mecklenburg County.

Six intermediate interchanges will be located at Indian Trail Fairview Road (SR 1520), Unionville Indian Trail Road (SR 1367), North Rocky River Road (SR 1514), US 601, NC 200 (Morgan Mill Road), and Austin Chaney Road (SR 1758). These will be full-access interchanges. Partial interchanges will be located between US 74 and the Monroe Expressway at the east and west termini of the tolled portion of the project. Additionally, access to and from Stallings Road and McKee Road will be available via frontage roads in the toll free portion of the project.

Tolls will be collected electronically via overhead mainline gantries using both electronic toll collection (ETC) and video toll collection (VTC). The NCTA VTC program is named Bill by Mail (BBM). Cash payments on the roadside will not be available. A gantry will be located on each mainline section at appropriate locations. Gantry locations shown in Figure 1.1 do not represent exact locations. There will not be any toll-free movements on the project from the western interchange with US 74 to the eastern interchange with US 74. Toll rates would be based on the distance covered on each mainline section. Each mainline section with a gantry is called a toll zone. The toll zones are numbered 1 through 7, and are depicted in Figure 1.1 along with the distance covered for each toll zone.

# NCDOT Monroe Expressway Traffic and Toll Revenue Study

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The project includes an upgrading of US 74 for approximately one mile at the far western end, to a controlled-access roadway with one-way frontage roads. The inset box in Figure 1.1 shows the upgraded section of US 74, including the frontage road system and the partial interchange with the Monroe Expressway. There will not be any toll collection on the upgraded section of US 74 or the frontage roads. A detailed description of the project configuration is provided in Section 3.3.

## 1.3 Scope of Work

The scope of work for this study was designed to produce traffic and toll revenue forecasts suitable for bond financing. The study work scope is comprised of the following seven tasks:

- Task 1: Data Collection and Summarization
- Task 2: Corridor Growth Analysis
- Task 3: Model Refinement and Calibration
- Task 4: Traffic and Toll Revenue Analysis
- Task 5: Traffic and Toll Revenue Sensitivity Tests
- Task 6: Study Documentation and Coordination
- Task 7: Traffic and Revenue Sensitivity Tests

A brief description of these tasks is provided below.

### **Task 1: Data Collection and Summarization**

#### *Subtask 1.1: Traffic Counts*

- CDM Smith obtained available traffic count data in the study area from the NCDOT.
- Seven-day vehicle classification counts were conducted at thirteen locations in the study area.

#### *Subtask 1.2: Video License Plate Recognition*

An automatic license plate recognition (ALPR) survey was conducted at 13 locations in the study corridor from 5:30 to 7:00 PM on a weekday in October 2015. Seven locations were on US 74, two locations were on Old Charlotte Highway, and three locations were on Secrest Short Cut Road. License plate images were obtained by video cameras in the westbound direction of travel. The survey was conducted to aid in identifying trip distances in the study area.

#### *Subtask 1.3: Travel Time and Speed Data*

- INRIX travel time data was obtained from RITIS.org for US 74 and other roadways in the study area.
- CDM Smith conducted independent travel time runs to validate the INRIX data.

#### *Subtask 1.4: Transportation Improvements*

Information on current and planned roadway improvements in the study area was collected from the NCDOT and various planning agencies.

## **Task 2: Corridor Growth Analysis**

Economic growth forecasts are one of the most critical elements of any traffic and revenue forecast, particularly for a new toll facility such as the Monroe Expressway. For this study, an independent economist, Dr. Stephen J. Appold, was engaged to review the socioeconomic and land-use forecasts that are assumed in the travel demand model. The goal of this effort was to evaluate the reasonableness of the socioeconomic and land-use assumptions and make suggested adjustments where appropriate. Dr. Appold revised population and number-of-households in select traffic analysis zones (TAZs) in the study area. After a review of Dr. Appold's work, CDM Smith implemented the recommended changes by developing new trip tables based on the new socioeconomic data.

## **Task 3: Model Refinement and Calibration**

CDM Smith obtained the most recent travel demand model, the Metrolina Regional Model 2015 version 1.1 (referred to as MRM or MRM15v1.1 in this report). This model is a key tool for evaluating future travel demand in the Charlotte/Mecklenburg County area. A review of the networks was conducted, including a review of the size of the TAZs in the study area for potential disaggregation and evaluating whether additional roads needed to be added to the networks.

The model was calibrated to base year 2015 conditions in the immediate project area. The traffic assignments were calibrated to collected traffic counts, travel speeds, and trip distance data. Calibration refinements were carried through to future-year assignments.

## **Task 4: Traffic and Toll Revenue Analysis**

The refined model was used to run a series of traffic assignments. Each assignment was run for four time periods: AM Peak, Midday, PM Peak and Overnight. Toll sensitivity assignments were conducted at opening year (2019) and 2030 to determine optimum per-mile toll rates for the project. Optimum rates were developed for each future-year traffic and revenue assignment. The MRM15v1.1 supports model years 2015, 2025, 2030 and 2040. CDM Smith developed a 2019 trip table and network to reflect opening year conditions.

Future-year assignments were conducted with the selected toll rates to evaluate the traffic and toll revenue potential of the Monroe Expressway. Based on the traffic modeling analysis, annual estimates of traffic and toll revenue were developed for the base-case condition from 2019 through 2040. The forecasts beyond 2040 were developed by assuming a modest increase in traffic growth on the project.

Toll revenue estimates in the early years were adjusted downwards to reflect ramp-up; the pattern of gradual build-up in demand for a new road. Finally, estimates of toll revenue leakage were developed to reflect the loss of toll revenue associated with video tolling, such as unreadable license plates, unidentified vehicle owners, and account collection issues.

## **Task 5: Traffic and Toll Revenue Sensitivity Tests**

A series of sensitivity tests were performed to identify how sensitive the base-case traffic and toll revenue estimates are to changes in specific variables. These variables include:

- Reduce economic growth by 30 percent,
- Reduce motorist values of time by 25 percent,
- Increased ETC market share,

- Increased motor fuel prices, and
- Reduced truck share.

#### **Task 6: Documentation and Coordination**

CDM Smith produced a series of technical memoranda to document key points in the study. These memoranda were submitted to the NCDOT/NCTA for review and comment prior to advancing to the next stage of the study. These technical memoranda included:

- ***Monroe Expressway – Data Collection***, dated December 18, 2015,
- ***Monroe Expressway – Independent Economic Review***, dated December 30, 2015,
- ***Monroe Expressway – Project Configuration and Modeling Inputs***, dated February 3, 2016, and
- ***Monroe Expressway – Toll Rate Assumptions***, dated March 10, 2016.

In addition, CDM Smith submitted Dr. Appold’s report to the NCDOT. The report, titled ***Evaluation of the Socio-economic Estimates Underlying the Study of the Feasibility of the Proposed Monroe Expressway***, dated February 17, 2016, presented Dr. Appold’s methodology and findings.

The documents just described are summarized in this report in corresponding chapters, as appropriate.

## **1.4 Report Structure**

This report consists of seven chapters.

- Chapter 1: Introduction – contains the purpose of the study, a description of the project, and the structure of the report.
- Chapter 2: Existing Conditions and Data Collection – presents the data collection efforts and the traffic conditions in the immediate study corridor.
- Chapter 3: Network Refinement – summarizes changes made to the base year and future year networks.
- Chapter 4: Independent Economic Review – summarizes the socio-economic assumptions in the MRM, the review of the socio-economic data by the economist, and the revisions to the socio-economics based on the economist’s recommendations.
- Chapter 5: Model Calibration - reviews the model calibration methodology. Provides data to illustrate the calibration in the study area.
- Chapter 6: Traffic and Toll Revenue Analysis – describes the modeling inputs and process, the toll sensitivity analysis, the traffic and gross toll revenue forecast for the Monroe Expressway, and the gross toll revenue forecast adjusted for revenue leakage and fee revenue.
- Chapter 7: Traffic and Revenue Sensitivity Tests – describes the results of the tests.



## Chapter 2

# Existing Conditions and Data Collection

This chapter summarizes the data collection efforts undertaken as part of this study, as well as the existing traffic and travel conditions they are meant to reflect. The following sections will discuss traffic volumes, travel speeds, and travel patterns in the project corridor. This data was used to aid in model calibration as well as for use in developing traffic and toll revenue annualization factors since the model reflects a typical weekday. In addition to the information provided in this chapter, a detailed Technical Memorandum titled *NCDOT TIP R-3329/R-2559 Monroe Expressway – Data Collection* was prepared and submitted to NCDOT in December 2015.

## 2.1 Data Collection Program

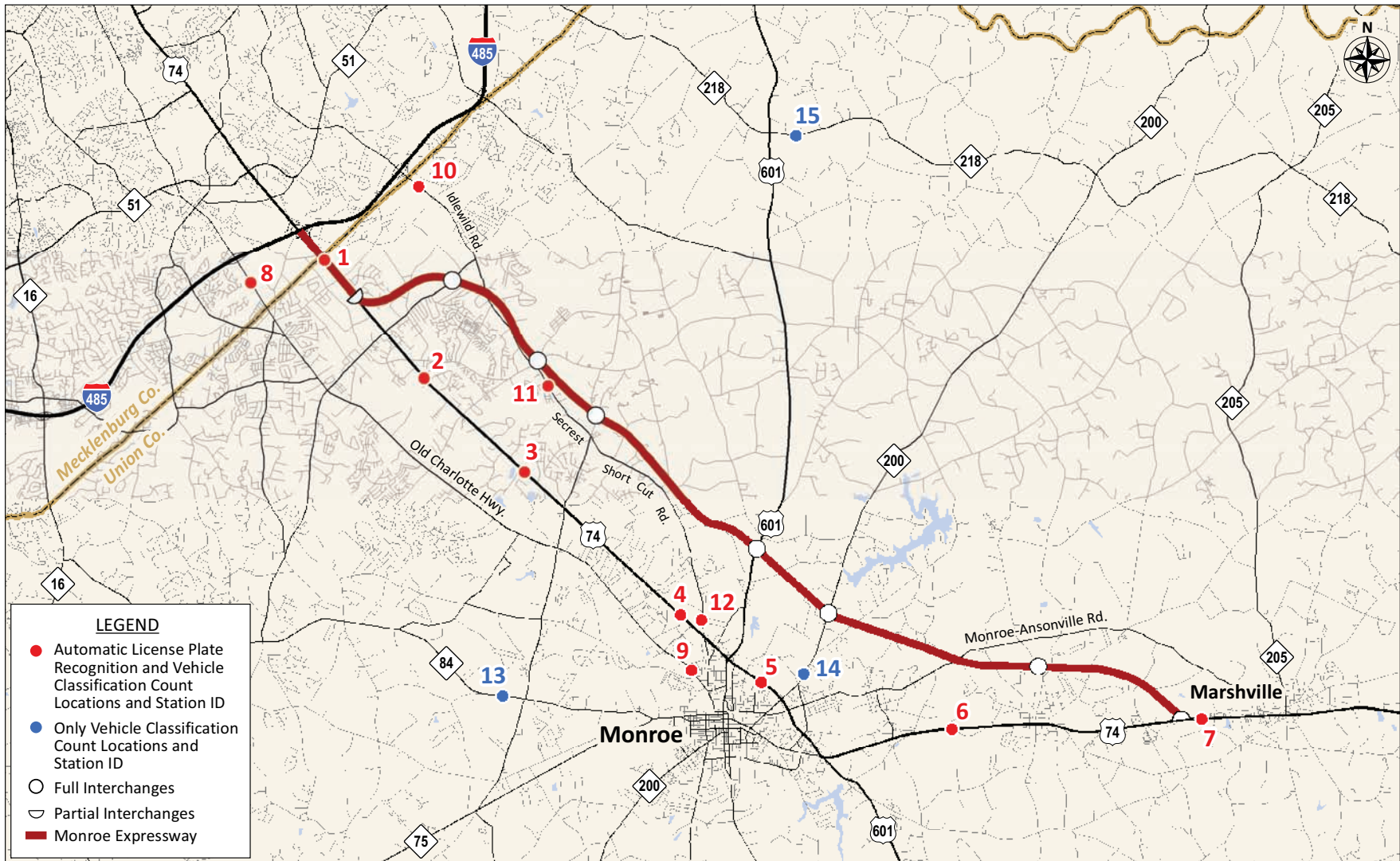
CDM Smith collected the following data for use in this traffic and toll revenue study:

- Available average annual daily traffic (AADT) counts were obtained from the NCDOT.
- Vehicle classification counts were conducted by The Traffic Group, a sub-consultant to CDM Smith, at 15 locations on US 74 and several other roads that are alternatives to US 74. The traffic counts were conducted at all the red and blue locations shown in **Figure 2.1**. Traffic counts were conducted in 15-minute increments by FHWA vehicle classifications for the 7-day period from October 22, 2015 through October 29, 2015. A description of the count locations is provided in **Table 2.1**.
- An automatic license plate recognition (ALPR) survey was conducted at 12 of the 15 traffic count locations. ALPR survey locations are shown in red on Figure 2.1. This effort consisted of recording license plate images by video camera and matching the plates across the survey locations to assist in determining car and truck trip lengths on US 74 between Wingate and I-485. These ALPR surveys were conducted from 5:30 AM to 7:00 PM on Thursday, October 22, 2015.
- INRIX travel times and speeds were obtained for roads in the study area.

The collected data are described in the following sections.

## 2.2 NCDOT Average Annual Daily Traffic Volumes

In addition to the traffic counts conducted as part of this study, CDM Smith collected and reviewed traffic counts provided by NCDOT. **Figure 2.2** shows the 2014 average annual daily traffic volumes at NCDOT count locations throughout the study region. As shown, the coverage area is quite extensive and includes multiple count locations along key competing and complementary routes to the proposed Monroe Expressway.



**TRAFFIC COUNT AND AUTOMATIC LICENSE PLATE  
RECOGNITION SURVEY LOCATIONS**

FIGURE 2.1



**Table 2.1**  
**Locations for Automatic License Plate Recognition and Vehicle Classification Counts**

Station ID (1)	Count Location	Data Collected Between These Crossroads	
		Crossroad 1	Crossroad 2
1	US 74	Independence Commerce Drive	Stallings Road
2	US 74	Indian Trail Fairview Road	Faith Church Road
3	US 74	Chamber Drive	Breckenridge Center Drive
4	US 74	Roland Drive	Secrest Short Cut Road
5	US 74	Miller Street	NC 200/Morgan Mill Road
6	US 74	S Bivens Road	Edgewood Drive
7	US 74	Forest Hills Road	N. Austin Street
8	Old Charlotte Highway	I-485	Morningwood Drive
9	North Charlotte Avenue	Dickerson Boulevard	Concord Ave
10	Idlewild Road	I-485	Stevens Mill Road
11	Secrest Short Cut Road	Unionville Indian Trail Road W	N Rocky River Road
12	Secrest Short Cut Road	Kim Court	Euclid Street
13	NC 84	Willoughby Road	Rocky River Road
14	NC 200	Creekridge Drive	N. Sutherland Avenue
15	NC 218	Price Tucker Road	US 601

1) Seven-day vehicle classification counts were conducted at all locations. ALPR surveys were conducted at Stations 1 through 13.

AADT volumes on US 74 were about 15,000 just east of the eastern Project terminus, in the vicinity of Marshville. Volumes nearly doubled on US 74 just west of the eastern Project terminus, to about 28,000. Daily volumes then increase considerably (to between 48,000 and 56,000) in the vicinity of Monroe. Peak volumes were recorded just east of the interchange with I-485, where daily trips reach 60,000. Daily volumes along the secondary parallel route to the Project, Old Charlotte Highway, ranged from about 14,000 in the middle of the corridor, to a high of 26,000 just east of I-485. Idlewild Road/Secrest Short Cut Road, which largely follows much of the western alignment of the Monroe Expressway, had average daily traffic volumes that ranged from 9,800 to 20,000.

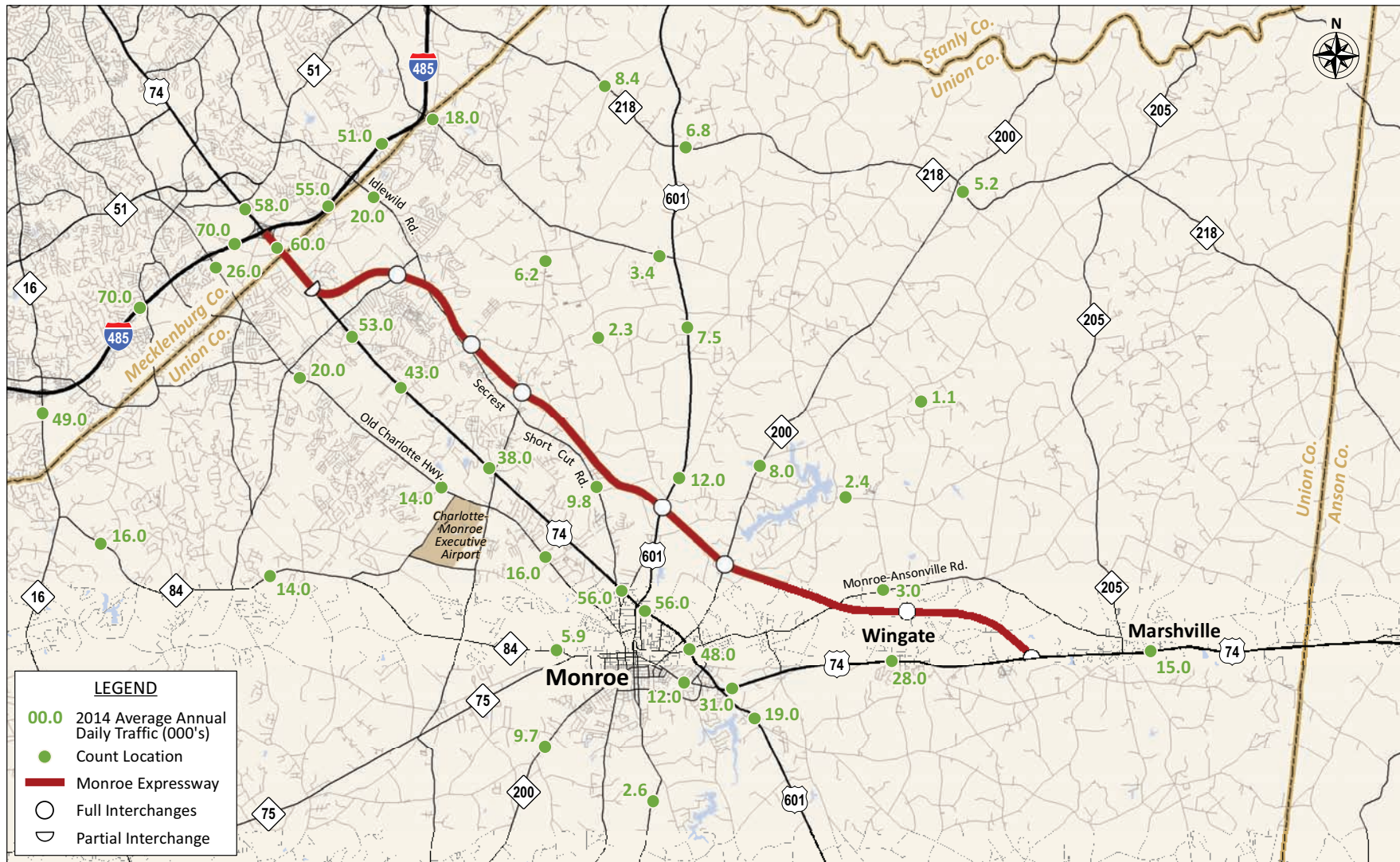
## 2.3 Summary of 7-Day Continuous Traffic Count Program

This section shares key information collected regarding daily and hourly traffic variations, as well as the mix of vehicles along key existing roads in the Project corridor.

**Figure 2.3** presents both the 2015 average weekday and average weekend day traffic volumes and the Station ID at each of the 15 data collection points. At all locations, average weekday volumes were higher than average weekend day volumes. Along US 74 west of Monroe, average weekday volumes at count stations 1 through 4 were between 10.4 percent and 12.6 percent higher than weekend day volumes. Weekday volumes were relatively higher compared to weekend day volumes on US 74 at count stations 5 through 7 (in Monroe and between Monroe and Marshville). At these three locations, weekday volumes were 17.1 percent to 19.3 percent greater than weekend day volumes.

# NCDOT Monroe Expressway Traffic and Toll Revenue Study

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Source: NCDOT AADT Maps

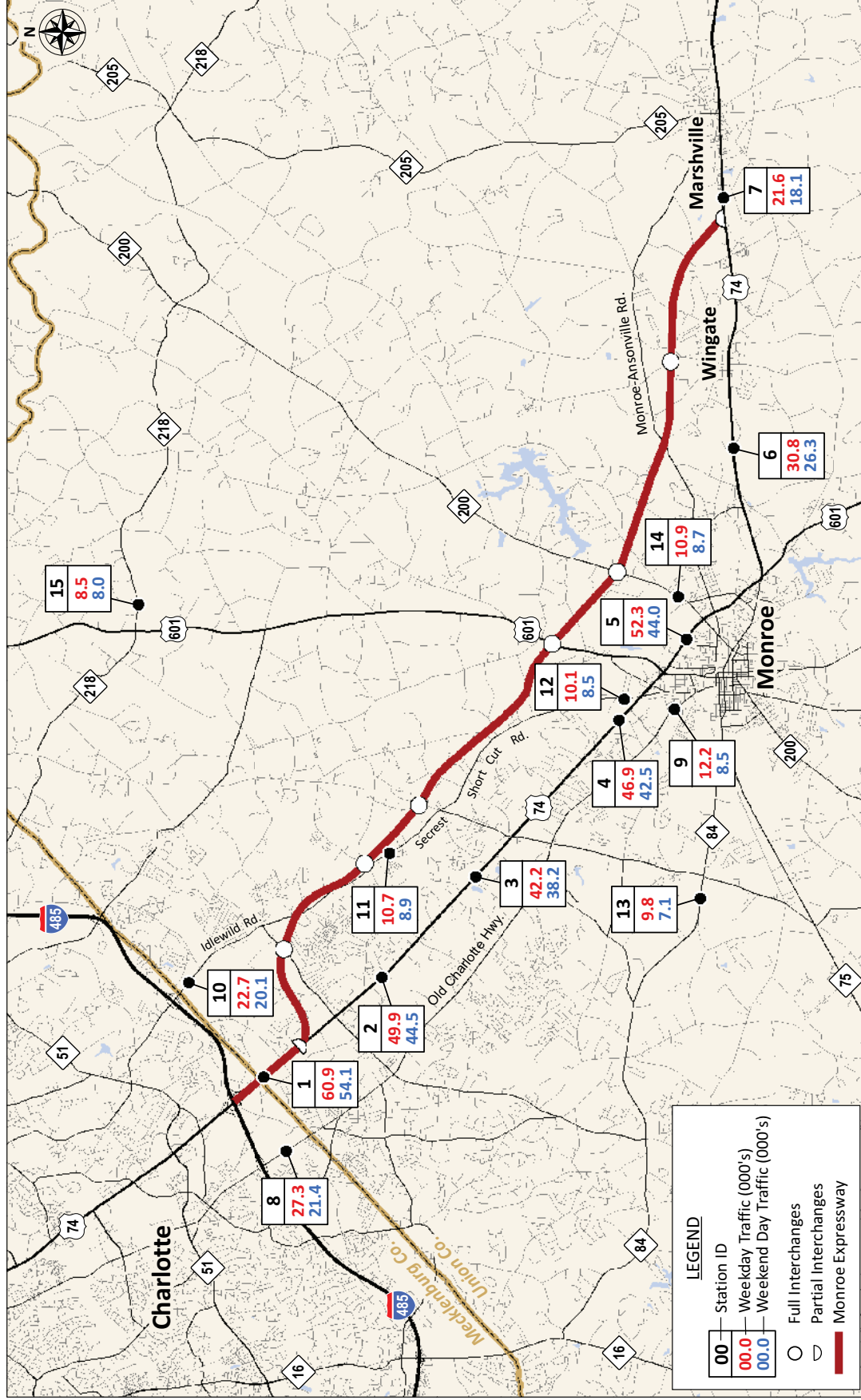


## 2014 AVERAGE ANNUAL DAILY TRAFFIC

FIGURE 2.2

# NCDOT Monroe Expressway Traffic and Toll Revenue Study

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Source: Counts conducted by The Traffic Group from October 22 through 29, 2015.

## 2015 AVERAGE ANNUAL WEEKDAY AND WEEKEND DAY TRAFFIC VOLUMES

FIGURE 2.3





These relatively higher weekday volumes would suggest a larger weekday commuter component compared to the other locations.

Most of the other count stations in and around the Monroe area exhibited a relatively high weekday traffic component, ranging from 6.3 percent to 43.5 percent higher than weekend day volumes. Again, this would suggest a high commuter base of traffic on these roads.

**Table 2.2** provides a detailed review of the distribution of average weekday traffic volumes by time period for each of the 15 count locations. The time periods used in Table 2.2 are the same four periods used in the Metrolina Regional Model. As shown, the distribution of traffic by time period was fairly consistent across all 15 count stations. The AM Peak period (3 hours) consisted of 15 to 21 percent of total weekday traffic. The Midday (6 hours) consisted of about 31 to 40 percent of total weekday traffic. The PM Peak period (3 hours) consisted of about 20 to 27 percent of total weekday traffic, and the Overnight period (12 hours) consisted of about 21 to 27 percent of total weekday traffic.

**Table 2.2**  
**Distribution of 2015 Average Annual Weekday Traffic by Time Period**

Station ID	Route	Percent Distribution of Weekday Traffic				Total Day
		AM Peak	Midday	PM Peak	Overnight	
		6:30-9:30 AM	9:30 AM-3:30 PM	3:30-6:30 PM	6:30 PM-6:30 AM	
1	US 74	19.7 %	34.5 %	20.2 %	25.6 %	100.0 %
2	US 74	18.2	35.4	20.4	26.0	100.0
3	US 74	18.3	34.7	20.5	26.6	100.0
4	US 74	15.7	37.8	21.2	25.2	100.0
5	US 74	15.4	37.3	21.5	25.7	100.0
6	US 74	17.2	34.7	22.2	25.9	100.0
7	US 74	17.5	34.7	22.0	25.8	100.0
<b>US 74 - Average</b>		<b>17.5</b>	<b>35.7</b>	<b>21.0</b>	<b>25.8</b>	<b>100.0</b>
8	Old Charlotte Hwy	19.2	35.9	22.4	22.5	100.0
9	North Charlotte Avenue	15.7	39.8	23.3	21.2	100.0
<b>Old Charlotte/N. Charlotte - Average</b>		<b>18.1</b>	<b>37.1</b>	<b>22.7</b>	<b>22.1</b>	<b>100.0</b>
10	Idlewild Road	19.2	32.4	24.5	23.9	100.0
11	Secrest Short Cut Rd	18.8	32.2	26.0	23.0	100.0
12	Secrest Short Cut Rd	18.3	32.7	26.5	22.5	100.0
<b>Idlewild/Secrest Road - Average</b>		<b>18.9</b>	<b>32.4</b>	<b>25.3</b>	<b>23.4</b>	<b>100.0</b>
13	NC 84	21.4	31.4	25.6	21.6	100.0
14	NC 200	19.6	32.8	23.9	23.7	100.0
15	NC 218	18.7	33.6	25.6	22.1	100.0

Source: Based on traffic counts conducted by The Traffic Group from October 22 through 29, 2015.

Daily traffic variations are shown in **Table 2.3** for US 74 count stations. The table shows average daily traffic variations by day of week and by two-axle, three-or-more axle, and total vehicles.

Along US 74 (Table 2.3) Monday through Thursday total volumes tended to be relatively similar (all near an index of 1.0). In all cases, Sunday represented the lowest travel day of the week, with indices between 80 percent and 85 percent of the average day. Friday, on the other hand, was the highest travel day at all stations, with total volume indices ranging 7 to 19 percent greater than average daily volumes.

**Table 2.3**  
**2015 Daily Traffic Variations On US 74**

Day of Week	Station 1		Station 2		Station 3		Station 4	
	Traffic Volume	Index	Traffic Volume	Index	Traffic Volume	Index	Traffic Volume	Index
<b>Two-Axle Vehicles</b>								
Sunday	46,664	0.85	39,007	0.88	33,734	0.90	36,672	0.87
Monday	56,260	1.03	45,722	1.03	38,356	1.02	42,474	1.00
Tuesday	52,629	0.96	42,563	0.96	36,621	0.97	40,678	0.96
Wednesday	55,489	1.01	44,098	0.99	36,919	0.98	40,765	0.96
Thursday	57,190	1.04	45,153	1.02	37,077	0.99	43,205	1.02
Friday	58,090	1.06	48,472	1.09	40,944	1.09	47,431	1.12
Saturday	57,563	1.05	46,264	1.04	39,514	1.05	45,386	1.07
Average Day	54,841	1.00	44,468	1.00	37,595	1.00	42,373	1.00
Average Weekday	55,932	1.02	45,202	1.02	37,983	1.01	42,911	1.01
Average Weekend Day	52,114	0.95	42,636	0.96	36,624	0.97	41,029	0.97
<b>Three-or-More Axle Vehicles</b>								
Sunday	1,535	0.37	1,487	0.38	1,236	0.36	1,175	0.36
Monday	5,140	1.25	4,828	1.24	4,229	1.22	3,836	1.17
Tuesday	5,062	1.23	4,721	1.21	4,204	1.21	3,924	1.20
Wednesday	5,030	1.23	4,687	1.20	4,219	1.22	4,012	1.22
Thursday	4,637	1.13	4,685	1.20	4,378	1.26	4,301	1.31
Friday	4,969	1.21	4,694	1.21	4,077	1.18	3,881	1.18
Saturday	2,342	0.57	2,161	0.55	1,909	0.55	1,801	0.55
Average Day	4,102	1.00	3,895	1.00	3,465	1.00	3,276	1.00
Average Weekday	4,968	1.21	4,723	1.21	4,221	1.22	3,991	1.22
Average Weekend Day	1,939	0.47	1,824	0.47	1,573	0.45	1,488	0.45
<b>Total Vehicles</b>								
Sunday	48,199	0.82	40,494	0.84	34,970	0.85	37,847	0.83
Monday	61,400	1.04	50,550	1.05	42,585	1.04	46,310	1.01
Tuesday	57,691	0.98	47,284	0.98	40,825	0.99	44,602	0.98
Wednesday	60,519	1.03	48,785	1.01	41,138	1.00	44,777	0.98
Thursday	61,827	1.05	49,838	1.03	41,455	1.01	47,506	1.04
Friday	63,059	1.07	53,166	1.10	45,021	1.10	51,312	1.12
Saturday	59,905	1.02	48,425	1.00	41,423	1.01	47,187	1.03
Average Day	58,943	1.00	48,363	1.00	41,060	1.00	45,649	1.00
Average Weekday	60,899	1.03	49,925	1.03	42,205	1.03	46,901	1.03
Average Weekend Day	54,052	0.92	44,460	0.92	38,197	0.93	42,517	0.93

Source: Based on traffic counts conducted by The Traffic Group from October 22 through 29, 2015.

**Table 2.3 (Continued)**  
**2015 Daily Traffic Variations On US 74**

<b>Day of Week</b>	<b>Station 5</b>		<b>Station 6</b>		<b>Station 7</b>	
	Traffic Volume	Index	Traffic Volume	Index	Traffic Volume	Index
<b>Two-Axle Vehicles</b>						
Sunday	38,878	0.82	22,992	0.84	16,540	0.90
Monday	48,178	1.02	27,343	1.00	18,531	1.01
Tuesday	44,656	0.95	25,456	0.93	17,090	0.93
Wednesday	45,198	0.96	27,125	0.99	17,468	0.95
Thursday	52,710	1.12	28,287	1.04	19,092	1.04
Friday	53,899	1.14	32,033	1.17	21,899	1.19
Saturday	46,675	0.99	27,926	1.02	17,921	0.98
Average Day	47,171	1.00	27,309	1.00	18,363	1.00
Average Weekday	48,928	1.04	28,049	1.03	18,816	1.02
Average Weekend Day	42,777	0.91	25,459	0.93	17,231	0.94
<b>Three-or-More Axle Vehicles</b>						
Sunday	1,043	0.38	684	0.31	694	0.31
Monday	3,292	1.19	2,676	1.20	2,657	1.17
Tuesday	2,816	1.02	2,687	1.20	2,878	1.27
Wednesday	2,877	1.04	2,875	1.29	2,888	1.28
Thursday	4,310	1.56	3,002	1.34	3,040	1.34
Friday	3,566	1.29	2,669	1.19	2,654	1.17
Saturday	1,387	0.50	1,057	0.47	1,041	0.46
Average Day	2,756	1.00	2,236	1.00	2,265	1.00
Average Weekday	3,372	1.22	2,782	1.24	2,823	1.25
Average Weekend Day	1,215	0.44	871	0.39	868	0.38
<b>Total Vehicles</b>						
Sunday	39,921	0.80	23,676	0.80	17,234	0.84
Monday	51,470	1.03	30,019	1.02	21,188	1.03
Tuesday	47,472	0.95	28,143	0.95	19,968	0.97
Wednesday	48,075	0.96	30,000	1.02	20,356	0.99
Thursday	57,020	1.14	31,289	1.06	22,132	1.07
Friday	57,465	1.15	34,702	1.17	24,553	1.19
Saturday	48,062	0.96	28,983	0.98	18,962	0.92
Average Day	49,926	1.00	29,545	1.00	20,628	1.00
Average Weekday	52,300	1.05	30,831	1.04	21,639	1.05
Average Weekend Day	43,992	0.88	26,330	0.89	18,098	0.88

Source: Based on traffic counts conducted by The Traffic Group from  
October 22 through 29, 2015.

**Table 2.4**  
**2015 Daily Traffic Variations On Alternative Roads**

Day of Week	Old Charlotte Hwy. and North Charlotte Ave.				Idlewild Rd. and Secret Short Cut Rd.					
	Station 8		Station 9		Station 10		Station 11		Station 12	
	Traffic Volume	Index	Traffic Volume	Index	Traffic Volume	Index	Traffic Volume	Index	Traffic Volume	Index
<b>Two Axle Vehicles</b>										
Sunday	18,948	0.75	7,151	0.65	18,223	0.84	7,988	0.80	7,572	0.80
Monday	26,386	1.05	11,547	1.05	21,574	1.00	10,113	1.01	9,606	1.01
Tuesday	25,407	1.01	11,307	1.03	20,594	0.95	9,533	0.95	9,168	0.97
Wednesday	26,220	1.04	11,546	1.05	21,448	0.99	10,014	1.00	9,477	1.00
Thursday	27,299	1.09	12,234	1.11	23,049	1.06	10,731	1.07	9,887	1.04
Friday	28,052	1.12	13,501	1.23	25,088	1.16	11,908	1.19	11,350	1.20
Saturday	23,547	0.94	9,767	0.89	21,797	1.01	9,643	0.97	9,282	0.98
Average Day	25,123	1.00	11,008	1.00	21,682	1.00	9,990	1.00	9,477	1.00
Average Weekday	26,673	1.06	12,027	1.09	22,351	1.03	10,460	1.05	9,898	1.04
Average Weekend Day	21,248	0.85	8,459	0.77	20,010	0.92	8,816	0.88	8,427	0.89
<b>Three-or-More Axle Vehicles</b>										
Sunday	72	0.14	23	0.18	76	0.27	38	0.17	35	0.20
Monday	796	1.53	154	1.20	372	1.32	322	1.45	295	1.68
Tuesday	554	1.07	135	1.05	288	1.02	219	0.99	174	0.99
Wednesday	508	0.98	151	1.18	223	0.79	227	1.02	165	0.94
Thursday	715	1.38	181	1.41	380	1.35	315	1.42	244	1.39
Friday	755	1.45	191	1.49	457	1.62	302	1.36	213	1.21
Saturday	242	0.47	64	0.50	181	0.64	130	0.59	104	0.59
Average Day	520	1.00	128	1.00	282	1.00	222	1.00	176	1.00
Average Weekday	666	1.28	162	1.27	344	1.22	277	1.25	218	1.24
Average Weekend Day	157	0.30	44	0.34	129	0.46	84	0.38	70	0.40
<b>Total Vehicles</b>										
Sunday	19,020	0.74	7,174	0.64	18,299	0.83	8,026	0.79	7,607	0.79
Monday	27,182	1.06	11,701	1.05	21,946	1.00	10,435	1.02	9,901	1.03
Tuesday	25,961	1.01	11,442	1.03	20,882	0.95	9,752	0.95	9,342	0.97
Wednesday	26,728	1.04	11,697	1.05	21,671	0.99	10,241	1.00	9,642	1.00
Thursday	28,014	1.09	12,415	1.11	23,429	1.07	11,046	1.08	10,131	1.05
Friday	28,807	1.12	13,692	1.23	25,545	1.16	12,210	1.20	11,563	1.20
Saturday	23,789	0.93	9,831	0.88	21,978	1.00	9,773	0.96	9,386	0.97
Average Day	25,643	1.00	11,136	1.00	21,964	1.00	10,212	1.00	9,653	1.00
Average Weekday	27,338	1.07	12,189	1.09	22,695	1.03	10,737	1.05	10,116	1.05
Average Weekend Day	21,405	0.83	8,503	0.76	20,139	0.92	8,900	0.87	8,497	0.88

Source: Based on traffic counts conducted by The Traffic Group from October 22 through 29, 2015.

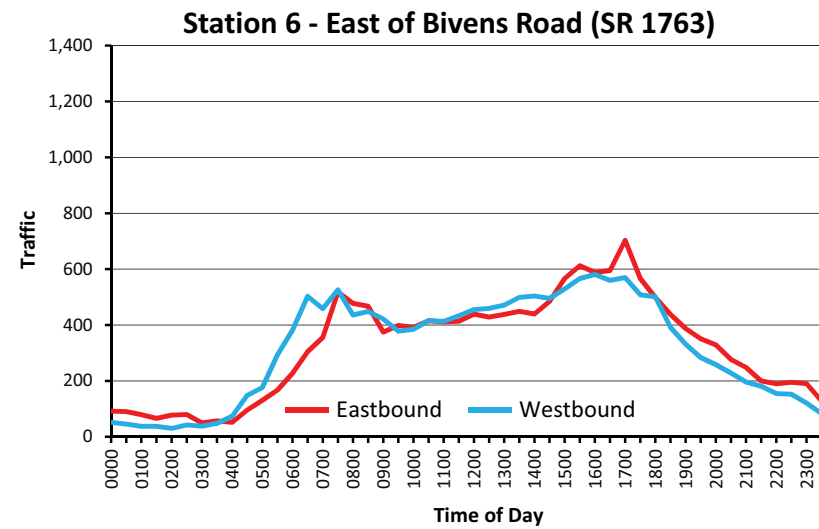
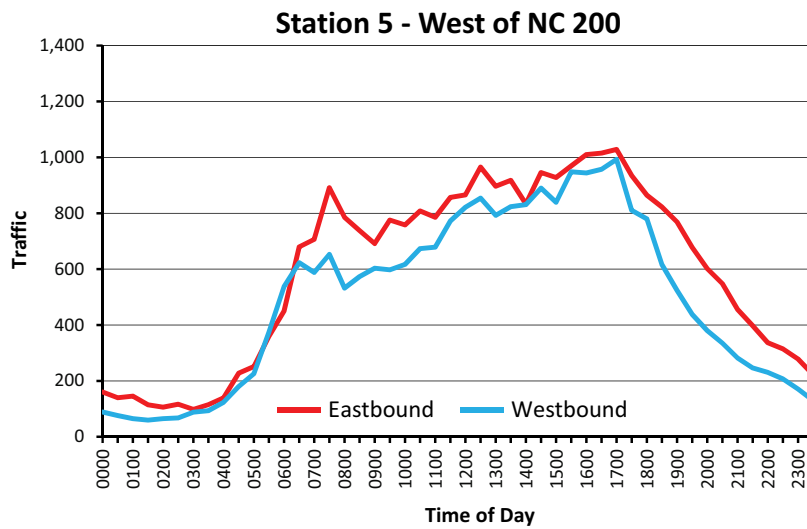
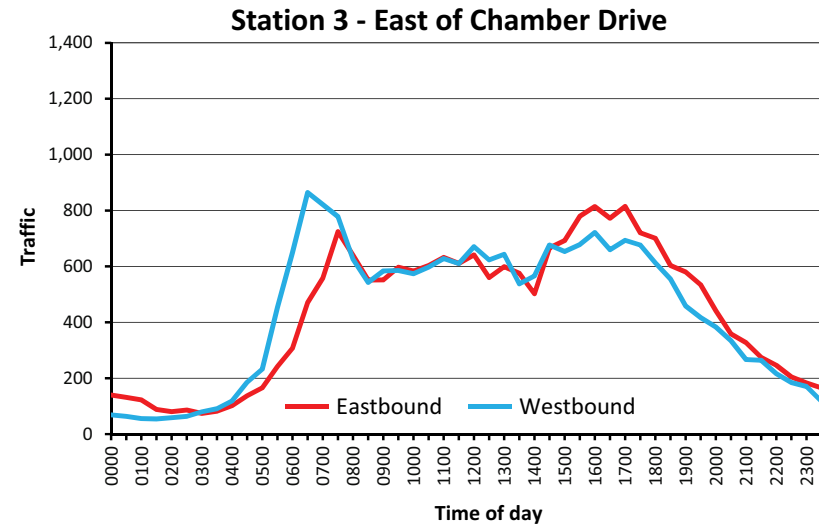
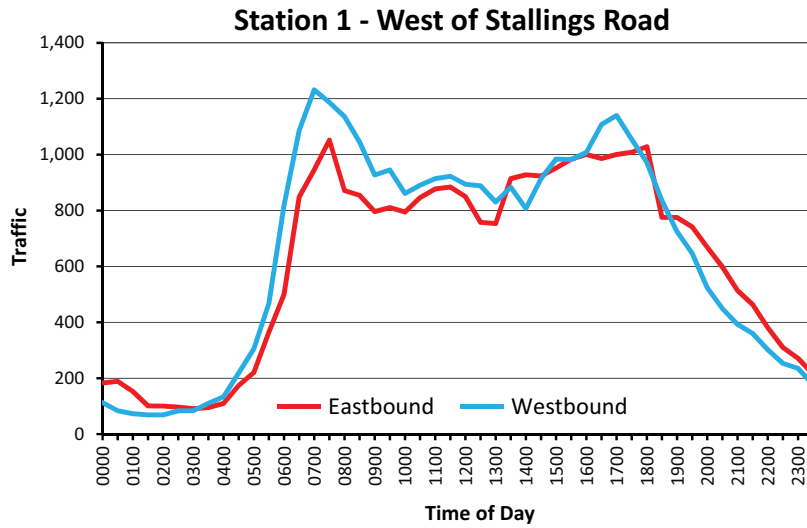
Passenger car traffic volumes on US 74 were quite consistent between average weekdays and average weekend days. Average weekday passenger car volumes ranged from 1 to 4 percent above the average daily volume, and average weekend volumes ranged from 3 to 9 percent below the average daily volume. As would be expected, commercial-vehicle travel was highly concentrated on weekdays. Commercial vehicle traffic on US 74 was 21 to 25 percent higher on a weekday compared to an average day. Weekend commercial vehicle volumes on US 74 were less than half that of average daily commercial traffic.

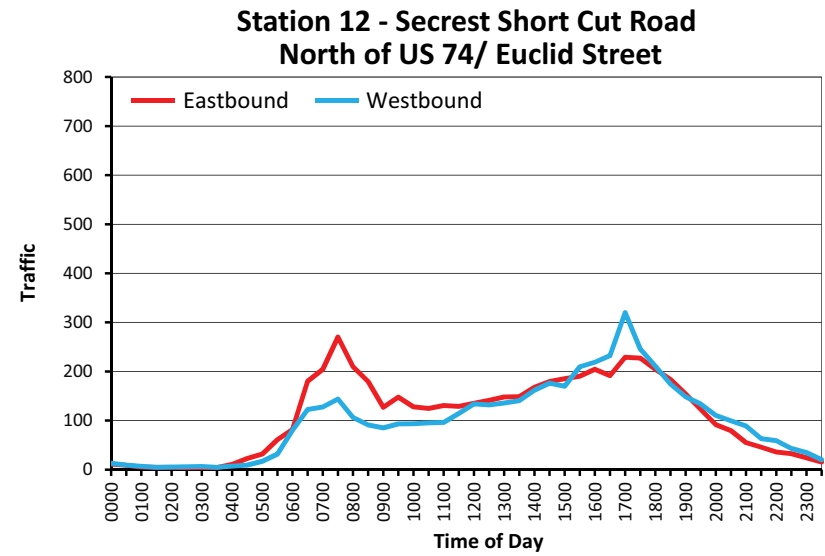
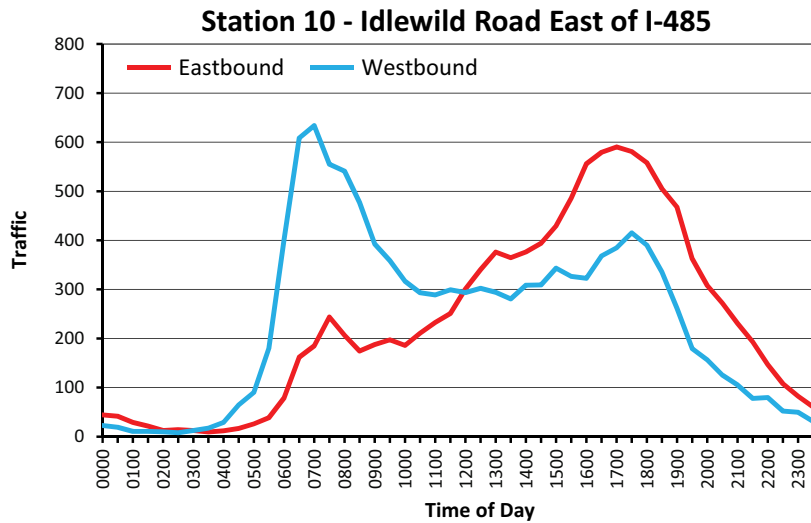
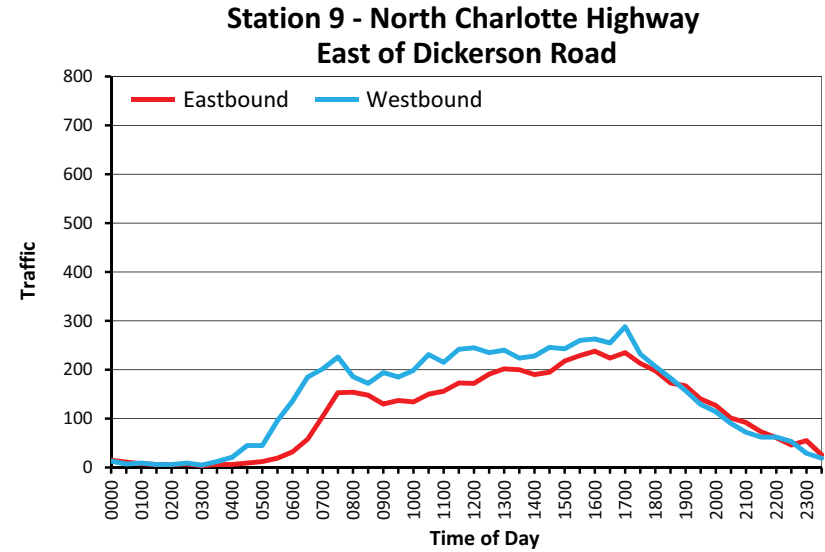
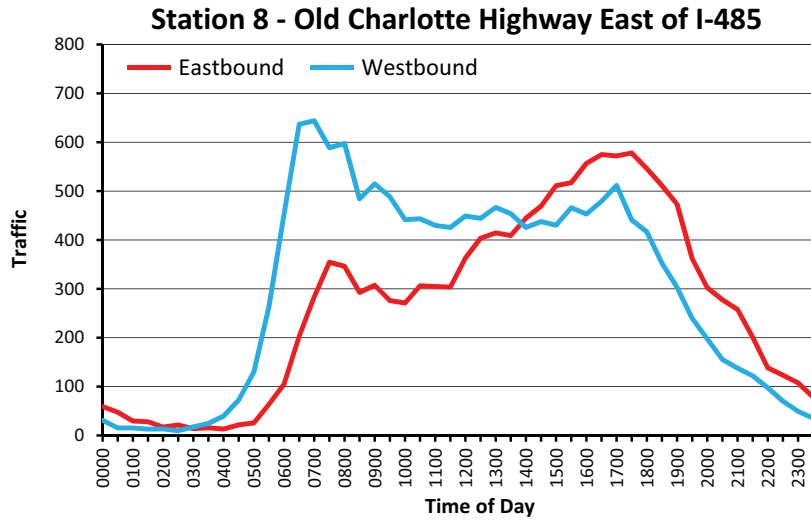
Daily traffic variations for two roads parallel to US 74 are presented in **Table 2.4**. These two roads, Old Charlotte Highway/North Charlotte Avenue and Idlewild Road/Secrest Short Cut Road share similar daily variations in traffic volumes. Passenger car volumes were consistently lowest on Sundays and highest on Fridays. Average weekday passenger car volumes ranged from 6 to 9 percent above the average day on Old Charlotte Highway/North Charlotte Avenue, and from 3 to 5 percent above the average day on Idlewild Road/Secrest Short Cut Road. Commercial vehicle traffic was highly concentrated on weekdays. Weekend commercial vehicle volumes were 30 to 46 percent of the average daily commercial volume, while average weekday volumes range from 22 to 28 percent above the average day.

Weekday hourly traffic variations, by direction, are shown graphically for four count stations along US 74 in **Figure 2.4**. Stations 1 and 3 (both west of Monroe) exhibit clear morning and evening peaking characteristics. Stations 5 and 6 (in Monroe and east of Monroe) had a slight morning peak and a gradual building of traffic throughout the day, culminating in an evening peak. What is most noticeable is the similarity in traffic volumes in each hour for between the two travel directions. There are some divergences, but they are relatively small.

**Figure 2.5** depicts weekday hourly variations for count stations along Old Charlotte Highway (Station 8) and North Charlotte Avenue (Station 9), and Idlewild Road (Station 10) and Secrest Short Cut Road (Station 12). Count Stations 8 and 10 are both at the far western end of the Project corridor, near I-485. Both exhibit very similar characteristics in that there is a pronounced westbound morning peak and a pronounced eastbound evening peak. At Station 12 on Secrest Short Cut Road, which is very close to downtown Monroe, the peaking directionality is reversed, with an eastbound morning peak and a westbound evening peak. At Station 9, on North Charlotte Highway in downtown Monroe, the hourly traffic profile is flatter, with a small peak in the morning hours and subsequently increasing volumes through the midday and into a small evening peak. Based on the traffic counts, the westbound traffic volumes were slightly higher for most of the day, including both the morning and evening peaks.







**Table 2.5** provides information on the typical weekday vehicle-class composition at count stations on US 74, Old Charlotte Highway/North Charlotte Avenue, Idlewild Road/Secret Short Cut Road, and NC 84, NC 200, and NC 218. Three vehicle categories (which align with the assumed toll class schedules) are provided; consisting of two axle, three axle, and four-or-more axle vehicles. Two axle vehicles comprised the vast majority of traffic at all count stations; ranging between 87.0 percent at Station 2 to 98.7 percent at Station 9.

**Table 2.5**  
**2015 Traffic Composition by Vehicle Class – Week Day**

Station	Percent Vehicle Class Distribution By Axle Class				Total
	2 Axles	3 Axles	4-or-more Axles	Subtotal 3-or-more Axles	
<b>US 74</b>					
1	91.8 %	1.9 %	6.2 %	8.2 %	100.0 %
2	90.5	1.6	7.8	9.5	100.0
3	90.0	2.0	8.0	10.0	100.0
4	91.5	1.6	6.9	8.5	100.0
5	93.6	1.4	5.0	6.4	100.0
6	91.0	1.5	7.5	9.0	100.0
7	87.0	2.0	11.0	13.0	100.0
<b>Old Charlotte Highway/North Charlotte Avenue</b>					
8	97.6	0.8	1.6	2.4	100.0
9	98.7	0.7	0.6	1.3	100.0
<b>Idlewild Road/Secret Short Cut Road</b>					
10	98.5	0.5	1.0	1.5	100.0
11	97.4	1.1	1.5	2.6	100.0
12	97.8	0.9	1.2	2.2	100.0
<b>Other Roads (NC 84, NC 200, NC 218, respectively)</b>					
13	97.5	1.5	1.0	2.5	100.0
14	94.9	2.2	2.9	5.1	100.0
15	91.4	1.7	6.9	8.6	100.0

Source: Based on traffic counts conducted by The Traffic Group from October 22 through 29, 2015.

Three axle vehicles were the smallest component of traffic at all locations; ranging from 0.5 percent at Station 11 to 2.2 percent at Station 14. Larger commercial vehicles (4-or-more axles) represented 5.0 to 11.0 percent of the traffic at US 74 count stations, and a much smaller proportion on Old Charlotte Highway/North Charlotte Avenue and Idlewild Road/Secret Short Cut Road.

## 2.4 Travel Speed Summary

A key element of model validation, was verifying that the model output accurately reflected current travel speeds on competing and complementary routes to the Monroe Expressway by time period. Two sources of travel time information were utilized in the validation process. The primary data source was INRIX, while secondary travel time data was collected by CDM Smith staff in order to confirm the INRIX information. Summaries of data from both sources are provided in this section.

**Figure 2.6** identifies all the roads for which INRIX data was available. One full year of weekday data (November 2014 through October 2015) was requested for the highlighted roads in this figure. All of the data was summarized by hour, direction, and roadway segment.

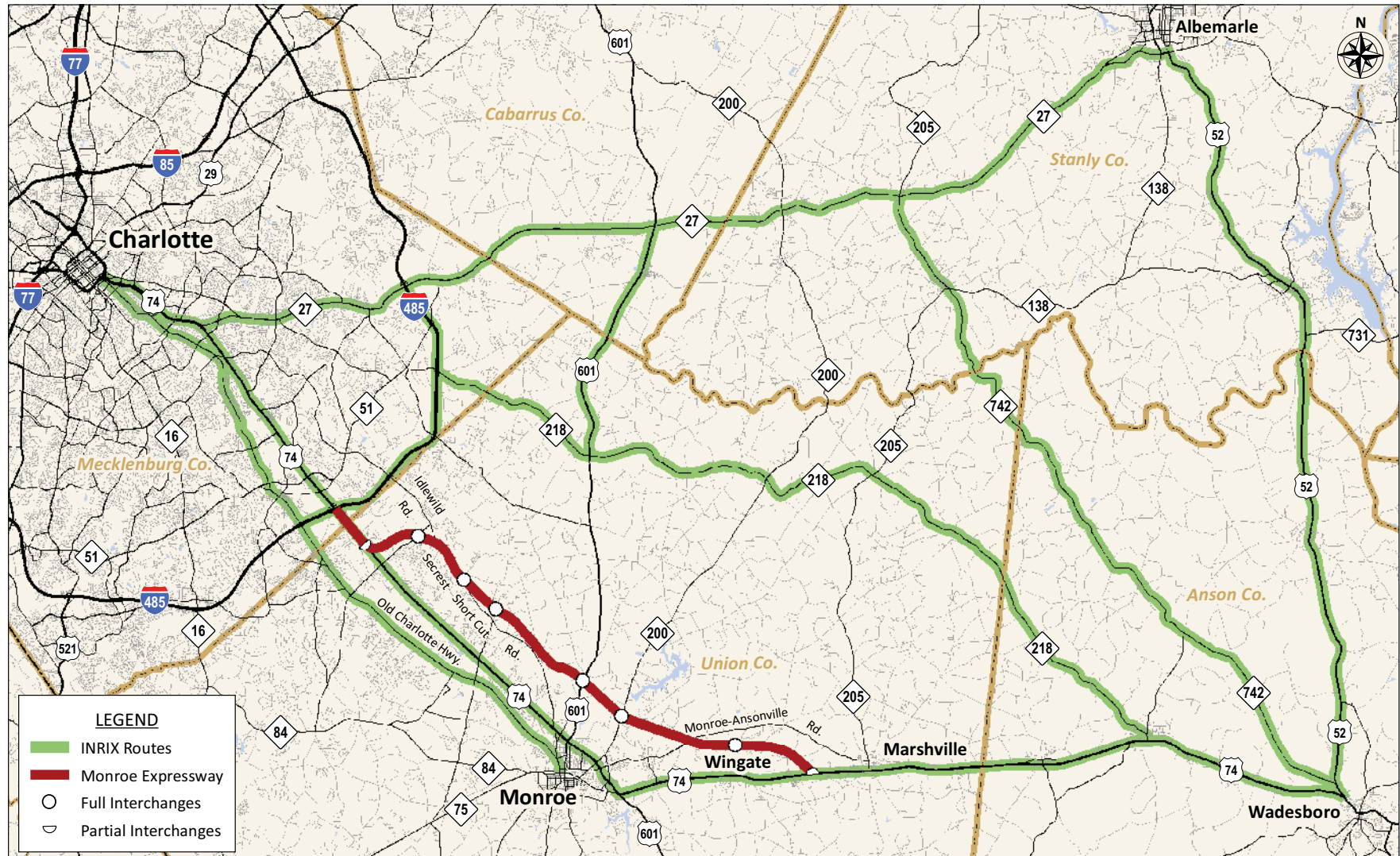
**Table 2.6** shows the summarized average weekday INRIX travel speed data for US 74 between NC 205/Elm Street in Marshville and I-485 near Matthews. Establishing actual travel speeds, particularly on US 74 is important, as the majority of traffic on the Monroe Expressway would come from US 74. The Monroe Expressway is intended to provide reliable high-speed travel to longer distance trips as an alternative to US 74 which provides local access to area homes and businesses. Posted speed limits on US 74 between NC 205/Elm Street in Marshville and I-485 range from 35 to 55 mph.

The visual “heat map” in Table 2.6 depicts travel speed by direction and hour, for road segments provided by INRIX. Each box shows the average weekday travel speed for a particular hour. Variations in travel speed can occur within the hour. The boxes are color coded to represent average travel speeds in 10 mile-per-hour increments. In general, travel speeds are slower in the westbound direction compared to eastbound travel. In the westbound direction, travel speeds showed the most extended declines between East Franklin Street and NC 200/Morgan Mill Road beginning around 7:00 AM through 10:00 PM (hour 21). As shown, speeds in this section ranged from 18 to 29 mph. During the same time period, average travel speeds were slightly faster on the adjacent segment, from NC 200/Morgan Hill Road to US 601, when speeds averaged around 30 mph.

Operating speeds were a little faster in the eastbound direction. The segment between I-485 and Stallings Road is the only segment that experienced average speeds less than 20 mph during a typical weekday. This condition occurred between 4:00 PM and 6:00 PM. The East Franklin Street to US 601/Pageland Highway segment exhibited the longest time period of suboptimal travel speeds; operating at around 30 mph between 10:00 AM and 4:00 PM.

# NCDOT Monroe Expressway Traffic and Toll Revenue Study

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**Table 2.6**  
**US 74 Weekday Travel Speeds from INRIX – Average from November 2014 through October 2015**

Segment Name	Distance (mi)	Westbound Speed by Hour																							
		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
NC-205/Elm St.	8.54	55	55	56	56	56	56	55	55	55	55	55	55	56	55	55	56	56	56	56	55	55	56	56	
US-601/Pageland Hwy.	0.12	48	48	48	48	48	48	47	46	46	46	46	46	46	47	46	46	45	46	46	47	47	47	48	
E. Franklin St.	1.21	34	34	35	35	34	35	32	29	28	21	20	20	18	19	19	19	20	21	23	29	28	28	31	
NC-200/Morgan Mill Rd.	1.02	38	38	38	39	38	38	34	30	30	30	29	28	29	29	29	28	28	30	32	33	33	35	36	
US-601(Concord Hwy)/NC-200	0.35	43	44	44	44	45	44	43	43	42	39	39	37	35	37	37	36	35	36	38	42	41	39	41	
US-601(Concord Hwy)/NC-200	1.58	46	46	46	46	47	47	47	47	46	45	45	43	44	44	45	45	44	46	46	45	44	45	46	
Roland Dr.	6.86	40	41	41	41	41	42	40	38	36	35	33	30	27	28	30	31	32	32	32	34	35	33	37	
Indian Trail Fairview Rd.	1.27	48	48	49	49	49	47	43	38	39	43	44	43	40	39	39	38	37	35	37	41	42	42	45	
Stallings Rd.	0.75	49	49	50	50	50	49	41	24	23	37	45	45	43	43	44	42	40	33	34	38	42	43	46	
I-485	0.76	51	51	52	52	52	52	48	44	43	47	49	49	48	48	48	48	45	45	43	46	47	48	50	

Segment Name	Distance (mi)	Eastbound Speed by Hour																							
		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
NC-205/Elm St.	9.54	49	49	49	49	49	49	48	48	47	48	48	48	48	48	47	47	47	47	47	48	48	47	48	
US-601/Pageland Hwy.	8.55	37	38	37	37	37	38	38	33	34	30	30	29	28	28	27	29	30	30	31	36	35	32	34	
E. Franklin St.	0.11	39	40	39	40	39	39	36	31	31	33	34	33	32	32	32	31	31	31	32	34	35	34	37	
NC-200/Morgan Mill Rd.	1.21	43	44	44	44	45	45	43	41	40	39	39	37	34	33	34	37	38	37	36	34	36	39	41	
US-601(Concord Hwy)/NC-200	0.97	46	46	47	47	47	47	47	47	47	46	46	45	44	44	44	44	44	43	44	44	44	45	45	
US-601(Concord Hwy)/NC-200	0.30	40	40	41	41	40	39	38	38	37	36	35	32	28	27	29	30	30	29	29	31	33	32	36	
Roland Dr.	1.66	49	49	49	50	49	50	47	47	47	47	46	44	43	42	42	40	38	38	39	42	43	44	46	
Indian Trail Fairview Rd.	6.86	49	50	51	52	51	50	48	43	42	42	42	40	39	39	40	36	33	31	32	34	42	43	46	
Stallings Rd.	1.26	51	52	53	54	54	51	47	36	37	37	38	35	31	27	26	22	19	18	20	21	43	46	49	
I-485	0.61	53	54	54	55	55	54	54	53	53	54	54	53	52	51	50	49	46	44	47	47	52	53	54	

Legend	
50.0 - 59.9 mph	
40.0 - 49.9 mph	
30.0 - 39.9 mph	
20.0 - 29.9 mph	
10.0 - 19.9 mph	

CDM Smith performed a limited number of travel time runs to validate the reasonableness of the INRIX speed data. Travel time runs were conducted on US 74 and Old Charlotte Highway/North Charlotte Avenue on November 12, 2015. A summary of the travel time runs is provided in **Table 2.7**.

The INRIX travel speeds exceeded the travel time study speeds by about 4 to 11 percent on US 74 and about 4 to 10 percent on Old Charlotte Highway/North Charlotte Avenue. It was concluded that the INRIX data is an acceptable indicator of current travel speeds for this study. The percent differences in travel speeds between the two sources were generally below 10 percent. The differences are likely due to the greater number of INRIX data points that represent all months out of a year, compared to the limited number of travel time studies conducted by CDM Smith.

**Table 2.7**  
**Validation of INRIX Travel Times and Speeds**

Direction	Period	Travel Time Studies (TTS) (1)			INRIX		Percent Difference INRIX to TTS	
		Number of Runs	Travel Time (2)	Speed (mph)	Travel Time (2)	Speed (mph)	Travel Time (2)	Speed (mph)
<b>US 74 (3)</b>								
Westbound	AM	3	0:32:44	35.0	0:29:52	38.4	(8.8)	9.6
	MD	2	0:27:10	42.2	0:26:12	43.8	(3.6)	3.8
	PM	3	0:32:57	34.8	0:30:47	37.2	(6.6)	7.0
Eastbound	AM	3	0:27:39	41.7	0:26:51	42.9	(2.9)	3.0
	MD	2	0:30:41	37.6	0:28:29	40.4	(7.1)	7.7
	PM	2	0:34:35	33.3	0:31:14	36.9	(9.7)	10.7
<b>Old Charlotte Highway/North Charlotte Avenue (4)</b>								
Westbound	AM	2	0:30:07	24.5	0:27:54	26.4	(7.3)	7.9
	MD							
	PM	2	0:25:20	29.1	0:24:21	30.3	(3.9)	4.1
Eastbound	AM	2	0:24:57	29.6	0:22:40	32.6	(9.1)	10.1
	MD							
	PM	2	0:26:46	27.6	0:25:46	28.6	(3.8)	3.9

1) Travel time runs conducted by CDM Smith  
2) Travel time in minutes and seconds  
3) Travel time between I-485 and Forest Hills Road in Marshville, NC  
4) Travel time between I-485 and W. Cromwell Street in Monroe, NC



## 2.5 License Plate Surveys

Automatic license plate recognition surveys were conducted at 12 locations within the study corridor from 5:30 AM to 7:00 PM on October 22, 2015. These locations are shown in Figure 2.1. The purpose of the study was to gather data on trip lengths, particularly on US 74, and compare the collected trip-length data to estimated trip lengths in the Metrolina Model. This data is beneficial to calibrating the model because motorists currently on US 74 would be much more likely to use the Monroe Expressway for longer distance trips compared to very short trips.

License plate images were collected in the westbound direction only. License plate images were processed using optical character recognition software, followed by a manual image review to ensure accuracy. Vehicle classification for each record was assigned during the manual image review process and was limited to distinguishing between passenger cars (FHWA Classes 1-5) and commercial vehicles (FHWA Classes 6-13).

**Table 2.8** presents the number of successfully captured license plate images at each location by time of day and vehicle class. Successfully captured license plate images are also presented as a percent of passing traffic during the survey period. Several instances of capture rates in excess of 100 percent are shown for commercial vehicles. This is likely due to incorrect vehicle classification of a small proportion of commercial vehicles in the manual image review process. The key point is that the sample size is very large. For US 74 locations, the successful identification rate of passenger car plates ranged from 81 to 94 of passing traffic on a total day. The successful identification of commercial vehicle trips on US 74 ranged from 67 to 94 percent on a total day.

Captured license-plate images were matched across survey stations and checked for reasonableness based on logical movements and travel time to identify unique trips. The results of the ALPR survey for trips on US 74 are summarized in **Table 2.9** for a weekday AM period, PM period and total day, for passenger cars and commercial vehicles. All movements reflect westbound trips along US 74. The station where a plate was first identified (the origin) is shown in the left column, while the last station where the same plate was identified (the destination) is shown across the top. The percent distribution of trips from each origin station are unique, thus, the sum of each row adds up to 100 percent. Each row describes movements that are identified as a percentage of the trips that started at a station and traveled far enough to be captured at a downstream station.

For example, for passenger cars in the AM time period, 4 percent of trips with an origin at Station 7 went as far as Station 3 (but did not reach Station 2), another 4 percent had a destination that went as far as Station 2 (but did not reach Station 1), and 17 percent had a destination that went as far as Station 1, or beyond. Any trip that was captured at Station 7, but did not also pass through Stations 6, 5, 4, 3, 2, or 1, would not be represented in this table.

Commercial trucks exhibited a higher percentage of long distance trips than passenger cars. On a total day basis, 39 percent of trips first identified at Station 7 continued through Station 1, compared to 19 percent for passenger cars, and 58 percent of commercial vehicles that entered at Station 5 continued through Station 1 compared to 34 percent of passenger cars.

It is important to recognize that these are not complete trip tables, as US 74 is not a limited access roadway. The number of access points are numerous, and this data set represents snapshots of specific locations, chosen to fall between major intersecting roads with US 74. However, the data was useful for comparing against trip-distance distributions in the Metrolina Model. Adjustments were made to the MRM's trip table to adjust for the observed trip distances.



**Table 2.8**  
**License Plate Capture Rate as a Percentage of Passing Traffic**

Survey Station	Total Day: (5:30 AM - 7:00 PM)						AM Period (7:00 AM - 10:00 AM)						PM Period (3:00 PM - 7:00 PM)					
	Passenger Cars			Commercial Vehicles			Passenger Cars			Commercial Vehicles			Passenger Cars			Commercial Vehicles		
	Passing Traffic	License Plates	Capture Rate	Passing Traffic	License Plates	Capture Rate	Passing Traffic	License Plates	Capture Rate	Passing Traffic	License Plates	Capture Rate	Passing Traffic	License Plates	Capture Rate	Passing Traffic	License Plates	Capture Rate
1	25,293	23,792	94%	1,661	1,469	88%	6,516	5,176	79%	306	327	107%	7,790	7,554	97%	430	399	93%
2	18,335	16,035	87%	1,536	1,380	90%	4,100	3,063	75%	278	295	106%	5,966	5,600	94%	400	369	92%
3	15,411	14,251	92%	1,333	1,081	81%	3,536	3,195	90%	273	192	70%	4,979	4,620	93%	346	310	90%
4	18,357	17,009	93%	1,342	1,051	78%	3,390	2,891	85%	276	216	78%	6,074	5,739	94%	319	273	86%
5	22,216	18,098	81%	1,238	1,162	94%	4,074	3,082	76%	224	232	104%	7,352	6,373	87%	320	282	88%
6	11,773	9,984	85%	942	682	72%	2,313	2,003	87%	164	125	76%	4,108	3,286	80%	289	168	58%
7	8,084	7,389	91%	965	651	67%	1,668	1,545	93%	175	142	81%	2,814	2,466	88%	277	155	56%
8	11,066	9,017	81%	273	204	75%	3,115	2,165	70%	48	36	75%	3,553	1,932	54%	66	45	68%
9	5,819	4,899	84%	54	72	133%	1,097	924	84%	10	11	110%	1,957	1,794	92%	18	21	117%
10	10,274	8,976	87%	138	98	71%	2,778	2,187	79%	37	13	35%	2,976	2,845	96%	31	22	71%
11	4,582	3,983	87%	115	71	62%	903	733	81%	29	17	59%	1,692	1,496	88%	29	13	45%
12	4,364	3,249	74%	87	40	46%	1,054	472	45%	11	3	27%	1,545	1,476	96%	25	14	56%

Source: Automatic License Plate Recognition conducted by The Traffic Group on Thursday, October 22, 2015.

**Table 2.9**  
**Results of Vehicle License Plate Recognition Survey**  
**Based on Westbound Trips on Thursday, October 22, 2015**

Passenger Cars								Commercial Vehicles										
AM Time Period (7:00 AM - 10:00 AM)								AM Time Period (7:00 AM - 10:00 AM)										
Origin Station		Destination Station						First Identified At This Station		Destination Station								
		1	2	3	4	5	6	7			1	2	3	4	5	6	7	
US 74	1								US 74	1								
	2	100%								2	100%							
	3	60%	40%							3	89%	11%						
	4	44%	24%	32%						4	52%	22%	26%					
	5	32%	16%	20%	32%					5	71%	8%	14%	7%				
	6	20%	10%	11%	18%	42%				6	42%	16%	0%	11%	32%			
	7	17%	4%	4%	9%	17%	50%			7	46%	4%	10%	7%	8%	24%		
PM Time Period (3:00 PM - 7:00 PM)								PM Time Period (3:00 PM - 7:00 PM)										
Origin Station		Destination Station						First Identified At This Station		Destination Station								
		1	2	3	4	5	6	7			1	2	3	4	5	6	7	
US 74	1								US 74	1								
	2	100%								2	100%							
	3	60%	40%							3	69%	31%						
	4	48%	26%	26%						4	61%	22%	16%					
	5	37%	14%	10%	40%					5	62%	11%	9%	19%				
	6	20%	8%	6%	19%	47%				6	27%	0%	15%	27%	31%			
	7	23%	5%	3%	7%	21%	42%			7	43%	6%	7%	6%	11%	26%		
Total Day Time Period (5:30 AM - 7:00 PM)								Total Day Time Period (5:30 AM - 7:00 PM)										
Origin Station		Destination Station						First Identified At This Station		Destination Station								
		1	2	3	4	5	6	7			1	2	3	4	5	6	7	
US 74	1								US 74	1								
	2	100%								2	100%							
	3	62%	38%							3	77%	23%						
	4	47%	26%	27%						4	58%	21%	21%					
	5	34%	13%	13%	40%					5	58%	11%	11%	19%				
	6	20%	8%	7%	21%	45%				6	26%	11%	6%	27%	30%			
	7	19%	4%	3%	11%	20%	44%			7	39%	6%	8%	14%	11%	23%		

Source: ALPR conducted by The Traffic group on October 22, 2015.

## Chapter 3

# Network Refinement

CDM Smith obtained the latest regional transportation demand model from the Charlotte Department of Transportation (CDOT). This section describes the model, the review of the model network, and subsequent refinements to the network in the study area.

### 3.1 The Metrolina Regional Model

The Metrolina Regional Model is the primary modeling tool for evaluating existing and future travel demand in the greater Charlotte area. The current model is in TransCAD and is designated the Metrolina Regional Travel Demand Model 2015 Version 1.1 (MRM15v1.1 or MRM). It covers a twelve county, bi-state region. In North Carolina, all of Cabarrus, Cleveland, Gaston, Lincoln, Mecklenburg, Rowan, Stanly and Union Counties are included, as well as the portion of Iredell County from the Mecklenburg County line northward to the Yadkin River, and the southeast corner of Catawba County. The model area also includes the entirety of York County, SC and the northern panhandle of Lancaster County, SC. The area encompassed by the MRM15v1.1 boundaries can be seen in **Figure 3.1**. The detailed study area is shaded in green. The proposed Monroe Expressway is shown in red.

The MRM is cooperatively developed and maintained by a team of modelers from the following agencies:

1. North Carolina Department of Transportation (NCDOT),
2. South Carolina Department of Transportation (SCDOT),
3. Charlotte Regional Transportation Planning Organization (CRTPO),
4. Cabarrus-Rowan Metropolitan Planning Organization (CRMPO),
5. Gaston – Cleveland – Lincoln Metropolitan Planning Organization (GCLMPO),
6. Rock Hill - Fort Mill Area Transportation Study (RFATS),
7. Charlotte Department of Transportation (CDOT) and,
8. Rocky River Rural Planning Organization (RRRPO).

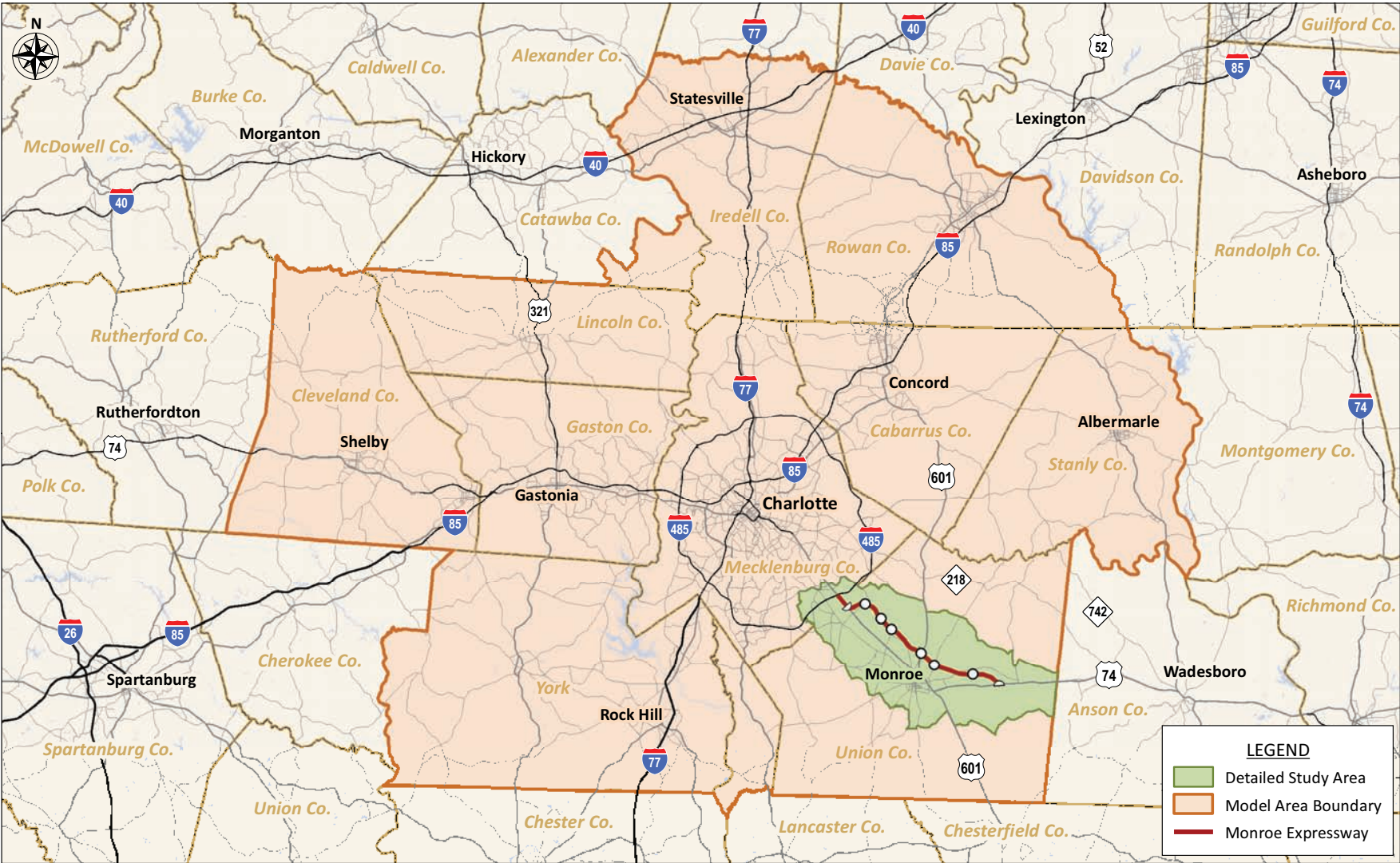
The official base year of the MRM15v1.1 is 2010, which incorporates 2010 US Census data. The model forecast years include 2015, 2025, 2030 and 2040. Each model year contains planned roadway and transit improvements based on the financially constrained metropolitan transportation plans for each of the respective MPOs. Projects in the non-MPO (RPO) areas are reflected in the networks only if they were included in the respective NC and SC Transportation Improvement Plan (TIP) documents.

The MRM is a weekday model, consisting of 3,439 TAZs, 82 externals, and with the following defined time periods:

- AM Peak Period: 6:30 AM to 9:30 AM
- Midday: 9:30 AM to 3:30 PM
- PM Peak Period: 3:30 PM to 6:30 PM
- Overnight Period: 6:30 PM to 6:30 AM

NCDOT Monroe Expressway  
Traffic and Toll Revenue Study

X:\TFT Group\Projects\NCDOT 110937 - 2015 - Monroe Bypass\Graphics\Comprehensive Report\ArcMap\Metrolina Regional Model Area.mxd 5/19/16



METROLINA REGIONAL MODEL AREA MAP

FIGURE 3.1

In the fall of 2015, CDM Smith obtained a working version of the MRM15v1.1 and the model documentation. CDM Smith used the 2015 network as the base year, and 2025, 2030 and 2040 networks for future-year assignments. A review of the MRM networks was conducted to determine whether any refinements were needed to improve the modeling output for this study. The review included the network coding of the Monroe Expressway, the size of TAZs in the study area, the location of centroid connectors in the study area, and whether additional roads needed to be added to the networks.

## 3.2 Project Configuration

The most up-to-date, detailed Monroe Expressway configuration was used to code the project. **Figure 3.2** presents a not-to-scale schematic that shows the location and configuration of the interchanges and the number of through travel lanes on the Expressway. The blue highlighted lanes represent the tolled Monroe Expressway and the green highlighted lanes represent the non-tolled, upgraded section of US 74. The distance in miles between interchanges on the tolled Monroe Expressway are shown in red. Four continuous, through travel lanes (two per direction) will be provided on the tolled Monroe Expressway through the forecast period, from 2019 through 2058.

**Figure 3.3** is a schematic of the upgraded section of US 74, the frontage road system, and the partial interchange with the Monroe Expressway. There will not be any toll collection on the upgraded section of US 74 or the frontage roads, highlighted in green and orange, respectively. The upgraded section of US 74 will maintain four to six through travel lanes. The system of frontage roads and the upgraded section of US 74 will provide multiple opportunities for vehicles to move between US 74 and the tolled Monroe Expressway. The Monroe Expressway will have a posted speed limit of 65 mph.

The Monroe Expressway was already coded into the MRM network years 2025, 2030 and 2040. The project coding, including distances, access points, and number of lanes was compared to the Monroe Bypass Constructors RFC Roadway Plans for accuracy. No substantive changes to distances, access points, or number of lanes were required.

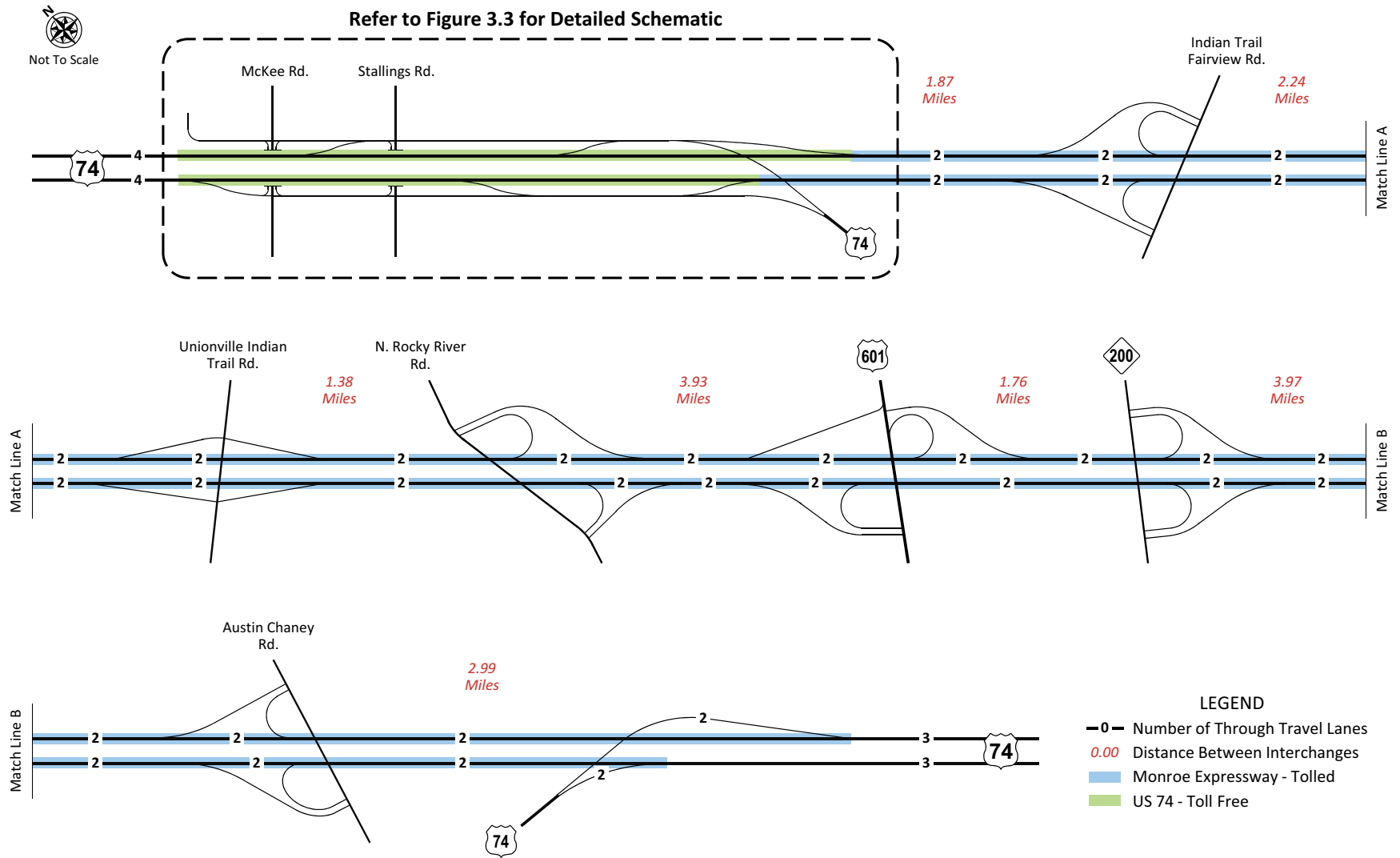
## 3.3 Traffic Analysis Zones, Centroid Connectors, and Added Roadways

The networks contain geographic areas called traffic analysis zones. Some TAZs in the study area were too large for the purposes of this study as they would not accurately differentiate how motorists would access the project. In order to more accurately reflect travel distances and times, CDM Smith disaggregated some TAZs in the vicinity of the proposed Monroe Expressway. Twenty TAZs were split into two, three or four new zones. The disaggregated zones are shown in **Figure 3.4**. Each original TAZ has one color, split by a dark black border.

After a review of the 2015 network and aerials available on the internet, it was determined that centroid connections for some TAZs needed to be modified in existing TAZs to more accurately reflect where traffic would access the roadway system. Centroid connectors represent where traffic loads onto the roadway network in each TAZ. Depending upon the TAZ, a centroid connector may have been re-located, deleted, or added. Modifications to centroid connectors were made to 19 existing TAZs and to the 20 disaggregated TAZs.

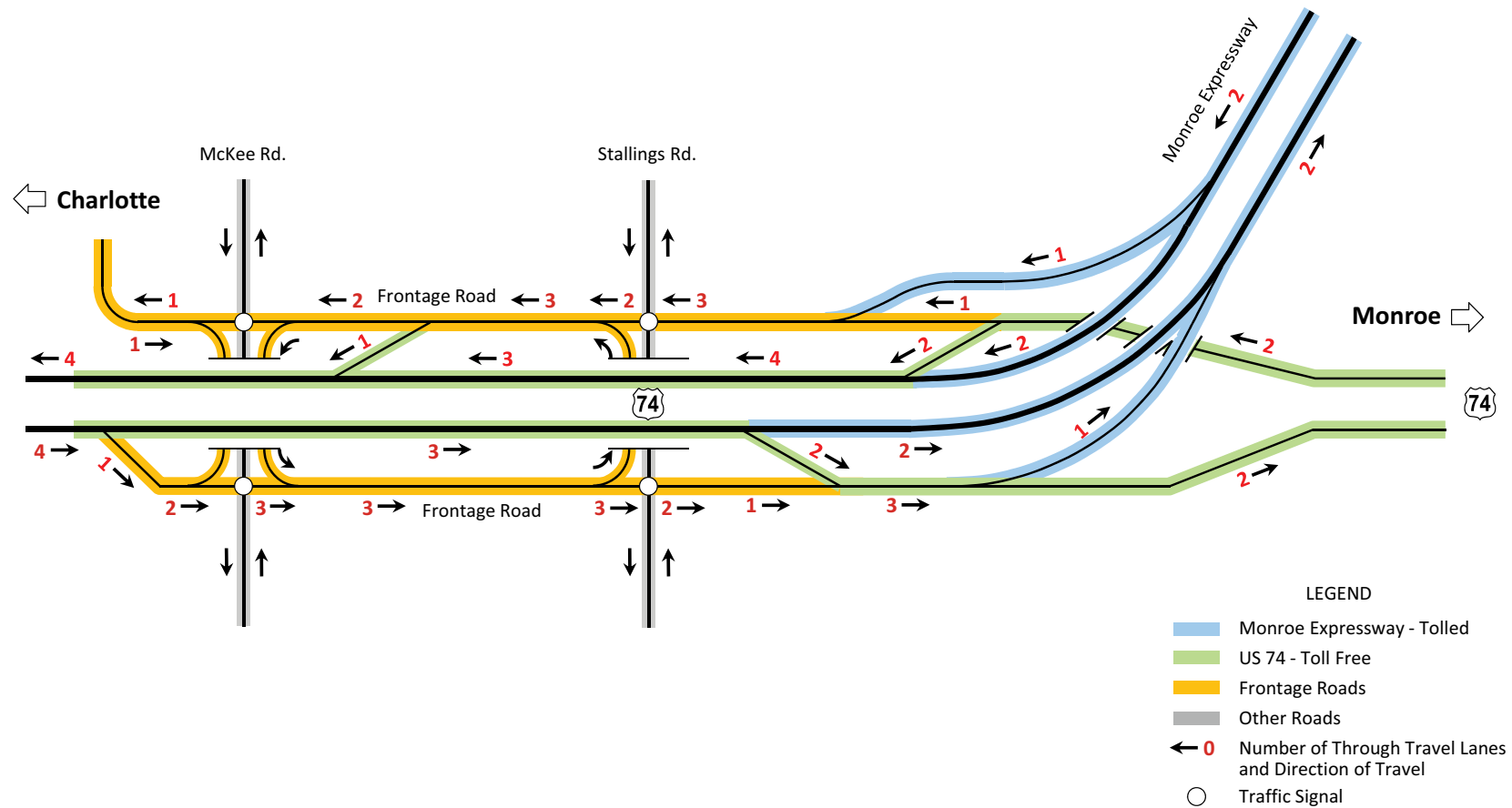
# NCDOT Monroe Expressway Traffic and Toll Revenue Study

NC-2015-Monroe Bypass / Graphics / Comprehensive Report / Powerpoint / CR-Landscape.pptx / 4-26-16





Not To Scale

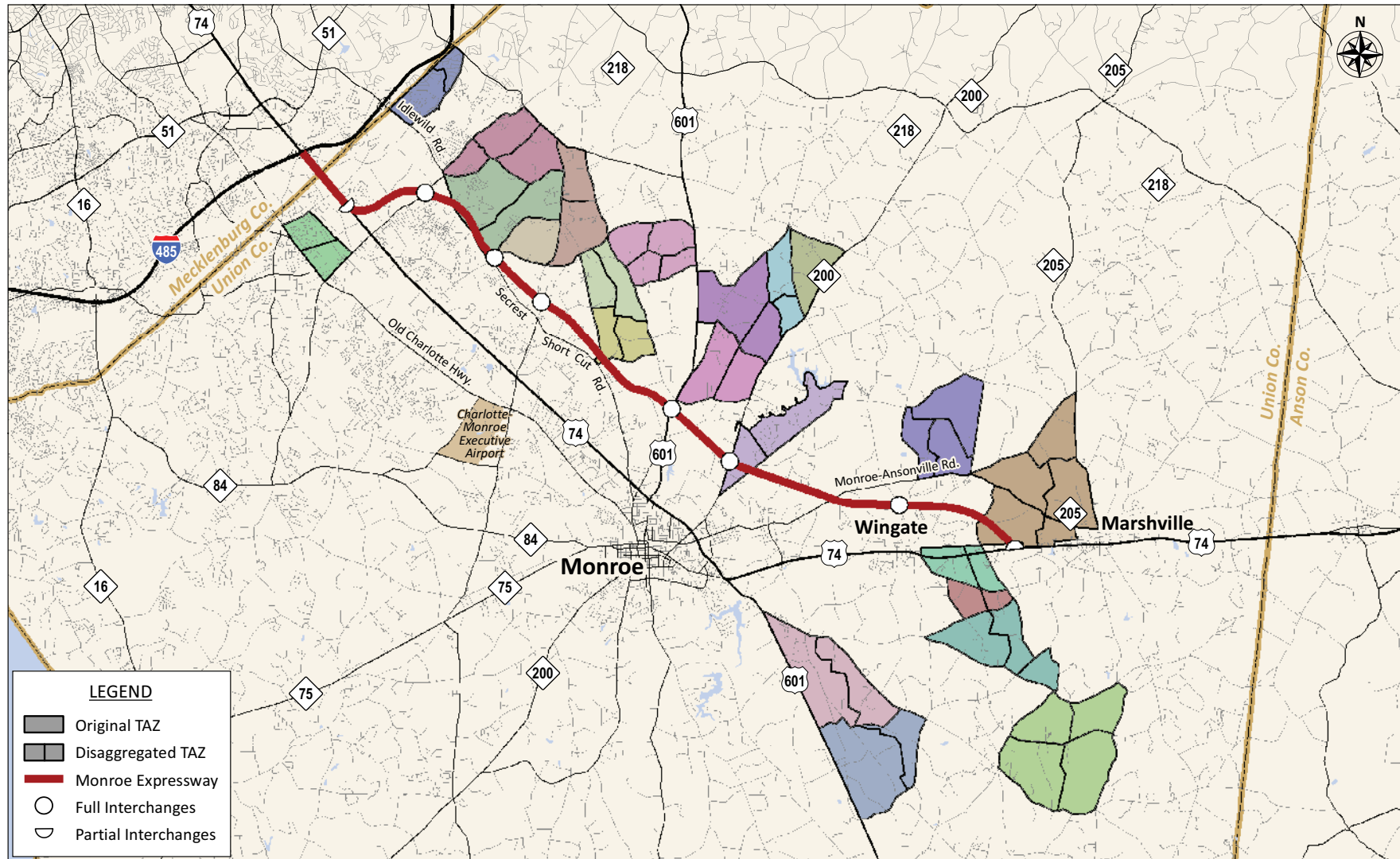


### MONROE EXPRESSWAY AND US 74 JUNCTION CONFIGURATION



FIGURE 3.3







Several existing roads, or sections of roads, were added to networks in order to more accurately reflect likely travel patterns of motorists that would potentially access the Monroe Expressway. These roads included Mills Harris Road, Nash Road, McIntyre Road, Ellis Griffin Road, Camden Road, Price Dairy Road, and Oak Spring Road.

### 3.4 Review of 2015 Network to Actual Ground Conditions

A review of the 2015 network was made, comparing actual ground conditions from aerials available on internet mapping sites to the roads coded in the network. The review focused on validating distances, intersection access points and number of travel lanes. This review focused primarily in the vicinity of the study area. No substantive changes were required, with the exception of those changes described in Section 3.3.

## Chapter 4

# Independent Economic Review

Economic growth forecasts are one of the most critical elements of any traffic and revenue forecast, particularly for a new toll facility such as the proposed Monroe Expressway. Because of the inherent uncertainty in the economic forecasting process, this has also become an area of considerable review and scrutiny by rating agencies and others in the financial community. As such, CDM Smith engaged Dr. Stephen J. Appold, an economist with local expertise, to conduct an independent analysis of the economic growth forecasts assumed in the Metrolina Regional Travel Demand Model (MRM15v1.1), a key tool for evaluating future travel demand in the region.

The goal of this effort was to evaluate the reasonableness of regional and corridor growth rates contained in the MRM15v1.1 and to make adjustments where appropriate. In this process Dr. Appold identified and analyzed major employers, employment centers, housing developments, and commercial and retail developments in order to derive an understanding of the economic drivers of the region. He also conducted an analysis of state-wide, regional and corridor growth rates based on the latest available historic trends and forecasts.

Dr. Appold's review specifically addressed forecasts for population, numbers of households, and employment, all of which are directly related to the traffic forecasts that the MRM15v1.1 produces. Each of these parameters was addressed for forecast years officially supported by the MRM15v1.1 (2015, 2025, 2030 and 2040) and for years used for forecast interpolation purposes (2020 and 2035).

The following presents a summary of the existing socioeconomic projections contained in the MRM15v1.1 in comparison with forecasts developed by Dr. Appold. Forecasts are presented on a region-wide basis, with a focus on Mecklenburg and Union Counties, and subsequently with a focus on the study corridor itself. The adjusted data set was reviewed by CDM Smith and was used as input in the travel demand modeling conducted in support of this study. A detailed description of Dr. Appold's methodology and conclusions can be found in his February 2016 *Evaluation of the Socio-economic Estimates Underlying the Study of the Feasibility of the Proposed Monroe Expressway*.

## 4.1 Model Area Adjustments

### 4.1.1 Model Area Boundaries

The MRM15v1.1 includes 10 North Carolina counties: Cabarrus, Catawba, Cleveland, Gaston, Iredell, Lincoln, Mecklenburg, Rowan, Stanly, and Union; and two South Carolina counties: Lancaster and York. Of the 12 counties, Catawba, Iredell, and Lancaster are only partially covered in the MRM. The area encompassed by the MRM15v1.1 boundary can be seen in Figure 3.1. The detailed study area is shaded in green. Year 2010 is the official base year, supported by 2010 US Census data. Future year socio-economic and land-use assumptions in the MRM15v1.1 are forecasts, including year 2015.

### 4.1.2 Model Area Population

**Table 4.1** presents MRM15v1.1 population projections by county for each model year. The upper portion of Table 4.1 shows the original data set. The lower portion shows the data set adjusted by Dr. Appold. Population growth rates for each 5-year interval are calculated using Average Annual Percent Change (AAPC).

**Table 4.1**  
**Model Area Population Forecasts by County - MRM15v1.1 and Adjusted Data**

County	MRM15v1.1 Data													
	2010	AAPC 2010-15	2015	AAPC 2015-20	2020	AAPC 2020-25	2025	AAPC 2025-30	2030	AAPC 2030-35	2035	AAPC 2035-40	2040	AAPC 2010-40
<b>Cabarrus</b>	178,012	2.1%	197,837	3.3%	232,934	2.8%	267,877	3.5%	318,094	1.2%	337,916	1.1%	357,601	2.4%
<b>Catawba</b>	9,978	2.9%	11,517	2.0%	12,704	2.0%	14,036	2.0%	15,523	2.0%	17,147	2.0%	18,886	2.1%
<b>Cleveland</b>	98,072	0.2%	98,968	0.3%	100,367	0.9%	105,058	1.0%	110,361	1.4%	118,270	1.3%	126,103	0.8%
<b>Gaston</b>	206,086	0.8%	214,374	0.8%	222,605	0.7%	230,793	0.7%	238,816	0.7%	247,798	0.7%	256,689	0.7%
<b>Iredell</b>	145,359	1.4%	155,570	1.3%	165,746	1.6%	179,804	1.5%	193,845	1.5%	208,843	1.4%	223,790	1.4%
<b>Lincoln</b>	78,265	1.8%	85,587	1.6%	92,858	1.5%	100,170	1.4%	107,433	1.4%	115,056	1.3%	122,641	1.5%
<b>Mecklenburg</b>	919,628	2.0%	1,016,280	1.8%	1,112,324	1.6%	1,206,967	1.5%	1,301,009	1.4%	1,396,793	1.3%	1,491,996	1.6%
<b>Rowan</b>	138,428	0.5%	142,241	0.9%	148,962	0.9%	155,571	1.2%	165,088	0.5%	168,900	0.4%	172,602	0.7%
<b>Stanly</b>	60,585	0.5%	62,036	0.4%	63,392	1.0%	66,737	1.0%	70,000	1.2%	74,349	1.1%	78,602	0.9%
<b>Union</b>	201,288	2.6%	228,719	2.0%	252,424	1.7%	274,861	1.6%	297,021	1.4%	319,173	1.3%	341,132	1.8%
<b>Lancaster</b>	19,729	0.3%	20,032	0.9%	20,974	1.6%	22,718	2.8%	26,095	2.7%	29,845	2.6%	33,895	1.8%
<b>York</b>	226,073	1.9%	248,692	2.3%	278,117	2.1%	307,957	1.0%	322,899	1.1%	340,394	1.4%	365,266	1.6%
<b>Model Area Total</b>	2,281,503	1.7%	2,481,853	1.7%	2,703,407	1.6%	2,932,549	1.5%	3,166,184	1.3%	3,374,484	1.2%	3,589,203	1.5%

County	Adjusted Data													
	2010	AAPC 2010-15	2015	AAPC 2015-20	2020	AAPC 2020-25	2025	AAPC 2025-30	2030	AAPC 2030-35	2035	AAPC 2035-40	2040	AAPC 2010-40
<b>Cabarrus</b>	178,012	1.6%	192,856	3.0%	223,625	2.6%	254,149	3.2%	297,582	1.1%	314,610	1.1%	331,483	2.1%
<b>Catawba</b>	9,978	0.2%	10,097	1.2%	10,714	1.2%	11,387	1.2%	12,106	1.2%	12,866	1.2%	13,645	1.0%
<b>Cleveland</b>	98,072	-0.1%	97,698	0.3%	99,059	0.9%	103,499	0.9%	108,498	1.3%	115,843	1.2%	123,167	0.8%
<b>Gaston</b>	206,086	0.5%	211,488	0.7%	218,619	0.7%	226,332	0.7%	233,885	0.7%	242,557	0.7%	251,139	0.7%
<b>Iredell</b>	145,359	1.1%	153,613	1.1%	161,900	1.6%	175,059	1.5%	188,213	1.2%	199,681	1.2%	212,169	1.3%
<b>Lincoln</b>	78,265	0.6%	80,545	1.5%	86,932	1.4%	92,989	1.3%	98,952	1.2%	105,120	1.1%	111,228	1.2%
<b>Mecklenburg</b>	919,628	2.1%	1,018,549	1.8%	1,115,877	1.5%	1,204,019	1.4%	1,291,649	1.4%	1,382,555	1.3%	1,473,062	1.6%
<b>Rowan</b>	138,428	0.0%	138,771	0.9%	145,250	0.8%	151,049	1.1%	159,380	0.4%	162,684	0.4%	165,913	0.6%
<b>Stanly</b>	60,585	0.2%	61,053	0.3%	62,054	1.0%	65,345	0.9%	68,408	1.2%	72,463	1.1%	76,421	0.8%
<b>Union</b>	201,288	1.8%	220,194	1.7%	239,703	1.7%	260,900	1.6%	281,836	1.4%	302,775	1.3%	323,524	1.6%
<b>Lancaster</b>	19,729	0.3%	20,032	0.9%	20,974	1.0%	22,005	1.7%	23,966	1.7%	26,027	1.6%	28,133	1.2%
<b>York</b>	226,073	2.0%	249,185	2.3%	279,025	2.0%	308,773	0.9%	323,633	1.1%	341,576	0.5%	349,753	1.5%
<b>Model Area Total</b>	2,281,503	1.5%	2,454,081	1.7%	2,663,732	1.5%	2,875,506	1.4%	3,088,108	1.2%	3,278,757	1.1%	3,459,637	1.4%

Note: MRM15v1.1 socioeconomic data for 2010 were derived from the 2010 U.S. Census.  
 AAPC is an abbreviation for Average Annual Percent Change.

The official base year for the MRM15v1.1 is 2010 and serves as a fixed point from which growth is measured in this analysis. The base year contains actual data from the US Census. Since the Project is located within Mecklenburg County and Union County, labels for these counties are shown in italics for emphasis.

As seen in Table 4.1, the unadjusted 2010 total population in the 12-county region amounted to nearly 2.28 million residents. The 2010 population in Mecklenburg and Union Counties was 920,000 and 201,000, respectively. These levels are forecast to increase to 3.59 million in the 12-county region, 1.49 million in Mecklenburg County, and 341,000 in Union County. An additional 1.31 million residents in the region over the 30-year period translates to an average annual growth rate of approximately 1.5 percent. Mecklenburg County is expected to add 572,000 residents over the same 30-year period, resulting in an average annual growth rate of approximately 1.6 percent. The corresponding population increase expected for Union County is 140,000, or an average annual increase of 1.8 percent.

When compared with region-wide MRM15v1.1 projections, the adjusted population forecast shows approximately 28,000 fewer residents in 2015 and 130,000 fewer by 2040. Within Mecklenburg County, the adjusted projections forecast approximately 2,000 additional residents in 2015 and 19,000 fewer in 2040. Within Union County, the adjusted projections forecast approximately 9,000 fewer residents in 2015 and 18,000 fewer in 2040.

#### 4.1.3 Model Area Households

**Table 4.2** presents MRM15v1.1 household projections by county for each model year. The upper portion of Table 4.2 shows the original data set. The lower portion shows the adjusted data set.

The unadjusted data set for 2010 shows 875,000 households region-wide, 362,000 in Mecklenburg County, and 68,000 in Union County. By 2040, households are projected to total about 1.40 million region-wide, 595,000 in Mecklenburg County, and 115,000 in Union County. This represents an increase of 520,000 households region-wide resulting in an average annual increase of 1.6 percent. Mecklenburg County is expected to gain about 232,000 households over the same 30-year period, resulting in an average annual growth rate of approximately 1.7 percent. Households within Union County are forecast to increase by 47,000, representing an average annual increase of approximately 1.8 percent.

When compared with region-wide MRM15v1.1 projections, the adjusted forecast shows approximately 10,000 fewer households in 2015 and 51,000 fewer by 2040. Within Mecklenburg County, the adjusted projections forecast approximately 1,000 additional households in 2015 and 8,000 fewer in 2040. Within Union County, the adjusted projections forecast approximately 3,000 fewer households in 2015 and 7,000 fewer in 2040.

#### 4.1.4 Model Area Employment

**Table 4.3** presents MRM15v1.1 employment projections by county for each model year. Growth rates for each 5-year interval are calculated using AAPC. No adjustments were made to the employment projections contained within the model.

**Table 4.2**  
**Model Area Household Forecasts by County - MRM15v1.1 and Adjusted Data**

County	MRM15v1.1 Data													
	2010	AAPC 2010-15	2015	AAPC 2015-20	2020	AAPC 2020-25	2025	AAPC 2025-30	2030	AAPC 2030-35	2035	AAPC 2035-40	2040	AAPC 2010-40
<b>Cabarrus</b>	65,667	2.2%	73,074	3.3%	86,131	2.8%	99,045	3.5%	117,615	1.2%	125,020	1.1%	132,273	2.4%
<b>Catawba</b>	4,032	2.8%	4,626	2.0%	5,113	2.0%	5,654	2.0%	6,257	2.0%	6,913	2.0%	7,616	2.1%
<b>Cleveland</b>	38,553	0.1%	38,790	0.2%	39,189	0.9%	41,061	1.0%	43,156	1.4%	46,300	1.3%	49,364	0.8%
<b>Gaston</b>	80,197	0.8%	83,592	0.8%	86,866	0.7%	90,087	0.7%	93,243	0.8%	96,809	0.7%	100,280	0.7%
<b>Iredell</b>	55,724	1.3%	59,449	1.2%	63,023	1.7%	68,472	1.5%	73,832	1.6%	79,741	1.4%	85,548	1.4%
<b>Lincoln</b>	30,343	1.7%	33,075	1.6%	35,751	1.6%	38,626	1.4%	41,452	1.4%	44,483	1.3%	47,456	1.5%
<b>Mecklenburg</b>	362,213	2.1%	401,572	1.9%	440,389	1.7%	479,065	1.5%	517,196	1.5%	556,239	1.3%	594,699	1.7%
<b>Rowan</b>	53,139	0.6%	54,680	1.0%	57,373	0.9%	59,952	1.2%	63,693	0.5%	65,233	0.4%	66,665	0.8%
<b>Stanly</b>	23,589	0.5%	24,234	0.5%	24,796	1.1%	26,165	1.0%	27,456	1.2%	29,185	1.1%	30,829	0.9%
<b>Union</b>	67,862	2.6%	76,979	2.0%	85,147	1.7%	92,814	1.6%	100,335	1.5%	107,863	1.3%	115,220	1.8%
<b>Lancaster</b>	8,008	0.3%	8,143	1.0%	8,544	1.6%	9,269	2.8%	10,654	2.7%	12,187	2.6%	13,858	1.8%
<b>York</b>	85,864	2.0%	94,578	1.8%	103,622	1.6%	112,173	1.5%	120,735	1.4%	129,416	3.2%	151,831	1.9%
<b>Model Area Total</b>	875,191	1.7%	952,792	1.7%	1,035,944	1.6%	1,122,383	1.6%	1,215,624	1.3%	1,299,389	1.4%	1,395,639	1.6%

County	Adjusted Data													
	2010	AAPC 2010-15	2015	AAPC 2015-20	2020	AAPC 2020-25	2025	AAPC 2025-30	2030	AAPC 2030-35	2035	AAPC 2035-40	2040	AAPC 2010-40
<b>Cabarrus</b>	65,667	1.6%	70,942	3.0%	82,330	2.6%	93,542	3.2%	109,508	1.1%	115,839	1.0%	122,015	2.1%
<b>Catawba</b>	4,032	0.1%	4,056	1.2%	4,312	1.2%	4,587	1.2%	4,880	1.2%	5,187	1.2%	5,503	1.0%
<b>Cleveland</b>	38,553	-0.1%	38,352	0.2%	38,659	0.9%	40,430	1.0%	42,401	1.3%	45,318	1.2%	48,177	0.7%
<b>Gaston</b>	80,197	0.6%	82,602	0.7%	85,408	0.7%	88,443	0.7%	91,413	0.7%	94,858	0.7%	98,210	0.7%
<b>Iredell</b>	55,724	1.1%	58,782	0.9%	61,554	1.6%	66,650	1.5%	71,665	1.2%	76,218	1.2%	81,075	1.3%
<b>Lincoln</b>	30,343	0.5%	31,156	1.4%	33,465	1.4%	35,850	1.3%	38,171	1.3%	40,634	1.2%	43,029	1.2%
<b>Mecklenburg</b>	362,213	2.2%	403,025	1.9%	442,390	1.6%	478,316	1.4%	513,734	1.4%	550,708	1.3%	587,193	1.6%
<b>Rowan</b>	53,139	0.1%	53,302	1.0%	55,898	0.8%	58,153	1.1%	61,424	0.4%	62,761	0.4%	64,006	0.6%
<b>Stanly</b>	23,589	0.2%	23,846	0.4%	24,274	1.1%	25,622	0.9%	26,834	1.2%	28,449	1.1%	29,977	0.8%
<b>Union</b>	67,862	1.7%	73,655	1.7%	80,163	1.7%	87,343	1.6%	94,384	1.5%	101,431	1.3%	108,319	1.6%
<b>Lancaster</b>	8,008	0.3%	8,143	1.0%	8,544	1.0%	8,979	1.7%	9,785	1.7%	10,629	1.6%	11,503	1.2%
<b>York</b>	85,864	2.1%	95,062	1.8%	104,075	1.6%	112,623	1.5%	121,195	1.4%	129,886	2.3%	145,864	1.8%
<b>Model Area Total</b>	875,191	1.5%	942,923	1.6%	1,021,072	1.5%	1,100,538	1.5%	1,185,394	1.3%	1,261,918	1.3%	1,344,871	1.4%

Note: MRM15v1.1 socioeconomic data for 2010 were derived from the 2010 U.S. Census.

AAPC is an abbreviation for Average Annual Percent Change.

**Table 4.3  
 Model Area Employment Forecast by County - MRM15v1.1**

County	MRM15v1.1 Data													
	2010	AAPC 2010-15	2015	AAPC 2015-20	2020	AAPC 2020-25	2025	AAPC 2025-30	2030	AAPC 2030-35	2035	AAPC 2035-40	2040	AAPC 2010-40
<b>Cabarrus</b>	69,595	2.9%	80,341	2.6%	91,409	2.2%	101,930	2.0%	112,729	1.9%	123,594	1.6%	133,988	2.2%
<b>Catawba</b>	1,756	2.5%	1,986	1.9%	2,179	1.0%	2,289	1.0%	2,405	1.2%	2,551	1.1%	2,698	1.4%
<b>Cleveland</b>	34,079	1.0%	35,858	0.8%	37,364	0.8%	38,826	0.6%	39,991	0.9%	41,805	0.7%	43,283	0.8%
<b>Gaston</b>	79,116	1.6%	85,548	1.4%	91,581	1.0%	96,414	0.9%	100,856	0.8%	105,215	0.7%	109,202	1.1%
<b>Iredell</b>	68,658	3.0%	79,590	2.5%	89,976	1.1%	94,969	0.9%	99,406	1.3%	105,845	1.1%	111,762	1.6%
<b>Lincoln</b>	25,101	1.1%	26,526	0.9%	27,700	1.0%	29,159	0.8%	30,396	1.2%	32,208	1.0%	33,806	1.0%
<b>Mecklenburg</b>	689,849	2.2%	768,304	1.9%	843,257	1.3%	899,099	1.1%	951,356	1.4%	1,017,632	1.2%	1,080,218	1.5%
<b>Rowan</b>	53,475	0.7%	55,432	0.7%	57,488	0.6%	59,168	0.6%	60,856	0.6%	62,812	0.5%	64,474	0.6%
<b>Stanly</b>	25,106	1.1%	26,559	0.8%	27,652	1.5%	29,842	1.2%	31,633	1.7%	34,476	1.3%	36,774	1.3%
<b>Union</b>	73,735	3.1%	85,974	1.4%	92,231	1.2%	97,759	1.1%	103,282	1.4%	110,518	1.1%	116,645	1.5%
<b>Lancaster</b>	4,210	16.7%	9,105	0.4%	9,281	0.3%	9,407	0.6%	9,672	0.6%	9,948	1.1%	10,494	3.1%
<b>York</b>	85,157	5.5%	111,318	1.4%	119,197	1.1%	125,836	1.1%	132,592	1.2%	140,482	1.1%	148,699	1.9%
<b>Model Area Total</b>	1,209,837	2.5%	1,366,541	1.7%	1,489,315	1.2%	1,584,698	1.1%	1,675,174	1.3%	1,787,086	1.1%	1,892,043	1.5%

Note: MRM15v1.1 socioeconomic data for 2010 were derived from the 2010 U.S. Census.  
 AAPC is an abbreviation for Average Annual Percent Change.

The unadjusted data set shows total employment in the model region at 1.21 million in 2010. The majority of these jobs, nearly 690,000, were in Mecklenburg County. Total employment in Union County in 2010 was approximately 74,000. Mecklenburg County, at 1.08 million jobs, is projected to remain the largest employment engine in the region in 2040. Union County employment is forecast to reach about 117,000 by 2040.

#### 4.1.5 Model Area Summary of Adjustments

**Table 4.4** presents a summary of adjustments for population, households and employment on a region-wide basis. Differences between the original MRM15v1.1 data set and the adjusted data set are presented on an absolute and percent basis for all model years. Growth rates for the 30-year period from 2010 to 2040 are also provided for comparison.

Region-wide, adjustments to 2015 population and household projections totaled negative 1.1 percent and negative 1.0 percent, respectively. The downward adjustments made to population and household forecasts increase over time. By 2040, adjustments to population and household forecasts totaled negative 3.6 percent.

**Table 4.4**  
**Model Area Summary of Adjustments**

Economic Input	2010	Forecast Year						AAPC 2010-40
		2015	2020	2025	2030	2035	2040	
<b>Population</b>								
MRM15v1.1 Data	2,281,503	2,481,853	2,703,407	2,932,549	3,166,184	3,374,484	3,589,203	1.5%
Adjusted Data	2,281,503	2,454,081	2,663,732	2,875,506	3,088,108	3,278,757	3,459,637	1.4%
Difference		-27,772	-39,675	-57,043	-78,076	-95,727	-129,566	
Percent Difference		-1.1%	-1.5%	-1.9%	-2.5%	-2.8%	-3.6%	
<b>Households</b>								
MRM15v1.1 Data	875,191	952,792	1,035,944	1,122,383	1,215,624	1,299,389	1,395,639	1.6%
Adjusted Data	875,191	942,923	1,021,072	1,100,538	1,185,394	1,261,918	1,344,871	1.4%
Difference		-9,869	-14,872	-21,845	-30,230	-37,471	-50,768	
Percent Difference		-1.0%	-1.4%	-1.9%	-2.5%	-2.9%	-3.6%	
<b>Employment</b>								
MRM15v1.1 Data	1,209,837	1,366,541	1,489,315	1,584,698	1,675,174	1,787,086	1,892,043	1.5%
Adjusted Data	1,209,837	1,366,541	1,489,315	1,584,698	1,675,174	1,787,086	1,892,043	1.5%
Difference		0	0	0	0	0	0	
Percent Difference		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	

Note: MRM15v1.1 socioeconomic data for 2010 were derived from the 2010 U.S. Census.  
AAPC is an abbreviation for Average Annual Percent Change.

## 4.2 Study Area Adjustments

### 4.2.1 Study Area Boundaries

The MRM15v1.1 is divided into 3,439 geographic units called Traffic Analysis Zones (TAZs). Of those, 211 TAZs are in the vicinity of US 74 and the proposed Monroe Expressway. These 211 TAZs constitute the study area. The majority of the study area TAZs are in Union County. The western-most TAZs in the study area are in Mecklenburg County. The 211 study area TAZs have been grouped into

19 superzones for reporting purposes. These 19 superzones are numbered and depicted in relation to the proposed Monroe Expressway in **Figure 4.1**. The following sections describe the MRM15v1.1 forecast population, number of households, and employment in the study area compared to the adjusted forecasts.

#### 4.2.2 Study Area Population

**Table 4.5** presents the study area population projections by superzone for each model year. The upper portion of Table 4.5 shows the original data set. The lower portion shows the adjusted data set.

In the unadjusted data set, Superzone 2 (located near I-485 and to the north of the proposed Monroe Expressway) is expected to have the most rapid growth in population between 2010 and 2040 (averaging 3.0 percent per year). Population in the adjacent Superzone 3 is forecast to grow at an average 2.5 percent per year over the same time period. In absolute terms, population in Superzone 13 and Superzone 14 is expected to see the greatest increase between 2010 and 2040. Both of these zones are located near I-485 and south of US 74.

Within the adjusted data set, the most notable changes to population projections were made to superzones on the eastern end of the study area. Population projections for 2015 in Superzone 7 and Superzone 19 were reduced by 22.1 percent and 19.9 percent, respectively. Population projections for 2015 in Superzone 6 and Superzone 18 were reduced by 12.2 percent and 10.8 percent, respectively. Similar downward adjustments to these eastern-most superzones were made for all forecast years.

**Figure 4.2** visually portrays the total forecasted change in population in the study area in the adjusted data set between 2010 and 2040 by TAZ (the smallest geographic unit of analysis in the model). It is apparent that forecast population growth is smallest in TAZs located east of Monroe. Larger increases in population growth are forecast to occur towards the western side of the study area, both to the north and south of US 74.

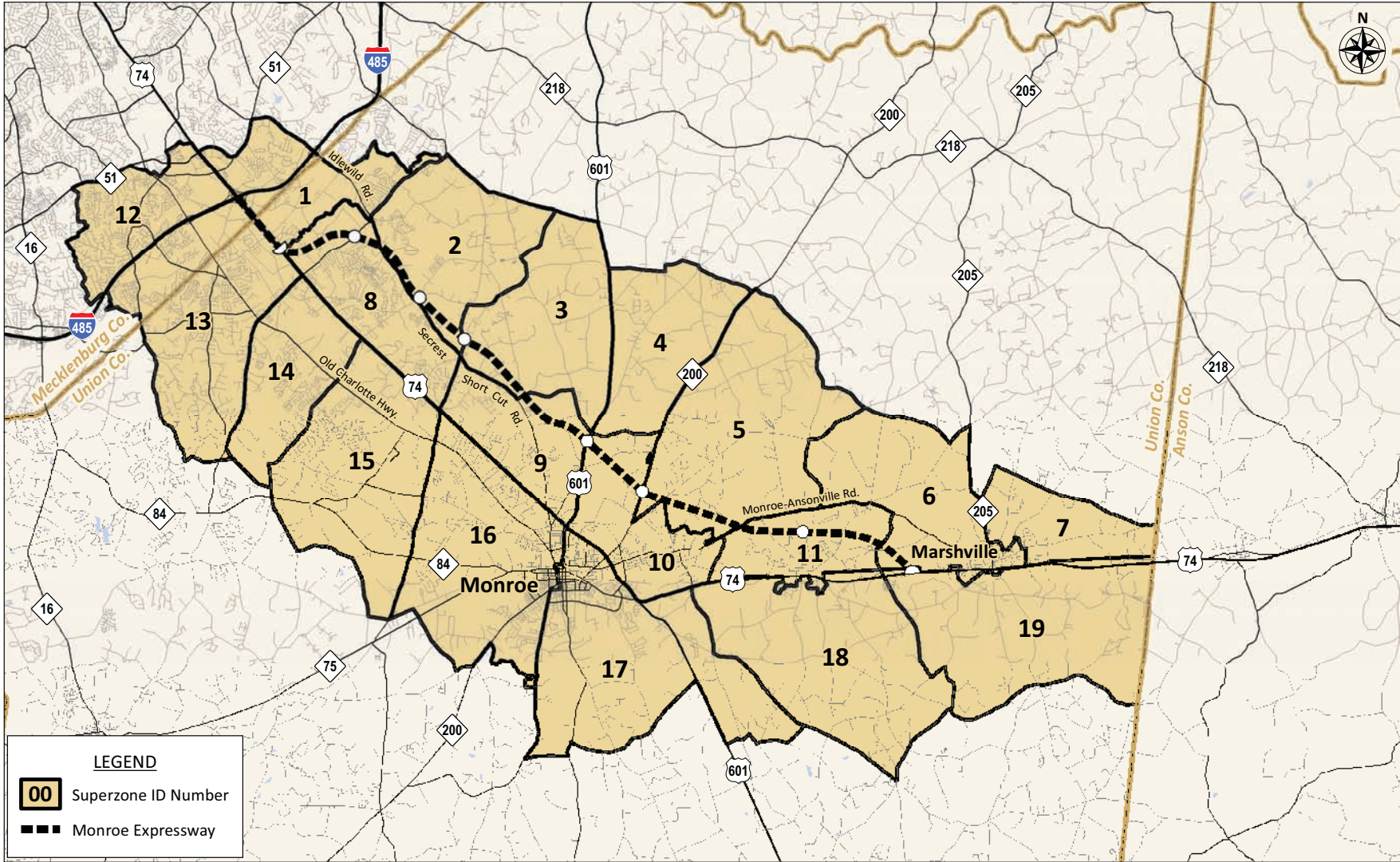
#### 4.2.3 Study Area Households

**Table 4.6** presents study area household projections by superzone for each model year. The upper portion of Table 4.6 shows the original data set. The lower portion shows the adjusted data set.

Unadjusted study area projections for number of households mirror population projections. Superzone 2 is anticipated to have the highest annual rate of growth in number of households, averaging 2.9 percent per year from 2010 to 2040. Households in Superzone 3 are forecast to increase by an average 2.6 percent per year during the same time period. These superzones are located in the western portion of the study area. The largest increase in the number of households is anticipated to occur in Superzones 13, 14 and 2. These superzones are all located in the western half of the study area.

Within the adjusted data set, the most notable changes to household projections were made to superzones on the eastern end of the study area. Household projections in Superzones 7 and 19 were reduced by more than 20 percent in all forecast years, and reduced by more than 10 percent in Superzones 6 and 18 in all forecast years.





**Table 4.5**  
**Study Area Population Forecast by Superzone - MRM15v1.1 and Adjusted Data**

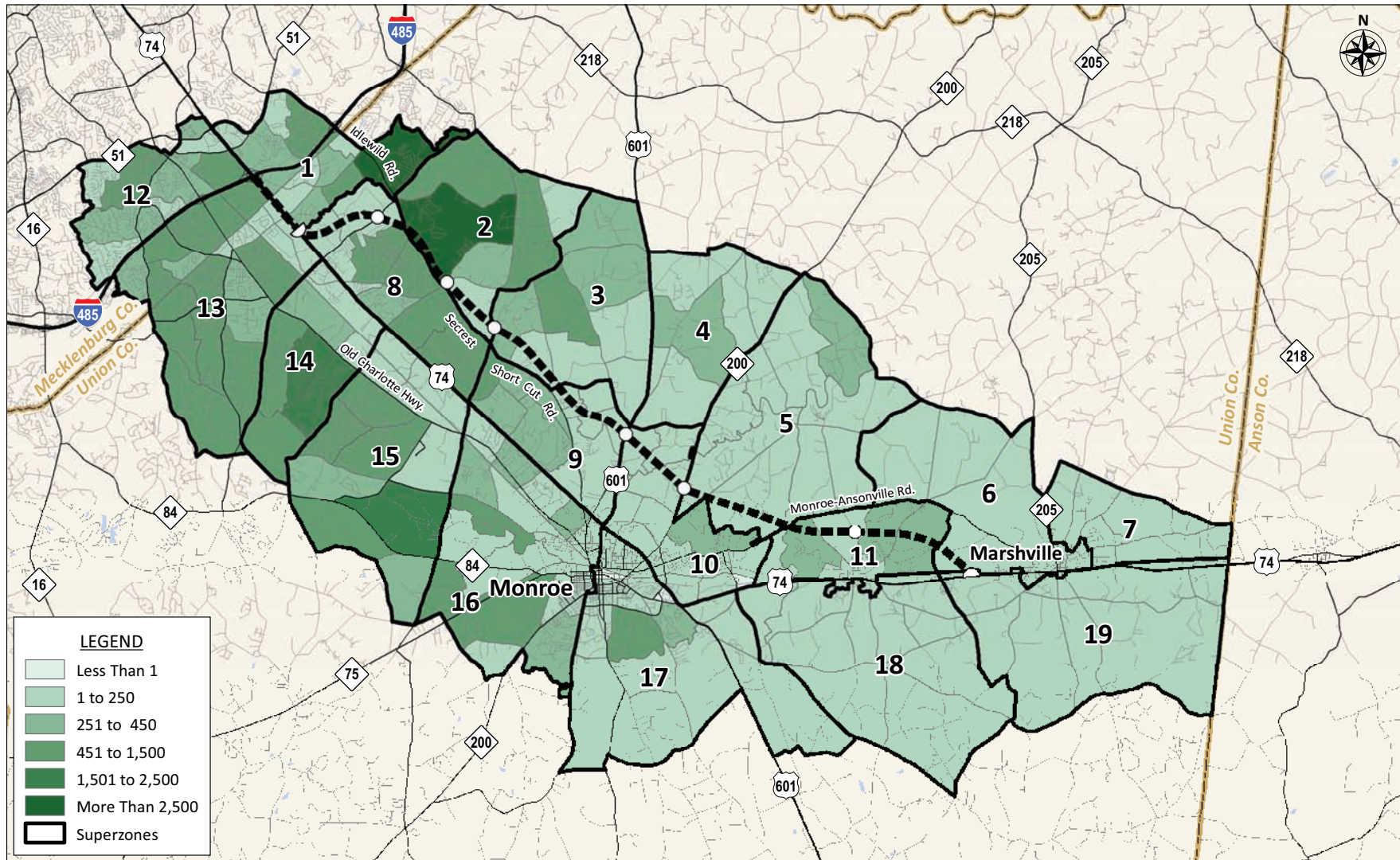
MRM15v1.1 Data														
Superzone	2010	AAPC 2010-15	2015	AAPC 2015-20	2020	AAPC 2020-25	2025	AAPC 2025-30	2030	AAPC 2030-35	2035	AAPC 2035-40	2040	AAPC 2040-40
1	9,919	2.0%	10,969	1.6%	11,888	1.6%	12,871	1.5%	13,853	1.3%	14,799	1.2%	15,741	1.6%
2	5,387	4.2%	6,617	7.8%	9,649	1.6%	10,458	1.5%	11,277	1.5%	12,119	1.3%	12,958	3.0%
3	2,151	3.0%	2,493	5.1%	3,196	2.1%	3,549	1.9%	3,892	1.7%	4,224	1.5%	4,554	2.5%
4	2,209	1.4%	2,366	1.1%	2,495	1.5%	2,688	1.4%	2,875	1.2%	3,057	1.2%	3,238	1.3%
5	2,762	1.8%	3,016	1.4%	3,228	1.9%	3,547	1.7%	3,856	1.5%	4,157	1.4%	4,455	1.6%
6	2,304	3.3%	2,712	1.3%	2,899	1.3%	3,090	1.1%	3,270	1.0%	3,443	1.0%	3,612	1.5%
7	621	5.6%	814	2.0%	897	1.6%	972	1.4%	1,041	1.2%	1,106	1.1%	1,168	2.1%
8	12,871	1.7%	13,988	0.8%	14,550	1.3%	15,551	1.3%	16,550	1.2%	17,560	1.1%	18,564	1.2%
9	5,033	1.7%	5,470	1.3%	5,830	1.8%	6,367	1.6%	6,884	1.4%	7,387	1.3%	7,883	1.5%
10	4,417	1.1%	4,657	0.8%	4,850	1.2%	5,139	1.1%	5,417	1.0%	5,690	0.9%	5,957	1.0%
11	4,860	0.0%	4,851	0.9%	5,065	1.4%	5,422	1.3%	5,788	1.2%	6,156	1.2%	6,520	1.0%
12	15,388	0.8%	16,031	0.8%	16,669	1.1%	17,563	1.0%	18,451	0.8%	19,212	0.8%	19,970	0.9%
13	21,515	1.9%	23,602	1.0%	24,750	1.9%	27,245	1.8%	29,731	1.3%	31,746	1.2%	33,750	1.5%
14	10,683	3.0%	12,367	2.5%	13,992	1.7%	15,191	1.5%	16,378	1.4%	17,567	1.3%	18,753	1.9%
15	11,222	2.3%	12,562	-0.1%	12,511	1.9%	13,778	1.8%	15,044	1.7%	16,330	1.5%	17,610	1.5%
16	15,506	1.2%	16,464	1.0%	17,298	1.3%	18,408	1.1%	19,473	1.0%	20,503	1.0%	21,524	1.1%
17	9,415	1.5%	10,136	1.9%	11,142	1.1%	11,793	1.1%	12,429	1.0%	13,051	0.9%	13,658	1.2%
18	2,578	2.1%	2,854	1.6%	3,088	1.9%	3,392	1.7%	3,692	1.6%	3,988	1.4%	4,281	1.7%
19	1,413	4.9%	1,798	1.7%	1,959	1.4%	2,105	1.3%	2,240	1.1%	2,366	1.0%	2,489	1.9%
Study Area Total	140,254	1.9%	153,767	1.5%	165,956	1.5%	179,129	1.4%	192,141	1.3%	204,461	1.2%	216,685	1.5%

Adjusted Data														
Superzone	2010	AAPC 2010-15	2015	AAPC 2015-20	2020	AAPC 2020-25	2025	AAPC 2025-30	2030	AAPC 2030-35	2035	AAPC 2035-40	2040	AAPC 2040-40
1	9,919	2.5%	11,243	1.6%	12,187	1.6%	13,198	1.5%	14,207	1.3%	15,188	1.2%	16,158	1.6%
2	5,387	5.6%	7,061	8.4%	10,560	1.5%	11,393	1.4%	12,238	1.4%	13,103	1.3%	13,966	3.2%
3	2,151	2.8%	2,468	4.1%	3,011	2.1%	3,343	1.9%	3,664	1.7%	3,977	1.5%	4,289	2.3%
4	2,209	0.6%	2,276	1.1%	2,401	1.5%	2,585	1.3%	2,761	1.2%	2,934	1.1%	3,105	1.1%
5	2,762	0.6%	2,840	1.4%	3,038	1.9%	3,333	1.7%	3,619	1.5%	3,897	1.4%	4,172	1.4%
6	2,304	0.7%	2,381	1.3%	2,539	1.2%	2,701	1.1%	2,854	1.0%	3,003	0.9%	3,148	1.0%
7	621	0.4%	634	1.9%	697	1.6%	753	1.3%	804	1.2%	853	1.1%	900	1.2%
8	12,871	0.8%	13,394	0.8%	13,940	1.3%	14,890	1.2%	15,838	1.2%	16,799	1.1%	17,756	1.1%
9	5,033	0.4%	5,141	1.3%	5,475	1.7%	5,969	1.5%	6,444	1.4%	6,907	1.3%	7,366	1.3%
10	4,417	0.2%	4,460	0.8%	4,644	1.2%	4,924	1.1%	5,192	1.0%	5,457	0.9%	5,713	0.9%
11	4,860	-1.1%	4,593	0.9%	4,792	1.4%	5,126	1.3%	5,472	1.2%	5,818	1.1%	6,160	0.8%
12	15,388	0.3%	15,582	0.8%	16,181	1.0%	16,976	0.9%	17,765	0.8%	18,465	0.7%	19,159	0.7%
13	21,515	1.4%	23,098	0.9%	24,103	1.7%	26,161	1.5%	28,220	1.2%	29,989	1.1%	31,742	1.3%
14	10,683	1.9%	11,723	2.3%	13,151	1.7%	14,296	1.5%	15,432	1.4%	16,569	1.3%	17,703	1.7%
15	11,222	1.3%	11,987	-0.1%	11,955	1.9%	13,126	1.7%	14,291	1.6%	15,471	1.5%	16,650	1.3%
16	15,506	0.5%	15,868	1.0%	16,664	1.2%	17,717	1.1%	18,725	1.0%	19,698	1.0%	20,660	1.0%
17	9,415	0.2%	9,519	1.7%	10,346	1.1%	10,940	1.0%	11,519	1.0%	12,085	0.9%	12,634	1.0%
18	2,578	-0.2%	2,546	1.6%	2,752	1.8%	3,012	1.7%	3,272	1.5%	3,529	1.4%	3,781	1.3%
19	1,413	0.4%	1,441	1.6%	1,563	1.4%	1,679	1.3%	1,787	1.1%	1,888	1.1%	1,990	1.1%
Study Area Total	140,254	1.1%	148,255	1.5%	159,999	1.5%	172,122	1.4%	184,104	1.2%	195,630	1.1%	207,052	1.3%

Note: MRM15v1.1 socioeconomic data for 2010 were derived from the 2010 U.S. Census, and AAPR is an abbreviation for Average Annual Percetn Change.





**TOTAL CHANGE IN POPULATION BY TAZ  
WITHIN THE ADJUSTED DATASET FROM 2010-2040**

FIGURE 4.2

**Table 4.6**  
**Study Area Household Forecast by Superzone - MRM15v1.1 and Adjusted Data**

Superzone	MRM15v1.1 Data													
	2010	AAPC 2010-15	2015	AAPC 2015-20	2020	AAPC 2020-25	2025	AAPC 2025-30	2030	AAPC 2030-35	2035	AAPC 2035-40	2040	AAPC 2010-40
1	3,565	1.9%	3,921	1.5%	4,218	1.6%	4,575	1.5%	4,928	1.3%	5,268	1.2%	5,605	1.5%
2	1,846	4.1%	2,255	7.4%	3,229	1.7%	3,512	1.6%	3,796	1.5%	4,089	1.4%	4,379	2.9%
3	769	3.0%	892	5.8%	1,183	2.1%	1,310	1.8%	1,433	1.6%	1,552	1.5%	1,669	2.6%
4	789	1.3%	843	1.1%	892	1.5%	963	1.4%	1,032	1.3%	1,099	1.1%	1,163	1.3%
5	1,077	1.7%	1,171	1.4%	1,255	1.9%	1,378	1.7%	1,497	1.5%	1,615	1.4%	1,727	1.6%
6	780	3.5%	927	1.5%	997	1.3%	1,066	1.2%	1,130	1.0%	1,190	1.0%	1,249	1.6%
7	242	5.3%	314	2.0%	346	1.6%	374	1.4%	401	1.3%	427	1.1%	450	2.1%
8	4,401	1.6%	4,757	0.6%	4,898	1.4%	5,242	1.3%	5,581	1.2%	5,924	1.1%	6,263	1.2%
9	1,892	1.5%	2,042	1.3%	2,179	1.7%	2,376	1.5%	2,564	1.4%	2,749	1.3%	2,928	1.5%
10	1,192	1.1%	1,257	0.9%	1,312	1.2%	1,394	1.1%	1,473	1.1%	1,553	0.9%	1,623	1.0%
11	1,251	1.4%	1,338	1.2%	1,417	1.6%	1,531	1.4%	1,641	1.3%	1,749	1.2%	1,852	1.3%
12	5,699	0.9%	5,966	0.9%	6,230	1.2%	6,612	1.1%	6,990	0.9%	7,310	0.8%	7,625	1.0%
13	7,655	1.9%	8,411	1.0%	8,834	2.2%	9,830	1.9%	10,816	1.4%	11,588	1.3%	12,354	1.6%
14	3,446	2.9%	3,980	2.5%	4,496	1.7%	4,892	1.5%	5,283	1.4%	5,676	1.3%	6,064	1.9%
15	3,747	2.2%	4,173	-0.2%	4,129	2.0%	4,566	1.8%	5,000	1.7%	5,442	1.6%	5,878	1.5%
16	5,557	1.1%	5,878	1.0%	6,190	1.3%	6,594	1.1%	6,981	1.1%	7,357	1.0%	7,720	1.1%
17	3,202	1.4%	3,429	1.6%	3,720	1.2%	3,947	1.1%	4,163	1.0%	4,379	0.9%	4,583	1.2%
18	903	2.7%	1,031	1.8%	1,126	2.0%	1,246	1.8%	1,362	1.6%	1,476	1.4%	1,585	1.9%
19	523	4.8%	662	1.8%	725	1.4%	779	1.3%	830	1.2%	879	0.9%	921	1.9%
Study Area Total	48,536	1.9%	53,247	1.5%	57,376	1.6%	62,187	1.5%	66,901	1.3%	71,322	1.2%	75,638	1.5%

Superzone	Adjusted Data													
	2010	AAPC 2010-15	2015	AAPC 2015-20	2020	AAPC 2020-25	2025	AAPC 2025-30	2030	AAPC 2030-35	2035	AAPC 2035-40	2040	AAPC 2010-40
1	3,565	2.3%	3,995	1.5%	4,298	1.6%	4,663	1.5%	5,023	1.4%	5,372	1.3%	5,717	1.6%
2	1,846	5.3%	2,385	8.0%	3,508	1.6%	3,797	1.5%	4,087	1.4%	4,385	1.3%	4,680	3.1%
3	769	3.0%	890	4.6%	1,112	2.1%	1,231	1.8%	1,346	1.6%	1,458	1.5%	1,568	2.4%
4	789	0.5%	809	1.1%	856	1.5%	923	1.4%	988	1.2%	1,051	1.1%	1,111	1.1%
5	1,077	0.5%	1,102	1.4%	1,180	1.9%	1,294	1.6%	1,404	1.5%	1,513	1.3%	1,616	1.4%
6	780	0.7%	807	1.4%	866	1.3%	924	1.2%	979	1.0%	1,030	1.0%	1,080	1.1%
7	242	0.2%	245	1.9%	269	1.5%	290	1.3%	310	1.3%	330	1.0%	347	1.2%
8	4,401	0.7%	4,553	0.6%	4,691	1.4%	5,017	1.3%	5,339	1.2%	5,665	1.1%	5,987	1.0%
9	1,892	0.3%	1,920	1.3%	2,046	1.7%	2,227	1.5%	2,399	1.4%	2,569	1.3%	2,734	1.2%
10	1,192	0.2%	1,202	0.9%	1,254	1.2%	1,333	1.1%	1,409	1.1%	1,486	0.9%	1,553	0.9%
11	1,251	0.0%	1,254	1.2%	1,328	1.6%	1,435	1.4%	1,538	1.3%	1,639	1.1%	1,735	1.1%
12	5,699	0.4%	5,807	0.8%	6,054	1.1%	6,391	1.0%	6,724	0.9%	7,016	0.8%	7,303	0.8%
13	7,655	1.4%	8,212	0.9%	8,572	1.8%	9,366	1.6%	10,153	1.3%	10,810	1.2%	11,461	1.4%
14	3,446	1.8%	3,761	2.3%	4,211	1.7%	4,587	1.6%	4,959	1.5%	5,333	1.3%	5,702	1.7%
15	3,747	1.1%	3,967	-0.2%	3,931	2.0%	4,332	1.8%	4,728	1.6%	5,130	1.5%	5,528	1.3%
16	5,557	0.3%	5,650	1.0%	5,947	1.3%	6,329	1.1%	6,694	1.0%	7,048	0.9%	7,389	1.0%
17	3,202	0.1%	3,220	1.5%	3,466	1.2%	3,674	1.1%	3,871	1.0%	4,069	0.9%	4,255	1.0%
18	903	0.2%	914	1.8%	997	2.0%	1,100	1.8%	1,200	1.6%	1,298	1.4%	1,391	1.5%
19	523	0.2%	529	1.8%	578	1.4%	620	1.3%	661	1.2%	700	1.0%	734	1.1%
Study Area Total	48,536	1.1%	51,222	1.5%	55,164	1.5%	59,533	1.4%	63,812	1.3%	67,902	1.1%	71,891	1.3%

Note: MRM15v1.1 socioeconomic data for 2010 were derived from the 2010 U.S. Census, and AAPC is an abbreviation for Average Annual Percent Change.

**Figure 4.3** visually portrays the total forecasted change in households in the study area, within the adjusted data set, between 2010 and 2040 by TAZ. Growth in the number of households is lowest in virtually all the TAZs east of US 601. Pockets of more aggressive growth in households is forecast to occur in the western TAZs, both to the north and south of US 74.

#### 4.2.4 Study Area Employment

**Table 4.7** presents study area employment projections by superzone for each model year. No adjustments were made to study area employment projections contained within the model.

The most rapid growth in employment is expected in Superzone 2, Superzone 3 and Superzone 5, each of which is expected to increase at an average annual rate in excess of 3.0 percent between 2010 and 2040. In absolute terms, Superzone 13 is expected to add the greatest number of jobs (approximately 9,000) over the same 30-year period. This accounts for more than 20 percent of the total increase in employment in the study area between 2010 and 2040.

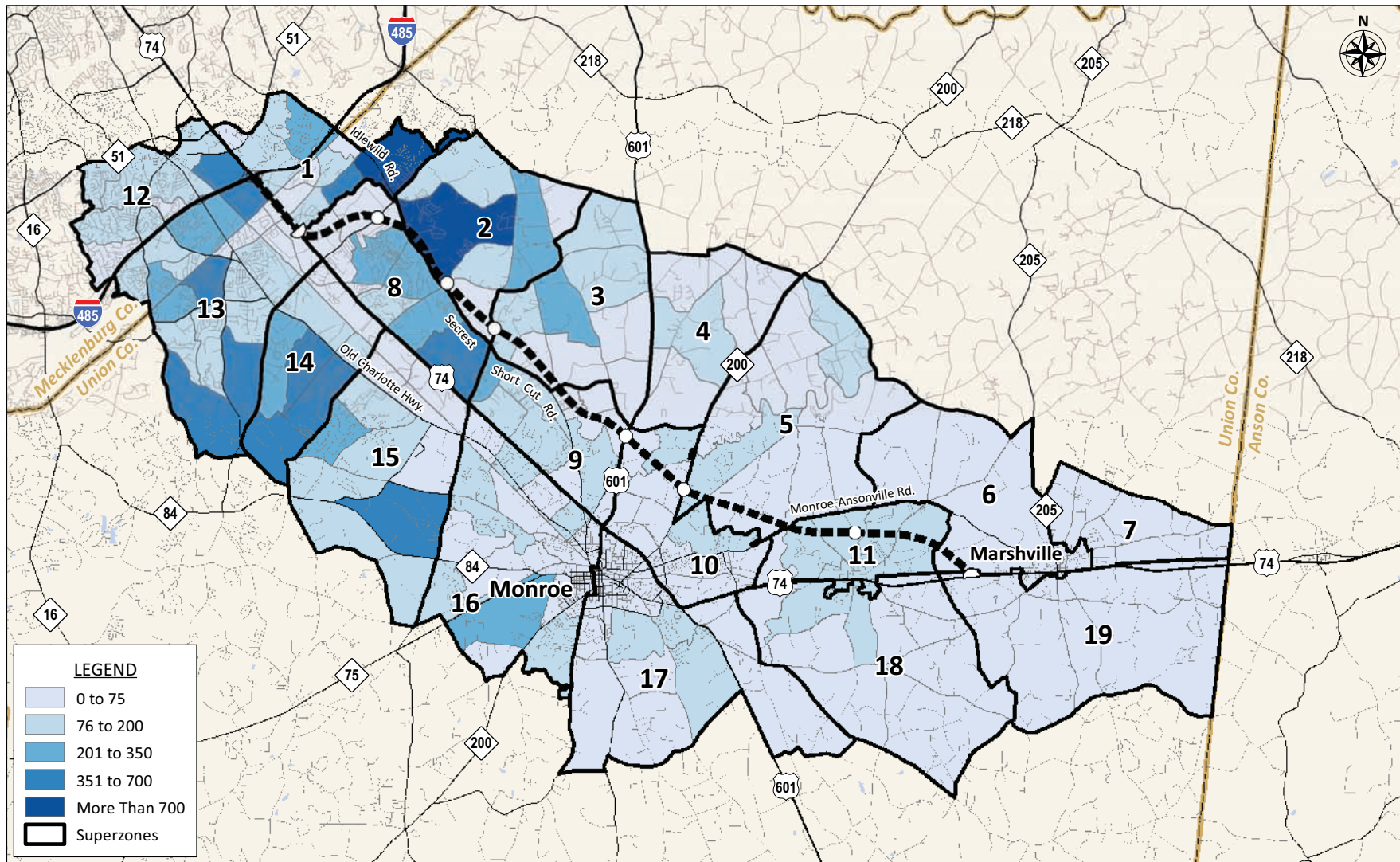
**Figure 4.4** portrays the total forecasted change in employment in the study area, within the adjusted data set, between 2010 and 2040 by TAZ. Larger employment increases are generally forecast to occur along the US 74 corridor compared to the surrounding TAZs.

#### 4.2.5 Study Area Summary

**Table 4.8** presents a bottom-line summary of adjustments made to population, household and employment forecasts within the study area. Differences between the original MRM15v1.1 data set and the adjusted data set are presented on an absolute and percent basis for all model years. Growth rates for the 30-year period from 2010 to 2040 are also provided for comparison.

Adjustments to 2015 population and household projections within study-area TAZs totaled negative 3.6 percent and negative 3.8 percent, respectively. By 2040, adjustments to population and household forecasts totaled negative 4.4 percent and negative 5.0 percent, respectively. The resultant impact on 30-year AAPC was a decrease from 1.5 percent to 1.3 percent for both population and households.





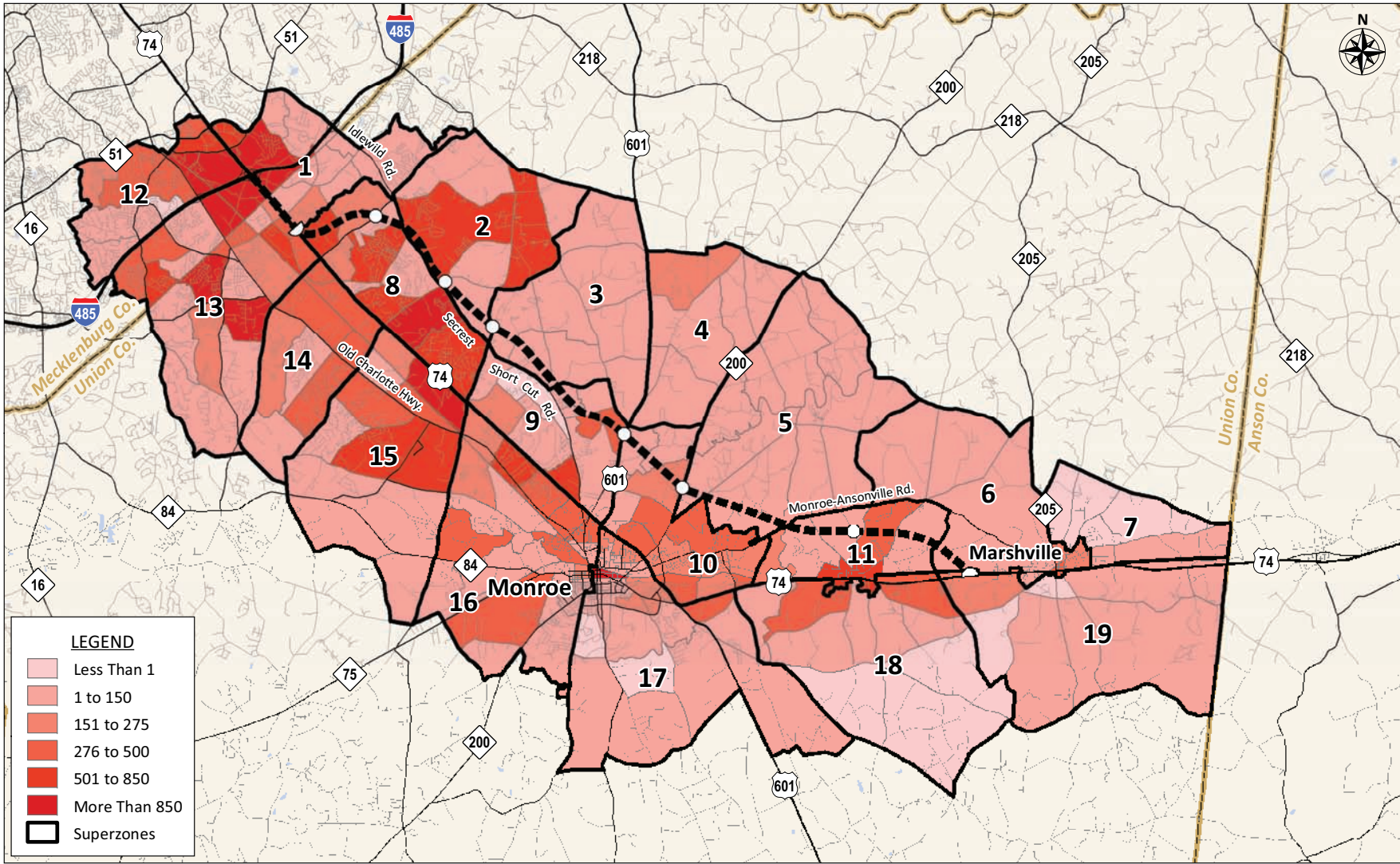
**TOTAL CHANGE IN HOUSEHOLDS BY TAZ  
WITHIN THE ADJUSTED DATASET FROM 2010-2040**

FIGURE 4.3

**Table 4.7**  
**Study Area Employment Forecasts by Superzone - MRM15v1.1**

Superzone	MRM15v1.1 Data													
	2010	AAPC 2010-15	2015	AAPC 2015-20	2020	AAPC 2020-25	2025	AAPC 2025-30	2030	AAPC 2030-35	2035	AAPC 2035-40	2040	AAPC 2010-40
1	2,835	3.5%	3,359	3.0%	3,887	1.6%	4,200	1.5%	4,519	1.8%	4,933	1.5%	5,316	2.1%
2	880	10.5%	1,448	2.6%	1,649	1.8%	1,807	1.7%	1,970	2.0%	2,179	1.7%	2,369	3.4%
3	250	7.6%	361	2.4%	407	2.1%	451	2.0%	499	2.7%	570	1.6%	617	3.1%
4	306	5.2%	395	2.0%	437	1.7%	476	1.5%	513	2.2%	572	1.3%	610	2.3%
5	170	11.0%	287	2.3%	322	3.2%	377	2.0%	417	3.5%	495	1.6%	536	3.9%
6	1,862	2.9%	2,145	0.9%	2,248	1.2%	2,391	1.1%	2,520	1.3%	2,689	1.1%	2,835	1.4%
7	129	2.1%	143	0.8%	149	2.6%	169	1.8%	185	2.3%	207	1.8%	226	1.9%
8	7,458	3.4%	8,798	1.3%	9,375	1.2%	9,943	1.0%	10,450	1.2%	11,066	1.0%	11,637	1.5%
9	3,278	1.9%	3,596	0.8%	3,749	1.4%	4,014	1.0%	4,215	1.2%	4,473	1.0%	4,710	1.2%
10	7,399	3.0%	8,579	0.9%	8,977	1.1%	9,505	0.8%	9,871	0.9%	10,318	0.8%	10,728	1.2%
11	2,110	3.9%	2,551	1.1%	2,701	1.6%	2,918	1.2%	3,090	1.3%	3,304	1.2%	3,499	1.7%
12	10,233	1.8%	11,169	1.6%	12,077	0.9%	12,660	0.9%	13,213	1.1%	13,923	0.9%	14,597	1.2%
13	9,140	6.3%	12,384	1.9%	13,637	1.5%	14,655	1.4%	15,672	1.6%	16,965	1.4%	18,177	2.3%
14	3,991	3.0%	4,634	1.2%	4,920	1.0%	5,174	1.0%	5,430	1.2%	5,754	1.0%	6,043	1.4%
15	5,792	3.2%	6,773	1.3%	7,210	1.5%	7,764	1.1%	8,213	1.3%	8,760	1.1%	9,273	1.6%
16	8,826	2.4%	9,942	1.1%	10,524	1.1%	11,130	1.0%	11,692	1.2%	12,419	1.0%	13,061	1.3%
17	8,475	1.9%	9,310	1.6%	10,064	0.7%	10,400	1.0%	10,939	1.2%	11,632	1.0%	12,238	1.2%
18	1,119	3.9%	1,355	2.7%	1,547	1.1%	1,633	1.6%	1,768	2.0%	1,950	1.5%	2,101	2.1%
19	968	1.9%	1,061	1.1%	1,120	1.0%	1,177	0.9%	1,232	1.4%	1,318	0.9%	1,380	1.2%
Study Area Total	75,221	3.3%	88,290	1.5%	95,000	1.2%	100,844	1.1%	106,408	1.3%	113,527	1.1%	119,953	1.6%

Note: MRM15v1.1 socioeconomic data for 2010 were derived from the 2010 U.S. Census.  
AAPC is an abbreviation for Average Annual Percent Change.



**TOTAL CHANGE IN EMPLOYMENT BY TAZ  
WITHIN THE UNADJUSTED DATASET FROM 2010-2040**

FIGURE 4.4





**Table 4.8**  
**Study Area Summary of Adjustments**

Economic Input	2010	Forecast Year						AAPC 2010-40
		2015	2020	2025	2030	2035	2040	
<b>Population</b>								
MRM15v1.1 Data	140,254	153,767	165,956	179,129	192,141	204,461	216,685	1.5%
Adjusted Data	140,254	148,255	159,999	172,122	184,104	195,630	207,052	1.3%
Difference		-5,512	-5,957	-7,007	-8,037	-8,831	-9,633	
Percent Difference		-3.6%	-3.6%	-3.9%	-4.2%	-4.3%	-4.4%	
<b>Households</b>								
MRM15v1.1 Data	48,536	53,247	57,376	62,187	66,901	71,322	75,638	1.5%
Adjusted Data	48,536	51,222	55,164	59,533	63,812	67,902	71,891	1.3%
Difference		-2,025	-2,212	-2,654	-3,089	-3,420	-3,747	
Percent Difference		-3.8%	-3.9%	-4.3%	-4.6%	-4.8%	-5.0%	
<b>Employment</b>								
MRM15v1.1 Data	75,221	88,290	95,000	100,844	106,408	113,527	119,953	1.6%
Adjusted Data	75,221	88,290	95,000	100,844	106,408	113,527	119,953	1.6%
Difference		0	0	0	0	0	0	
Percent Difference		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	

Note: MRM15v1.1 socioeconomic data for 2010 were derived from the 2010 U.S. Census.  
AAPC is an abbreviation for Average Annual Percent Change.

## Chapter 5

# Model Calibration

The traffic and toll revenue potential of the Monroe Expressway was analyzed using the Metrolina Regional Travel Demand Model 2015 Version 1.1 (MRM15v1.1 or MRM). In the fall of 2015, CDM Smith obtained a working version of the MRM15v1.1 and the model documentation. The official base year of the MRM15v1.1 is 2010, which incorporates 2010 US Census data. The model forecast years include 2015, 2025, 2030 and 2040. CDM Smith used the 2015 model year as the new base year, and calibrated to 2015 conditions. The calibration effort focused on the detailed study area which is shown in green shading in Figure 3.1. and highlighted in Figure 4.1.

The MRM15v1.1 was calibrated first for traffic volumes, then for observed travel speeds and finally for observed sample trip distances on US 74 within the study corridor. Each of these variables impact each other, thus necessitating an iterative process to achieve the desired results for each target metric.

Calibration involves modifying the model's internal parameters so that the model reflects current observed conditions. This chapter provides a summary of the degree to which the output of the base-year travel demand model matches observed data.

Actual data metrics used for calibration included 1) available traffic counts from NCDOT, 2) traffic counts conducted by The Traffic Group, 3) INRIX travel time and speed data, and 4) sample trip distance distributions, primarily on US 74, obtained from ALPR surveys. Details of the data collection efforts and a summary of the collected data described in Chapter 2 of this report and in the *Monroe Expressway – Data Collection* memorandum dated December 18, 2015.

In order to demonstrate that the 2015 base-year model sufficiently represents existing conditions, the following comparisons were made between model results and observed field data:

1. Model traffic-volume output compared to traffic counts at locations along seven screenlines;
2. Model traffic-volume output compared to traffic counts located on US 74;
3. Model travel-speed output compared to 2015 INRIX travel speed data; and
4. Comparisons of select trip lengths on US 74 derived from ALPR surveys compared to model output.

## 5.1 Traffic Volume Calibration Results

One assessment of model calibration is whether the total assigned screenline volume compares well with actual traffic counts. The level of difference between counts and volumes may vary between individual links, but if the total assigned volume crossing the screenline is reasonably close to actual counts, this is an indication that the general level of traffic and travel patterns is fairly well represented by the model.

As mentioned previously, the model calibration was performed at 2015 levels. Calibrated model was compared to average weekday traffic volumes as the model is a weekday model. An evaluation was conducted by comparing traffic counts with 2015 model output. Various criteria, including minimizing the root mean square error (RMSE), volume count comparisons and GEH statistic (a commonly used

method for comparing two sets of traffic volumes) were used to test model refinements as subsequent calibration tests were performed.

**Figure 5.1** shows the location of traffic count screenlines within the detailed study area. As shown in the figure, seven screenlines were developed for this study. All of these screenlines are drawn perpendicular to US 74, capturing roads parallel to the Monroe Expressway. The Monroe Expressway will pull traffic from these roads. Screenlines 2 through 6 pass through the Monroe Expressway project alignment.

Base year calibration adjustments were conducted to obtain reasonable matches between the observed and estimated traffic volumes at screenline count locations. **Table 5.1** provides a comparison of unadjusted MRM screenline volumes and corresponding traffic counts. The first column shows the combined average weekday traffic (AWDT) count across each screenline, while the second and third columns show the pre-and-post calibration MRM results, respectively. Despite an overall difference of only 1.4 percent, four of the seven screenline volume totals differed from corresponding traffic counts by more than 20.0 percent within the pre-calibration results. The calibration process drastically improves this variance and brings the greatest difference down to 1.7 percent. The combined total volume across all screenlines is approximately 0.1 percent above the average weekday counts within the post-calibration results.

**Table 5.1**  
**Comparison of Assigned Model Volumes with Actual Counts by Screenline Location**

Screenline ID	Count	Pre-Calibration		Post-Calibration	
		Model Output	Difference from Data	Model Output	Difference from Data
1	189,480	229,172	20.9%	188,993	-0.3%
2	163,372	172,726	5.7%	162,634	-0.5%
3	123,939	129,143	4.2%	123,907	0.0%
4	107,628	71,652	-33.4%	109,408	1.7%
5	89,668	102,566	14.4%	89,886	0.2%
6	55,924	41,914	-25.1%	55,748	-0.3%
7	27,624	20,922	-24.3%	27,722	0.4%
Totals	757,635	768,095	1.4%	758,300	0.1%

**Figure 5.2** presents a scatter plot comparing post-calibration model volumes versus observed traffic volumes for each of the 154 count locations contained within the 7 screenlines. The comparisons are shown for the four time-periods modeled in this study – AM Peak, Midday, PM Peak and Overnight. These figures show traffic counts plotted against corresponding model output for each time period. Each scatterplot is fitted with a trend line, and the corresponding equation and  $R^2$  value is printed on each. Trend line factors close to 1.00 represent calibrations that are close to observed conditions. The regression line shows that the calibrated 2015 CDM Smith base-year model matches observed traffic closely at most locations, i.e., the plot of model volumes compared to observed traffic volumes is close to the  $y=x$  line, and there are no extreme outliers. Overall the model appears to have a very reasonable  $R^2$ , or “goodness-of-fit”, greater than 0.99.

Table 5.2 presents 2015 base-year volume calibration results for the 15 classification count locations (conducted by The Traffic Group) on US 74 and several other roads that are alternatives to US 74. The

location of each count station is portrayed in Figure 2.1 and described in Table 2.1. Stations 1 through 7 are particularly important as US 74 is the source of the majority of traffic that will shift to the Monroe Expressway. Traffic count volumes presented in Table 5.2 represent three-day weekday averages (Tuesday, Wednesday, Thursday). Pre-calibration results showed variances ranging from 23.9 percent to negative 80.7 percent between traffic counts and model output. Post-calibration results showed variances ranging from 1.2 percent to negative 1.9 percent, while 13 of the 15 locations had a variance of just plus or minus 0.5%.

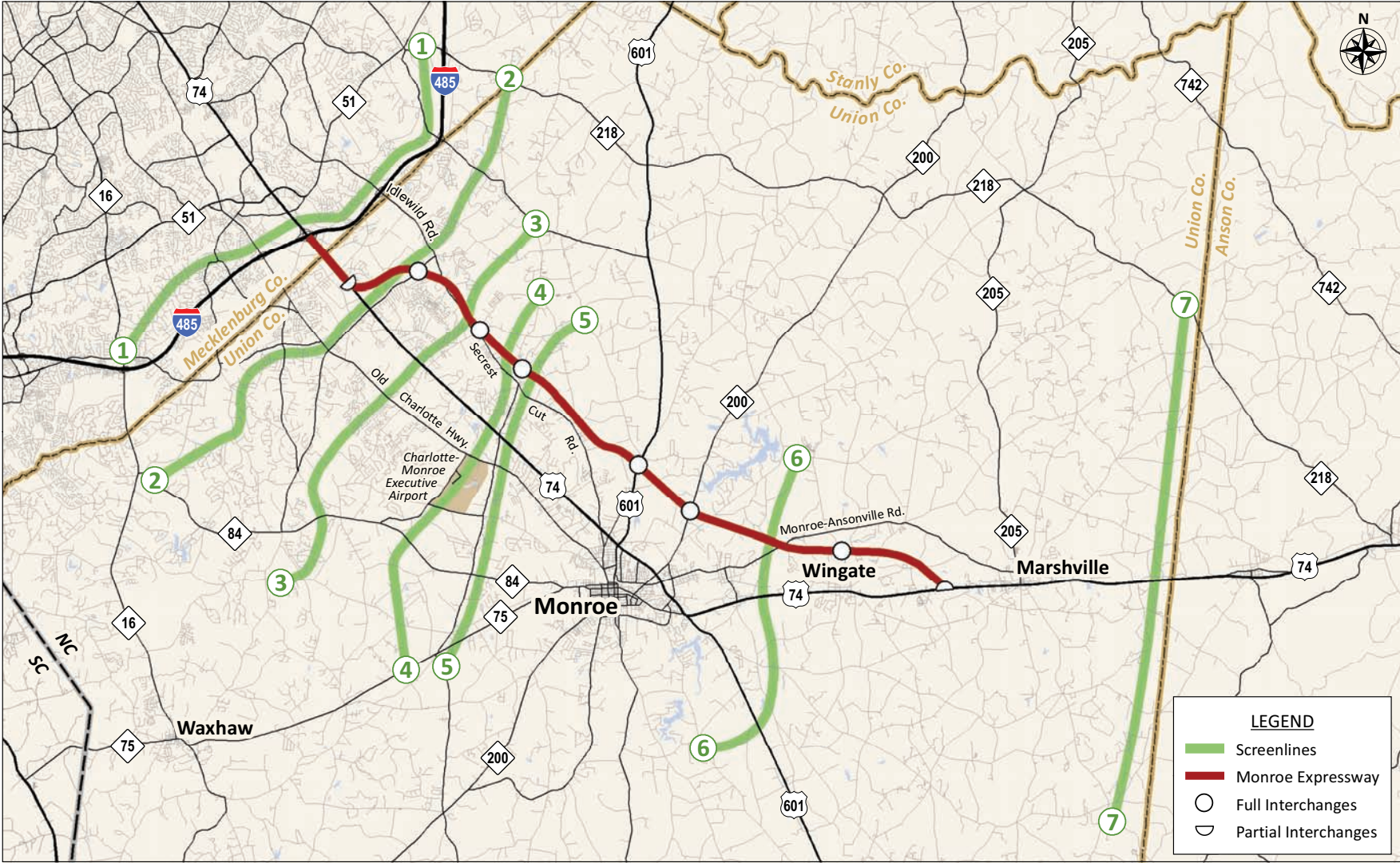
**Table 5.2**  
**Comparison of Assigned Model Volumes with Actual Counts at Classification Count Locations**

Station ID	Road	Average Weekday (1)	Pre-Calibration		Post-Calibration	
			Model Output	Difference from Data	Model Output	Difference from Data
1	US 74	60,011	74,369	23.9%	60,736	1.2%
2	US 74	48,637	59,421	22.2%	48,790	0.3%
3	US 74	41,138	44,710	8.7%	41,232	0.2%
4	US 74	45,634	40,737	-10.7%	45,752	0.3%
5	US 74	50,853	29,940	-41.1%	50,914	0.1%
6	US 74	29,810	15,716	-47.3%	29,769	-0.1%
7	US 74	20,816	9,732	-53.2%	20,799	-0.1%
8	Old Charlotte Highway	26,904	24,833	-7.7%	27,045	0.5%
9	North Charlotte Avenue	11,852	7,981	-32.7%	11,630	-1.9%
10	Idlewild Road	21,992	22,211	1.0%	21,993	0.0%
11	Secrest Short Cut Road	10,348	8,786	-15.1%	10,393	0.4%
12	Secrest Short Cut Road	9,704	11,991	23.6%	9,703	0.0%
13	NC 84	9,429	10,515	11.5%	9,385	-0.5%
14	NC 200	10,699	10,825	1.2%	10,702	0.0%
15	NC 218	7,968	1,536	-80.7%	7,945	-0.3%

(1) Average weekday traffic volumes are based on a three-day internal weekday average including Tuesday, Wednesday and Thursday.

# NCDOT Monroe Expressway Traffic and Toll Revenue Study

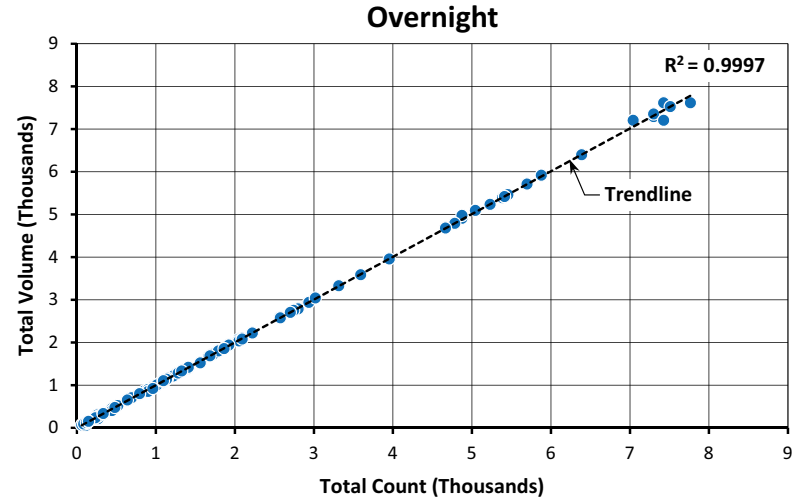
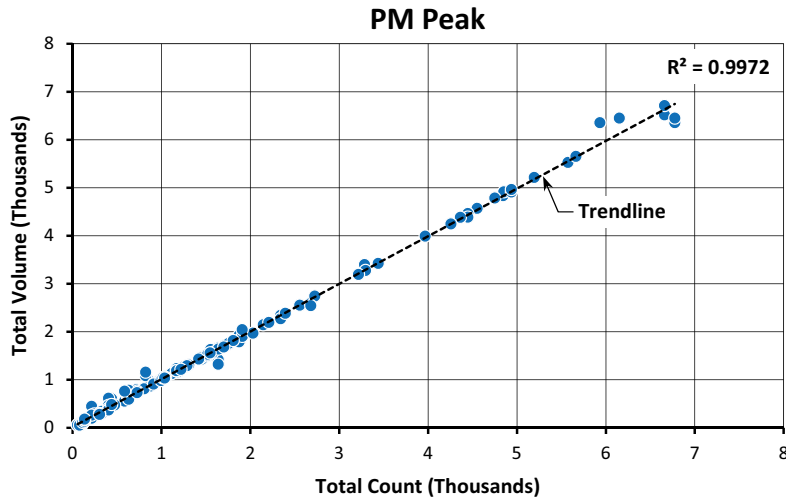
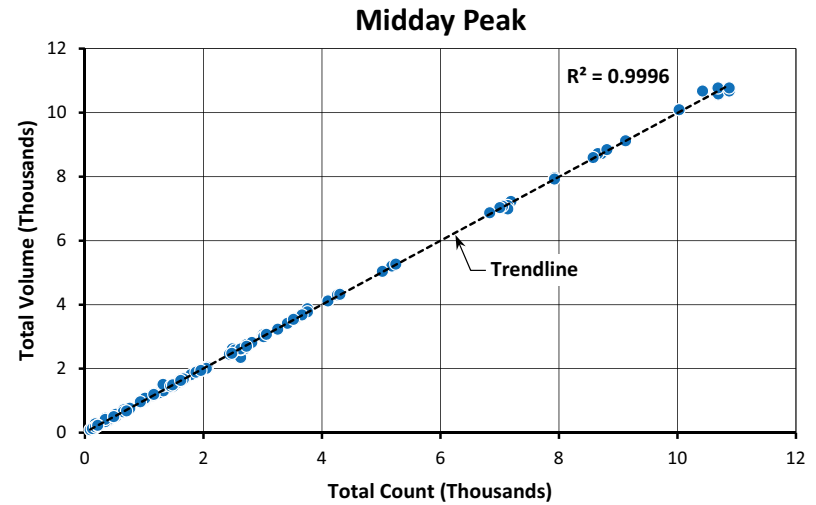
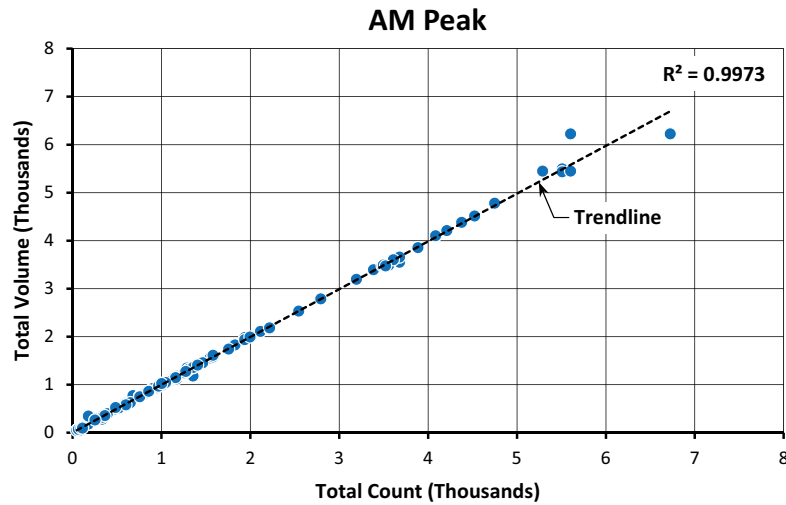
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## TRAFFIC SCREENLINES

FIGURE 5.1





## 5.2 Travel Speed Calibration Results

In a well calibrated model, both traffic volumes and travel times must be accurately represented. This section compares model output with INRIX travel speeds on US 74, the primary alternative route to the proposed Monroe Expressway.

**Table 5.3** presents a weekday travel time comparison between the INRIX data and model output for a through trip on US 74 between Forest Hills School Road in Marshville and I-485 in Mathews. Comparisons are shown for three modeled time periods – AM Peak, Midday and PM Peak. A before-and-after calibration comparison is included in Table 5.3 to present the impacts of the calibration effort. Similar to the travel time data presented in Table 5.3, travel speed comparisons are shown in **Table 5.4**. US 74 speeds in the model are a little higher than the INRIX data, except during the Midday in the westbound direction. This is a conservative assumption when evaluating the Monroe Expressway as the primary competitor to US 74. Reducing the speeds on US 74 down to the INRIX averages was found to push more volume off of US 74 than desired.

**Table 5.3**  
Comparison of US 74 Observed and Model Travel Times (in minutes)

Direction	Time Period	INRIX Data	Pre-Calibration		Post-Calibration	
			Model Output	Difference from Data	Model Output	Difference from Data
Westbound	AM	29.9	26.9	-2.9	26.9	-3.0
	MD	26.2	26.4	0.2	26.9	0.7
	PM	30.8	26.7	-4.1	27.7	-3.0
Eastbound	AM	26.9	26.8	0.0	27.0	0.2
	MD	28.5	26.6	-1.8	27.3	-1.2
	PM	31.2	27.6	-3.7	28.1	-3.2

**Table 5.4**  
Comparison of US 74 Observed and Model Travel Speeds (in mph)

Direction	Time Period	INRIX Data	Pre-Calibration		Post-Calibration	
			Model Output	Difference from Data	Model Output	Difference from Data
Westbound	AM	38.0	42.6	4.6	42.6	4.6
	MD	44.0	43.6	-0.4	42.8	-1.2
	PM	37.0	43.1	6.1	41.5	4.5
Eastbound	AM	43.0	43.4	0.4	43.1	0.1
	MD	40.0	43.7	3.7	42.7	2.7
	PM	37.0	42.0	5.0	41.2	4.2

### 5.3 Automatic License Plate Recognition Survey

An ALPR survey was conducted for the primary purpose of identifying sample trip lengths along the study corridor, particularly on US 74. The ALPR survey was conducted at 12 locations from 5:30 AM to 7:00 PM on Thursday, October 22, 2015. These locations are shown in Figure 2.1. The ALPR survey effort consisted of recording license plate images by video camera and matching the plates across the survey locations to assist in determining weekday car and truck trip lengths on US 74 between Wingate and I-485. This data was beneficial to calibrating the model because motorists currently on US 74 are much more likely to use the Monroe Expressway for longer distance trips compared to very short trips, so trip length distributions may impact the travel demand on the Monroe Expressway. The collection efforts are described in Section 2.4.

Captured license-plate images were matched across survey stations and checked for reasonableness based on logical movements and travel time to identify unique trips. The results discussed in this section focus on US 74 during the peak travel periods. ALPR survey results for passenger cars during the AM Peak period on US 74 are summarized in the top box of **Table 5.5**. All movements reflect westbound trips along US 74. The station where a plate was first identified (the origin) is shown in the left column, while the last station where the same plate was identified (the destination) is shown across the top. The percent distribution of trips from each origin station are unique, thus, the sum of each row adds up to 100 percent. Each row describes movements that are identified as a percentage of the trips that started at a station and traveled far enough to be captured at a downstream station. For example, for passenger cars in the AM time period, 4 percent of trips with an origin at Station 7 went as far as Station 3 (but did not reach Station 2), another 4 percent had a destination that went as far as Station 2 (but did not reach Station 1), and 17 percent had a destination that went as far as Station 1, or beyond. Any trip that was captured at Station 7, but did not also pass through Stations 6, 5, 4, 3, 2, or 1, would not be represented in this table.

It is important to recognize that these matrices are not complete trip tables, as US 74 is not an access controlled road. US 74 has numerous access points. The trip distance matrices represent snapshots of specific locations, chosen to fall between major intersecting roads with US 74. However, the data was useful for adjusting trip distance distributions in the MRM.

As discussed previously, the 2015 MRM was initially calibrated to screenline traffic counts and counts along US 74 in the study corridor. Another series of calibration assignments were made to further calibrate to weekday travel speeds by time period. The calibration process resulted in changes to travel patterns within the model, including trip distance distributions. The final iterative calibration process involved re-adjusting trip distances where necessary.

Table 5.5 also contains the resulting passenger-car trip-distance distributions from the calibrated 2015 MRM for the AM Peak period. The resulting calibration shows that the number of the longest distance trips on US 74, from the model output, are underestimated compared to the survey data. For example, the survey data shows that about 17 percent of passenger cars entering Station 7 travel through station 1 (the longest possible trip), while the model output has only 11 percent of passenger car through trips. The longest distance trips are also underestimated for passenger cars entering from stations 6, 5, and 4. Some intermediate distance trips are somewhat over represented in the model output. Examples of this condition includes passenger cars entering from Station 6 and traveling through Station 3. Some movements match exactly, such as movements that entered Station 5 or 4, and traveled through Station 2. Very short distance trips are less likely to divert to the Monroe Expressway.



**Table 5.6** compares trip-distance distributions between the 2015 calibrated model and the ALPR survey for passenger cars during the PM Peak period. The comparison shows similar patterns to the AM Peak period, in that the longest distance trips are under-represented in the calibrated model and the intermediate distance trips tend to be over represented.

It is not expected that the calibrated model output will replicate the trip-distance data. US 74 actual travel patterns are complicated due to an unlimited number of access points, while the model is constrained to access at intersections and at a limited numbers of centroid connectors. In addition, calibrating to traffic volumes and travel speeds alter travel patterns in numerous ways. In summary, the model was calibrated to reasonable parameters, and reflects a conservative calibration in that it does not over represent the longest distance trips that are more likely to use the Monroe Expressway.

**Table 5.5**  
**US 74 Survey Results vs. MRM Trip Distance Patterns – AM Peak**

Entering At Westbound Survey Station		ALPR SURVEY						
		1	2	3	4	5	6	7
US 74	1							
	2	100%						
	3	60%	40%					
	4	44%	24%	32%				
	5	32%	16%	20%	32%			
	6	20%	10%	11%	18%	42%		
	7	17%	4%	4%	9%	17%	50%	
Entering At Westbound Survey Station		MRM POST-CALIBRATION						
		1	2	3	4	5	6	7
US 74	1							
	2	100%						
	3	45%	55%					
	4	22%	24%	54%				
	5	16%	16%	27%	41%			
	6	16%	16%	18%	21%	29%		
	7	11%	11%	11%	13%	15%	39%	

**Table 5.6**  
**US 74 Survey Results vs. MRM Trip Distance Patterns – PM Peak**

Entering At Westbound Survey Station		ALPR SURVEY						
		1	2	3	4	5	6	7
US 74	1							
	2	100%						
	3	60%	40%					
	4	48%	26%	26%				
	5	37%	14%	10%	40%			
	6	20%	8%	6%	19%	47%		
	7	23%	5%	3%	7%	21%	42%	
Entering At Westbound Survey Station		MRM POST-CALIBRATION						
		1	2	3	4	5	6	7
US 74	1							
	2	100%						
	3	46%	54%					
	4	29%	33%	39%				
	5	13%	18%	21%	47%			
	6	12%	12%	13%	21%	42%		
	7	8%	8%	8%	11%	17%	49%	

## Chapter 6

# Traffic and Revenue Analysis

This chapter presents a summary of the traffic and revenue analysis conducted for the Monroe Expressway. In addition to an overview of the travel demand modeling process, this chapter also presents information about the regional highway improvement program, basic assumptions and modeling inputs, the toll sensitivity analysis, recommended toll rates, and the Base Condition traffic and toll revenue forecasts for the Monroe Expressway.

### 6.1 Analytical Methodology

The modeling process used to analyze the traffic and toll revenue potential of the Monroe Expressway is depicted in **Figure 6.1**. The following describes the major steps in the modeling process.

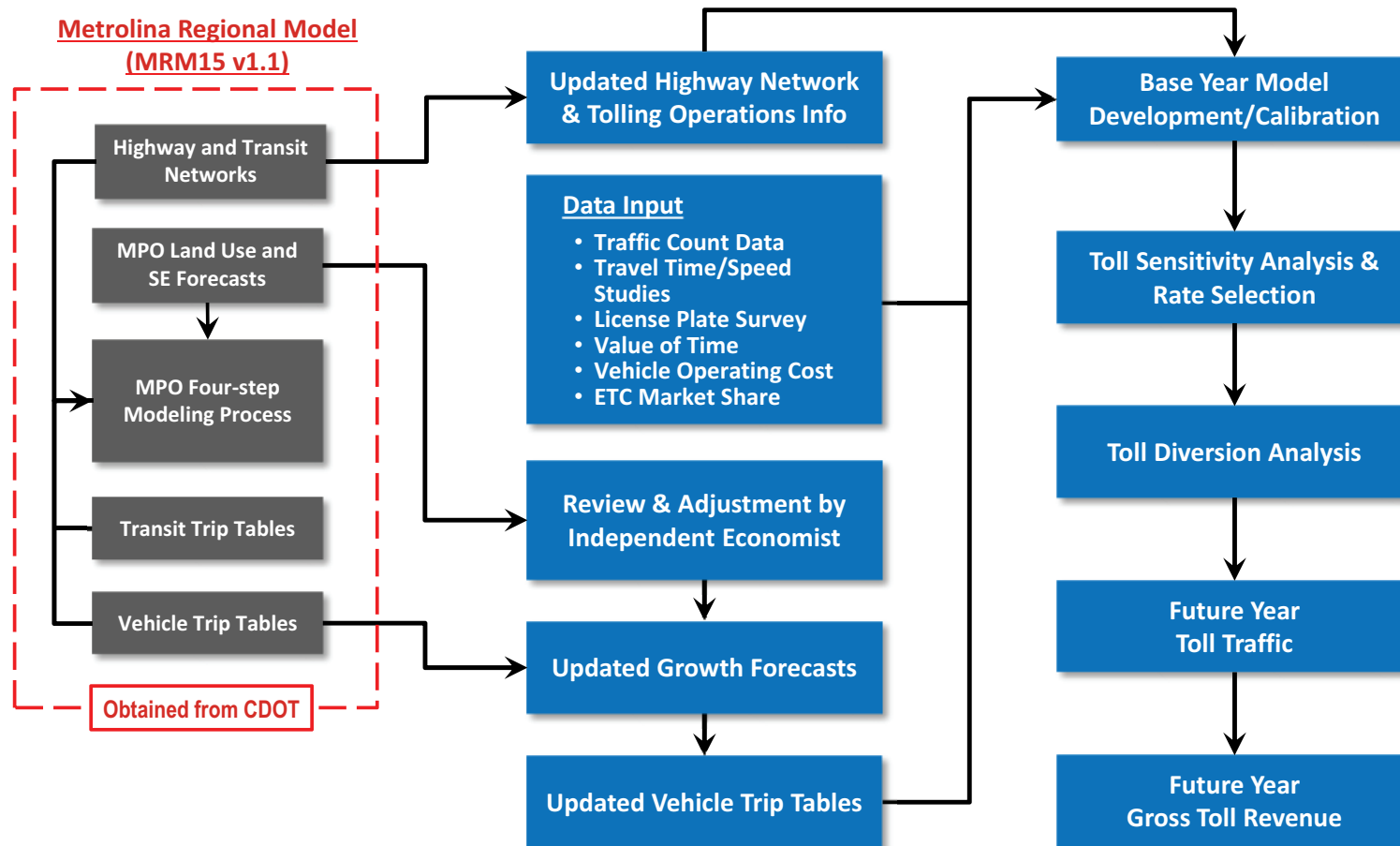
As described in Chapter 3, Section 3.1, the modeling process was initiated by obtaining the Metrolina Regional Model, specifically the MRM15v1.1. This model's base year is 2010, which reflects 2010 US Census data. The MRM supports future years 2015, 2025, 2030 and 2040. The MRM includes highway and transit networks and land-use and socio-economic data for each model year. Transit and vehicle trip tables are derived from the model.

CDM Smith reviewed and modified the highway network as described in Chapter 3. These modifications included disaggregating TAZs, changing centroid connections, and adding additional roads or road segments to the networks. A comparison was also made between the 2015 network and actual ground conditions observed in aerials available on the internet. These comparisons were made to validate the 2015 network in the study area against current conditions. No substantive changes to distances, access points, or number of lanes were required.

Data inputs necessary for calibrating the model and using the model to develop toll transaction and revenue forecasts was obtained and analyzed by CDM Smith. This data included:

1. Traffic count data;
2. Travel time and speed data;
3. License plate survey data;
4. Current values of time;
5. Current vehicle operating costs; and
6. ETC market share.

A major analytical component of the modeling process was the independent review of the underlying socioeconomic assumptions in the MRM. This was undertaken by Dr. Appold, an economist with recognized expertise in the area's land-use and socioeconomic profile. Adjustments to the socioeconomic data in the MRM were made by the economist for all forecast model years. After a review by CDM Smith, the economic adjustments were incorporated into the MRM model resulting in updated vehicle trip tables that reflected new growth forecasts.



CDOT: Charlotte Department of Transportation.

All the new data inputs and the updated vehicle trip tables were incorporated into the MRM forecast years (2015, 2025, 2030 and 2040). The next step was to calibrate the 2015 model to existing conditions in the study area. Calibration included comparing the model output against known traffic volumes and travel speeds on area roads. In addition, the trip distance distributions acquired by the ALPR survey were used in calibration to adjust model trip distances on US 74. The calibration results were described in Chapter 5. Changes in the model necessary to achieve calibration in 2015 were carried forward into the future year networks. Based on the revised model, a 2019 model year was created that contains the Monroe Expressway project coding, as the Expressway is assumed to open on January 1, 2019.

Toll sensitivity analysis was conducted for the opening year (2019) to determine the “optimal” toll rate that should be assessed. This was accomplished by running a series of toll assignments at progressively higher toll rates, and evaluating the resulting toll transactions and toll revenue on the Expressway. “Optimal” can mean different things; in this case, optimal refers to a point on the curve that nearly maximizes toll revenue, yet leaves some room to make some upward adjustments in rates should the need arise. Once the 2019 toll rates were identified, the toll rates were developed for the future years, assuming that the toll rates would be adjusted annually to keep up with inflation.

Once the toll rates were selected for 2019, for Electronic Toll Collection (ETC) and Video Toll Collection (VTC), a series of assignments were made for years 2019, 2025, 2030 and 2040 to develop the traffic and revenue estimates for the Monroe Expressway. These assignments were run for four time periods, by cars and trucks, and by two methods of payment (ETC and VTC). The assignments compared the travel time and distance for a trip path on the Monroe Expressway with a path on the best toll-free alternative route. The estimated traffic that would be expected to use the toll road is a function of 1) the travel time saved and the distance saved, 2) the assumed monetary value of these savings, and 3) the toll rate being tested in any given assignment. In general, as the total costs to use the proposed toll road increase, estimated usage of the toll road decreases. The model recognizes capacity constraints on roadways. Speeds for future-year forecasts are calculated based on volume to capacity ratios and reflect increasing congestion over time on both the proposed toll facility and existing toll free roads.

The toll diversion assignments result in forecasts of calendar-year average annual weekday tolled traffic by toll zone on the Monroe Expressway for the assignment years. Intermediate year traffic volumes were interpolated. Toll transactions for the years subsequent to the available model years were developed by assuming an annual increase in traffic based on decreasing the prior trend line.

Annual gross toll revenue estimates were developed from the average annual weekday transactions (AAWDTs) by annualizing the tolled traffic estimates to take into account weekend day traffic and holidays, and calculating the annual gross toll revenue. The traffic and toll revenue forecasts were developed for calendar years because the MRM model operates on a calendar year basis. The forecasts were then converted to the NCDOT fiscal year, which begins on July 1. The gross toll revenue does not include adjustments for uncollectible revenue or fee revenue associated with VTC. These adjustments were added as a last step based on actual experience from the Triangle Expressway, which has been in operation as a toll facility since January 3, 2012.

## 6.2 Modeling Inputs

This section describes key inputs to the model that influence the traffic and toll revenue analysis process.

### 6.2.1 Toll Collection

Toll collection for the Monroe Expressway is assumed to be consistent with the existing toll collection methods used on the Triangle Expressway. The Monroe Expressway will operate as an all-electronic tolling (AET) system. This system will allow motorists to pay their toll without stopping or slowing down. Instead of passing through a conventional toll booth, an overhead toll collection system will be mounted to a gantry, a structure elevated over the road. As the motorist passes under the gantry, either an ETC transponder is read and the toll is automatically charged to the transponder account, or a photo is taken of the license plate and the registered owner of the vehicle will receive a Bill By Mail (BBM) invoice in the mail. An AET system generally provides a safer, quicker, and more convenient experience for motorists.

On the Monroe Expressway, tolls will be collected via NC Quick Pass (NCDOT's ETC program) or by BBM (NCDOT's VTC Program). The NC Quick Pass program is currently interoperable with Georgia's Peach Pass, Florida's Sun Pass and E-ZPass. A map of states with NC Quick Pass interoperable ETC programs is shown in **Figure 6.2**. Throughout this study, ETC refers to NC Quick Pass and the other interoperable systems. This interoperability arrangement is assumed to continue through the forecast period of this study.

All vehicles will be permitted to use the Monroe Expressway. The following three toll classes will be implemented:

- Class 1 (2-axle vehicles): includes all two-axle vehicles regardless of the number of tires.
- Class 2 (3-axle vehicles): includes all three-axle vehicles including two-axle vehicles towing a single-axle trailer.
- Class 3 (4-or-more axle vehicles): includes all vehicles with four-or-more axles (4+) including two-axle vehicles towing a dual-axle trailer.

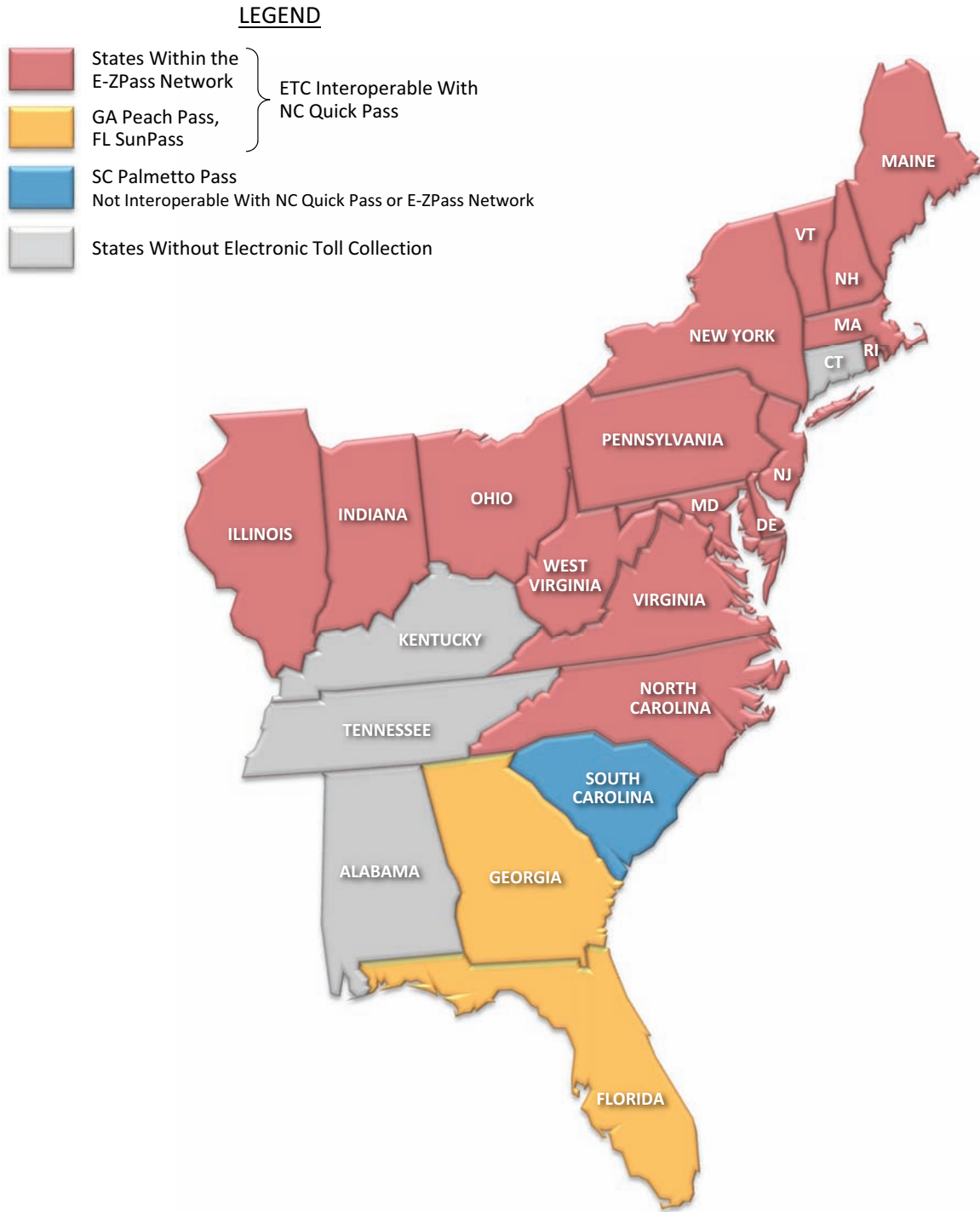
Motorists who pay with NC Quick Pass (or interoperable systems) will receive a 35 percent discount off of the BBM rates for all vehicle toll classes. All Class 2 toll rates will equal two times the Class 1 toll rate, and Class 3 toll rates will equal four times the Class 1 toll rate.

### 6.2.2 ETC Market Share

The assumed future market shares of ETC and BBM transactions is an important input into the traffic demand model. ETC transactions are at less "risk" of non-payment compared to BBM transactions, which are more prone to "leakage" or non-payment for a variety of reasons. CDM Smith developed ETC and BBM market shares for modeling years 2019, 2025, 2030 and 2040 based on actual experience from the Triangle Expressway and other AET facilities in the US.

**Table 6.1** presents total annual weekday toll transactions by ETC and BBM on the Triangle Expressway from its opening year in 2012 through the second quarter of 2015. The ETC market share totaled 49.2 percent in 2012, 57.5 percent in 2013 and 58.1 percent in 2014. Through the second quarter of 2015, the ETC market share totaled 58.3 percent. It appears that the rate of increase in annual ETC market share after 2013 has been quite modest.

The Monroe Expressway is likely to be the second dedicated toll road in North Carolina in 2019, after the Triangle Expressway in the Raleigh area. The I-77 Express lanes project in Charlotte is expected to open in late 2017. Due to the small number of operating toll roads in the state, there won't likely be a



large population of motorists with an NC Quick Pass Account. There will be a positive benefit from North Carolina's proximity to other states with toll facilities that use E-ZPass, as shown previously in Figure 6.2.

**Table 6.1**  
**Observed Weekday ETC Market Share on the Triangle Expressway**

Calendar Year	Number Of Annual Weekday Transactions			Percent Market Share By Transactions		
	ETC	BBM	Total	ETC	BBM	Total
2012	2,806,662	2,901,039	5,707,701	49.2	50.8	100.0
2013 (1)	13,258,229	9,800,970	23,059,199	57.5	42.5	100.0
2014	17,801,006	12,849,303	30,650,309	58.1	41.9	100.0
2015 (2)	10,378,659	7,431,990	17,810,649	58.3	41.7	100.0

1) The last section of the Triangle Expressway opened to toll traffic on 1/3/2013, from US 64 to NC 55.  
2) Data through June 2015.

Source: North Carolina Turnpike Authority Operations Statistics Report

Future-year estimates of ETC and BBM annual weekday market shares for the Monroe Expressway are presented in **Table 6.2** for modeling years 2019, 2025, 2030 and 2040. The estimated percent market shares were developed for Class 1 vehicles (2-axle vehicles) and combined Class 2 and 3 vehicles (3 and 4+ axle vehicles). Weekday market shares are presented because the MRM model represents weekday traffic volumes.

The ETC market share for Class 1 vehicles is estimated to total about 59 percent in 2019, and increase to about 61, 64 and 68 percent in 2025, 2030 and 2040, respectively. These increases represent average annual increases of about 0.4 percentage points per year. Commercial vehicles (Classes 2 and 3 combined) are anticipated to have higher ETC participation rates, starting at about 70 percent in 2019, and increasing to about 71, 72 and 74 percent in 2025, 2030 and 2040, respectively.

**Table 6.2**  
**Assumed Annual Weekday ETC Market Share on the Monroe Expressway**

Calendar Year	Class 1 Vehicles			Class 2 and 3 Vehicles		
	ETC	BBM	Total	ETC	BBM	Total
2019 (1)	59.0	41.0	100.0	70.0	30.0	100.0
2025	61.5	38.5	100.0	71.0	29.0	100.0
2030	64.0	36.0	100.0	72.0	28.0	100.0
2040	68.0	32.0	100.0	74.0	26.0	100.0

1) Assumes the entire Monroe Expressway opens on January 1, 2019.



### 6.2.3 Value of Time

Estimates of motorist Value of Time (VOT) were calculated based on median household income data in the MRM model. The data was available for each traffic analysis zone (TAZ) in the model. In aggregate, based on weighted trips for each TAZ in the model, the 2015 passenger-car VOT is estimated to equal \$10.40 per hour (or \$0.173 per minute) in the project corridor. Values of time for commercial vehicles were assumed to increase by a factor of 1.8. The VOTs were inflated annually for use in future-year assignments based on forecast inflation rates described in Section 6.2.5.

### 6.2.4 Vehicle Operating Cost

Vehicle Operating Costs (VOC) take into account the wear and tear on a vehicle as expressed in maintenance costs, tires, and other variable costs such as oil and fuel. A passenger-car operating cost of \$0.168 per mile was estimated for 2015 based on the following data:

- The average cost of gasoline in the Lower Atlantic states provided by the Energy Information Administration.
- The average cost of tires and maintenance by passenger car vehicle type provided in the **2014 Your Driving Costs** report published by AAA.
- The passenger-car vehicle type distribution for the State of North Carolina published in the **2014 National Automobile Dealers Association (NADA) Annual Report**.

Depreciation and insurance are not included in the operating cost.

By 2030, the average passenger-car vehicle operating cost is estimated to total \$0.209 per mile. Operating costs for future years were developed based on: 1) forecasts of future crude oil prices, 2) assumed improvements in the average gas mileage associated with government-mandated fuel efficiency standards, and 3) inflation adjusted costs of tires and maintenance.

Commercial vehicle operating costs are much more difficult to calculate due to the variation in truck sizes and types and availability of corporate fleet information. For this study, the vehicle operating costs for commercial vehicle trips was assumed to be three times greater than passenger cars in 2015. This differential increases over time since anticipated fuel efficiency improvements for passenger vehicles are not assumed for commercial vehicles. By 2030, it was assumed that commercial vehicle operating costs were four times greater than passenger cars on a per mile basis.

### 6.2.5 Annual Inflation Rates

Toll rates, VOT and components of VOC are increased annually in the modeling process assuming they keep pace with inflation. Average annual inflation rates are shown in **Table 6.3** for various historical and forecast time periods. All inflation rates are for the Charlotte-Concord-Gastonia, NC-SC Metropolitan Statistical Area (Charlotte MSA), represented in **Figure 6.3**. Historically, the annual rate of inflation has averaged 2.2 percent from 1995 to 2000, 1.8 percent from 2000 to 2005 and 2.6 percent from 2005 to 2010. The average inflation rate decreased to 1.6 percent from 2010 to 2015, due in part to steeply decreasing gasoline and oil prices.

Annual forecasted CPI indices were obtained from Moody's Analytics for 2016 through 2045. As shown in **Table 6.3**, annual inflation is forecast to average 2.5 percent between 2015 and 2019, 2.3 percent between 2019 and 2025, and 2.1 percent after 2025. Annual inflation is forecast to average 2.2 percent

per year from 2015 to 2040, which equals the historical inflation rate of the past 25 years, from 1990 to 2015.

**Table 6.3**  
**Actual and Estimated Average Annual Inflation Rates <sup>(1)</sup>**

<b>Historical Time Period (2)</b>	<b>AAPC (4)</b>
1995 - 2000	2.2%
2000 - 2005	1.8%
2005 - 2010	2.6%
2010 - 2015	1.6%
<b>Forecast Time Period (3)</b>	
2015 - 2019	2.5%
2019 - 2025	2.3%
2025 - 2030	2.1%
2030 - 2040	2.1%

1) Historical data and forecasts are for the Charlotte-Concord-Gastonia, NC-SC Metropolitan Statistical Area.

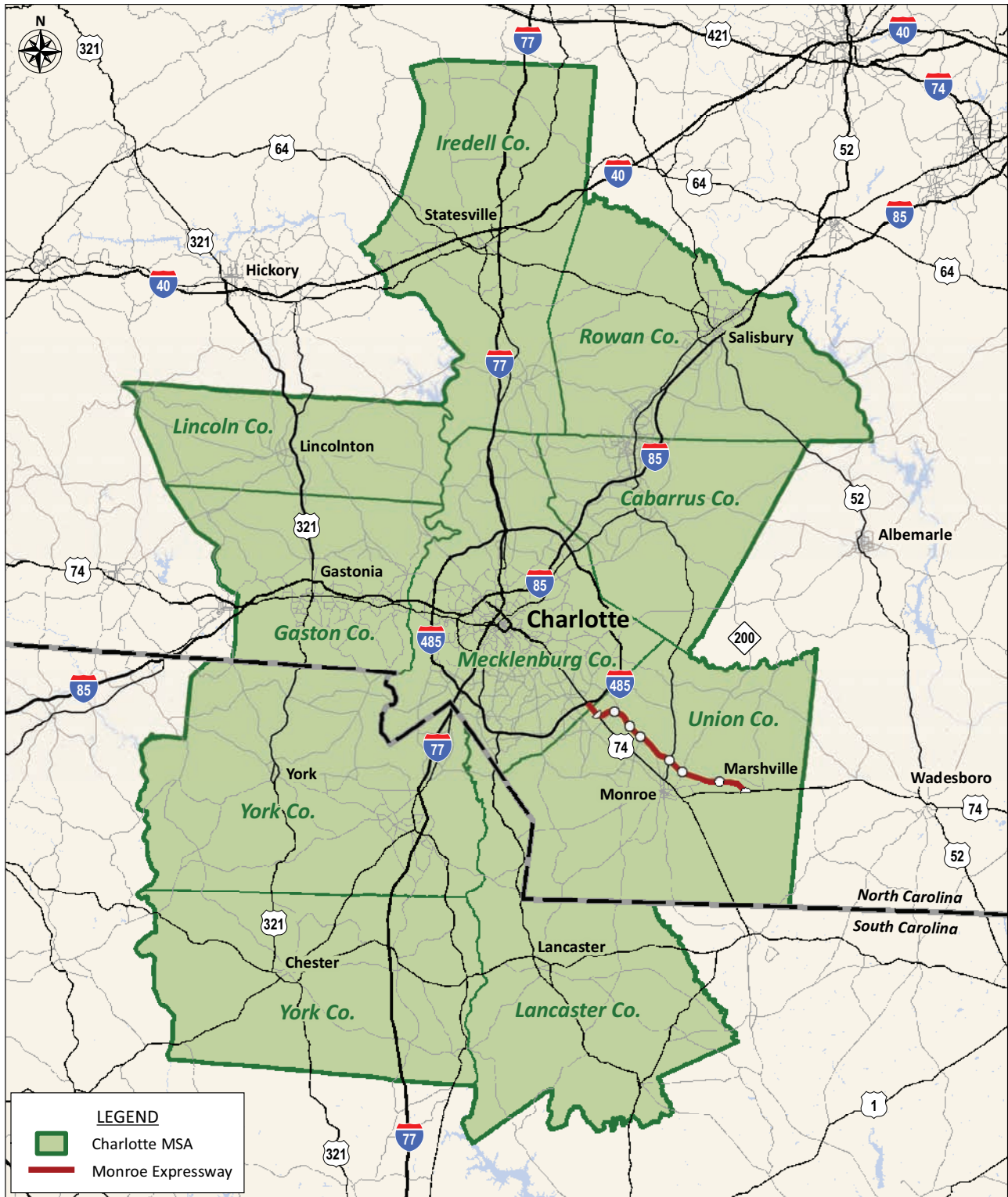
2) Based on Bureau of Labor Statistics CPI (Index 1982-84 = 100) data for all Urban Consumers through the third quarter of 2015.

3) Based on annual forecasts developed by Moody's Analytics, last updated on 1/22/2016.

4) AAPC is an abbreviation for Average Annual Percent Change.

# NCDOT Monroe Expressway Traffic and Toll Revenue Study

X:\TFT Group\Projects\NCDOT 110937 - 2015 - Monroe Bypass\Graphics\Comprehensive Report\ArcMap\Charlotte MSA Area.mxd 15-16-16



## CHARLOTTE METROPOLITAN STATISTICAL AREA

FIGURE 6.3

## 6.3 Basic Assumptions

The traffic and revenue estimates for the Monroe Expressway are predicated on the following basic assumptions, which are considered reasonable for purposes of the base case forecast:

1. The Monroe Expressway, in its entirety as described in Section 3.2 Project Configuration, will open to traffic on January 1, 2019.
2. The configuration, number of lanes, and number of access points on the Monroe Expressway will not change during the forecast period.
3. Tolls will be charged for the three vehicle classes and two payment types described in Section 6.2.1 Toll Structure. The toll rates will be increased annually from the initial 2019 toll rates, to keep up with inflation. The toll rates and tolling zone locations are provided in Section 6.6 Recommended Toll Rates.
4. No transportation improvement projects, particularly new roads, additional road capacity, or new interchanges on limited access roads will be constructed during the forecast period, other than those included in the MRM15v1.1. Assumed roadway improvements are discussed in Section 6.4.
5. The annual percentage of ETC and BBM transactions will match the assumed market shares described in Section 6.2.2.
6. Economic growth in the project study area by TAZs will occur as forecast by the independent economist.
7. Revenue leakage due to unreadable or uncollectible ETC or BBM transactions, or any transactions that cannot be processed and payment collected, will occur. The adjustments made to gross toll revenue forecasts, to account for uncollectible toll revenue, are based on actual experience on the Triangle Expressway. If actual experience on the Monroe Expressway differs from the Triangle Expressway with regard to adjustments for uncollectible toll revenue, the resulting net toll revenue forecasts for Monroe Expressway will differ from those forecast in this study.
8. The leakage estimates contained in this report are dependent upon the selection of appropriate toll collection technology and the adoption of business rules and enforcement procedures designed to minimize the loss of revenue.
9. Annual inflation rates will average those presented in Section 6.2.5.
10. The Monroe Expressway will be well maintained, efficiently operated, effectively signed, and promoted to encourage maximum usage and to reach the assumed percentage goals for ETC usage.
11. Motor fuel will remain in adequate supply throughout the forecast period. Fuel price forecasts were obtained from the U.S. Energy Information Administration in a report titled *Annual Energy Outlook 2015 with projections to 2040*. The forecast fuel costs were incorporated into the estimated vehicle operating costs.
12. No national or regional emergency will arise that would abnormally restrict the use of motor vehicles.

Any significant departure from these basic assumptions could materially affect traffic and revenue potential on the Monroe Expressway.

## 6.4 Future Transportation Improvements

CDM Smith identified the roadway improvements assumed in the MRM15v1.1 network years 2015, 2025, 2030 and 2040. The assumed improvements in the MRM were compared against those listed in the State Transportation Improvement Program (STIP), and various planning documents in the MRM area obtained from Metropolitan Planning Organizations (MPOs) and Rural Planning Organizations (RPOs). The goal was two-fold:

1. To verify that roadway improvements listed in current transportation plans and long range plans are present in the MRM in the appropriate years, and
2. To identify roadway improvements that may substantially impact the travel demand on the Monroe Expressway.

The following are the documents that were reviewed in order to identify planned roadway improvements in the MRM model area.

1. *NCDOT Current STIP, November 2015*
2. *Cabarrus / Rowan Urban Area Metropolitan Planning Organization, Draft 2040 Metropolitan Transportation Plan, March 2014*
3. *CRTPO 2040 Metropolitan Transportation Plan Air Quality Conformity Determination Report, March 2014*
4. *The Way Forward: 2040 Metropolitan Transportation Plan, Gaston-Cleveland-Lincoln Metropolitan Planning Organization, Adopted March 27, 2014*
5. *Rock Hill – Fort Mill Area Transportation Study FY 2014 – 19 TIP Financial Statement*
6. *North Carolina Department of Transportation, Prioritization 4.0, NCDOT Strategic Prioritization Office of Transportation, July 2015*

CDM Smith verified that the planned roadway improvements listed in the above documents are reflected in the MRM networks. Based on comments from the NCDOT, the assumed project completion date was changed from that assumed in the MRM network for several projects, and the proper adjustment was made to the networks. CDM Smith also verified that there were no network improvements assumed in the MRM networks that were not listed in a planning document, were located in the study area, and were likely to have an impact on Monroe Expressway usage. In the modeling assignments, CDM Smith used the same roadway assumptions that were included in the MRM15v1.1 with a few changes to assumed completion dates.

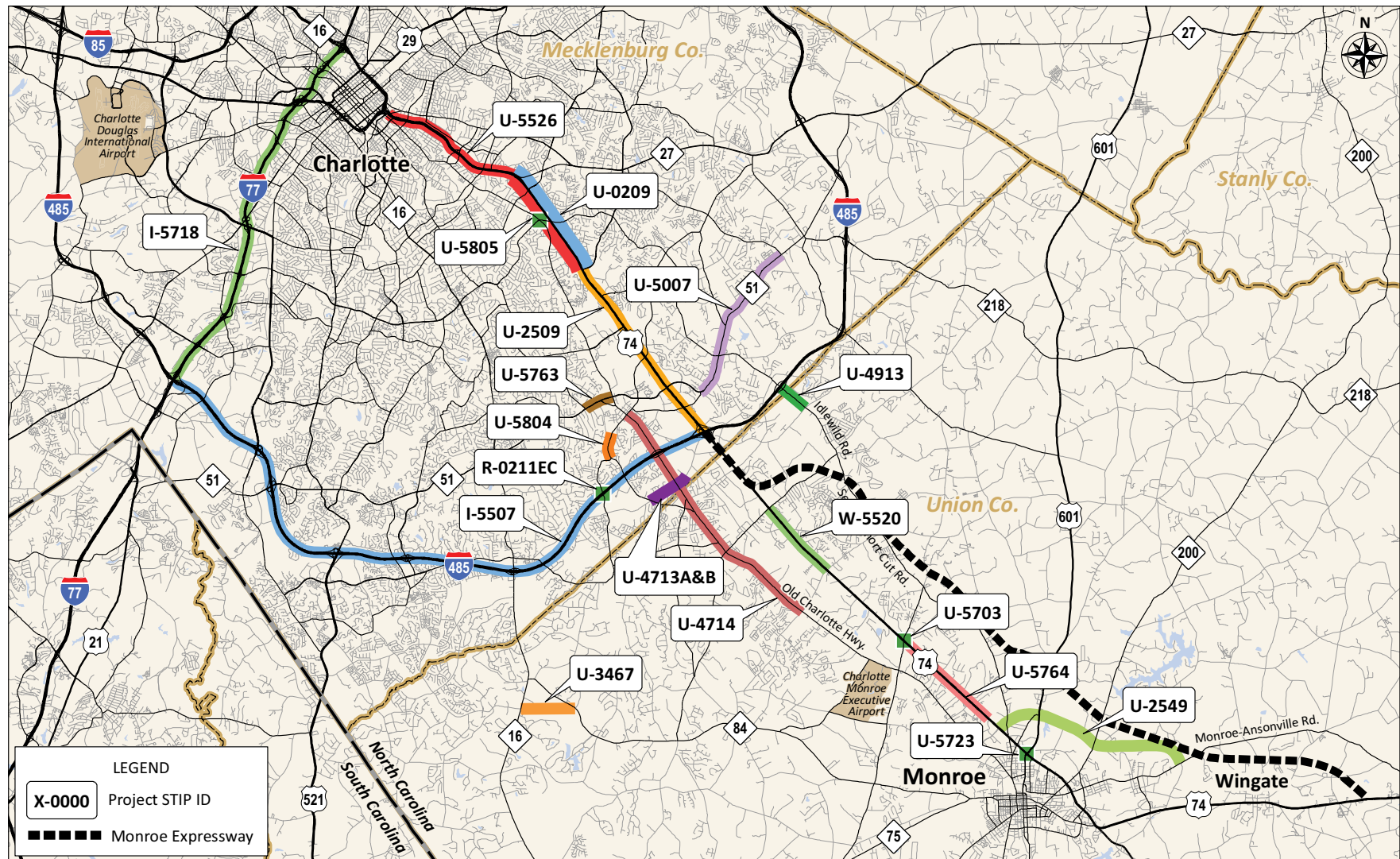
**Table 6.4** and **Figure 6.4** present a list of selected future roadway improvement projects that are reflected in the MRM networks, are identified in future roadway plans, and are in the vicinity of the Monroe Expressway. These projects were selected because they were fairly major in scope, or were located in the study corridor.

Notable Mecklenburg County roadway improvements in the vicinity of the proposed Monroe Expressway include the addition of express lanes on I-77, I-485 and US 74. The construction of additional toll-free capacity is planned for segments of I-485, US 74 and NC 51. Each of these projects will have some impact on traffic volumes and travel patterns in the area.

**Table 6.4**  
**Selected Future-Year Roadway Improvements**  
**Assumed in the Current Monroe Expressway Traffic and Revenue Study**

Project STIP ID	Roadway	Location	Description	Assumed Opening Date
<b>Mecklenburg County</b>				
U-0209	US 74	Brookshire Freeway to Idlewild Road in Charlotte	Widen to 4 lanes per direction from NC 27 to Wallace Lane and construct interchanges with Sharon Amity Road and Idlewild Road	Dec. 2016
R-0211EC	I-485	Weddington Road overpass	Construct new interchange between I-485 and Weddington Road	Jan. 1, 2019
U-2509	US 74	Charlotte Outer Loop to Conference Drive in Charlotte	Widen to 3 general purpose lanes per direction and build express lanes in median	Jan. 1, 2025
U-4713A	New Road	SR 3448 (Pleasant Plains Road) to SR 1009 (E. John Street)	Add 1 lane per direction on new location	
U-4713B	New Road	SR 1009 (John Street) to SR 3457 (Campus Ridge Road)	Add 1 lane per direction on new location	
U-5007	NC 51	Matthews Township Parkway to SR 3128 (Lawyers Road)	Add 1 general purpose lane per direction	Jan. 1, 2025
I-5507	I-485	I-77 South of Charlotte to US 74 (Independence Boulevard)	Add 1 express lane per direction	Jan. 1, 2019
U-5526	US 74	I-277 to Wallace Lane	Convert existing and proposed busway to reversible express lane from I-277 to Albemarle Road and add 1 express lane per direction from Albemarle Road to Wallace Lane	Jan. 1, 2018
I-5718	I-77	Phase A: I-485 (Exit 1) to Woodlawn Road (Exit 6) Phase B: Woodlawn Road (Exit 6) to I-277/US 74 (Exit 9) Phase C: I-277/US 74 (Exit 9) to I-277/NC 16 (Exit 11) Phase D: I-277/US 74/NC 27 Interchange Phase E: I-277/NC 16, US 21 Interchange	Add 1 express lane per direction Add 1 express lane per direction Add 1 express lane per direction Interchange improvements Interchange improvements	Jan. 1, 2030
U-5763	NC 51	SR 3356 (Sardis Road) to SR 1009 (Monroe Road)	Add 1 general purpose lane per direction	Jan. 1, 2020
U-5804	SR 3448	Fullwood Lane to Weddington Road	Add 1 lane per direction	Jan. 1, 2017
U-5805	SR 1009	Intersection with Idlewild Road	Construct improvements	Jan. 1, 2021
<b>Union County</b>				
U-2549	Monroe Northern Loop	US 74 TO SR 1751 (Walkup Avenue) at SR 1763 (Bivens Road)	Add 2 lanes per direction on new location	Jan. 1, 2030
U-3467	New Road	NC 16 (Providence Road) to SR 84 (Weddington Road)	Extend SR 1316 (Rea Road) from NC 16 (Providence Road) to SR 84 (Weddington Road)	Jan. 1, 2020
U-4714	SR 1009	SR 3448 (Trade Street) to SR 1377 (Wesley Chapel-Stouts Road)	Add 1 general purpose lane per direction and convert to superstreet	Jan. 1, 2025
U-4913	Idlewild Rd	I-485 TO SR 1524 (Stevens Mill Road)	Add 1 general purpose lane per direction	Jan. 1, 2022
W-5520	US 74	Indian Trail Fairview Road to Wesley Chapel Stouts Road	Convert existing full movement signalized intersections to signalized superstreet design	Jan. 1, 2017
U-5703	US 74	SR 1514 (Rocky River Road) intersection	Reconfigure to superstreet design	Jan. 1, 2022
U-5723	US 74	US 601 Interchange	Construct improvements	Jan. 1, 2022
U-5764	US 74	Hanover Drive to SR 1007 (Rocky River Road)	Add 1 general purpose lane per direction	Jan. 1, 2023





SELECTED FUTURE-YEAR ROADWAY IMPROVEMENTS

FIGURE 6.4

Roadway improvements within Union County that will directly impact travel demand on the proposed Monroe Expressway include:

1. U-5764 – the addition of 1 general purpose lane in each travel direction on US 74 between Hanover Drive and SR 1007. This roadway improvement is anticipated to be completed by January 1, 2023.
2. U-2549 – the construction of the Monroe Northern Loop, a new 4-lane roadway that will provide enhanced route options for travel in the area of Monroe. This roadway improvement is assumed to be completed by January 1, 2030.
3. U-4714 – the addition of 1 general purpose lane in each travel direction on SR 1009 (Old Charlotte Highway) between SR 3448 (Trade Street) to SR 1377 (Wesley Chapel-Stouts Road). This improvement is assumed to be completed by January 1, 2025.

These three roadway improvements had relatively small, system wide negative impacts on Monroe Expressway toll transactions based on the assignment process.

## 6.5 Toll Rate Sensitivity Analysis

A toll rate sensitivity analysis was conducted at 2019 opening year conditions, to identify the optimum per-mile toll for the Monroe Expressway. The analysis was conducted by running a series of assignments with gradually increasing per-mile toll rates in order to identify a point on the curve that optimizes toll revenue, but still leaves some room for upward adjustment.

**Figure 6.5** illustrates the 2019 Class 1 (two-axle vehicle) toll sensitivity curve for ETC assuming the entire toll road is operational. The x-axis represents the range of tested per-mile toll rates. The y-axis represents the resulting average weekday toll revenue for all three toll classes and both methods of payment.

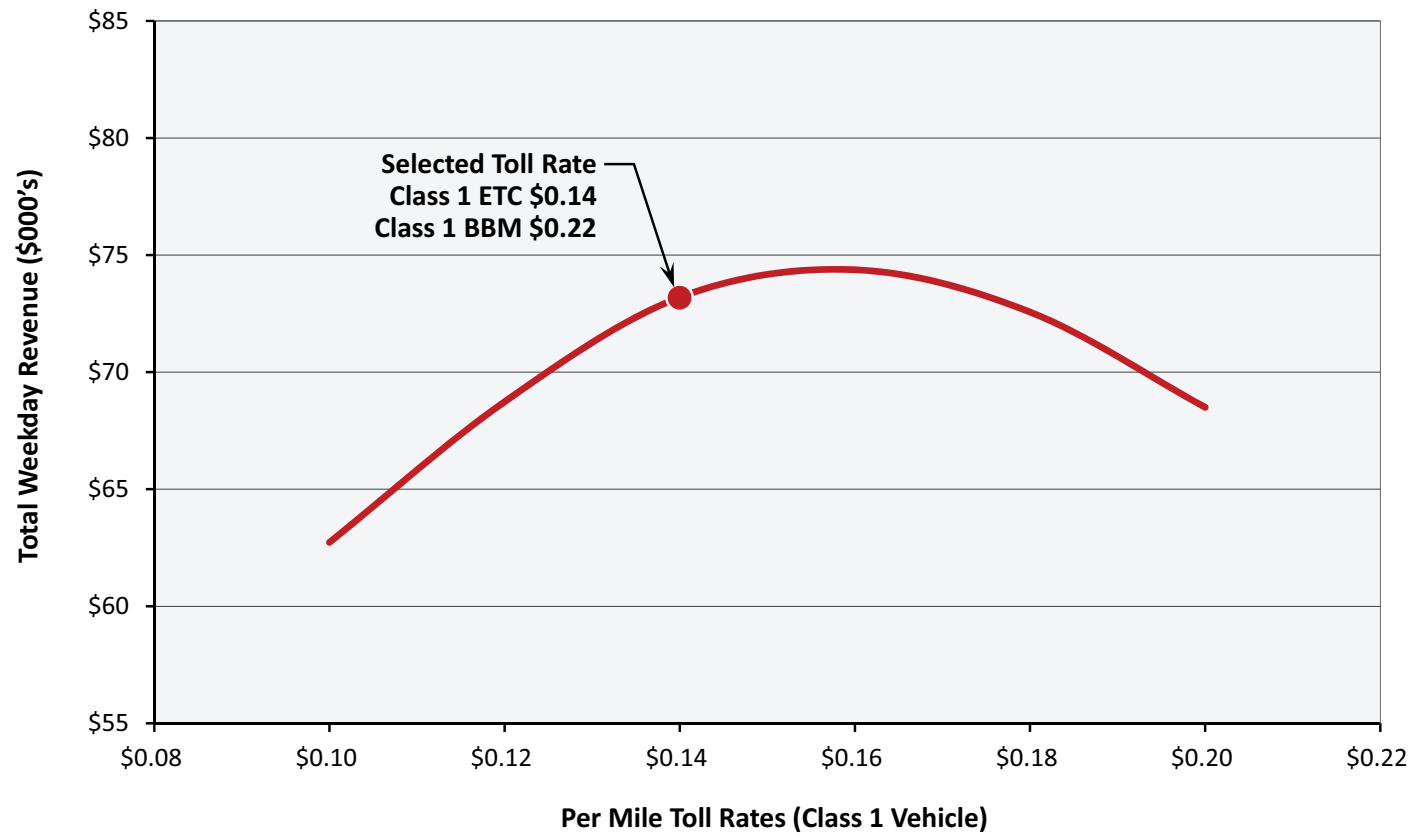
As shown in the figure, the selected, optimal ETC toll rate for a Class 1 vehicle traveling the full length of the toll road is approximately \$0.14 per mile. The associated Class 1 BBM toll rate for the same trip is about \$0.22 per mile (assuming the current ETC-BBM toll relationship). Actual tolls collected for each toll zone will be equal to the length of that mainline section multiplied by the per-mile toll rate, and rounded up to the nearest penny. The selected toll rate is set slightly below the rate which would maximize toll revenue in order to provide a limited “margin of safety” for setting future rates. Rates are assumed to increase annually to keep pace with inflation.

## 6.6 Recommended Toll Rates by Toll Zone

**Table 6.5** shows Class 1 ETC and BBM rates, by tolling zone, for all years from 2019 through 2040. These toll rates are based on the 2019 selected optimum toll rates of \$0.14 per mile for Class 1 ETC and \$0.22 per mile for Class 1 BBM. In all years, Class 2 rates are double Class 1 rates, and Class 3 rates are four times Class 1 rates. ETC toll rates receive a 35 percent discount from BBM toll rates. As shown in this table, annual rate adjustments take place each January 1 to take into account the impacts of annual inflation (see Table 6.3 for a description of the assumed inflation rates).

**Figure 6.6** graphically displays the ETC toll rates in 2019 and 2030 at each tolling zone location for Class 1, Class 2 and Class 3 vehicles. The opening-year ETC toll for a full-length trip through all seven tolling zones on the Monroe Expressway will be \$2.54 for Class 1 vehicles, increasing to \$3.22 in 2030. A





**ESTIMATED 2019 MONROE EXPRESSWAY  
TOLL SENSITIVITY CURVE**

**Table 6.5**  
**Recommended Monroe Expressway Annual Toll Rates by Tolling Zone**  
**Class 1 ETC and BBM**

Calendar Year (1)	Zone 1 (2.99 mi.)		Zone 2 (3.97 mi.)		Zone 3 (1.76 mi.)		Zone 4 (3.93 mi.)		Zone 5 (1.38 mi.)		Zone 6 (2.24 mi.)		Zone 7 (1.87 mi.)		Through Trip Toll (Passes through All Zones)	
	US 74 - Austin Chaney Rd		Austin Chaney Rd - NC 200		NC 200 - US 601		US 601 - N. Rocky River Rd.		N. Rocky River Rd. - Unionville Indian Trail Rd.		Unionville Indian Trail Rd. - Indian Trail Fairview Rd.		Indian Trail Fairview Rd. - US 74		ETC	BBM
	ETC	BBM	ETC	BBM	ETC	BBM	ETC	BBM	ETC	BBM	ETC	BBM	ETC	BBM	ETC	BBM
2019	\$ 0.42	\$ 0.65	\$ 0.56	\$ 0.86	\$ 0.25	\$ 0.39	\$ 0.55	\$ 0.85	\$ 0.19	\$ 0.29	\$ 0.31	\$ 0.48	\$ 0.26	\$ 0.40	\$ 2.54	\$ 3.92
2020	0.43	0.66	0.57	0.88	0.26	0.40	0.56	0.87	0.19	0.30	0.32	0.49	0.27	0.41	2.60	4.01
2021	0.44	0.68	0.59	0.90	0.26	0.41	0.58	0.89	0.20	0.30	0.32	0.50	0.27	0.42	2.66	4.10
2022	0.45	0.70	0.60	0.92	0.27	0.42	0.59	0.91	0.20	0.31	0.33	0.51	0.28	0.43	2.72	4.20
2023	0.46	0.71	0.61	0.94	0.27	0.43	0.60	0.93	0.21	0.32	0.34	0.53	0.28	0.44	2.77	4.30
2024	0.47	0.73	0.63	0.96	0.28	0.44	0.62	0.95	0.21	0.32	0.35	0.54	0.29	0.45	2.85	4.39
2025	0.48	0.74	0.64	0.99	0.29	0.45	0.63	0.97	0.22	0.33	0.36	0.55	0.30	0.46	2.92	4.49
2026	0.49	0.76	0.66	1.01	0.29	0.46	0.64	0.99	0.22	0.34	0.36	0.56	0.30	0.47	2.96	4.59
2027	0.50	0.78	0.67	1.03	0.30	0.47	0.66	1.02	0.23	0.35	0.37	0.57	0.31	0.48	3.04	4.70
2028	0.51	0.79	0.68	1.05	0.31	0.48	0.67	1.04	0.23	0.35	0.38	0.59	0.32	0.49	3.10	4.79
2029	0.52	0.81	0.70	1.07	0.31	0.49	0.69	1.06	0.24	0.36	0.39	0.60	0.32	0.50	3.17	4.89
2030	0.53	0.83	0.71	1.09	0.32	0.50	0.70	1.08	0.24	0.37	0.39	0.61	0.33	0.51	3.22	4.99
2031	0.55	0.84	0.73	1.12	0.32	0.51	0.71	1.10	0.25	0.38	0.40	0.62	0.34	0.52	3.30	5.09
2032	0.56	0.86	0.74	1.14	0.33	0.52	0.73	1.13	0.25	0.38	0.41	0.64	0.34	0.53	3.36	5.20
2033	0.57	0.88	0.76	1.16	0.34	0.53	0.74	1.15	0.26	0.39	0.42	0.65	0.35	0.54	3.44	5.30
2034	0.58	0.90	0.77	1.19	0.35	0.54	0.76	1.17	0.26	0.40	0.43	0.66	0.36	0.55	3.51	5.41
2035	0.59	0.92	0.79	1.21	0.35	0.55	0.78	1.20	0.27	0.41	0.44	0.68	0.37	0.56	3.59	5.53
2036	0.60	0.94	0.81	1.24	0.36	0.56	0.79	1.22	0.27	0.42	0.45	0.69	0.37	0.58	3.65	5.65
2037	0.62	0.96	0.82	1.26	0.37	0.57	0.81	1.25	0.28	0.43	0.46	0.71	0.38	0.59	3.74	5.77
2038	0.63	0.98	0.84	1.29	0.38	0.59	0.83	1.28	0.29	0.44	0.47	0.72	0.39	0.60	3.83	5.90
2039	0.64	1.00	0.86	1.32	0.38	0.60	0.84	1.30	0.29	0.44	0.47	0.74	0.40	0.61	3.88	6.01
2040	0.66	1.02	0.88	1.35	0.39	0.61	0.86	1.33	0.30	0.45	0.49	0.75	0.41	0.63	3.99	6.14

1) Assumes toll rates will be increased annually on January 1.

Note:

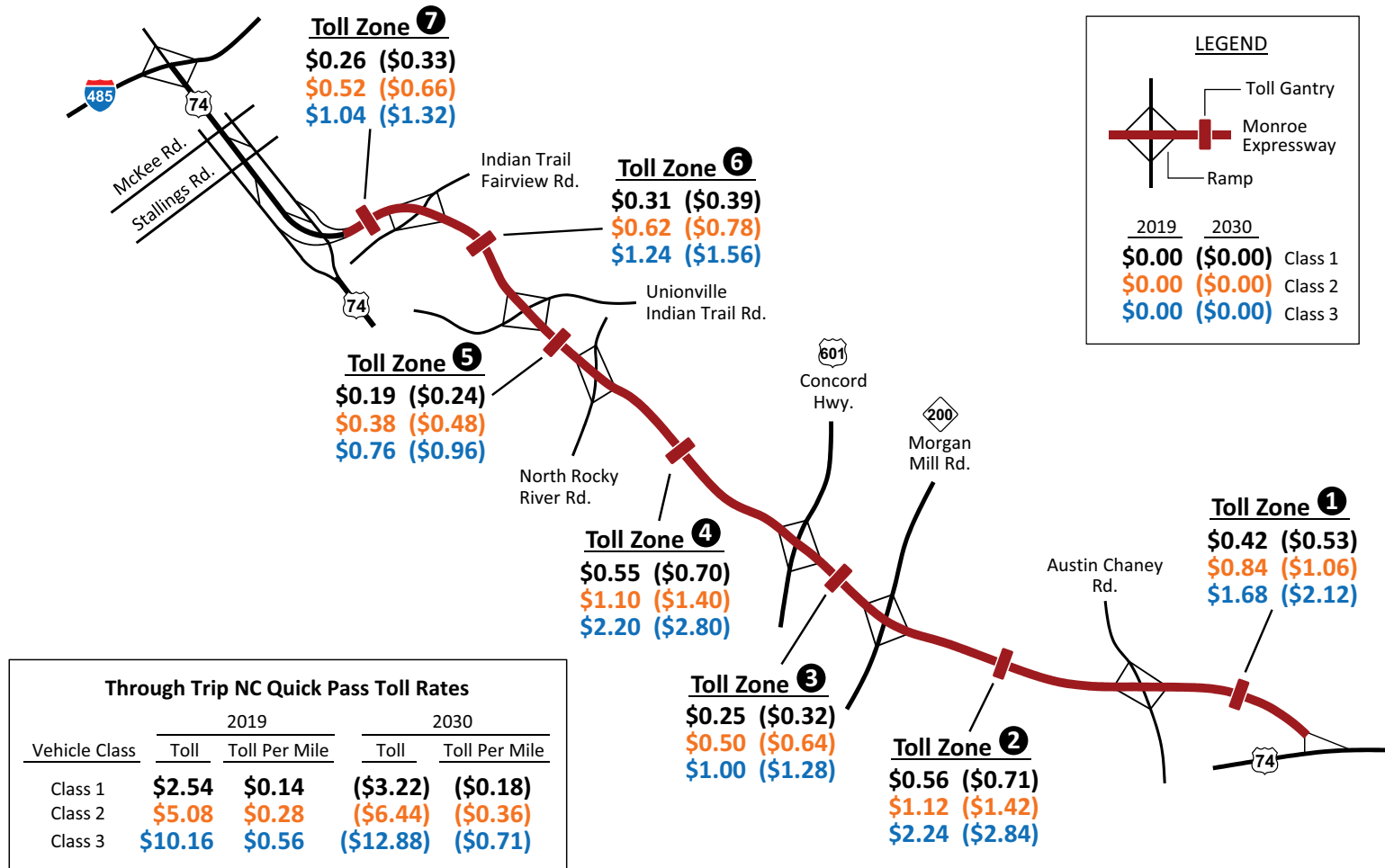
Class 2 tolls will be two times the Class 1 tolls

Class 3 tolls will be four times the Class 1 tolls

ETC tolls receive a 35 percent discount from the BBM tolls



Not To Scale



**RECOMMENDED ETC TOLL RATES  
(2019 AND 2030)**

large truck (Class 3) with ETC will pay \$10.16 in 2019, and \$12.88 in 2030, to travel the length of the Monroe Expressway.

**Figure 6.7** illustrates the BBM toll rates for Class 1, Class 2, and Class 3 vehicles by location for 2019 and 2030. In 2019, a Class 1 vehicle with BBM will pay \$3.92 for a full-length trip, increasing to \$4.99 in 2030. A Class 3 vehicle will pay \$15.68 in 2019 and \$19.96 in 2030 for the same trip.

## 6.7 Estimated Weekday Traffic Volumes

Estimates of weekday mainline traffic volumes in 2019, 2025, 2030 and 2040 are shown in **Figure 6.8**. Vehicles will be tolled on each mainline section via overhead gantries. As can be seen in the figure, weekday mainline traffic volumes increase steadily from the easternmost mainline section to the westernmost section. The traffic volumes shown in the figure do not include any downward “ramp-up” adjustment, which is incorporated in the early years of the annual traffic forecasts. Total 2019 weekday traffic volumes range from 9,100 on the easternmost section (Zone 1: US 74 to Austin Chaney Rd.) to a high of 33,100 on the westernmost section (Zone 7: Indian Trail Fairview Rd. to US 74).

In 2030, weekday mainline traffic volumes on the Monroe Expressway are forecast to range from 11,200 (easternmost section) to 42,800 on the westernmost section. Weekday traffic volumes in 2040 are forecast to range from 12,300 on the easternmost section to 48,200 on the westernmost section.

Forecast traffic volumes decrease from 2025 to 2030 in Zone 2 (Austin Chaney Rd – NC 200). This decrease is due to a roadway improvement (Project STIP U-2549) that is assumed to open on January 1, 2030. The improvement consists of a new four-lane road, called the Monroe Northern Loop, that extends from US 74 to SR 1751 (Walkup Ave.) at Bivens Rd. The project is shown in Figure 6.4. This project is estimated to draw traffic off of certain sections of the Monroe Expressway, most notably from Toll Zone 2. On a systemwide basis, the negative impacts of the Monroe Northern Loop are relatively small.

## 6.8 Sample Travel Time and Distance Savings

**Figure 6.9** illustrates estimated average travel-time savings during the three-hour AM Peak Period (6:30 through 9:30 AM), in the westbound direction, in 2019 and 2030, by comparing travel time on the Monroe Expressway to the best alternative toll-free route. Estimated travel times were obtained from the calibrated MRM assignments. The travel times represent average minutes of travel during the three-hour peak period. Actual travel times will vary from these estimates, sometimes significantly, based on actual roadway and weather conditions, and on actual travel demand in shorter increments of time.

The following three trips are shown in Figure 6.9 to illustrate potential travel time savings by using the Monroe Expressway:

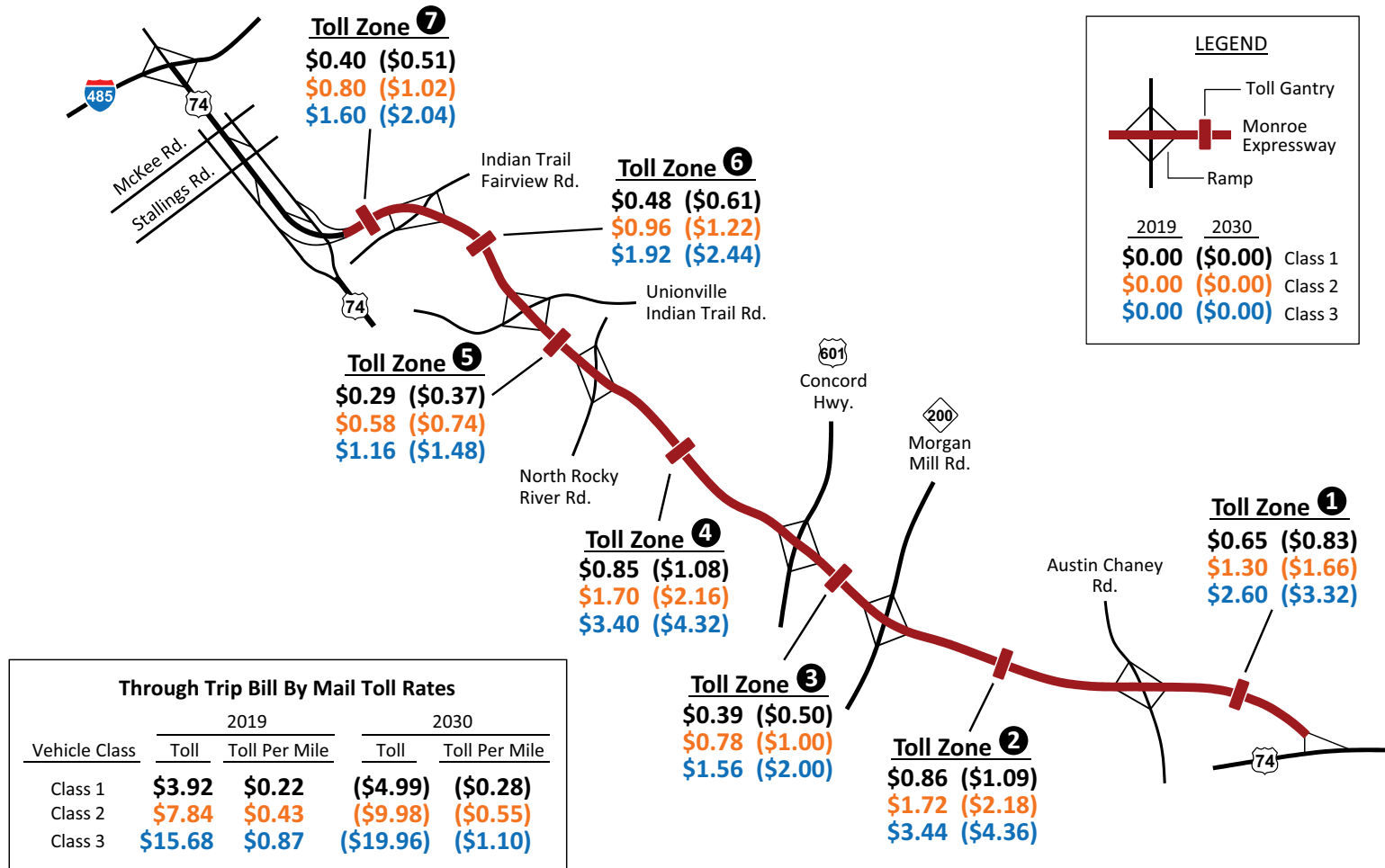
- Trip 1 – from Marshville to Mathews,
- Trip 2 – from Monroe to Mathews, and
- Trip 3 from Indian Trail to Mathews.

# NCDOT Monroe Expressway Traffic and Toll Revenue Study

NC-2015-Monroe Bypass / Graphics / Comprehensive Report / Powerpoint / CR-Landscape.pptx / 4-26-16



Not To Scale



## RECOMMENDED BBM TOLL RATES (2019 AND 2030)

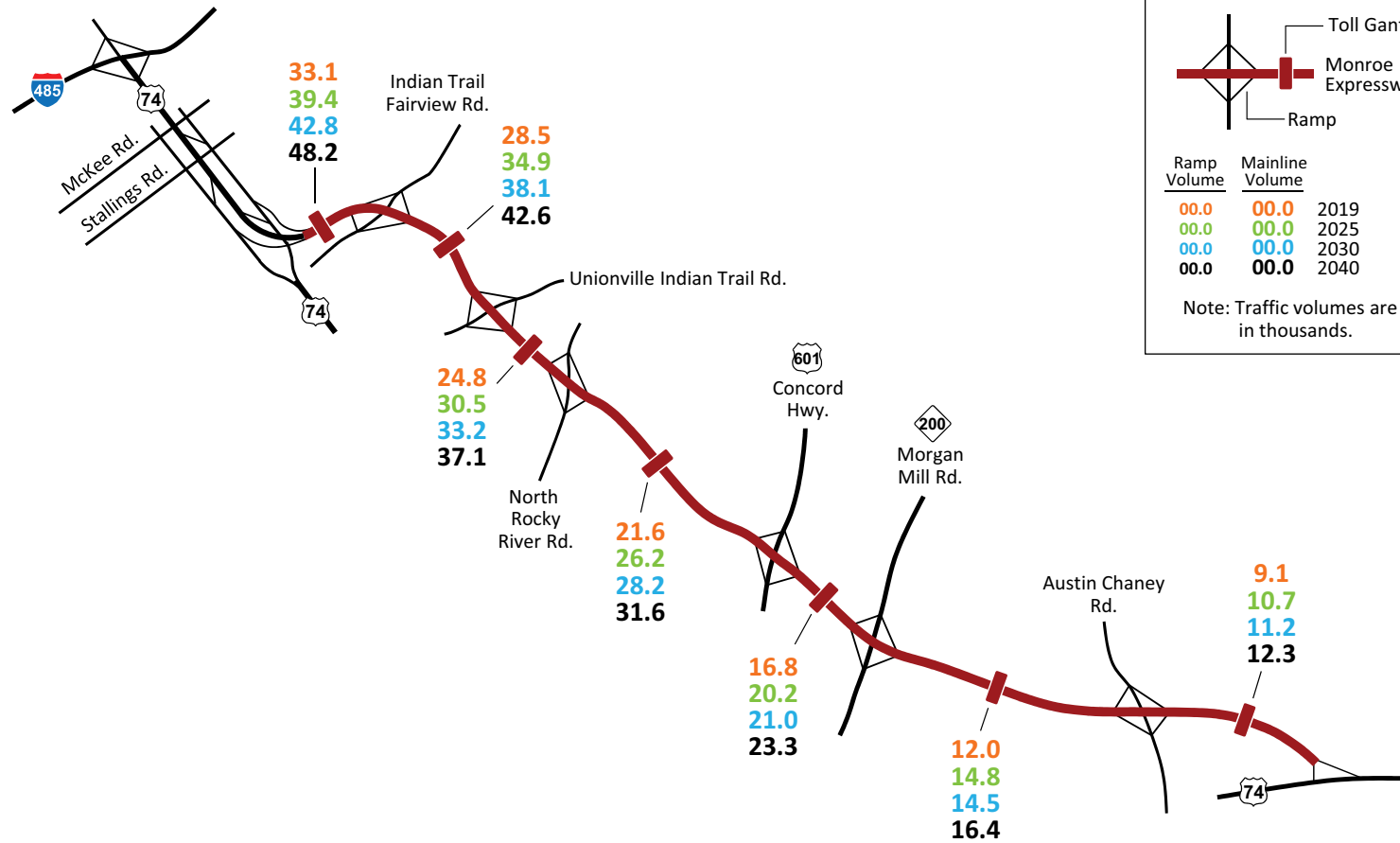


FIGURE 6.7

# NCDOT Monroe Expressway Traffic and Toll Revenue Study



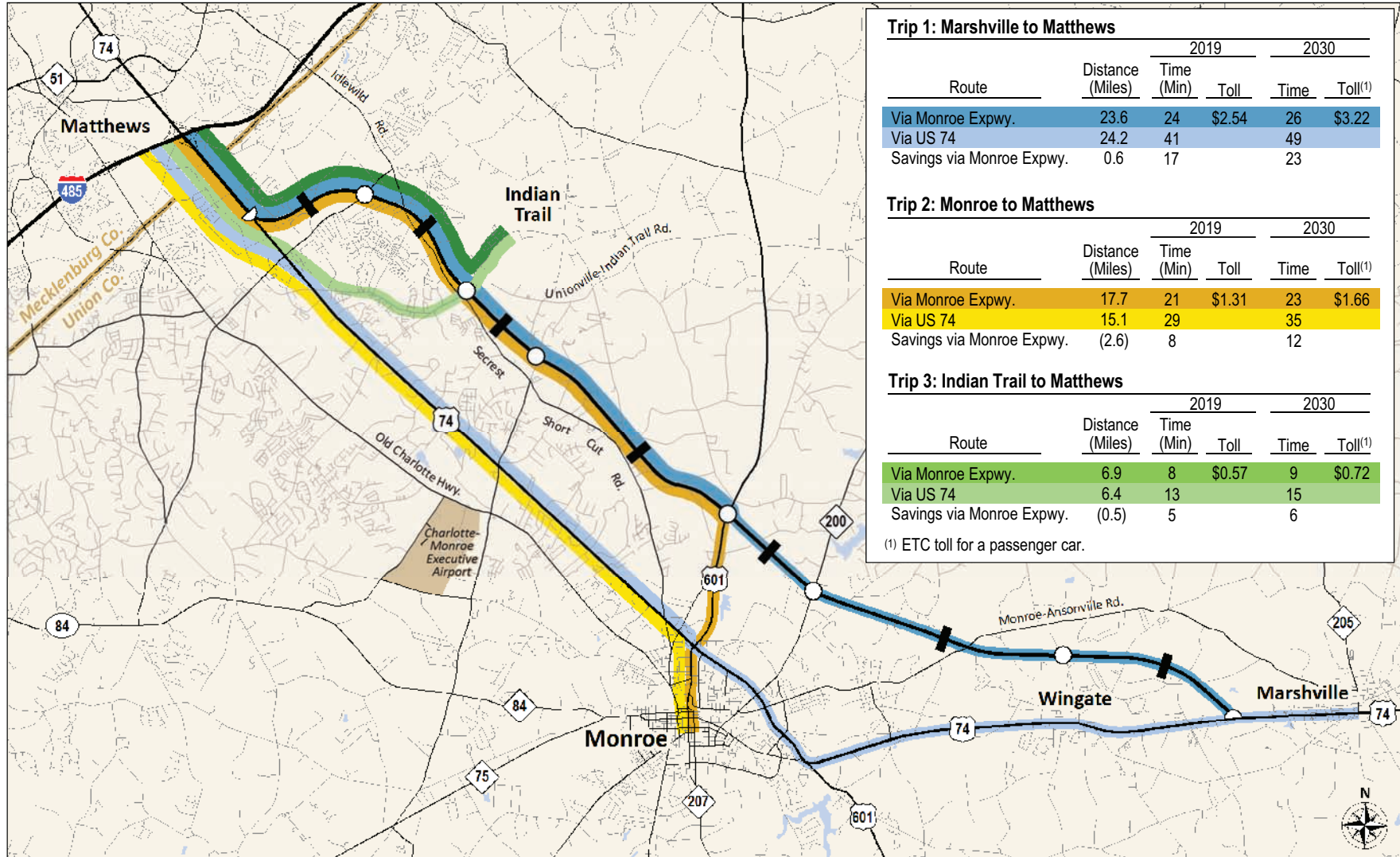
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**ESTIMATED 2019, 2025, 2030 AND 2040  
AVERAGE WEEKDAY TRAFFIC VOLUMES - CALENDAR YEAR**

# NCDOT Monroe Expressway Traffic and Toll Revenue Study

NC-2015-Monroe Bypass / Graphics / Comprehensive Report / Powerpoint / CR-Landscape.pptx / 4-26-16



**ESTIMATED AVERAGE TRAVEL TIME SAVINGS  
AM PEAK PERIOD - WESTBOUND**

The trip comparison data includes the distance traveled, the average travel time in minutes, and the passenger-car ETC toll for the trip on the Expressway. For example, in 2019, a trip from Marshville to Mathews (Trip 1) on the Monroe Expressway would save about 0.6 miles and an average of 17 minutes compared to the same trip via US 74 during the AM Peak Period. In 2030, the average-time savings for using the Monroe Expressway is estimated to increase to 23 minutes. The toll cost for a passenger car making this trip via the Monroe Expressway would be \$2.54 in 2019 and \$3.22 in 2030. The cost of the toll is accounted for in the route choice assigned in the modeling process.

A trip from Monroe to Mathews (Trip 2) on the Monroe Expressway compared to US 74 would include an increased distance of 2.6 miles, and an average travel-times savings of 8 minutes in 2019 and 12 minutes in 2030. The toll cost for a passenger car making this trip via the Monroe Expressway would be \$1.31 in 2019 and \$1.66 in 2030.

A trip from Indian Trail to Mathews (Trip 3) on the Monroe Expressway compared to US 74 would include an increased distance of 0.5 miles, and an average travel-times savings of 5 minutes in 2019 and 6 minutes in 2030. The toll cost for a passenger car making this trip via the Monroe Expressway would be \$0.57 in 2019 and \$0.72 in 2030.

## 6.9 Assignment-Year Annualization and Ramp-Up Adjustments

This section describes the methodology for developing the following forecasts: 1) the average weekday toll revenue, 2) the calendar-year toll transactions and toll revenue, 3) the ramp-up adjustment for the opening year, and 4) the conversion of traffic and toll revenue to a fiscal year. This process was performed for the assignment years 2019, 2025, 2030 and 2040. **Table 6.6** illustrates the process for year 2019.

### 6.9.1 Calendar Year 2019 Average Weekday Toll Transactions and Toll Revenue

As seen in Table 6.6, Class 1 toll transactions for each toll zone and by ETC and BBM, are multiplied by their corresponding toll rates to arrive at the average weekday toll revenue. Similarly, the combined Class 2 and 3 toll transactions, are multiplied by an average weighted toll for the two classes to arrive at the average weekday toll revenue for each tolling zone. The result in 2019 is an estimated 145,888 average weekday transactions and \$72,686 average weekday toll revenue.

### 6.9.2 Calendar Year 2019 Annual Toll Transactions and Toll Revenue

The average weekday toll transactions and toll revenue are converted into an annual year forecast. This annualization is based on the assumption that there will be the equivalent of 327.3 weekdays in a calendar year for the Monroe Expressway study. This conversion takes into account lower estimated traffic volumes on weekend days and holidays. For this study, it was assumed that average weekend day traffic will be 68 percent of average weekday traffic on the Expressway. As shown in Table 6.6, the annualized toll transactions for calendar year 2019 will be 47,745,000 (145,888 average weekday transactions multiplied by 327.3). Similarly, annualized toll revenue for calendar year 2019 will be \$23,789,000 (\$72,686 average weekday revenue multiplied by 327.3).



**Table 6.6**  
**Development of FY 2019 Toll Transactions and Gross Toll Revenue Estimates**

<b>I. Calendar Year - Estimated Average Weekday Toll Transactions</b>						
Calendar Year 2019						
Toll Zone Number and Name	Class 1		Classes 2 and 3		All Vehicles	
	BBM	ETC	BBM	ETC		
1	US 74 - Austin Chaney Rd.	3,252	4,694	350	823	9,119
2	Aystin Chaney Rd. - NC 200	4,300	6,365	397	959	12,021
3	NC 200 - US 601	6,121	8,876	542	1,286	16,825
4	US 601 - N. Rocky River Rd.	7,823	11,561	659	1,564	21,607
5	N. Rocky River Rd. - Union Indian Trail Rd.	9,019	13,196	757	1,782	24,754
6	Union Indian Trail Rd. - Indian Trail/Fairview Rd.	10,619	15,216	790	1,833	28,458
7	Indian Trail/Fairview Rd. - US 74	12,733	17,624	844	1,902	33,103
	<b>Total</b>	<b>53,867</b>	<b>77,533</b>	<b>4,338</b>	<b>10,150</b>	<b>145,888</b>

<b>II. Calendar Year - Toll Rates</b>					
Calendar Year 2019					
Toll Zone Number and Name	Class 1		Average Weighted Toll for Classes 2 and 3		
	BBM	ETC	BBM	ETC	
1	US 74 - Austin Chaney Rd.	\$ 0.65	\$ 0.42	\$ 2.16	\$ 1.40
2	Aystin Chaney Rd. - NC 200	0.86	0.56	2.86	1.86
3	NC 200 - US 601	0.39	0.25	1.30	0.83
4	US 601 - N. Rocky River Rd.	0.85	0.55	2.83	1.83
5	N. Rocky River Rd. - Union Indian Trail Rd.	0.29	0.19	0.97	0.63
6	Union Indian Trail Rd. - Indian Trail/Fairview Rd.	0.48	0.31	1.60	1.03
7	Indian Trail/Fairview Rd. - US 74	0.40	0.26	1.33	0.87

<b>III. Calendar Year - Estimated Average Weekday Gross Toll Revenue</b>						
Calendar Year 2019						
Toll Zone Number and Name	Class 1		Classes 2 and 3		All Vehicles	
	BBM	ETC	BBM	ETC		
1	US 74 - Austin Chaney Rd.	\$ 2,114	\$ 1,972	\$ 755	\$ 1,152	\$ 5,993
2	Aystin Chaney Rd. - NC 200	3,698	3,564	1,136	1,783	10,182
3	NC 200 - US 601	2,387	2,219	705	1,067	6,378
4	US 601 - N. Rocky River Rd.	6,649	6,359	1,864	2,863	17,735
5	N. Rocky River Rd. - Union Indian Trail Rd.	2,616	2,507	734	1,123	6,980
6	Union Indian Trail Rd. - Indian Trail/Fairview Rd.	5,097	4,717	1,264	1,888	12,966
7	Indian Trail/Fairview Rd. - US 74	5,093	4,582	1,122	1,655	12,453
	<b>Total</b>	<b>\$ 27,654</b>	<b>\$ 25,920</b>	<b>\$ 7,580</b>	<b>\$ 11,532</b>	<b>\$ 72,686</b>

<b>Annualization Procedure</b> (in thousands)		
Annualization Factor: 327.3 days per year		
Period	Annual Toll Transactions	Annual Gross Toll Revenue
Calendar Year (CY) 2019	47,745	\$23,789
Apply Ramp-Up Factor To CY 2019	0.60	0.60
Dampened CY 2019	28,647	\$14,273
Conversion to Fiscal Year 2019		
Half of CY 2019 (January-June)	14,324	\$7,137

### 6.9.3 Calendar Year 2019 Ramp-Up Adjustment

The annualized transactions and toll revenue were dampened to reflect “ramp-up” in 2019. With new toll facilities, it often takes time for motorists to learn about the new road and change their travel patterns, particularly for motorists who may use the road infrequently or live far from the road. It also accounts for the time it takes motorists to learn about and feel comfortable with the toll collection methods, particularly if there aren’t existing toll roads in the area. The duration and level of ramp-up adjustments can be directly affected by a well-conceived promotion and signing program.

For the purposes of this study, a 36-month ramp-up period was assumed. The traffic and toll revenue forecasts for the first three years of operation was adjusted downward to reflect the time it will take to gradually build up to full demand. **Table 6.7** presents the ramp-up factors assumed for this study.

**Table 6.7**  
**Assumed Ramp-Up Factors**

<u>Calendar Year</u>	<u>Ramp-Up Factor (1)</u>
2019	0.600
2020	0.800
2021	0.950

1) Applied to calendar year transaction estimates.

After applying ramp-up to 2019 estimates, as seen in Table 6.6, the dampened annual toll transactions total 28.6 million, and the dampened toll revenue totals \$14.3 million.

### 6.9.4 Conversion of 2019 to a Fiscal Year

Transaction and toll revenue forecasts on a calendar year basis were divided in half and allocated to the appropriate fiscal year, which is assumed to run from July 1 of one calendar year to June 30 of the following calendar year. Because the Monroe Expressway is assumed to open on January 1, 2019, it will only be open for half of fiscal year 2019 (July 1, 2018 – June 30, 2019). As seen in Table 6.6, FY 2019 transactions and toll revenue are forecast to total 14.3 million and \$7.1 million respectively.

### 6.9.5 FY 2025, FY 2030 and FY 2040 Transactions and Toll Revenue

The same procedure as described in the previous sections for FY 2019 was followed to develop the fiscal year toll transactions and toll revenue. **Tables 6.8** and **6.9** illustrate the procedures to develop FY 2030 and FY 2040. In each of these instances, two adjacent calendar years are calculated, and re-allocated to form the fiscal year estimates. For example, FY 2030 is composed of half of calendar year 2029 and half of calendar year 2030. As mentioned previously, model years are 2019, 2025, 2030, and 2040. Intermediate years were developed by interpolating between assignment years. Ramp-up adjustments were not made to any assignment years except 2019. The same annualization assumptions were made for all assignment years.

**Table 6.8**  
**Development of FY 2030 Toll Transactions and Gross Toll Revenue Estimates**

I. Calendar Year - Estimated Average Weekday Toll Transactions										
Toll Zone Number and Name	Calendar Year 2029					Calendar Year 2030				
	Class 1		Classes 2 and 3		All Vehicles	Class 1		Classes 2 and 3		All Vehicles
	BBM	ETC	BBM	ETC		BBM	ETC	BBM	ETC	
1 US 74 - Austin Chaney Rd.	3,669	6,251	366	916	11,202	3,611	6,306	357	912	11,186
2 Austin Chaney Rd. - NC 200	5,319	9,481	474	1,238	16,511	4,667	8,413	388	1,016	14,483
3 NC 200 - US 601	6,542	11,568	551	1,441	20,103	6,749	12,118	590	1,547	21,004
4 US 601 - N. Rocky River Rd.	8,967	16,004	714	1,857	27,542	9,054	16,507	730	1,918	28,209
5 N. Rocky River Rd. - Unionville Indian Trail Rd.	10,624	18,742	841	2,169	32,376	10,721	19,342	866	2,257	33,186
6 Unionville Indian Trail Rd. - Indian Trail Fairview Rd.	12,494	21,578	872	2,218	37,161	12,607	22,276	899	2,312	38,095
7 Indian Trail Fairview Rd. - US 74	14,499	24,227	938	2,314	41,979	14,557	24,911	963	2,404	42,834
<b>Total</b>	<b>62,115</b>	<b>107,850</b>	<b>4,757</b>	<b>12,152</b>	<b>186,874</b>	<b>61,965</b>	<b>109,873</b>	<b>4,793</b>	<b>12,366</b>	<b>188,997</b>

II. Calendar Year - Toll Rates										
Toll Zone Number and Name	Calendar Year 2029					Calendar Year 2030				
	Class 1		Average Weighted Toll for Classes 2 and 3			Class 1		Average Weighted Toll for Classes 2 and 3		
	BBM	ETC	BBM	ETC		BBM	ETC	BBM	ETC	
1 US 74 - Austin Chaney Rd.	\$ 0.81	\$ 0.52	\$ 2.69	\$ 1.75		\$ 0.83	\$ 0.53	\$ 2.75	\$ 1.78	
2 Austin Chaney Rd. - NC 200	1.07	0.70	3.57	2.32		1.09	0.71	3.64	2.37	
3 NC 200 - US 601	0.49	0.31	1.62	1.03		0.50	0.32	1.65	1.06	
4 US 601 - N. Rocky River Rd.	1.06	0.69	3.53	2.28		1.08	0.70	3.60	2.33	
5 N. Rocky River Rd. - Unionville Indian Trail Rd.	0.36	0.24	1.21	0.79		0.37	0.24	1.23	0.80	
6 Unionville Indian Trail Rd. - Indian Trail Fairview Rd.	0.60	0.39	1.99	1.28		0.61	0.39	2.04	1.31	
7 Indian Trail Fairview Rd. - US 74	0.50	0.32	1.66	1.08		0.51	0.33	1.69	1.11	

III. Calendar Year - Estimated Average Weekday Gross Toll Revenue										
Toll Zone Number and Name	Calendar Year 2029					Calendar Year 2030				
	Class 1		Classes 2 and 3		All Vehicles	Class 1		Classes 2 and 3		All Vehicles
	BBM	ETC	BBM	ETC		BBM	ETC	BBM	ETC	
1 US 74 - Austin Chaney Rd.	\$ 2,972	\$ 3,251	\$ 985	\$ 1,603	\$ 8,810	\$ 2,997	\$ 3,342	\$ 982	\$ 1,624	\$ 8,945
2 Austin Chaney Rd. - NC 200	5,691	6,636	1,691	2,872	16,890	5,087	5,973	1,411	2,408	14,879
3 NC 200 - US 601	3,206	3,586	893	1,485	9,169	3,374	3,878	973	1,640	9,865
4 US 601 - N. Rocky River Rd.	9,506	11,043	2,521	4,233	27,302	9,778	11,555	2,629	4,468	28,430
5 N. Rocky River Rd. - Unionville Indian Trail Rd.	3,825	4,498	1,018	1,713	11,054	3,967	4,642	1,065	1,805	11,479
6 Unionville Indian Trail Rd. - Indian Trail Fairview Rd.	7,496	8,415	1,735	2,838	20,486	7,690	8,688	1,835	3,029	21,242
7 Indian Trail Fairview Rd. - US 74	7,250	7,753	1,558	2,499	19,059	7,424	8,221	1,627	2,668	19,940
<b>Total</b>	<b>\$39,945</b>	<b>\$45,182</b>	<b>\$10,401</b>	<b>\$17,242</b>	<b>\$112,770</b>	<b>\$40,318</b>	<b>\$46,299</b>	<b>\$10,522</b>	<b>\$17,643</b>	<b>\$114,781</b>

Annualization Procedure (rounded to thousands)		
Annualization Factor: 327.3 days per year		
Period	Annual Toll Transactions	Annual Gross Toll Revenue
Calendar Year (CY) 2029	61,159,000	\$ 36,907,000
Calendar Year (CY) 2030	61,854,000	\$ 37,565,000
Conversion to Fiscal Year		
Half of CY 2029	30,580,000	\$ 18,453,000
Half of CY 2030	30,927,000	\$ 18,783,000
<b>Total Fiscal Year 2030</b>	<b>61,507,000</b>	<b>\$ 37,236,000</b>

**Table 6.9  
Development of FY 2040 Toll Transactions and Gross Toll Revenue Estimates**

I. Calendar Year - Estimated Average Weekday Toll Transactions										
Toll Zone Number and Name	Calendar Year 2039					Calendar Year 2040				
	Class 1		Classes 2 and 3		All	Class 1		Classes 2 and 3		All
	BBM	ETC	BBM	ETC	Vehicles	BBM	ETC	BBM	ETC	Vehicles
1 US 74 - Austin Chaney Rd.	3,597	7,221	372	1,025	12,216	3,596	7,331	374	1,039	12,339
2 Austin Chaney Rd. - NC 200	4,726	9,870	419	1,185	16,201	4,733	10,047	422	1,206	16,408
3 NC 200 - US 601	6,653	13,960	624	1,785	23,022	6,642	14,181	628	1,814	23,265
4 US 601 - N. Rocky River Rd.	8,990	19,157	793	2,273	31,213	8,983	19,477	800	2,316	31,576
5 N. Rocky River Rd. - Unionville Indian Trail Rd.	10,607	22,439	943	2,691	36,681	10,595	22,812	952	2,745	37,104
6 Unionville Indian Trail Rd. - Indian Trail Fairview Rd.	12,468	25,895	976	2,754	42,093	12,453	26,332	985	2,808	42,577
7 Indian Trail Fairview Rd. - US 74	14,478	29,194	1,041	2,870	47,582	14,469	29,713	1,050	2,927	48,159
Total	61,520	127,736	5,168	14,584	209,008	61,470	129,892	5,212	14,854	211,429

II. Calendar Year - Toll Rates										
Toll Zone Number and Name	Calendar Year 2039				Calendar Year 2040					
	Class 1		Average Weighted Toll for Classes 2 and 3		Class 1		Average Weighted Toll for Classes 2 and 3			
	BBM	ETC	BBM	ETC	BBM	ETC	BBM	ETC		
1 US 74 - Austin Chaney Rd.	\$ 1.00	\$ 0.64	\$ 3.31	\$ 2.14	\$ 1.02	\$ 0.66	\$ 3.38	\$ 2.19		
2 Austin Chaney Rd. - NC 200	1.32	0.86	4.38	2.85	1.35	0.88	4.48	2.91		
3 NC 200 - US 601	0.60	0.38	1.99	1.27	0.61	0.39	2.04	1.30		
4 US 601 - N. Rocky River Rd.	1.30	0.84	4.33	2.80	1.33	0.86	4.43	2.86		
5 N. Rocky River Rd. - Unionville Indian Trail Rd.	0.44	0.29	1.49	0.96	0.45	0.30	1.52	0.99		
6 Unionville Indian Trail Rd. - Indian Trail Fairview Rd.	0.74	0.47	2.45	1.58	0.75	0.49	2.50	1.61		
7 Indian Trail Fairview Rd. - US 74	0.61	0.40	2.04	1.33	0.63	0.41	2.08	1.36		

III. Calendar Year - Estimated Average Weekday Gross Toll Revenue										
Toll Zone Number and Name	Calendar Year 2039					Calendar Year 2040				
	Class 1		Classes 2 and 3		All	Class 1		Classes 2 and 3		All
	BBM	ETC	BBM	ETC	Vehicles	BBM	ETC	BBM	ETC	Vehicles
1 US 74 - Austin Chaney Rd.	\$ 3,597	\$ 4,622	\$ 1,233	\$ 2,194	\$ 11,645	\$ 3,668	\$ 4,839	\$ 1,265	\$ 2,274	\$ 12,045
2 Austin Chaney Rd. - NC 200	6,239	8,488	1,834	3,379	19,940	6,389	8,841	1,892	3,509	20,632
3 NC 200 - US 601	3,992	5,305	1,242	2,267	12,805	4,052	5,530	1,281	2,358	13,221
4 US 601 - N. Rocky River Rd.	11,687	16,092	3,434	6,365	37,578	11,947	16,750	3,546	6,625	38,868
5 N. Rocky River Rd. - Unionville Indian Trail Rd.	4,667	6,507	1,406	2,584	15,164	4,768	6,844	1,448	2,717	15,776
6 Unionville Indian Trail Rd. - Indian Trail Fairview Rd.	9,227	12,171	2,391	4,351	28,139	9,340	12,903	2,462	4,521	29,225
7 Indian Trail Fairview Rd. - US 74	8,831	11,677	2,124	3,817	26,449	9,116	12,182	2,184	3,981	27,462
Total	\$48,239	\$64,862	\$13,662	\$24,956	\$151,720	\$49,279	\$67,889	\$14,077	\$25,986	\$157,230

Annualization Procedure (rounded to thousands)		
Annualization Factor: 327.3 days per year		
Period	Annual Toll Transactions	Annual Gross Toll Revenue
Calendar Year (CY) 2039	68,403,000	\$ 49,654,000
Calendar Year (CY) 2040	69,195,000	\$ 51,457,000
Conversion to Fiscal Year		
Half of CY 2039	34,201,000	\$ 24,827,000
Half of CY 2040	34,598,000	\$ 25,729,000
Total Fiscal Year 2040	68,799,000	\$ 50,556,000

## 6.10 Fiscal Year Gross Toll Transactions and Toll Revenue

This section presents annual toll transactions and annual gross toll revenue forecasts from FY 2019 through FY 2058. Gross toll revenue consists of toll revenue from all toll transactions, prior to accounting for leakage or processing fee revenue.

Estimated annual toll transactions by Class 1 and combined Class 2 and 3 vehicles is presented in **Table 6.10** and **Figure 6.10**. Annual transactions are expected to increase from 14.3 million in FY 2019, to 57.3 million in FY 2025, 61.5 million in FY 2030, and 68.8 million in FY 2040. Traffic estimates for FY 2019 through FY 2022 were adjusted downward to reflect the three-year ramp-up period as discussed in Section 6.8.3.

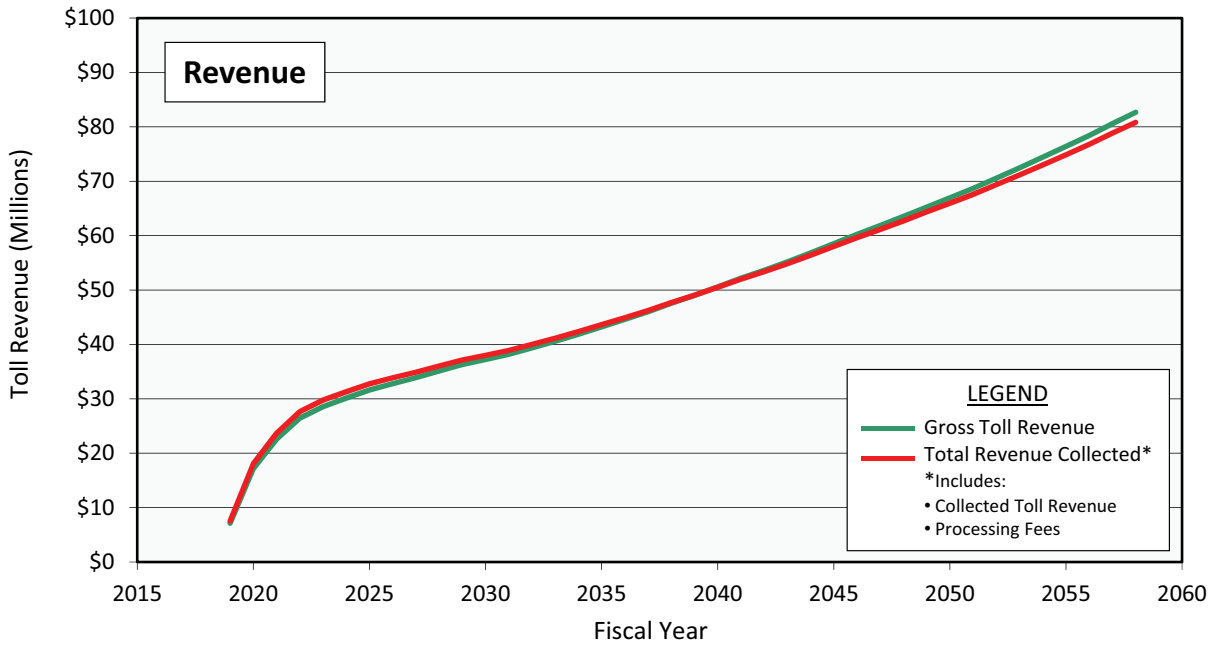
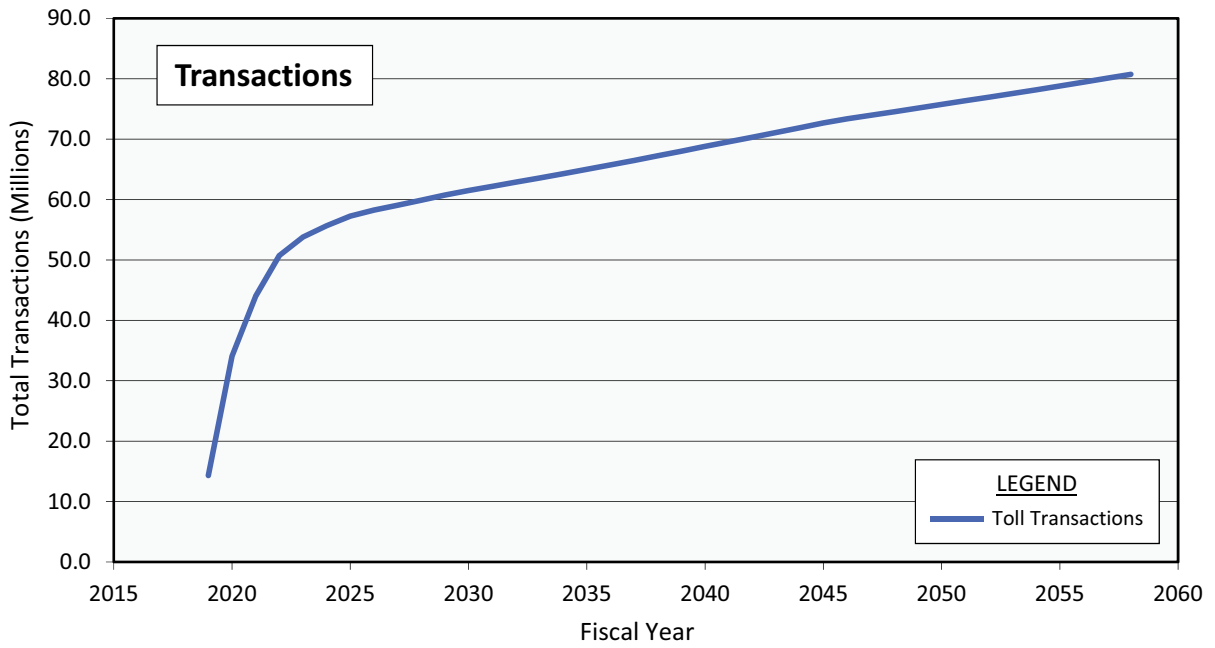
**Table 6.10**  
**Estimated Annual Toll Transactions for Monroe Expressway**  
**(in thousands)**

Fiscal Year (1)	Class 1			Classes 2 and 3			All Vehicles			Percent ETC
	BBM	ETC	Total	BBM	ETC	Total	BBM	ETC	Total	
2019 (2,3)	5,289	7,612	12,901	426	997	1,422	5,715	8,609	14,324	60.1
2020 (3)	12,521	18,203	30,724	1,002	2,355	3,358	13,523	20,559	34,082	60.3
2021 (3)	16,040	23,714	39,754	1,271	3,009	4,280	17,311	26,723	44,034	60.7
2022 (3)	18,317	27,537	45,854	1,436	3,427	4,863	19,753	30,965	50,717	61.1
2023	19,261	29,455	48,716	1,494	3,594	5,088	20,755	33,049	53,804	61.4
2024	19,754	30,735	50,489	1,516	3,676	5,192	21,270	34,411	55,682	61.8
2025	20,124	31,853	51,977	1,531	3,743	5,274	21,655	35,596	57,251	62.2
2026	20,253	32,676	52,929	1,538	3,794	5,332	21,791	36,470	58,261	62.6
2027	20,274	33,403	53,677	1,543	3,845	5,388	21,817	37,248	59,065	63.1
2028	20,295	34,148	54,443	1,549	3,897	5,446	21,844	38,045	59,889	63.5
2029	20,317	34,911	55,228	1,554	3,950	5,504	21,871	38,861	60,732	64.0
2030	20,304	35,628	55,932	1,563	4,012	5,575	21,867	39,640	61,507	64.4
2031	20,271	36,262	56,534	1,575	4,084	5,660	21,847	40,347	62,193	64.9
2032	20,255	36,874	57,129	1,588	4,160	5,748	21,844	41,034	62,878	65.3
2033	20,239	37,497	57,735	1,602	4,237	5,839	21,841	41,733	63,574	65.6
2034	20,223	38,129	58,352	1,615	4,315	5,931	21,838	42,445	64,283	66.0
2035	20,206	38,773	58,979	1,629	4,395	6,024	21,835	43,168	65,003	66.4
2036	20,190	39,427	59,618	1,643	4,476	6,119	21,833	43,904	65,737	66.8
2037	20,174	40,093	60,267	1,656	4,559	6,216	21,831	44,652	66,483	67.2
2038	20,158	40,770	60,928	1,670	4,644	6,314	21,828	45,413	67,242	67.5
2039	20,142	41,458	61,600	1,684	4,730	6,414	21,826	46,187	68,014	67.9
2040	20,126	42,158	62,283	1,699	4,817	6,516	21,824	46,975	68,799	68.3
2041	20,090	42,877	62,967	1,709	4,895	6,603	21,799	47,772	69,570	68.7
2042	20,035	43,616	63,652	1,714	4,961	6,676	21,750	48,578	70,327	69.1
2043	19,981	44,369	64,349	1,720	5,029	6,749	21,701	49,398	71,098	69.5
2044	19,926	45,134	65,060	1,725	5,098	6,823	21,652	50,231	71,883	69.9
2045	19,872	45,912	65,784	1,731	5,167	6,899	21,603	51,079	72,683	70.3
2046	19,822	46,589	66,411	1,734	5,230	6,964	21,556	51,819	73,375	70.6
2047	19,777	47,161	66,938	1,734	5,286	7,019	21,510	52,447	73,957	70.9
2048	19,731	47,741	67,472	1,733	5,342	7,076	21,465	53,083	74,548	71.2
2049	19,686	48,327	68,013	1,733	5,399	7,132	21,419	53,726	75,146	71.5
2050	19,641	48,921	68,562	1,733	5,457	7,190	21,374	54,377	75,751	71.8
2051	19,589	49,519	69,108	1,732	5,515	7,247	21,321	55,034	76,355	72.1
2052	19,530	50,121	69,651	1,731	5,574	7,304	21,261	55,695	76,956	72.4
2053	19,471	50,731	70,202	1,730	5,633	7,363	21,201	56,364	77,564	72.7
2054	19,412	51,348	70,760	1,729	5,693	7,421	21,141	57,041	78,182	73.0
2055	19,353	51,973	71,327	1,727	5,753	7,481	21,081	57,727	78,807	73.3
2056	19,295	52,606	71,901	1,726	5,814	7,541	21,021	58,420	79,441	73.5
2057	19,236	53,246	72,482	1,725	5,876	7,601	20,962	59,122	80,084	73.8
2058	19,178	53,894	73,072	1,724	5,939	7,663	20,902	59,832	80,735	74.1

1) Fiscal year extends from July 1 through June 30.

2) Monroe Expressway assumed to open on January 1, 2019. Only 6 months of operation are assumed in FY 2019.

3) Includes an assumed ramp-up to full traffic volumes.



**ESTIMATED ANNUAL TOLL  
TRANSACTIONS AND REVENUE**



FIGURE 6.10

The ETC market share is anticipated to range from about 60 percent of total transactions in FY 2019 to about 68 percent in FY 2040. **Table 6.11** shows the targeted ETC and BBM market shares, by calendar year, and the resulting ETC and BBM market shares from the model results. As shown in the table, the model market shares closely match with the targeted values.

**Table 6.11**  
Annual Weekday ETC Market Share of Total Transactions  
On the Monroe Expressway

Calendar Year		Method-of-Payment Percent Market Share Targets					
		Class 1 Vehicles			Class 2 and 3 Vehicles		
		ETC	BBM	Total	ETC	BBM	Total
2019	(1)	59.0	41.0	100.0	70.0	30.0	100.0
2025		61.5	38.5	100.0	71.0	29.0	100.0
2030		64.0	36.0	100.0	72.0	28.0	100.0
2040		68.0	32.0	100.0	74.0	26.0	100.0

Calendar Year		Model Results - Percent Method of Payment Market Share					
		Class 1 Vehicles			Class 2 and 3 Vehicles		
		ETC	BBM	Total	ETC	BBM	Total
2019	(1)	59.0	41.0	100.0	70.1	29.9	100.0
2025		61.3	38.7	100.0	71.0	29.0	100.0
2030		63.7	36.3	100.0	72.0	28.0	100.0
2040		67.7	32.3	100.0	73.9	26.1	100.0

1) Assumes the Monroe Expressway opens on January 1, 2019.

Transaction forecasts through 2040 were based on modeling results. Transactions after 2040 were based on extrapolating growth rates, taking into account prior year experience. Transactions between FY 2040 and FY 2058 were assumed to increase at the rates shown in **Table 6.12**.

**Table 6.12**  
Outer Year Annual Transaction and Revenue  
Growth Rate Assumptions: 2040 – 2058

FY Period	Annual Growth Rate	
	Toll Transactions	Toll Revenue
2040 - 2045	1.1%	3.0%
2045 - 2058	0.8%	2.7%

ETC market share is forecast to increase from 2040 through 2058, ranging from an ETC market share of about 68 percent in 2040 to about 74 percent in 2040. Throughout the forecast period, BBM transactions generally decline, as the proportion of ETC transactions is assumed to gradually increase.

Annual revenue estimates are provided in **Table 6.13** and illustrated in Figure 6.9. Toll revenue estimates are provided for Class 1 and combined Class 2 and 3 vehicles, and by method of payment. The total annual gross toll revenue is expected to increase from about \$7.1 million in FY 2019 to about \$82.7 million in FY 2058. This reflects the impact of both traffic growth and annual toll increases. Toll revenue estimates for the first four fiscal years is dampened to reflect ramp-up. The assumed annual growth rates for gross toll revenue past the last modeling year of 2040 are shown in Table 6.12. Toll revenue growth was assumed to average 3.0 percent per year from 2040 to 2045, and 2.7 percent per year from 2045 to 2058.

ETC toll revenue is expected to account for about 53 percent of the total gross toll revenue in FY 2025, 60 percent in 2040, and 66 percent in 2058. In comparison, the ETC transactions are expected to comprise about 62 percent in FY 2025, 68 percent in FY 2040, and 74 percent in FY 2058. The lower ETC toll revenue percentages, compared to ETC transaction percentages, are due to the discounted toll that ETC users receive.

## 6.11 Fiscal Year Net Toll Revenue

This section describes the process by which gross toll revenue was adjusted to reflect unbillable and uncollectible BBM toll transactions. Net toll revenue consists of total collected toll revenue and processing fee revenue. Assumptions contained in this section are based on current NCTA business rules and recent actual experience on the Triangle Expressway.

### 6.11.1 Unbillable Bill by Mail Transaction Assumptions

Video tolling, while not new, contains inherent risks associated with various steps in the toll collection process. For example, it is possible that some plates may not be properly read, or vehicle owner address information with DMV records is incomplete. During calendar year 2015 NCTA was able to invoice 90.2 percent of Bill by Mail toll transactions on the Triangle Expressway. Approximately 6.7 percent of total Bill by Mail transactions were unbillable based on license plate images that could not be processed due to missing, blocked or damaged license plates, unreadable images, or other reasons. An additional 3.1 percent of Bill by Mail transactions were unbillable based on insufficient vehicle owner address information. Based on this information, 9.8 percent of forecast Monroe Expressway Bill by Mail transactions were assumed to be unbillable. In the development of net toll revenue estimates, expected toll revenue associated with unbillable Bill by Mail transactions was deducted from projected gross toll revenue.

### 6.11.2 Uncollectible Bill by Mail Revenue Assumptions

Under any video-tolling system, there is also an inherent collection risk of motorists who simply don't pay their invoices. Over the course of calendar years 2014 and 2015 NCTA was able to successfully collect 87.9 percent of invoiced Triangle Expressway Bill by Mail toll revenue. Based on this information 12.1 percent of billable Monroe Expressway Bill by Mail toll revenue was assumed to be uncollectible.



**Table 6.13**  
**Estimated Annual Gross Toll Revenue For Monroe Expressway (1)**  
 (in thousands \$)

Fiscal Year (2)	Class 1			Classes 2 and 3			All Vehicles			Percent ETC
	BBM	ETC	Total	BBM	ETC	Total	BBM	ETC	Total	
2019 (3,4)	\$2,715	\$2,545	\$5,260	\$744	\$1,132	\$1,876	\$3,459	\$3,677	\$7,137	51.5 %
2020 (4)	6,516	6,173	12,688	1,773	2,708	4,481	8,289	8,880	17,169	51.7
2021 (4)	8,526	8,212	16,739	2,295	3,534	5,829	10,822	11,747	22,568	52.0
2022 (4)	9,949	9,739	19,687	2,649	4,113	6,762	12,598	13,852	26,449	52.4
2023	10,717	10,630	21,347	2,818	4,407	7,225	13,535	15,037	28,572	52.6
2024	11,239	11,355	22,594	2,925	4,608	7,532	14,164	15,963	30,126	53.0
2025	11,701	12,103	23,804	3,021	4,800	7,821	14,722	16,903	31,625	53.4
2026	12,053	12,654	24,707	3,106	4,983	8,089	15,159	17,636	32,796	53.8
2027	12,351	13,201	25,552	3,188	5,163	8,351	15,539	18,364	33,903	54.2
2028	12,647	13,842	26,489	3,270	5,347	8,618	15,917	19,190	35,107	54.7
2029	12,930	14,464	27,394	3,358	5,544	8,902	16,288	20,008	36,296	55.1
2030	13,134	14,970	28,104	3,424	5,709	9,132	16,558	20,678	37,236	55.5
2031	13,322	15,467	28,790	3,494	5,890	9,384	16,816	21,357	38,173	55.9
2032	13,592	16,055	29,647	3,596	6,124	9,720	17,189	22,179	39,368	56.3
2033	13,861	16,668	30,529	3,703	6,360	10,062	17,563	23,028	40,591	56.7
2034	14,119	17,341	31,459	3,813	6,605	10,417	17,931	23,945	41,877	57.2
2035	14,411	18,039	32,450	3,926	6,866	10,792	18,337	24,905	43,242	57.6
2036	14,727	18,696	33,423	4,039	7,136	11,175	18,767	25,832	44,599	57.9
2037	15,043	19,390	34,433	4,156	7,420	11,576	19,199	26,809	46,009	58.3
2038	15,360	20,213	35,574	4,282	7,725	12,007	19,642	27,938	47,580	58.7
2039	15,653	20,930	36,583	4,409	8,025	12,434	20,061	28,956	49,017	59.1
2040	15,958	21,723	37,681	4,539	8,336	12,875	20,497	30,059	50,556	59.5
2041	16,269	22,577	38,846	4,661	8,653	13,313	20,930	31,230	52,159	59.9
2042	16,534	23,353	39,887	4,772	8,953	13,725	21,306	32,305	53,611	60.3
2043	16,806	24,229	41,034	4,884	9,259	14,143	21,690	33,488	55,177	60.7
2044	17,103	25,161	42,264	4,995	9,570	14,565	22,098	34,731	56,829	61.1
2045	17,398	26,152	43,551	5,113	9,885	14,998	22,511	36,038	58,549	61.6
2046	17,733	27,081	44,813	5,223	10,205	15,428	22,955	37,286	60,241	61.9
2047	18,049	27,965	46,014	5,325	10,519	15,843	23,373	38,484	61,857	62.2
2048	18,335	28,907	47,242	5,430	10,849	16,279	23,765	39,756	63,521	62.6
2049	18,668	29,869	48,537	5,537	11,191	16,728	24,204	41,061	65,265	62.9
2050	18,989	30,807	49,796	5,647	11,530	17,177	24,636	42,337	66,973	63.2
2051	19,292	31,762	51,054	5,759	11,884	17,643	25,051	43,646	68,697	63.5
2052	19,624	32,829	52,454	5,872	12,249	18,121	25,497	45,078	70,574	63.9
2053	19,974	33,872	53,846	5,984	12,634	18,618	25,958	46,506	72,464	64.2
2054	20,339	34,957	55,296	6,098	13,026	19,124	26,437	47,984	74,420	64.5
2055	20,668	36,094	56,761	6,217	13,424	19,641	26,884	49,518	76,402	64.8
2056	21,000	37,247	58,247	6,336	13,832	20,168	27,336	51,080	78,415	65.1
2057	21,371	38,498	59,869	6,461	14,260	20,720	27,831	52,758	80,590	65.5
2058	21,709	39,672	61,381	6,586	14,708	21,294	28,296	54,380	82,676	65.8

1) Excludes any allowance for uncollectible revenue.

2) Fiscal year extends from July 1 through June 30.

3) Monroe Expressway assumed to open on January 1, 2019. Only 6 months of operation are assumed in FY 2019.

4) Includes an assumed ramp-up to full traffic volumes.

### 6.11.3 Bill by Mail Processing Fee Revenue Assumptions

Under current NCTA business rules, Bill by Mail transactions are invoiced on a 35-day cycle. If a customer does not pay the first invoice for an unpaid toll, a \$6.00 processing fee is charged with the second invoice. A maximum of \$48.00 in processing fees may be assessed in a 12-month period. NCTA assesses an additional \$6.00 processing fee and a \$25.00 civil penalty as part of the third invoice if a Bill by Mail invoice remains unpaid. A maximum of \$50.00 in civil penalties may be assessed in a 12-month period. It is important to note only the processing fee revenue proceeds are retained by NCTA, thus civil penalties have not been considered as part of this analysis.

Over the course of calendar years 2014 and 2015, approximately 56.9 percent of invoiced Bill by Mail revenue was paid on the first invoice, approximately 15.3 percent was paid on the second invoice, and approximately 15.6 percent was paid on the third or later invoice. Based on this information it was assumed that 30.9 percent of Monroe Expressway Bill by Mail invoices will pay the \$6.00 processing fee associated with a second invoice. It was also assumed that 15.6 percent of the Monroe Expressway Bill by Mail invoices will pay the additional \$6.00 processing fee associated with a third or later invoice.

### 6.11.4 Net Toll Revenue

**Table 6.14** summarizes the estimated net toll revenue from FY 2019 through FY 2058. Toll revenue estimates are provided for Class 1 and combined Class 2 and 3 vehicles, and by method of payment. The total annual net toll revenue is expected to increase from about \$7.5 million in FY 2019 to about \$80.8 million in FY 2058. Toll revenue estimates for the first four fiscal years is dampened to reflect ramp-up. Net toll revenue exceeds gross toll revenue forecasts from FY 2019 through 2039. Net toll revenue is somewhat less than gross toll revenue from 2040 through 2058. This is because fee revenue becomes a smaller component of gross toll revenue over time due to several factors, including: 1) BBM transactions decrease over time as the ETC market share increases, thus the associated fee revenue decreases, and 2) the processing fee is assumed to remain constant throughout the forecast period, while toll rates are assumed to increase annually, therefore, fee revenue does not keep pace with increasing toll rates.

**Table 6.14**  
**Estimated Annual Net Toll Revenue For Monroe Expressway (1)**  
(in thousands \$)

Fiscal Year (2)	Collected Toll Revenue									Percent ETC	Fee Revenue	Net Toll Revenue
	Class 1			Classes 2 and 3			All Vehicles					
	BBM	ETC	Total	BBM	ETC	Total	BBM	ETC	Total			
2019 (3,4)	\$2,152	\$2,545	\$4,697	\$590	\$1,132	\$1,722	\$2,742	\$3,677	\$6,420	57.3 %	\$1,100	\$7,519
2020 (4)	5,165	6,173	11,338	1,406	2,708	4,113	6,571	8,880	15,451	57.5	2,603	18,055
2021 (4)	6,759	8,212	14,972	1,819	3,534	5,354	8,579	11,747	20,326	57.8	3,333	23,659
2022 (4)	7,887	9,739	17,626	2,100	4,113	6,213	9,987	13,852	23,839	58.1	3,805	27,644
2023	8,496	10,630	19,126	2,234	4,407	6,641	10,730	15,037	25,767	58.4	4,000	29,767
2024	8,910	11,355	20,265	2,319	4,608	6,926	11,228	15,963	27,191	58.7	4,100	31,292
2025	9,276	12,103	21,379	2,395	4,800	7,195	11,671	16,903	28,574	59.2	4,176	32,750
2026	9,555	12,654	22,209	2,462	4,983	7,445	12,018	17,636	29,654	59.5	4,202	33,856
2027	9,791	13,201	22,992	2,528	5,163	7,690	12,319	18,364	30,683	59.9	4,207	34,890
2028	10,026	13,842	23,868	2,593	5,347	7,940	12,619	19,190	31,808	60.3	4,212	36,020
2029	10,250	14,464	24,714	2,662	5,544	8,206	12,912	20,008	32,920	60.8	4,217	37,137
2030	10,412	14,970	25,382	2,714	5,709	8,423	13,126	20,678	33,805	61.2	4,215	38,020
2031	10,561	15,467	26,029	2,770	5,890	8,660	13,332	21,357	34,689	61.6	4,210	38,898
2032	10,776	16,055	26,830	2,851	6,124	8,975	13,627	22,179	35,805	61.9	4,208	40,013
2033	10,988	16,668	27,657	2,935	6,360	9,295	13,924	23,028	36,951	62.3	4,206	41,157
2034	11,193	17,341	28,533	3,023	6,605	9,627	14,215	23,945	38,161	62.7	4,204	42,365
2035	11,425	18,039	29,464	3,112	6,866	9,978	14,537	24,905	39,442	63.1	4,202	43,645
2036	11,675	18,696	30,371	3,202	7,136	10,338	14,878	25,832	40,710	63.5	4,200	44,910
2037	11,926	19,390	31,315	3,295	7,420	10,714	15,220	26,809	42,030	63.8	4,198	46,228
2038	12,177	20,213	32,390	3,394	7,725	11,119	15,571	27,938	43,510	64.2	4,197	47,706
2039	12,409	20,930	33,339	3,495	8,025	11,520	15,904	28,956	44,860	64.5	4,195	49,054
2040	12,651	21,723	34,374	3,598	8,336	11,934	16,249	30,059	46,308	64.9	4,193	50,501
2041	12,897	22,577	35,474	3,695	8,653	12,348	16,592	31,230	47,822	65.3	4,187	52,009
2042	13,108	23,353	36,460	3,783	8,953	12,736	16,891	32,305	49,196	65.7	4,177	53,373
2043	13,323	24,229	37,552	3,872	9,259	13,131	17,195	33,488	50,682	66.1	4,166	54,849
2044	13,559	25,161	38,719	3,960	9,570	13,530	17,518	34,731	52,250	66.5	4,156	56,405
2045	13,793	26,152	39,945	4,053	9,885	13,939	17,846	36,038	53,884	66.9	4,146	58,029
2046	14,058	27,081	41,139	4,141	10,205	14,346	18,198	37,286	55,484	67.2	4,136	59,620
2047	14,309	27,965	42,273	4,221	10,519	14,740	18,530	38,484	57,013	67.5	4,127	61,140
2048	14,535	28,907	43,442	4,305	10,849	15,154	18,840	39,756	58,596	67.8	4,118	62,714
2049	14,799	29,869	44,669	4,389	11,191	15,581	19,188	41,061	60,249	68.2	4,109	64,358
2050	15,054	30,807	45,861	4,477	11,530	16,006	19,530	42,337	61,867	68.4	4,100	65,967
2051	15,294	31,762	47,056	4,566	11,884	16,449	19,860	43,646	63,505	68.7	4,089	67,595
2052	15,557	32,829	48,387	4,655	12,249	16,904	20,213	45,078	65,291	69.0	4,077	69,368
2053	15,835	33,872	49,707	4,744	12,634	17,378	20,579	46,506	67,085	69.3	4,065	71,150
2054	16,124	34,957	51,081	4,834	13,026	17,861	20,958	47,984	68,942	69.6	4,053	72,995
2055	16,385	36,094	52,478	4,928	13,424	18,352	21,313	49,518	70,831	69.9	4,041	74,872
2056	16,648	37,247	53,895	5,023	13,832	18,855	21,671	51,080	72,750	70.2	4,030	76,780
2057	16,942	38,498	55,440	5,122	14,260	19,381	22,064	52,758	74,822	70.5	4,018	78,840
2058	17,210	39,672	56,882	5,221	14,708	19,930	22,432	54,380	76,812	70.8	4,006	80,818

- 1) Net toll revenue consists of total collected toll revenue and processing fee revenue.
- 2) Fiscal year extends from July 1 through June 30.
- 3) Monroe Expressway assumed to open on January 1, 2019. Only 6 months of operation are assumed in FY 2019.
- 4) Includes an assumed ramp-up to full traffic volumes.

## 6.12 Disclaimer

Current accepted professional practices and procedures were used in the development of these updated traffic and revenue forecasts. However, as with any forecast of the future, it should be understood that there may be differences between forecasted and actual results caused by events and circumstances beyond the control of CDM Smith. In formulating its forecasts, CDM Smith has reasonably relied upon the accuracy and completeness of information provided (both written and oral) by the NCDOT/NCTA and other local and state agencies. CDM Smith also has relied upon the reasonable assurances of some independent parties and is not aware of any facts that would make such information misleading.

CDM Smith has made qualitative judgments related to several key variables in the development and analysis of the traffic and revenue forecasts that must be considered as a whole; therefore, selecting portions of any individual result without consideration of the intent of the whole may create a misleading or incomplete view of the results and the underlying methodologies used to obtain the results. CDM Smith gives no opinion as to the value or merit to partial information extracted from this report.

All forecasts and projections reported herein are based on CDM Smith's experience and judgment and on a review of information obtained from multiple state and local agencies, including NCDOT/NCTA, by an independent third party. These estimates and projections may not be indicative of actual or future values, and are therefore subject to substantial uncertainty. Future developments cannot be predicted with certainty, and may affect the forecasts or projections expressed in this report, such that CDM Smith does not specifically guarantee or warrant any forecasts or projections contained within this report.

While CDM Smith believes that some of the projections or other forward-looking statements contained within the report are based on reasonable assumptions as of the date in the report, such forward looking statements involve risks and uncertainties that may cause actual results to differ materially from the results predicted. Therefore, following the date of this report, CDM Smith will take no responsibility or assume any obligation to advise of changes that may affect its assumptions contained within the report, as they pertain to: socioeconomic and demographic forecasts, proposed residential or commercial land use development projects and/or potential improvements to the regional transportation network.

CDM Smith is not, and has not been, a municipal advisor as defined in Federal law (the Dodd Frank Bill) to NCDOT/NCTA and does not owe a fiduciary duty pursuant to Section 15B of the Exchange Act to NCDOT/NCTA with respect to the information and material contained in this report. CDM Smith is not recommending and has not recommended any action to NCDOT/NCTA. NCDOT/NCTA should discuss the information and material contained in this report with any and all internal and external advisors that it deems appropriate before acting on this information.

## Chapter 7

# Sensitivity Tests

Five tests were conducted to determine the sensitivity of the Base Condition annual transaction and toll revenue forecasts to changes in key study assumptions. The sensitivity tests were conducted for calendar years 2019 and 2040. The results were converted to fiscal year (FY) and are reported for FY 2019 and FY 2040. The following describes the five sensitivity tests:

1. **Reduced Economic Growth** – trip table growth in the MRM were reduced by 30 percent.
2. **Reduced Value of Time** - passenger car (Class 1) and truck (Classes 2 and 3) values of time were reduced by 25 percent.
3. **Increased ETC Market Share** - passenger car and truck ETC market shares were increased by 20 percent.
4. **Increased Motor Fuel Prices** – motor fuel prices were increased by 50 percent.
5. **Reduced Truck Market Share** – 25 percent of the forecast truck transactions on the Monroe Expressway were assumed to be passenger cars. Total toll transactions remained unchanged.

**Table 7.1** shows the Base Condition forecasts for fiscal year toll transactions, gross toll revenue, and net toll revenue. The results of the five sensitivity tests are also shown, including the difference and percent impact between the sensitivity test forecast and the Base Condition forecast. The percent impact of each sensitivity test compared to the Base Condition net toll revenue forecast is graphically shown in **Figure 7.1**.

## 7.1 Reduced Economic Growth

The rate of trip table growth was reduced by 30 percent between 2015 and 2040 to simulate slower economic growth than assumed in the MRM model. As a result of the slower growth, toll transactions decreased by 13 percent in FY 2019 and 20 percent in FY 2040. Similarly, gross and net toll revenue decreased by 12 percent in FY 2019 and 18 percent in FY 2040. The percent impacts in 2040 are larger compared to the 2019 percent impacts because of the compounding nature of the reduced annual growth rates.

## 7.2 Reduced Value of Time

Motorist value of time (VOT) is an important factor in the modeling process, as it influences a driver's willingness to pay a toll in order to achieve a time savings by using the toll road. The VOT is based in part on the median household income in each traffic analysis zone in the MRM. Base Condition VOTs were reduced by 25 percent in calendar years 2019 and 2040, resulting in an estimated 11 percent and 10 percent decrease in transactions in FY 2019 and FY 2040, respectively. Annual gross and net toll revenue estimates were also reduced by about 11 and 10 percent in FY 2019 and FY 2040, respectively.

**Table 7.1**  
**Summary of Sensitivity Test Results on Fiscal Year Transaction and Toll Revenue Estimates**  
**(in thousands)**

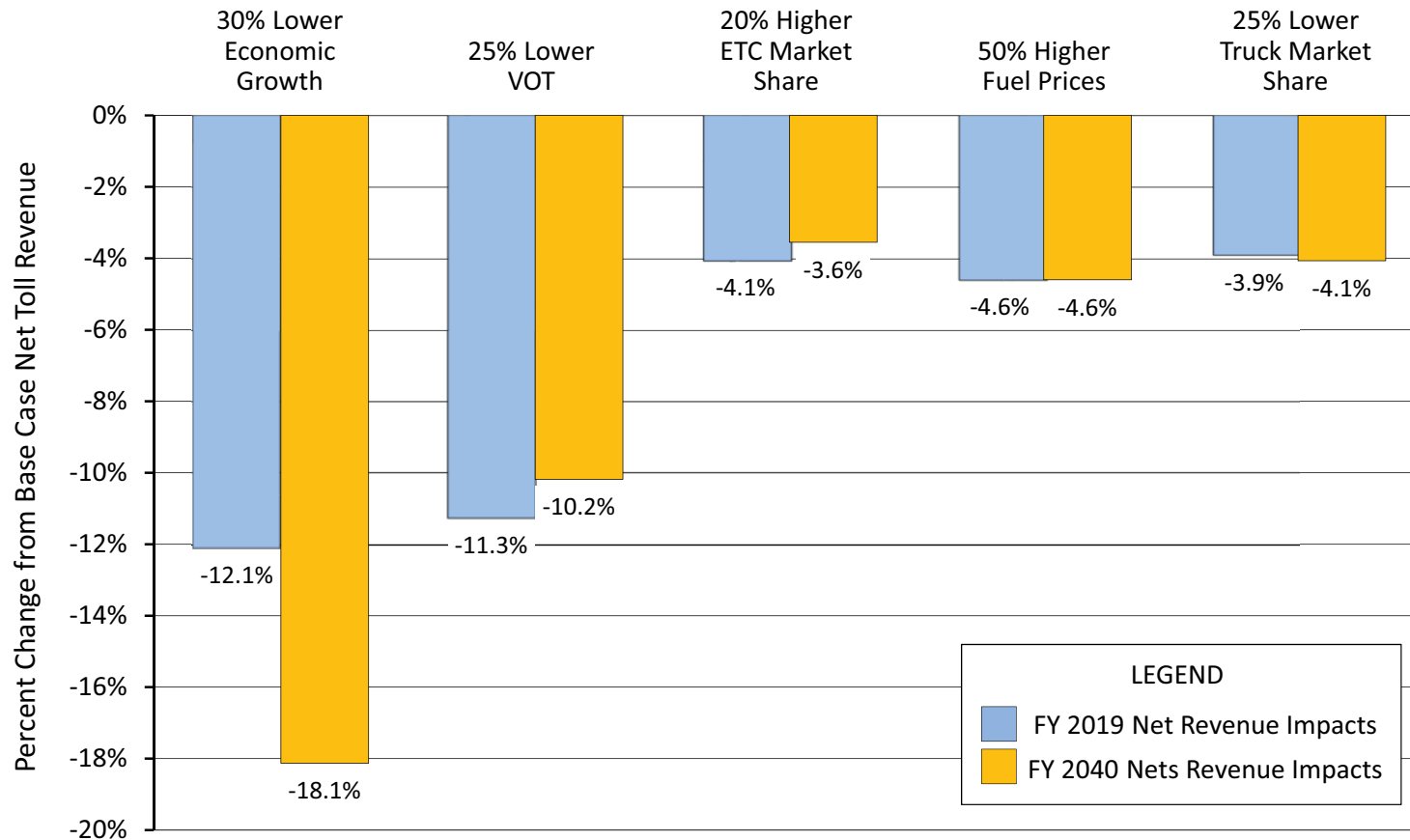
Base Condition and Sensitivity Scenarios	Annual Toll Transactions		Annual Gross Toll Revenue (7)		Annual Net Revenue (8)	
	2019 (6)	2040	2019 (6)	2040	2019 (6)	2040
Base Condition	14,324	68,799	\$7,137	\$50,556	\$7,519	\$50,501
<b>Sensitivity Scenarios</b>						
1 Overall Economic Growth Reduced by 30% (1)	12,422	55,326	\$6,274	\$41,392	\$6,610	\$41,347
Difference	(1,902)	(13,473)	(863)	(9,164)	(909)	(9,154)
Percent Difference	-13.3%	-19.6%	-12.1%	-18.1%	-12.1%	-18.1%
2 Value of Time Reduced by 25% (2)	12,806	61,938	\$6,334	\$45,408	\$6,673	\$45,359
Difference	(1,518)	(6,861)	(803)	(5,148)	(846)	(5,142)
Percent Difference	-10.6%	-10.0%	-11.3%	-10.2%	-11.3%	-10.2%
3 ETC Market Share Increased by 20% (3)	14,753	70,854	\$6,922	\$48,633	\$7,214	\$48,708
Difference	429	2,055	(215)	(1,923)	(305)	(1,793)
Percent Difference	3.0%	3.0%	-3.0%	-3.8%	-4.1%	-3.6%
4 Fuel Price Increased by 50% (4)	13,502	64,976	\$6,809	\$48,255	\$7,174	\$48,203
Difference	(822)	(3,823)	(328)	(2,301)	(345)	(2,298)
Percent Difference	-5.7%	-5.6%	-4.6%	-4.6%	-4.6%	-4.6%
5 Truck Market Share Reduced by 25% (5)	14,324	68,799	\$6,805	\$48,294	\$7,226	\$48,447
Difference	0	0	(332)	(2,262)	(293)	(2,054)
Percent Difference	0.0%	0.0%	-4.7%	-4.5%	-3.9%	-4.1%

1) 30 percent global reduction in MRM trip table growth from base year 2015 through 2040.  
2) Value of time is reduced by 25 percent for cars and trucks.  
3) Electronic toll collection market share is reduced by 20 percent for cars and trucks.  
4) Fuel price is increased by 50 percent.  
5) Truck transactions forecast for the Monroe Expressway are reduced by 25 percent. Those same transactions are assumed to be car transactions. Total transactions remain unchanged.  
6) Includes a dampening factor (ramp-up) on traffic and revenue.  
7) Total expected toll revenue for all toll transactions, prior to accounting for leakage or fee revenue.  
8) Total collected toll revenue and processing fee revenue.

## 7.3 Increased ETC Market Share

The Base Condition assumes that Class 1 ETC participation will increase from about 59 percent in calendar year 2019, to about 68 percent in 2040. Combined Class 2 and 3 ETC participation will increase from about 70 percent in 2019 to 74 percent in 2040. Conversely, the use of VTC is assumed to decrease over the years as ETC increases.

The increased ETC market share test assumes a 20 percent increase in ETC participation for all vehicle classes. In 2019 the Class 1 ETC market share would be 71 percent, reaching 82 percent in 2040. Because of the 35 percent discounted ETC toll rate, compared to the VTC rate, and a larger pool of ETC vehicles, the toll diversion assignment indicates that toll transactions would increase by about 3 percent in both FY 2019 and FY 2040. Annual gross toll revenue decreases by 3 percent in FY 2019 and 4 percent in FY 2040 due to the lower ETC toll rates. Net toll revenue also decreases by about 4 percent in FY 2019 and FY 2040.



**SENSITIVITY TESTS: NET REVENUE IMPACTS  
COMPARED TO BASE CONDITION**

## 7.4 Increased Motor Fuel Prices

Motor fuel prices can be volatile, and this test assumes that the Base Condition motor fuel prices increase by 50 percent in each assignment year. This change would result in higher operating costs for the motorist and likely result in reduced travel demand. To reflect the reduced travel demand, the trip tables were reduced by 5 percent. The motor vehicle operating cost was also increased to reflect the increase in motor fuel prices. Under this scenario, annual toll transactions decreased by 6 percent in FY 2019 and FY 2040, and annual gross and net toll revenues decreased by 5 percent in FY 2019 and FY 2040.

## 7.5 Reduced Truck Market Share

Truck toll rates are significantly higher than passenger car toll rates. Class 2 vehicles (those with 3 axles) pay twice the Class 1 (2 axle vehicles) toll rates, and Class 3 vehicles (those with 4 or more axles) pay four times the Class 1 toll rates. If the market share of Class 2 and Class 3 vehicles on the Monroe Expressway is reduced and converted to Class 1 vehicles, there would be a negative impact on toll revenue. For the sensitivity test, 25 percent of the Class 2 and 3 vehicles forecast to use the Monroe Expressway were assumed to be Class 1 vehicles. The total number of transactions remain unchanged from the Base Condition. Annual gross toll revenue decreased by 5 percent and net toll revenue decreased by 4 percent.



**APPENDIX D**

**GEC REPORT**

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# Engineering Report

## Monroe Expressway

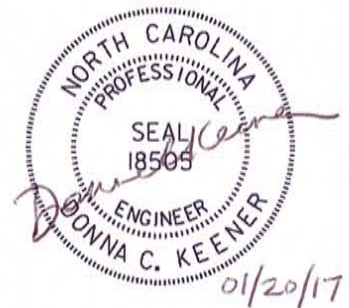
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# North Carolina Turnpike Authority

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John Collett

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Charles Travis, III

James Walker

## ***Executive Staff***

Beau Memory – Executive Director

Marvin Butler – Deputy Executive Director

\*James Trogdon, PE, has been appointed by Governor Cooper to serve as North Carolina Secretary of Transportation. He will take the oath of office on or about January 23, 2017. The Chairman position will remain vacant until the Board elects a new Chairman on February 2, 2017. Under the Bylaws of the Authority, the Vice-Chairman is authorized to act in the absence of a Chairman.

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## CHAPTER 1 | INTRODUCTION

This report documents and describes the location, engineering design features, project capital cost estimates, projected operation and maintenance expenses, renewal and replacement expenses, and the design-build procurement schedule for the proposed Monroe Expressway, the “Project”. This is a new location, all-electronic tolling (AET) project that will be funded, constructed, operated and maintained by the North Carolina Department of Transportation (NCDOT) and the North Carolina Turnpike Authority (NCTA).

The NCTA was created from a need to implement alternative financing to provide for key transportation projects during a time of rapid growth, dwindling resources and escalating construction costs. In October 2002, North Carolina Session Law 2002-133 created the NCTA. Since then, North Carolina has enacted legislation to further define the powers of NCTA, and to increase the number of projects that could be studied. The NCDOT is currently authorized to study, plan, develop, and undertake preliminary design work on an unlimited number of toll facilities in the state. At the conclusion of these activities, the NCDOT and NCTA are authorized to design, establish, finance, purchase, construct, operate, and maintain up to 11 toll facilities. The Monroe Expressway is the second of these projects to be financed and constructed.

### NORTH CAROLINA TURNPIKE AUTHORITY ORGANIZATION

In October 2002, legislation was passed authorizing the creation of the NCTA with the purpose to study, design, plan, construct, promote, own, finance and operate a system of toll roads, bridges, and/or tunnels supplementing the traditional non-toll transportation system serving the citizens of North Carolina (NC General Statute [GS] §136-89.182). By action of the North Carolina General Assembly, effective July 27, 2009, the Authority became a part of the North Carolina Department of Transportation (NCDOT), a public agency of the State of North Carolina.

The NCTA is governed by a nine-member Authority Board. The General Assembly appoints four representatives: two based upon the recommendation of the President Pro Tempore of the Senate, and two based upon the recommendation of the Speaker of the House of Representatives. The remaining members consist of the Secretary of Transportation, and four members appointed by the Governor. The following powers have been delegated by the Secretary to the Authority Board:

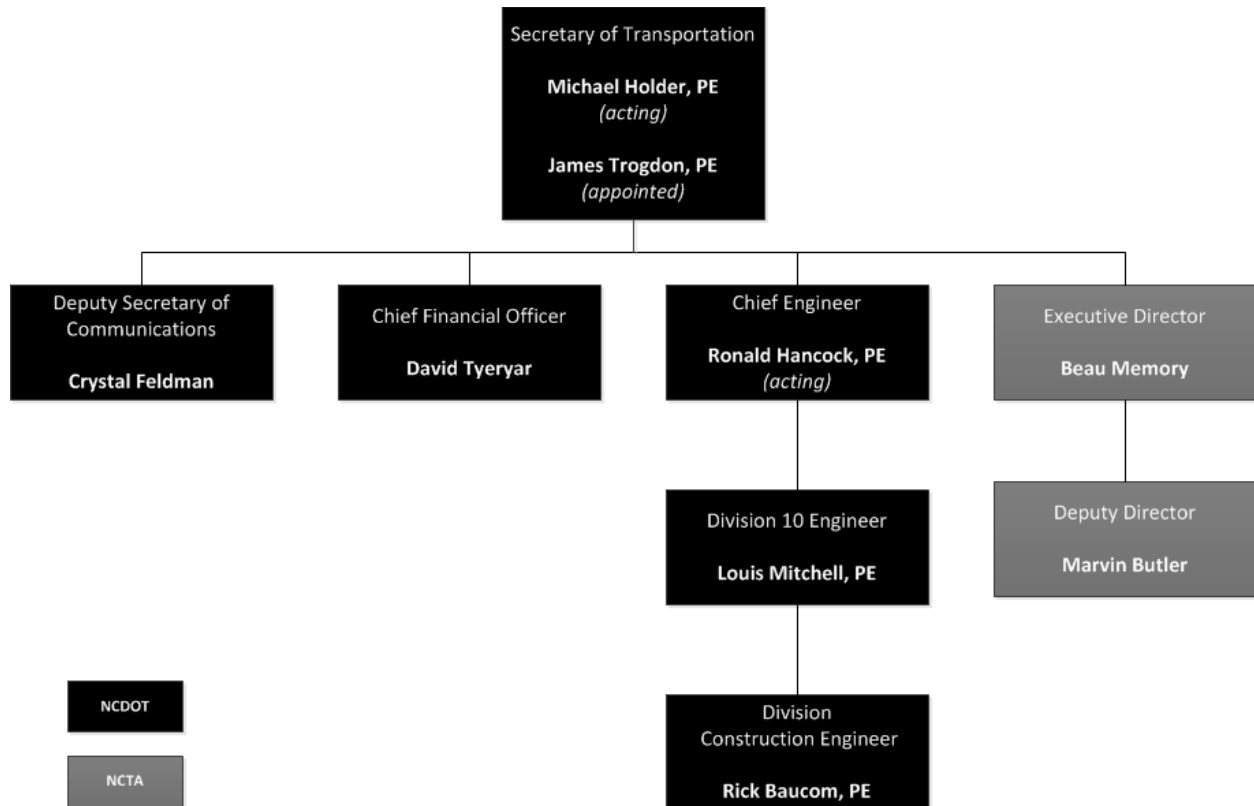
- Fix, revise, charge, and collect tolls and fees for Turnpike Projects pursuant to NCGS §136-89.183 (a)(5);
- Issue bonds or notes of the NCTA pursuant to NCGS §136-89.183(a)(6);
- Invest the proceeds of bonds or notes of the NCTA that are pending disbursement or other idle funds of the Authority in any investment authorized by NCGS §159-30 pursuant to NCGS §136-89.183 (6a); and,
- Exercise such additional powers as shall be necessary for the financing of Turnpike Projects through compliance with the associated bond documentation, including complying with any arbitrage, rebate or other federal tax filings and providing for secondary market disclosure; provided any such additional power may be subjected to conditions, including the involvement and participation of other portions of the North Carolina Department of Transportation, which are stated within the bond documentation and executed by the Secretary acting as the Secretary.

The following describes the reporting structure of the NCDOT and NCTA. (See also **Exhibit 1**):

- The NCDOT Secretary of Transportation is responsible for the oversight and management of departmental operations.

- The NCTA Executive Director is responsible for toll collection and traffic management on North Carolina’s toll roads; the Executive Director reports directly to the NCDOT Secretary of Transportation.
- The NCDOT Chief Engineer directs design, construction, and routine maintenance of the nearly 80,000 mile state highway system, including toll roads, in North Carolina, and also manages the 14 Division Offices. Monroe Expressway is located within Division 10.
- NCTA public outreach efforts are a part of the NCDOT Communications Office.
- NCTA financial activities are under the control of the NCDOT Chief Financial Officer.

**Exhibit 1: Organizational Chart**



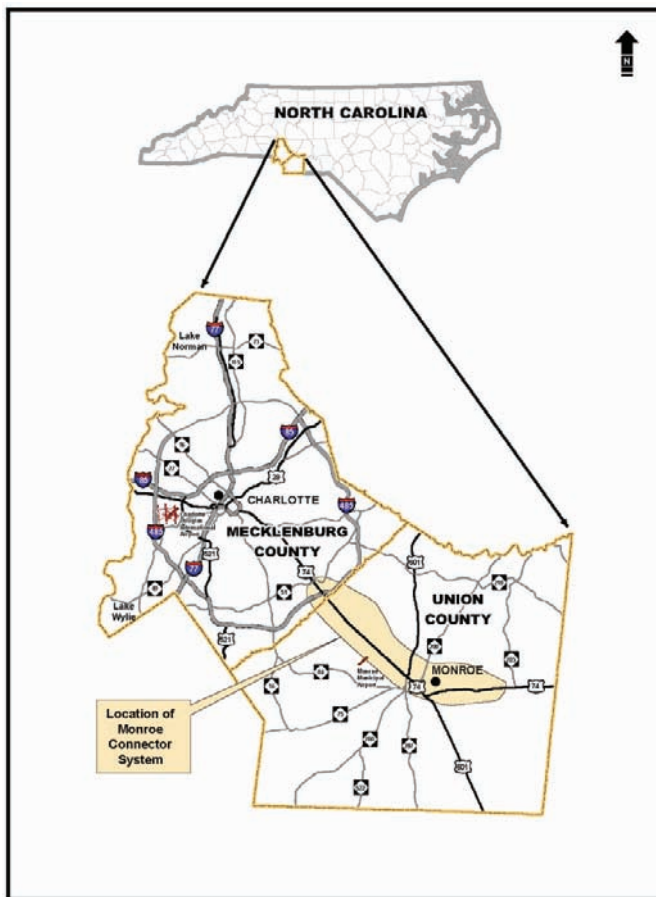
In order for a project to be considered for development as a toll facility, the legislation requires that the project be included in a locally adopted comprehensive transportation plan and be shown in the current NCDOT State Transportation Improvement Program (STIP) (GS§ 136-89.183[a][2]). Any toll road developed in the state must have a free alternate route (GS §136-89.197). All revenues from tolls are to be used to cover the cost of financing, operating and maintaining the road. Current legislation requires that when the toll revenue backed debt is retired, and financial obligations of the road are met, then tolls will be removed (GS §136-89.196).

## CHAPTER 2 | PURPOSE OF PROJECT

The Monroe Expressway (formerly referred to as the Monroe Bypass/Connector, and later as the Monroe Bypass) is located southeast of Charlotte, a fast growing area of the state, and is expected to improve mobility and capacity within the project study area by providing a new parallel facility for the US 74 corridor, extending from US 74 near I-485 in Mecklenburg County to US 74 between the towns of Wingate and Marshville in Union County. This will allow for high-speed regional travel, while maintaining access to properties along existing US 74. See **Exhibit 2** for the Regional Project Map.

US 74 is the major east-west route connecting the Charlotte region, a major population center and freight distribution point, to the North Carolina coast and the port at Wilmington (North Carolina’s largest port). In addition, US 74 is a primary transportation connection between Union County, which was the fastest growing county in North Carolina between 2000 and 2010, and Mecklenburg County/City of Charlotte, the economic hub of the region. Even though Union County is one of the fastest growing counties in the state, it is the only county having a major border with Mecklenburg County that does not have a high-speed interstate-type facility which connects it to Mecklenburg County. US 74 also serves as an important commercial corridor for Union County residents and businesses, with many retail, commercial, and employment centers having direct access to/from US 74. In Union County, employment is most strongly concentrated in the City of Monroe and/or along existing US 74.

### Exhibit 2: Regional Map



Currently, US 74 in the project area (from near I-485 in Mecklenburg County to between the towns of Wingate and Marshville in Union County) is a four-to six-lane arterial roadway with speed limits that range from 35 mph to 55 mph along the corridor. The weighted average posted speed limit is 49 mph. There is limited control of access along the facility; there are numerous driveway access points, turning points, and intersections, including 27 at-grade signalized intersections. Thus, traffic signals and the lack of access control cause slower speeds and congestion during typical weekday peak travel periods. An evaluation of real time travel information available from INRIX, Inc. and travel time field surveys (conducted as part of the NEPA documentation) demonstrated that average travel speeds during the morning and afternoon peak travel periods during the day, along existing US 74 did not reach 50 mph for the periods evaluated (2011, 2012 and 2013). There is a high level of existing and projected congestion along this route. As a vital intrastate corridor of regional, statewide, and national significance, the US 74 corridor is included in national, state and local transportation plans, and is a designated part of the National

Highway System Strategic Highway Network (STRAHNET). The STRAHNET includes roads that provide defense access, continuity, and emergency capabilities for movements of military personnel and equipment.

With Charlotte being the largest city in North Carolina, the Charlotte-Mecklenburg County region is a significant commercial center for the Carolinas. During the period between 2000 and 2010, both Union and Mecklenburg Counties experienced high population growth. North Carolina's population as a whole grew by 18.5 percent, while Union and Mecklenburg Counties grew at much faster rates (62.8 percent and 32.2 percent, respectively). As stated previously, Union County had the highest percentage of growth among all North Carolina Counties from 2000 to 2010. The largest percent increases in population from 2000 to 2010 generally occurred in and around the communities of Stallings and Indian Trail in western Union County and near Matthews within Mecklenburg County. These areas are in proximity to transportation infrastructure (including I-485) and the City of Charlotte. According to the 2012 Annual Mobility Report from Texas Transportation Institute, **the Charlotte urban area - the metropolitan area in NC and SC within and surrounding the city of Charlotte - ranked 25<sup>th</sup> in congestion per peak traveler in 2011, with the average peak traveler experiencing 40 hours of congestion per year.** An evaluation of congestion information since 1982 revealed a long-term increase in the yearly hours of delay per commuter of 32 hours.

Union County has a number of advantages relative to other parts of the region, including available land for development, high median income and good area schools. It has affordable housing relative to its median income level and one of the best school districts in the region, based on SAT scores and graduation rates. Despite having one of the highest average commute times over the last decade, Union County still has grown faster than any other county in the region. This finding suggests that factors other than accessibility to jobs are encouraging households to choose to locate in Union County. The factors driving these strong growth trends over the last decade are projected to continue to increase the population of Union County.

The county's proximity to employment centers in the Charlotte-Mecklenburg County urban area and relative affordability of housing has led to Union County's rapid development as a "bedroom community." A substantial percentage of Union County's residents commute to Mecklenburg County for work. According to the 2011 commuting patterns from the Employment Security Commission of North Carolina, approximately 57,875 (nearly 70 percent) of the 83,179 total workers residing in Union County commuted outside the county to work. Of those, approximately 65 percent (37,836) commuted to Mecklenburg County (Employment Security Commission of North Carolina Web site: <http://esesc23.esc.state.nc.us/WorkForceInDepth/>).

***By providing a controlled-access expressway, the proposed Project is expected to reduce travel times in the design year 2035 by up to 50 minutes for travelers and commuters on the US 74 corridor in Union County.*** This travel time savings is assuming a roundtrip along the length of the Project compared to an equivalent roundtrip along existing US 74 from east of Marshville to the US 74/I-485 interchange.

This improved accessibility could result in a shift of some residential and commercial/industrial growth in eastern Union County instead of northwestern or central Union County. These areas of eastern Union County are currently predominately rural.

Charlotte is a hub in trucking transportation with 329 trucking firms located in the Charlotte metropolitan area, including many of the nation's largest trucking companies. Approximately half of the nation's top 100 trucking firms have operations in Charlotte, including nine of the top 10 firms. Approximately 28,000 people are employed by the trucking industry in Charlotte. US 74 is the primary route connecting Charlotte to the Port of Wilmington; as a result, the existing facility has a very high percentage of truck traffic (13 percent), with future projections ranging from 18 - 24 percent along the Project, and 7-10% of trucks continuing to use the existing US 74. With the expansion of the Charlotte Intermodal Terminal, the nation's first inland port which opened in January 1984, and with container traffic



*Trucks make up > 13 percent of US 74 traffic.*

on the east coast expected to continue to increase, the existing US 74 corridor would become overwhelmed by truck traffic.

Much of the US 74 corridor between Charlotte and Wilmington has been upgraded to a controlled-access expressway facility. Only the section of US 74 in Union County, and a portion in Anson County, remains unimproved. This section of US 74, with more than two dozen signalized intersections, continues to be the primary impediment to efficient travel between Charlotte and eastern North Carolina. The Project will improve the deficiency of east-west transportation in Union County. The Project will decrease travel times through the corridor during

peak periods by up to 50 minutes in 2035. Truck traffic will be encouraged to use this facility because of the reliable travel times instead of clogging up the local US 74 route.

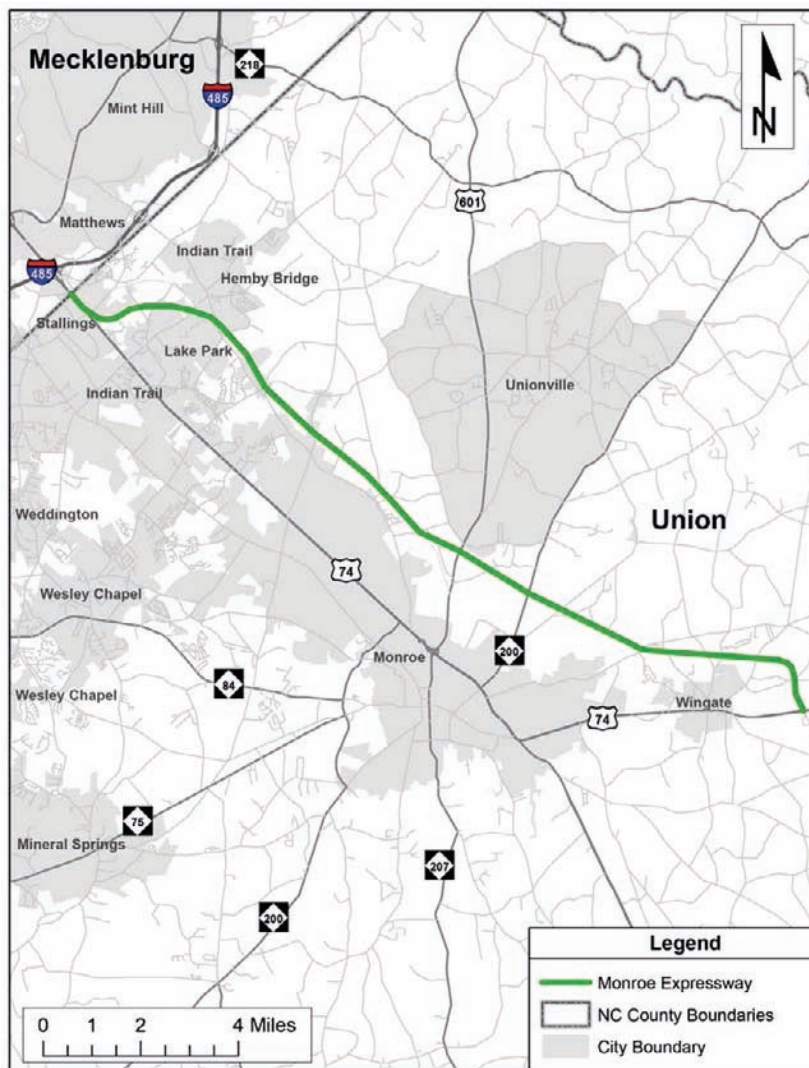
In addition, the **Project has been advocated by the North Carolina tourism industry**. The Project would support the state's tourism industry by connecting Charlotte and the southern Piedmont to beaches in South Carolina and southeastern North Carolina. With a less congested, quicker route, and significant travel time savings, residents of the Charlotte area may be encouraged to make more frequent trips to the beach.

Congestion reduces the efficiency of transportation infrastructure and increases travel time, air pollution, and fuel consumption. As noted before, the Charlotte urban area ranks 25<sup>th</sup> in congestion per peak traveler, with the average peak traveler experiencing 40 hours of congestion per year. This Project is seen as a major congestion reliever for this area of the Charlotte Metrolina Region.

## CHAPTER 3 | PROJECT DESCRIPTION

The Monroe Expressway is a four-lane controlled access toll facility. Tolls will be collected by an all-electronic toll collection system. There will be no cash toll booths. Existing US 74 will be improved for approximately 1.5 miles from just east of I-485; the improvements consist of elevating US 74 and constructing an adjacent pair of frontage roads to maintain access to the local street network and businesses. At the east end of the elevated section, a partial interchange will be constructed to access US 74 Bypass, i.e., the “Monroe Expressway.” The Expressway then proceeds eastward on a new location alignment from east of Stallings Road to the project terminus at existing US 74 between the towns of Wingate and Marshville. The total length of the new location alignment of the Monroe Expressway Project is approximately 18.1 miles (see **Exhibit 3**). From west to east, full interchanges will be located at Indian Trail-Fairview Road, Unionville-Indian Trail Road, Rocky River Road, US 601, NC 200, and Austin Chaney Road. Partial interchanges will be located with US 74 on each end of the Project. The roadway is being constructed under one highway design-build contract.

**Exhibit 3: Project Map**





## IMPROVEMENTS TO EXISTING US 74



The improvements to existing US 74 include an elevated six-lane controlled-access freeway, with two- or three-lane, one-way frontage roads on either side, for a total of 10 to 12 lanes. The length of the elevated section is approximately one mile. The number of lanes on the frontage roads varies depending on the proximity to U-turn locations, along with on and off-ramps. The six-lane non-tolled expressway portion of US 74 includes reconstructing US 74 on fill material with retaining walls, which allows the frontage roads to be built immediately at the base of the

retaining walls. The right-of-way width required for this section is approximately 260 feet.

## NEW LOCATION TOLL FACILITY

The 18-mile, new location tolled expressway will have four 12-foot travel lanes, 12-foot outside paved shoulders, and 4-foot inside paved shoulders. The median is 46' in width, and will be capable of accommodating one additional lane in each direction, if deemed warranted at a later date. The right-of-way width being acquired is approximately 300 feet, with additional right-of-way required for interchanges, frontage roads, and improvements to intersecting roads.

Grade separations are being provided between the toll road and several local roads and streams, as well as an existing mainline CSX rail line. The construction of the Project is typical for the area with structures limited to normal grade separations and flyovers.

The Project will contain seven mainline toll collection zones, for a tolled distance of approximately 18 miles. (See **Exhibits 4-6**):

### Exhibit 4: Toll Zone Locations

Toll Zone #	Toll Zone Locations	Distance (mi.)
1	Between US 74 & Indian Trail-Fairview Rd	1.87
2	Between Indian Trail-Fairview Rd & Unionville-Indian Trail Rd	2.24
3	Between Unionville-Indian Trail Rd & Rocky River Rd	1.38
4	Between Rocky River Rd & US 601	3.93
5	Between US 601 & NC 200	1.76
6	Between NC 200 & Austin Chaney Rd	3.97
7	Between Austin Chaney Rd & US 74 near Wingate	2.99
	Total Tolled Distance	18.14

Exhibit 5: Tolling Schematic – West End

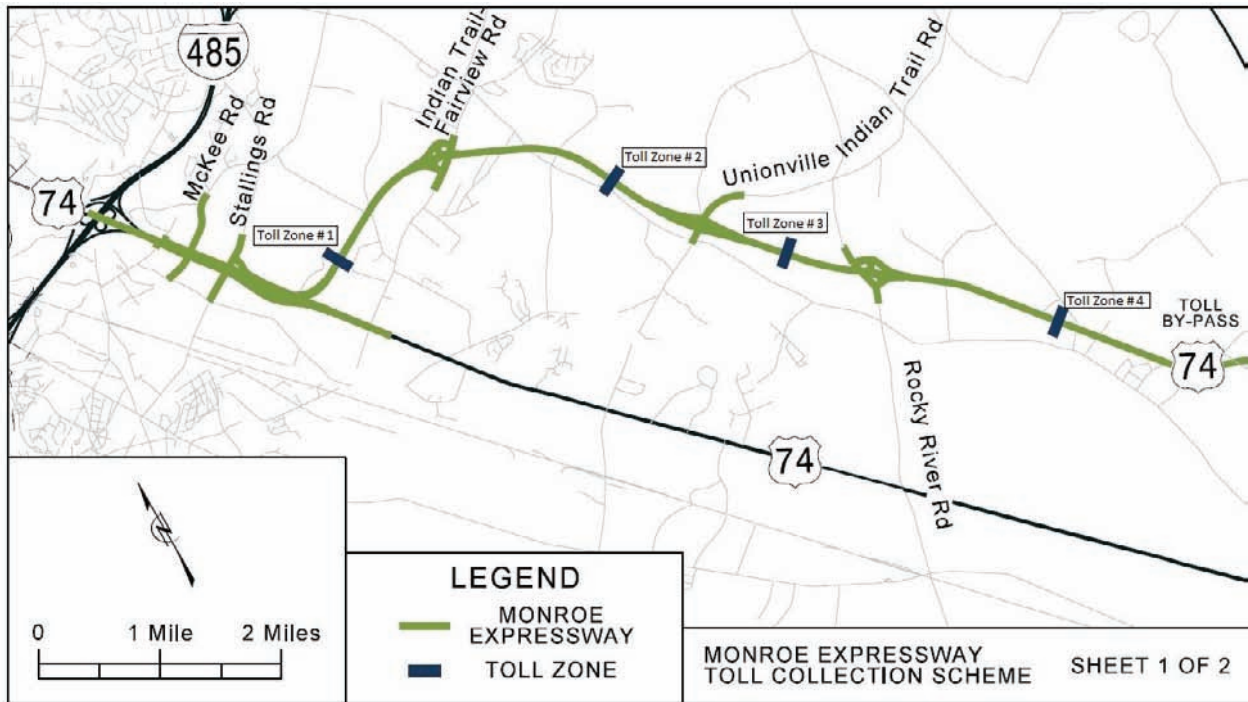
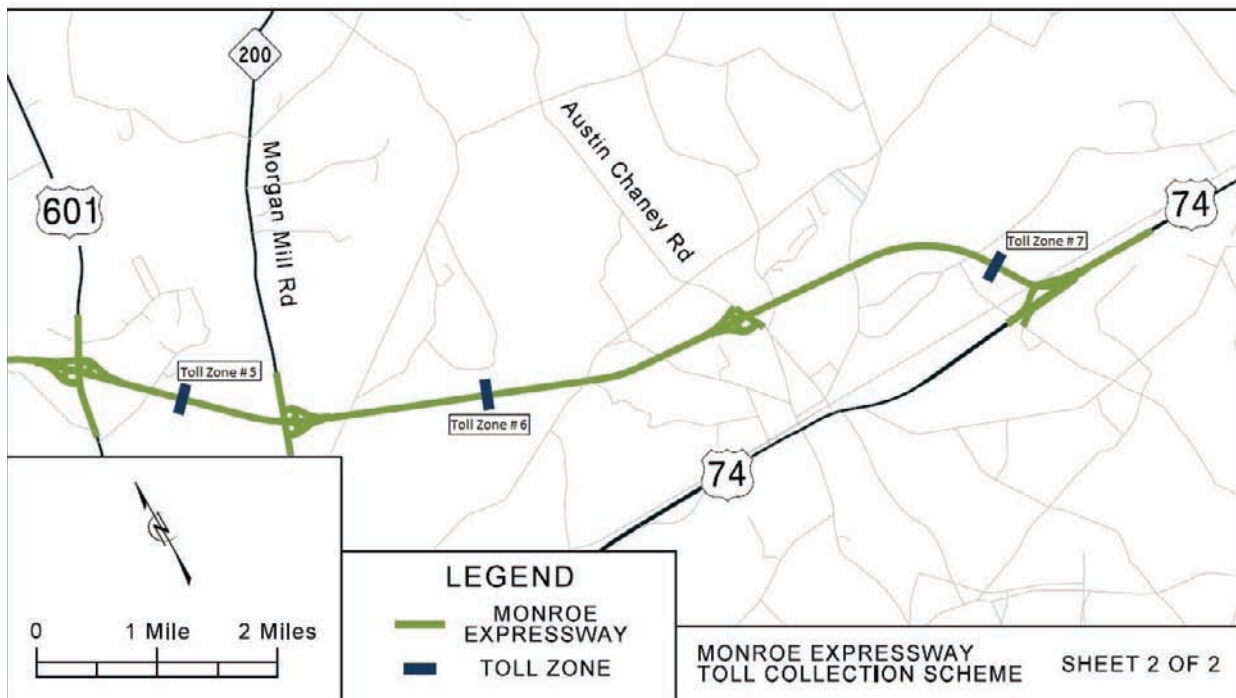


Exhibit 6: Tolling Schematic – East End





## CHAPTER 5 | PROJECT BACKGROUND & HISTORY

### PROJECT PLANNING

The preliminary planning and development of the corridor, including the required environmental reviews, was undertaken in accordance with the National Environmental Policy Act of 1969 (NEPA), FHWA regulations, NCDOT rules, and other applicable federal, state and local laws. Issues considered during the NEPA process included socioeconomic conditions in surrounding communities and environmental impacts, such as water resources (wetland, streams, and ponds), air quality, traffic noise, traffic, cultural resources, federally-protected species, community impacts and hazardous material sites. The planning for the Project was conducted by NCTA, NCDOT, and numerous consulting firms. The division FHWA office has been heavily involved in this Project since the project planning phase began for the Project. Representatives from the regional FHWA office attended all public meetings and hearings. Frequent discussions were also held with the FHWA to ensure project planning and environmental documents were in compliance with applicable federal statutes and regulations.

Preliminary designs for the Project were completed by external consultants contracted with the NCTA and NCDOT. Enhancements to the overall design, full definition of the ROW requirements, utility designs, and coordination with the design-build teams continued through award of the design-build contract. The NCTA is coordinating closely with NCDOT's Division 10 personnel and Raleigh-based design groups.

The Project will provide a number of benefits to the Metrolina region. While a project of this magnitude cannot be developed without some impacts to the environment, steps have been taken to avoid, minimize and mitigate those impacts to the greatest extent possible. Some of these steps are listed below.

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### STORMWATER

Stormwater drainage systems for the Project have been designed in accordance with the requirements of the National Pollutant Discharge Elimination System (NPDES) program. The Project also utilizes NCDOT's Best Management Practices for the protection of surface waters during construction. Other design features such as vegetated berms and swales were considered and incorporated into the roadway design where appropriate to mitigate any potential transfer of toxins or other nutrients into surface waters. Grass-lined ditches will be used instead of concrete pipes, where possible, in order to maximize nutrient and particulate removal. Detention and retention facilities will be utilized, as required, to maintain appropriate water discharge rates into existing tributaries. These measures will assist in the preservation of the existing ecosystem.

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### WETLANDS AND STREAMS

A rigorous evaluation was undertaken to avoid and minimize the Project's impacts on wetlands and streams. Mitigation was required for all unavoidable impacts to jurisdictional wetlands and streams. Mitigation needs for the Project were provided through the North Carolina Division of Mitigation Services (formerly called the North Carolina Ecosystem Enhancement Program). Bridges will be utilized, where practical and feasible, to span wetlands and streams.

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## PROTECTED SPECIES

Informal Section 7 Consultation with the US Fish and Wildlife Service was completed to determine the effect of the Project on federally-protected species in the project area, in accordance with the Endangered Species Act of 1973. The Project was designed to avoid direct impacts to the Carolina heelsplitter by avoiding sensitive watersheds and to the Schweinitz's sunflower by protecting known plant occurrences. The US Fish and Wildlife Service issued a letter of concurrence with NCDOT/NCTA's Biological Assessment and associated biological conclusions on December 16, 2013 for the Carolina heelsplitter, its designated critical habitat in Goose and Duck Creeks, and the Schweinitz's sunflower.

Studies conducted for the Project concluded that the Project would not contribute notably to further effects to the Carolina heelsplitter, but NCDOT/NCTA voluntarily elected to fund conservation in the Flat Creek watershed in South Carolina to help offset any potential but unpredictable impacts to the species. In addition, NCDOT/NCTA funded the continued operation of the US Geological Survey's stream gauge on Goose Creek for five years.

In addition, because there are two occurrences of the Schweinitz's sunflower very close to the construction limits of the Project, NCDOT/NCTA has committed to protecting these two plant occurrences with measures and commitments that will protect them from impacts during construction of the Project as well as preserve these populations in perpetuity.

The Northern long-eared bat (NLEB) was proposed for listing in October 2013 and as of December 2014, the species was listed as having "potential" to occur in Mecklenburg and Union Counties. After officially becoming listed as federally-threatened in April 2015, the NLEB was removed from the list of protected species for Union County but remains on the list for Mecklenburg County. Based on the results of surveys conducted by NCDOT in 2014, proximity to known occurrences of NLEB, lack of potential foraging and roosting habitat within the study area, and using currently available guidance from US Fish and Wildlife Service, the proposed project has a biological conclusion of No Effect for NLEB.

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## AIR

The project study area is located within the Charlotte-Gastonia-Rock Hill air quality region (which includes Mecklenburg County and Union County), which is a moderate non-attainment region for ozone. Mecklenburg County is a maintenance area for carbon monoxide. Compliance of an individual project with the ozone and carbon monoxide National Ambient Air Quality Standards (NAAQS) is demonstrated if the project is included in a conforming transportation plan, which considers the urban area as a whole. The Monroe Expressway is included in the MUMPO 2035 LRTP, which is a conforming transportation plan.

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## NOISE

Traffic noise studies have been conducted as part of the environmental study process to identify impacted receptors and how best to mitigate potential traffic noise from the Project. Based on the Design Noise Report completed in February 2016, four noise walls are considered to be "likely" in the following general locations: White Oak Lane, Oakland Avenue, Clear Creek Drive and Dusty Hollow Road/Wallace Road. The final decision on the installation of the noise walls will be made upon completion of the project design, the public involvement process, concurrence with NCDOT Policy and FHWA approval. The current aesthetic design plans incorporate aesthetic treatment into the noise walls.

## HAZARDOUS MATERIALS

The NCDOT is ensuring that all state and federal laws will be strictly adhered to in the abatement of hazardous materials located on the Project's right of way, if encountered. The identification and remediation of these sites that would otherwise remain unidentified is of incalculable benefit to the environment.

## NEPA DOCUMENTATION, INITIAL PROJECT FINANCING, & LITIGATION DELAYS

The Final Environmental Impact Statement (EIS) was approved in May 2010 and a Record of Decision was received in August 2010.

In October 2010, the NCTA issued \$233,920,000 in State Appropriation Revenue Build America Bonds (BAB's). On October 28, 2010, the NCTA opened design-build price proposals for the highway design-build contract. The successful proposer was Monroe Bypass Constructors (a joint venture of United Infrastructure, Anderson Columbia, and Boggs Paving) with a bid of \$367,700,000, which included the costs for final design and construction engineering and inspection (CEI). The selected team's bid was 21% below the engineer's estimate of \$465.2 million, and 9% and 13% below the unsuccessful bids of \$402.1 million and \$424.4 million, respectively. In their Technical Proposal, the design-build team proposed a project opening date of December 31, 2014.

However, the project financing did not move forward due to a lawsuit filed by the Southern Environmental Law Center (SELC) on behalf of three conservation groups challenging the Project's NEPA document. The design-build contract was not awarded because of the financing delays. The design-build team agreed to hold their price for up to one year. NCDOT prevailed in the initial lawsuit filed by the SELC in the United States District Court in the opinion published on October 24, 2011. Following the favorable court opinion, the following activities took place:

- November 9, 2011 - \$10 million Senior Toll Revenue Bonds sold
- November 16, 2011 - \$214.505 million State Appropriation Revenue Bonds sold
- November 23, 2011 – Design-Build highway construction contract awarded and a Limited Notice to Proceed was granted for design and permitting activities
  - Revised Substantial Completion Date (project opening) to December 31, 2015
  - Revised Final Completion Date to July 1, 2016
- December 15, 2011 - \$145.535 million GARVEE bonds sold

Following the October 2011 ruling, the SELC filed an appeal to the United States 4<sup>th</sup> Circuit Court of Appeals, and a three-judge panel overturned the lower court decision on May 3, 2012. Out of an abundance of caution, the NCTA undertook a review of the issues detailed in the panel's opinion to determine what, if any, additional environmental study may be necessary. During this data review process, NCTA engaged a variety of experts to assist in the data analysis and explanation. The design, construction, and right-of-way acquisition of the Project were halted in May 2012 and the August 2010 Record of Decision was rescinded by the FHWA. NCDOT agreed to compensate the Design-Build Team monthly for idle labor and equipment due to the delay in accordance with the executed contract. The cost of this delay was approximately \$2.8 million. The acquisition of right of way due to hardship situations (medical and financial) was permitted to continue during the work stoppage.

On May 15, 2014, a Final Supplemental Final Environmental Impact Statement (FSFEIS) was approved and a new Record of Decision was issued by the FHWA. The Design Build Team remobilized and reinitiated the preparation of design plans. On June 23, 2014, the SELC again filed suit in United States District Court, challenging the NCDOT and FHWA's NEPA documentation prepared for the Project. The NC Department of Environment and Natural Resources

– Division of Water Resources issued the 401 Water Quality Certification on March 6, 2015. The US Army Corps of Engineers issued the Section 404 Individual Permit on May 8, 2015. On this same day, NCDOT issued an Unlimited Notice to Proceed with construction activities.

In April 2015, NCDOT also removed the CEI scope of work from the design-build contract; subsequently, NCDOT executed a contract directly with Summit Design and Engineering Services to perform CEI services directly for the Department. The value of this cost-plus, not-to-exceed contract is \$18,187,091.20. Within this same design-build change order, NCDOT supplemented the design-build team to provide additional contract time and compensation related to project delay. The net amount of the change order executed on April 2, 2015 was \$76,061,160.21. The revised Substantial Completion Date was updated to November 27, 2018. The Project is scheduled for Final Completion on May 28, 2019.

On May 14, 2015, the SELC filed a motion for a temporary restraining order and preliminary injunction in the United States District Court, asking the court to enjoin NCDOT and FHWA from all construction activities to preserve the status quo while the merits of the June 2014 case are considered. On September 10, 2015, the US District Court denied the SELC's motions for summary judgment, temporary restraining order, preliminary injunction, and motion for a hearing. SELC filed a notice of appeal to the US 4<sup>th</sup> Circuit Court of Appeals on September 15, 2015. The parties submitted legal briefs and oral arguments were held on May 12, 2016. On June 9, 2016 the U.S. Court of Appeals for the 4th Circuit ruled in favor of NCDOT/FHWA by holding that the agencies' environmental study was valid and did not violate any laws. The SELC did not appeal the Court of Appeals judgment. In addition, in July 2015, NCDOT and SELC entered into a settlement agreement regarding the Clean Water Act permit needed for the Project. Under the terms of the agreement, NCDOT has satisfied that settlement by depositing \$850,000 with the Catawba Lands Conservancy, which will use the money to purchase land in Union County for conservation. In return, the SELC is prohibited from filing new lawsuits against the Project.

Federal, state, and local permits and other approvals already obtained for the Monroe Expressway include:

- MPO Approval, Air Quality Conformity (May 3, 2010)
- NC Ecosystem Enhancement Program Acceptance of Mitigation (June 24, 2010)
- NC Department of Environment and Natural Resources 401 Water Quality Certification (December 22, 2010, withdrawn May 17, 2012, reissued March 6, 2015)
- US Army Corps of Engineers 404 Permit (April 15, 2011, suspended May 17, 2012, reissued May 8, 2015)

## CHAPTER 6 | PROJECT DETAILS

### HIGHWAY DESIGN-BUILD CONSTRUCTION

The design criteria are consistent with the current practices and standards of NCDOT and the American Association of State Highway and Transportation Officials (AASHTO). Design criteria and typical sections were based on existing (2008) and projected (2035) traffic forecasts and the long-range vision for the US 74 corridor, as defined by the NC Strategic Highway Corridor program and the NC Intrastate Corridor System. Future traffic projections for the facility were based on a design year of 2035 and assume the facility is tolled. Design guidelines were based on desirable roadway standards from AASHTO's *A Policy on Geometric Design of Highways and Streets* (2004), the *NCDOT Roadway Design Manual*, and the *NCDOT Roadway Standard Drawings*.

Two typical sections were developed for the Project – one for the western segment which includes upgrading a short portion of existing US 74 and one for the majority of the roadway on new location. These typical sections are depicted in **Appendix A**.

The posted speed limit for the tolled highway on the new location roadway will be 65 mph, although it is likely to be reposted at 70 mph after opening in order to be in accordance with the latest speed limit policies for similar facilities in North Carolina. Along the western end of the Project within the elevated section, the posted speed limit will be 55 mph. The posted speed limit of the frontage roads adjacent to the elevated section will be 35 mph.

The design and construction of all local cross streets (-Y- Lines), ramps, service roads and cul-de-sacs, widening and improvements are of sufficient length to tie to existing facilities based upon the current guidelines and standards. The -Y- Lines were designed for the appropriate speeds based upon the functional classification and for a speed consistent with the currently posted speed limits.

The US Army Corps of Engineers 404 Permit was obtained for the Project. Any required coordination with the environmental agencies, approvals from the environmental agencies, public involvement and/or permit modifications resulting from a variation in the proposed design and/or construction method, or utility relocation/construction is the sole responsibility of the design-build team and will be coordinated with NCDOT. NCDOT will not allow any contract time extensions associated with obtaining a permit modification, public involvement or additional agency coordination/approvals.

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### PAVEMENT

Because the projected traffic volumes are predicted to be heaviest on the western end and become lighter on the eastern end, the NCTA divided the Project into three segments for pavement design purposes. The western section is about one mile long, and includes the upgrade of existing US 74. The middle section is about eleven miles long and the eastern section is the remaining seven miles. For each of these three sections, the NCDOT Pavement Management Unit prepared six 30-year design options to allow maximum flexibility in pavement type selection for the design-build teams. In addition, the design-build teams were allowed to economize these designs as long as certain criteria were met. In general, the pavement designs are thicker on the western end and progress to thinner designs on the eastern end. Monroe Bypass Constructors economized on an asphalt pavement option with cement-treated aggregate base course and asphalt shoulders.

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## BRIDGE AND WALL STRUCTURES

Bridge design and construction criteria for the Project's 37 bridges conform to the most current versions of the AASHTO "*Load and Resistance Factor Design (LRFD) Bridge Design Specification*", NCDOT "*Structure Design Manual*" (including policy memos) and "*NCDOT Bridge Policy Manual*". Design Live Load for structures and ramp structures is HS25 loading. Construction and materials shall be in accordance with *NCDOT Standard Specifications for Roads and Structures* (2012), NCDOT Structure Design Unit Project Special Provisions, NCDOT Structure Design Unit Standard Drawings and any special provisions included in the project requirements. Bridge materials include non-prestressed cast-in-place concrete, prestressed precast concrete and steel.

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## HYDRAULICS

Stormwater conveyance was designed in accordance with criteria provided in the North Carolina Division of Highways "*Guidelines for Drainage Studies and Hydraulics Design-1999*", the addendum "*Handbook of Design for Highway Drainage Studies-1973*", NCDOT "*Stormwater Best Management Practices Toolbox-2008*" and North Carolina Division of Highways Hydraulics Unit website, <http://www.ncdot.org/doh/preconstruct/highway/hydro/>.

The design-build team has completed the hydraulics design scope of work for the Project. The following milestones have been achieved:

- Submitted permit drawings and permit application package to NCDOT for submittal to environmental agencies
- Designed all storm drainage systems within the project limits
- Prepared Culvert and Bridge Survey Reports for structures
- Designed erosion and sedimentation control plans
- Analyzed existing culverts and cross pipes adjacent to the Project and within existing ROW. Recommended replacement of any deficient (structurally and/or hydraulically) pipes and/or culverts
- Prepared CLOMR or MOA packages for FEMA regulated streams impacted by the design

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## LIGHTING

The design of all illumination systems will conform to the latest edition of the AASHTO "*Roadway Lighting Design Guide*", and in accordance with the NCTA's specific requirements. The design will be performed as part of the design-build contract. All lighting will be reviewed by NCTA and other units of NCDOT for conformance with the project requirements.

Roadway lighting is required, including service roads and underpasses, from the western end of the Project through the interchange of US 74 Bypass and existing US 74 near Stallings. Continuous roadway lighting is not required through the remainder of the Project. Complete interchange lighting will be installed at the westernmost interchange of US 74 Bypass and existing US 74. To keep traffic flowing smoothly, the all-electronic tolling (AET) zones will not be lighted beyond what is necessary for video tolling; this approach will de-emphasize the tolling equipment where no driver decisions are required.

Standard design documents developed by NCTA will be utilized for the Project. Lighting systems will be comprised of two main types of equipment – high mast lighting standards (poles of up to 100' tall with a ring of 4 to 12

luminaries), and pole-top lighting standards (poles of up to 45' tall with one or two full-cutoff luminaries without arm and at zero tilt). Conventional lighting standards with a cobra head luminary and arm will not be used, as the pole top luminaries can be more easily maintained without lane closures. The design-build contractor will design the systems for economy of installation and maintenance. High mast lighting will be used wherever possible. At a minimum, pole lighting will be utilized where ROW does not allow for standard installation of high mast lighting, and where high mast lighting standards are not found to be the most economical equipment.

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## SIGNING

Distinctive and adequate signing is a necessity for major highway facilities. Signs will provide a means by which the user can readily be guided throughout the Monroe Expressway corridor. Large, legible, directional signage, as well as regulatory and warning signs, will be provided. Signs along existing intersecting highways and thoroughfares will be modified as necessary to provide clear directions to the Monroe Expressway. Special signing in advance of the toll zones will be used to inform drivers of the various payment options.

The development of Signing Plans is underway by the design-build team in accordance with the latest editions of the *Manual on Uniform Traffic Control Devices (MUTCD)*, the *NC Supplement to the MUTCD*, *NCDOT Standard Specifications for Roads and Structures*, the *NCDOT Roadway Standard Drawings*, *AASHTO's Standard Specifications for Structural Supports for Highway Signs, Luminaries, and Traffic Signals*, "Guidelines for Preparation of Signing Plans for Design-Build Projects", and the "Design-Build Submittal Guidelines". NCTA toll collection signing standards have been developed and are being utilized by the design-build team for these specific signs. All electrical installations and coordination are the responsibility of the design-build team and must meet NEC, state, and local codes. All electrical/electronic equipment and devices must be UL (Underwriters Laboratory) approved and listed. NCTA has provided the design-build team with a Signing Schematic of the toll road corridor for use in developing the signing plans.

In addition to the required signage, NCTA will provide mile markers every one-half mile on the mainline. Each mile marker location shall have two mile markers mounted back to back on one u-post to permit easy visual identification and promote safety.

All overhead sign assemblies shall be designed, fabricated, and installed by the design-build team and shall meet all NCDOT and NCTA requirements. The wind speed for overhead sign assembly design is 90 miles per hour.

The design-build team shall use Type IX reflective sheeting for the legends (text) and background on all overhead signs. No overhead sign lighting is required for advance guide, toll related signs or exit directional overhead signs.

NCTA sign standards include posting signs before entry to the Expressway, prior to system or service interchange ramps, which identify the Expressway as a tolled road and present the two options for customer payment (NC Quick Pass and Bill by Mail). As required by general statute, blue guide signs will be installed on the toll facility at an exit to be determined that will direct customers to the NC Quick Pass storefront (where customers can purchase a transponder and receive customer service). Additional guide signs will be installed on the ramps and along the route to provide turn by turn direction to the storefront.

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## SIGNALS

The design-build team is designing and preparing plans for the traffic signal installations. This work includes, but is not limited to, the preparation of Traffic Signal Plans, Electrical and Programming Details, Utility Make-Ready Plans,

Communications Cable & Conduit Routing Plans and Project Special Provisions. These plans are being prepared in accordance with the *“Design-Build Submittal Guidelines”* and the *“Guidelines for Preparation of Traffic Signal & Intelligent Transportation System Plans on Design-Build Projects,”* which are available on the NCDOT Design-Build website.

The design-build team is responsible for providing the safest and most economical design for the public. The design-build team is responsible for ensuring that all plans and designs conform to the current design standards of the NCDOT Intelligent Transportation Systems & Signals Unit. All plans and associated design material and specifications are being reviewed and approved by NCDOT before installation.

The original scope of work included six new traffic signals at interchange ramp terminals and seven upgraded signals in the project vicinity. However, the selected team elected to design and construct roundabouts in lieu of traffic signals at several locations. In addition, the design-build team will install and/or maintain a spread-spectrum wireless communication system which will serve as the communications medium between existing traffic signals and/or new traffic signals as required to form closed-loop traffic signal systems.

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## INTELLIGENT TRANSPORTATION SYSTEMS

The Monroe Expressway will include Intelligent Transportation Systems (ITS) infrastructure and operational systems to support overall management of traffic flow to assist with timely response to incidents. ITS deployment will complement similar NCDOT activities on interstate highways in the region, and will meet or exceed the State’s ITS performance requirements. ITS will be constructed by the highway design-build contractor. The project elements comprising the ITS include:

- A fiber-optic (backbone) network (FON), in combination with leased commercial circuits, to provide a redundant communication network for the toll systems and the ITS. The communication network will be configured to connect toll locations, ITS devices and NCTA and NCDOT transportation management centers (TMCs).
- Approximately 47 traffic detector locations (two per mainline segment between interchanges and one on each interchange ramp).
- Approximately 25 closed-circuit television (CCTV) camera locations with less than 1-mile spacing sufficient to provide full viewing of the Expressway and of the crossing roads at interchanges.
- Ten Dynamic Message Sign (DMS) locations in advance of key decision points relative to major cross routes or alternative routes. Seven full-color DMS’s will be located on toll gantries, while one amber DMS will be located on a shared sign structure, and two amber DMS’s will be on a shared standalone pedestal.
- One Environmental Sensing Station (ESS) will be provided for atmospheric and pavement monitoring at a key location on the west end of the corridor.

The design of the ITS elements is near completion by the highway design-build team. These designs are being reviewed by NCTA, the toll integrators (once they are selected), NCDOT ITS Design, and local NCDOT ITS Operations staff to ensure that the design approach fits into both the overall tolls operational scheme and the ITS operational plan for the metro area.

It is crucial that ITS video feeds and data are transmitted seamlessly to the TMC (traffic management center) in Charlotte and to the NCTA in the State Transportation Operations Center (STOC) located in the Joint Facilities



Headquarters in Raleigh. It is also crucial to establish a reliable and secure connection to transmit tolls data to the NCTA Customer Service Center (CSC) in Raleigh.

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## TOLL INFRASTRUCTURE

The design and construction of the toll infrastructure is included in the design-build lump sum price of the highway construction contract.

Toll infrastructure consists of 14 mainline toll zones with dual-gantry design (similar to Triangle Expressway) with 50-foot separation between the gantries. There are no proposed ramp gantries. The design-build team will also design and construct maintenance pull-off areas at the toll zone sites, toll equipment vaults/shelters, backup power generator equipment and propane tank, and aesthetic screen walls. The toll gantries are being designed for a 4-lane mainline cross-section, which can be easily modified to accommodate an additional lane in the median in both directions.

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## CONSTRUCTION OVERSIGHT

NCDOT Division 10 is responsible for construction management and construction oversight for the Project. In addition, NCDOT has engaged a private engineering firm, Summit Engineering and Design, to provide construction engineering and inspection services. Activities include monitoring and reviewing project documentation to ensure that plans, specifications, standards, reporting, procurement and construction are in compliance with applicable federal/state laws and regulations. The NCDOT Division Engineer is responsible for overseeing these activities. Summit is providing independent monitoring of construction to verify construction progress, contractor invoicing and quality of work.

The NCDOT required the selected design-build team to procure an independent consultant to provide impartial environmental and permit monitoring services in conjunction with the Project. Three Oaks Engineering is currently monitoring items during each phase of the construction, including construction runoff water quality device inspections, hazardous material spill reporting and response, compliance with US Army Corps of Engineers Section 404 permit requirements and NCDENR-DWQ 401 permit requirements, and notifications of archaeological discoveries. The NCDOT has designated an internal environmental coordinator to review and supervise this monitoring program. NCDOT is assisting with erosion and sedimentation compliance during design reviews and during construction.

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## AESTHETICS AND LANDSCAPING

Pursuant to NCTA desires and commitments, landscaping and special aesthetic treatments will be provided along the Monroe Expressway corridor with a budget of approximately 3% of the total construction cost. The historical and natural features of the area (including building patterns, style, colors, native stone, and native plants) were selected to support a design image that reflects the surrounding natural environment.

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## AESTHETICS

The Monroe Expressway will have a distinctive aesthetic character, making it a distinguishable road within North Carolina. The NCTA's purposes in setting a high aesthetic standard for the facility are to:

- Encourage the attraction of initial users, by giving the road a distinguishable “brand”;
- Provide an enhanced travel experience to users who will be paying to use the road; and
- Create a community amenity with the potential to attract public support and possibly some financial contribution for landscape, amenities, maintenance and public art.

The *Aesthetic Design Guidelines*, including architectural guidelines for the toll zones, bridges and retaining walls, sound walls, and sign structures, were developed by Atkins, in close coordination with NCTA staff. An architectural review committee of community representatives was consulted to assure that the design is appropriate for the context in which the Monroe Expressway will be located. The style and detailing of the aesthetic themes was inspired by regional architectural themes. The selected theme uses primarily brick with a mix of stone, and incorporates retaining walls, decorative pilasters, and emblems.

The aesthetic design is concentrated around the major interchanges and cross-street bridges. The NCTA has prioritized the aesthetics treatments in the following order, from highest to lowest:

1. Elevated section adjacent to existing US 74
2. Bridges visible to motorists
3. Toll gantries, retaining walls, and sound walls
4. Overhead and DMS signs

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## LANDSCAPING

Landscaping design plans are being prepared by the NCDOT Roadside Environmental Unit. The guiding principles are to utilize the most highly visible areas within the corridor to provide the most visual impact, while also using plant materials that require low maintenance. The NCDOT intends to award one or more separate landscape installation contracts.

## UTILITY ADJUSTMENTS

To facilitate early utility coordination for the Project, NCTA employed URS Corporation (URS) and their subconsultant, MA Engineering Consultants (MA). Prior to award of the design-build contract, the URS/MA team was responsible for coordinating project development with all public and private utilities that may be affected by the Project. They confirmed the location and type of the utilities, as well as identified the utility owners in order to coordinate the relocation of all utilities in conflict with the Project. Following project award in November 2011, the design-build team has been responsible for utility coordination work.

The URS/MA team as well as the selected design-build team followed the guidelines as listed below:

- *NCDOT Utility Manual - Policies & Procedures for Accommodating Utilities on Highway Rights of Way*
- *Federal Aid Policy Guide- Subchapter G, Part 645, Subparts A & B*
- *Federal Highway Administration’s Program Guide, Utility Adjustments & Accommodations on Federal Aid Highway Projects*
- *NCDOT Construction Manual Section 105-8*
- *NCDOT Right of Way Manual - Chapter 16 Utility Relocations*
- *NCDENR Public Water Supply - Rules governing public water supply*

- *NCDENR Division of Water Quality - Title 15A - Environment and Natural Resources*

In addition to municipal water and sanitary sewer (“wet” utilities) within the various municipalities, the impacted “dry” utilities include Duke Energy, Piedmont Natural Gas, Time Warner Cable, Sprint (fiber-optic cable), Union Power, Verizon, and Windstream. As with most projects, timely utility relocations are a challenge. To date, the design-build team has been able to mitigate most delays by rescheduling operations.

The design-build team’s lump sum price includes the cost to relocate water and sanitary sewer lines. The cost for the relocation of “dry” utility relocations will be paid by NCDOT if the utility demonstrates compensable interest. In those cases where the utility owner wishes to provide additional capacity or correct existing deficiencies, the utility owner will reimburse NCDOT for these betterment costs.

## CHAPTER 7 | PROJECT IMPLEMENTATION

The implementation of the Monroe Expressway is well underway. The project planning phase is complete, and the highway construction has begun.

### HIGHWAY CONSTRUCTION

#### HIGHWAY DESIGN-BUILD CONSTRUCTION

The construction of Monroe Expressway is being completed using a design-build method of contracting. A Request for Qualifications for the highway contract was distributed in April 2010, the short-list of teams was selected in June 2010, the contract price proposals were opened on October 28, 2010 and technical scores were announced. From the group of three short-listed teams, Monroe Bypass Constructors, LLC (MBC) was selected through the design-build best-value procurement process. MBC is a joint venture of United Infrastructure Group, Boggs Paving and Anderson Columbia Company with Rummel, Klepper & Kahl (RK&K) as the lead design firm. Headquartered in South Carolina, United Infrastructure was founded in 1926 and specializes in bridge and highway construction projects in the southeastern United States. United Infrastructure is the managing partner with 33.34% interest and is the primary point of contact for the NCTA. Anderson Columbia was founded in 1958 as a local contractor in Florida, and has expanded their highway and bridge construction to several states in the Southeast. Boggs Paving was founded in 1994 in Monroe, NC with an emphasis on asphalt paving. At the time of project award, the joint venture collectively had 151 years of highway and bridge construction experience. This team offered a lump sum price of \$367.7 million. This original price proposal included construction engineering and inspection (CEI) services; CEI services were removed from the contract in 2015 as part of a larger change order.

#### PAYMENT AND PERFORMANCE BONDS

At the time of project award in 2011, the NCDOT required that the design-build team execute payment and performance bonds in the amount of the bid (\$367.7M). Liberty Mutual Insurance Company is serving as the surety for these bonds.

The performance bond secures the design-build team's promise to perform the project in accordance with its terms and conditions, within the time allowed. The payment bond protects certain laborers, material suppliers, and subcontractors against nonpayment. United, Anderson, and Boggs have a collective aggregate bonding capacity of \$1.45 billion and a collective single project bonding capacity of \$750 million per the surety capacity letters.

In the case of failure of one or more members of the design-build joint venture, Liberty Mutual Insurance Company (as their surety), would step in and ensure that the project was completed per the original contract. The project is bonded at \$367.7 million with approximately \$250 million in remaining work at the close of State Fiscal Year 2016; therefore, there would be no additional cost to the NCDOT.

#### WARRANTY

As a requirement of the contract, the design-build team will furnish a warranty bond in the amount of 5% of the total cost of the contract as a prerequisite for determination of substantial completion. Initial acceptance will occur as soon as the NCDOT confirms in writing that contract provisions have been met and the design-build team has reached Substantial Completion. The date on which Substantial Completion occurs will coincide with the Warranty

Initiation Date. Prior to expiration of the three-year warranty term, the NCDOT will produce a punch list of those items which require corrective work prior to fulfillment of the warranty obligation.

### INCENTIVE BONUSSES AND LIQUIDATED DAMAGES

The highway design-build contract includes provisions for both incentives and liquidated damages for various elements. **Exhibit 7** contains the various bonuses available to the team, as well as the damages for not meeting certain requirements.

#### Exhibit 7: Incentive Bonuses and Liquidated Damages

Item	Incentive if Met	Liquidated Damages if Not Met
Substantial Completion Date, including Toll Integration	\$3.0 million bonus to Design-Build Team	\$25,000/day
Substantial Complete Date, without Toll Integration	\$2.0 million bonus to Design-Build Team	\$25,000/day
Roadside Toll Collection System by Substantial Completion Date	\$100,000 to RTCS vendor	\$5,000/day
Final Completion Date	N/A	\$10,000/day
Completion of ORT infrastructure and ITS devices by July 31, 2018	N/A	\$15,000/day
Road and lane closures in excess of those permitted in RFP	N/A	Varies by roadway from \$1,000/hour to \$10,000/hour
Environmental Excellence: No Immediate Corrective Actions (ICA) No Continuances of Immediate Corrective Actions (CICA) No Notices of Violation (NOV) No Cease and Desist Orders (C&D)	\$150,000	\$50,000 forfeiture per ICA or CICA \$150,000 forfeiture per NOV or C&D \$12,500 liquidated damages per each follow-up violation

### SCHEDULE

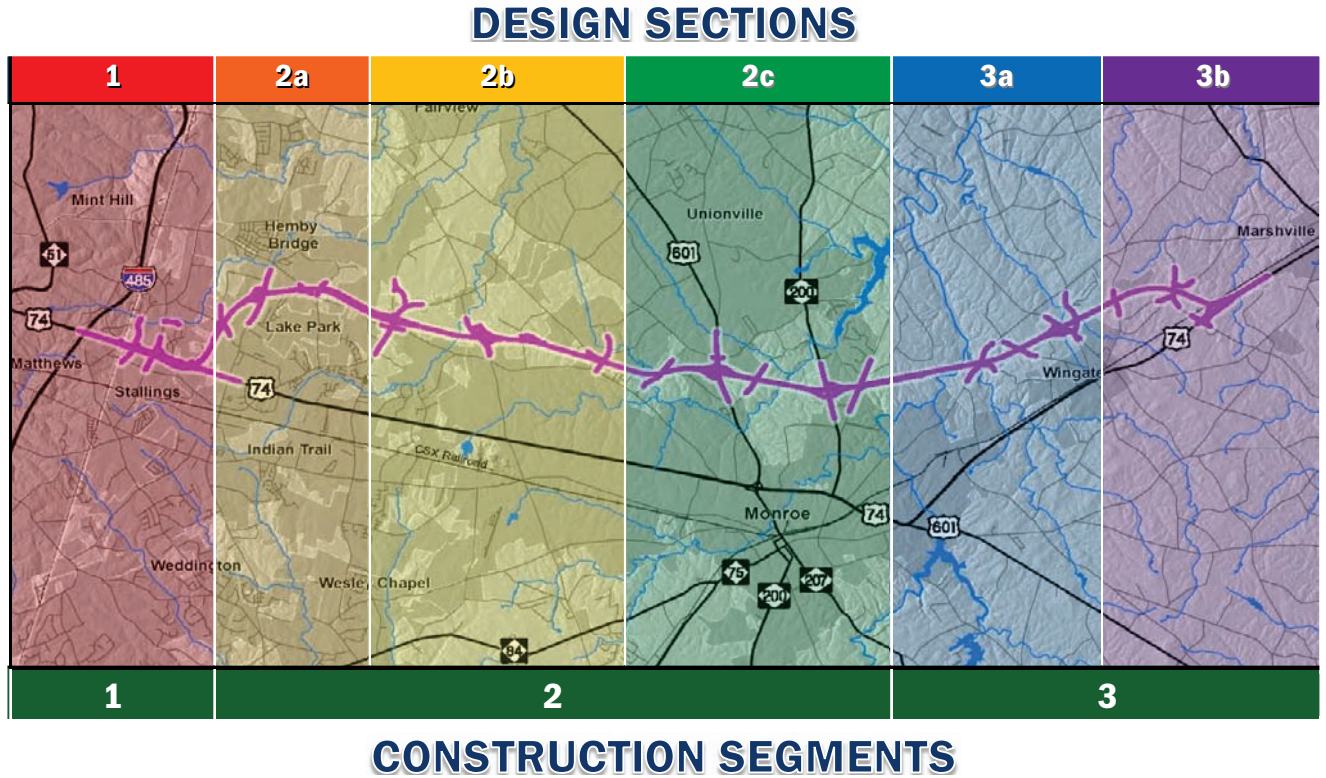
As part of their Technical Proposal, MBC proposed a project opening date of December 31, 2014. However, due to delays caused by litigation, the current schedule assumes the Project will open to traffic on November 27, 2018, with final completion occurring in May 2019.

As of June 30, 2016, MBC was approximately 44% complete with the design and construction of the highway.

**PROJECT SEGMENTS**

The Monroe Expressway design-build team has divided the Project into six sections for design and right-of-way acquisition, which are sub-segments of three construction segments, as depicted below in **Exhibit 8**. The construction segments are designated 1, 2 and 3, while the design sections are designated 1, 2a, 2b, 2c, 3a and 3b.

**Exhibit 8: Design Section and Construction Segment Map**



**LANDSCAPING INSTALLATION CONTRACT**

One or more landscape installation contracts will be awarded for the length of the corridor. The landscape design will be performed by NCDOT’s Roadside Environmental Unit; the contract(s) will be awarded to the lowest qualified bidder(s).

**RIGHT OF WAY ACQUISITION**

NCDOT purchased right of way for portions of the Monroe Bypass (R-2559) in 2001-2002 under a previously approved NEPA document (Project R-2559 Finding of No Significant Impact (FONSI) dated June 1997). As part of the right of way purchase, it is estimated that 39 residences (which included nine mobile homes) and three businesses were relocated.

For a project of this magnitude, the NCDOT is working with four professional services firms to manage and perform the right of way acquisition process on their behalf. All of the selected firms have extensive experience in the field of right of way acquisition, relocations, and related services and will adhere to the provisions of the Uniform Relocation and Real Property Acquisition Act of 1970, as well as all appropriate state and federal guidelines.

As of November 14, 2016, right-of-way and easement acquisition is virtually complete for the 471 parcels. 362 parcels (77%) have been settled and 109 parcels (23%) have been filed for condemnation. The North Carolina Attorney General's Office is currently working to settle the condemned parcels through continuing negotiations; trial dates will be set if negotiations are unsuccessful.

## TOLL INTEGRATION

In order to enable tolling of the Monroe Expressway, new procurements are underway for the Roadside Toll Collection System (RTCS) and Electronic Toll Collection System (ETCS) vendors. NCTA will exercise its option for contract amendments to the Triangle Expressway for the Back Office System (BOS) and Operations Center for Customer Service (OPS) contracts that were procured as part of North Carolina's first toll road, the Triangle Expressway.

### ROADSIDE TOLL COLLECTION SYSTEM (RTCS)

A procurement is underway that will enable NCTA to select a single vendor to design, install, operate, and maintain the RTCS for Monroe Expressway, with the possibility of expansion to other NCTA projects. This multi-year contract will include all aspects of NC Quick Pass (transponder-based) and Bill by Mail (video-based) transaction creation from the roadside environment to the existing NCTA BOS, including transaction formation, image processing and verification, digital video system, and toll host.

An Industry Forum was held on February 16, 2016 to provide an opportunity for NCTA to provide a project overview and information regarding the scope of work and agency requirements to interested vendors. The RTCS Request for Proposals (RFP) for Monroe Expressway was advertised on April 14, 2016 and proposals were accepted on July 11, 2016. The Authority is currently in the process of selecting the best-value proposer, with negotiations beginning in October. The Notice to Proceed (NTP) is anticipated in early 2017.

To encourage coordination and cooperation with Monroe Bypass Constructors, an incentive payment of \$100,000 will be paid to the Roadside Toll Collection vendor if the open to toll traffic go-live date of November 26, 2018 is met.

The contract includes the initial design and construction, plus operations and maintenance for a period of five years from NTP. The contract will also allow for up to two 3-year extensions.

### AUTOMATIC VEHICLE IDENTIFICATION (AVI) READERS AND TRANSPONDERS

The procurement process to select a vendor to provide automatic vehicle identification (AVI) readers and transponders began in mid-2016. The Request for Proposals was advertised on August 30, 2016. Technical and Price Proposals were accepted on October 14, 2016. Selection of the best-value proposer is scheduled to occur in early 2017. (In previous reports and project documentation, this vendor was referred to as the Electronic Toll Collection System (ETCS) provider). The selected vendor will provide the AVI subsystem and transponders for the Monroe Expressway. The AVI readers and transponders currently contemplated for the Monroe Expressway will offer a



multiprotocol solution that will allow NCTA to read transponders issued by NC Quick Pass, E-ZPass®, SunPass®, and Peach Pass®. This contract will include the design of AVI readers, coordination with the RTCS vendor for installation and testing of the antennas and readers, as well purchasing transponders.

The Monroe Expressway AVI will be fully implemented and tested prior to going live on November 26, 2018.

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## BACK OFFICE SYSTEM (BOS)

The existing BOS contract for Triangle Expressway was awarded to Xerox in 2009 and includes customer account management, RTCS transaction processing, system reporting, invoicing, webpage, etc. The original contract was established with the understanding that as additional projects come on-line, the BOS would be modified as necessary to accommodate them. Expanding the BOS in this manner allows for economies of scale, compliance with state legislation and DMV agreements, and streamlined customer service. The existing BOS currently supports two types of payments for trips on the Triangle Expressway: pre-paid tolls through ETC accounts (NC Quick Pass) and post-paid tolls through video tolling (Bill-by-Mail). In addition to accepting North Carolina's transponder, the NC Quick Pass, NCTA has toll interoperability agreements with E-ZPass®, Florida's SunPass®, and Georgia's Peach Pass. The Monroe Expressway will accept transponders from all of these toll programs.

In addition to processing ETC and video tolling transactions for the Monroe Expressway and other NCTA facilities, the BOS must be able to accurately manage system requirements that are unique to that facility. With the addition of new facilities, the BOS will be required to have a reporting system that accounts for transactions and reconciles the revenues for each facility. Information will also be added to the NC Quick Pass website (maps, toll rates) to provide customers and potential customers with enough information to make informed travel and transponder decisions.

It is currently assumed that NCTA will scope and negotiate an Extra Work Order with Xerox for the BOS that will be executed in 2017. In order to accommodate Monroe Expressway transactions, the BOS will be fully implemented and tested prior to going live in August 2018.

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## CUSTOMER SERVICE CENTER (CSC)

Staffing and management of the NC Quick Pass Customer Service Center is being performed by AECOM. The scope of work includes establishing and maintaining accounts, as well as overall customer service operations. NCTA has projected that additional customer service representatives will be needed once the Monroe Expressway begins selling transponders and collecting tolls. An additional storefront where customers can buy transponders, pay their bills, and set up accounts will be established in the vicinity of the Monroe Expressway. NCTA is currently in the process of evaluating the vicinity near Monroe, I-485, and US 74 to determine if a location is available that would meet the dual needs of a storefront and a back-up or 2nd call center. This investigation is in the preliminary phases and no final determination as to whether NCTA can accommodate, and/or if it is financially prudent to have, a back-up or 2nd call center in this region, has been made. That being said, the 'biggest case' scenario would entail NCTA accommodating approximately 20 call center stations, four or five storefront windows, tag storage and deposit rooms, plus related supervisory, managerial and NCTA support (offices, conference rooms, file storage, etc.). If the facility is large enough, it is possible that NCTA would accommodate additional storage for other parts of the Project (roadside, etc.). The 'smallest case' scenario would have NCTA accommodating four or five storefront windows, tag storage and deposit rooms, plus related supervisory and NCTA support.



The existing operations contract with AECOM will be amended to accommodate the additional personnel requirements. The go-live date for the revisions to the Operations Center and the Charlotte area storefront is August 2018.

## PUBLIC INVOLVEMENT

Public involvement and input has been encouraged throughout the development of the Project. Local government officials, civic organizations, neighborhood groups, and interested citizens were informed of the progress of the Project through a series of public workshops and a substantial number of small group meetings. Other outreach efforts and opportunities for the public to review project information and provide input included project mailings, a project website, and a toll-free project telephone number (i.e., project hotline).

During the design and construction phases of the Monroe Expressway, the public information and involvement program has maintained a high level of communication by informing and educating local government agencies, special interest groups, businesses, and the general public about the project status of the Monroe Expressway. The NCDOT Communications Office, with input from the design-build team, will develop a Public Information Plan for the Project that will provide the public with an opportunity for input, notify the public in advance of construction and potential impacts, and demonstrate to the public that the Monroe Expressway will be developed pursuant to a well-executed Public Information Plan.

## PUBLIC OUTREACH

Prior to Project opening, NCDOT will develop an outreach plan to educate and inform the public about the travel time savings associated with the Monroe Expressway. The use of an NC Quick Pass transponder to obtain a discounted toll rate will also be encouraged. The initiatives will be tailored to fit the market conditions and needs of the commuters in the Charlotte and Monroe areas and their surrounding counties. These initiatives consist of outreach programs to local businesses, creative services, branding, interactive marketing, social media, as well as sales and other promotional activities.

## CHAPTER 8 | TOLL COLLECTION OPERATIONS

Toll collection operations include the collection of the correct toll amounts from patrons, in accordance with the established toll rate schedule, accounting of the toll revenue, transfer of the funds into banks and among interoperable agencies, and documentation of the toll collection activities.

Similar to NCTA's Triangle Expressway, the Monroe Expressway will be exclusively operated as an all-electronic toll (AET) system. AET is the collection of toll revenue through the use of electronic toll collection (ETC) devices, otherwise referred to as transponders, and/or through the capture of license plate images. The proposed AET system will collect tolls as vehicles pass through tolling zones at highway speeds. A toll zone is defined as the area of the roadway, under or on the gantry, where the toll collection system equipment is located, performing the development of a toll transaction. There will be seven mainline tolling points and 28 tolled lanes. The shoulders will not contain a complete suite of toll equipment, but will contain triggers and cameras to record the license plates of vehicles trying to evade tolls by leaving the travel lanes.

The basic components for any AET toll collection program are the roadside toll collection system (RTCS) and back office systems (BOS), the Customer Service Center, and overall operations and maintenance.

Toll collection will utilize pre-paid and post-paid payment methods. For the former, patrons have the option of establishing pre-paid toll accounts and purchasing transponders, which are mounted within the vehicle. Tolls are deducted from the customer's account as they pass through a toll zone. For customers who do not pre-pay, video tolling camera equipment will process license plate captures and they will be subsequently billed on a monthly basis for the tolls in accordance with established NCTA policies pertaining to video toll invoicing or post-paid tolls.

Session Law 2008-225 was ratified by the North Carolina General Assembly on July 18, 2008 and requires payment of outstanding turnpike tolls and applicable fees or fines prior to vehicle registration renewal. This bill was revised in July 2010 as Session Law 2010-133 as it pertains to the video toll collection process.

### ROADSIDE TOLL COLLECTION SYSTEM (RTCS)

The function of the RTCS is to detect vehicles at the toll zones, build the proper transaction, and transmit that transaction and supporting data to the BOS. The RTCS being developed for the Monroe Expressway is a state-of-the-art fully automated toll zone, plaza, toll facility host and database.

The RTCS includes all toll-related hardware and software located on the roadway, automated license plate recognition and processing software. Additionally, the RTCS includes CCTV cameras for roadway overview, traffic and system audit, and site security.

The RTCS will build a completed transaction by detecting and classifying the vehicle, by identifying vehicles through reading a transponder, if present, or by capturing front and rear images of the vehicle's license plate number to begin image processing. If an ETC transponder is detected, the transaction information is sent to the BOS for validation of account status and debiting of the account for the correct toll amount. If an ETC transponder is not detected, an image of the vehicle's license plate will be captured and identified post transaction through image processing. License plate numbers not associated with any prepaid accounts will be sent to the appropriate state DMV to obtain their demographic information through the BOS. All transactions for a given billing period will be billed to the registered owner of the vehicle through an invoicing process.

## ELECTRONIC TOLL COLLECTION SYSTEM

The ETCS for the Monroe Expressway will include a system that automatically recognizes a vehicle using a valid encoded transponder, records the vehicle passing through the toll system, and provides necessary information to the RTCS needed to build a transaction that will collect a toll from a previously established pre-paid account. This subsystem includes the lane antennas and readers to capture the transactions and the transponders that will be issued to the customers.

## BACK OFFICE SYSTEM (BOS)

The BOS is a state-of-the-art toll system management and toll account management system made up of the system host, databases, customer service center (CSC) module and necessary interfaces to payment systems and commercial establishments. The BOS is located within NCTA's toll operation center in Morrisville, NC. The system's overriding functions include acceptance of transactions and roadway data, managing prepaid toll accounts, collecting revenue through these accounts, reporting revenue collection activities, and interfacing with external contacts (retail, interoperable agencies, financial institutions, and DMVs).

The BOS includes the main toll collection system computer server and database, and the hardware and software necessary to support the customer service center and interoperability with out-of-state toll agencies.

## CUSTOMER SERVICE CENTER (CSC)

NCTA's Customer Service Center (CSC) will house the BOS and CSC for statewide operations. The Customer Service Center is located in an offsite facility at 200 Sorrell Grove Church Road in Morrisville, NC. In addition, to provide local customer service for the Monroe Expressway, a storefront service center will be located in the vicinity of the Project.

Prior to the opening of Phase I of the Triangle Expressway in 2012, NCTA selected URS (now merged with AECOM) to provide staffing for the CSC, and to manage all functions for the statewide ETC and video billing programs. These functions include customer service at walk-in centers, call center, mail and email responses, ETC account opening, transponder sales and inventory management, account management, image reviews, video billing, interoperability/reciprocity with out-of-state toll facilities, and collection efforts. NCTA will negotiate a supplemental agreement to extend AECOM's service to the Monroe Expressway storefront locations.

NCTA operations personnel will continue to be co-located with AECOM staff within the Operations Center and will oversee the contract, monitor performance requirements, and provide audit and accounting for these operations.

## CHAPTER 9 | PROJECT COSTS

### INITIAL PROJECT COST ESTIMATE

HNTB developed the initial project cost estimate, which was based on the results of a Monte Carlo simulation. The cost estimating team used a statistical software tool called Crystal Ball® in order to perform the simulation. Each of the input variables was assigned a reasonable range of values, with the end result being a final forecast probability curve that reflects the uncertainty of the input variables. In addition, the estimates for each category were inflated into year-of-expenditure dollars using a range of reasonable inflation rates. For instance, right of way cost estimates were modeled using annual inflation rates ranging from 0% to 3%, with 2% being most likely. Contrastingly, administrative expenses were modeled using annual inflation rates ranging from 2.0% to 4.5%, with 3.5% being most likely. Based on guidance from FHWA, the project team used the cost that represents a 70% probability that the cost will be less than or equal to this value. In addition, a Cost Estimate Review workshop was conducted by FHWA in April 2010 that served to validate the estimating processes used and the final results. The project cost estimate used to finalize project financing in the fall of 2011 was \$671.5 million.

### REVISED PROJECT COST ESTIMATE

The cost estimate reflected in this report is based on actual and projected expenditures through June 30, 2016. This cost to complete the Project, also used in the Plan of Finance, is \$731 million. Schedule and scope changes, as well as recent right-of-way acquisition trends, caused the following cost estimates to be revised from the initial estimate:

- Highway Design-Build Contract
- Damages for Project Delays
- Inflationary Adjustments for Design and Construction
- Construction Engineering and Inspection (CEI)
- Diesel Fuel and Asphalt Cement Adjustments
- Right of Way Acquisition
- NCDOT Labor and Administration

The adjustments to these estimates are discussed below. **Exhibit 9** illustrates how the cost estimate has evolved since 2011. Descriptions of all of the current cost estimates are provided in this section.

**Exhibit 9: Initial and Current Project Cost Estimate**

Description	Initial Estimate (\$M)	Current Estimate (\$M)
Highway Design-Build Base Contract	\$ 367.70	\$ 349.46
Construction Change Orders	\$ 26.57	\$ 26.57
Delay Claim/Inflationary Adjustments	\$ -	\$ 99.61
Construction Administration - outsourced	\$ 11.95	\$ -
CEI - outsourced	\$ -	\$ 18.18
Landscaping	\$ 5.91	\$ 5.91
Diesel Fuel and AC Adjustments	\$ 13.89	\$ 13.88
Stipends and Incentives	\$ 3.65	\$ 3.50
Right of Way Acquisition	\$ 187.27	\$ 147.27
Utility Relocation	\$ 4.76	\$ 4.76
Toll Integration	\$ 23.45	\$ 23.45
NCDOT Labor and Administration	\$ 22.89	\$ 34.84
Marketing and Outreach	\$ 3.43	\$ 3.43
<b>Estimated Project Cost</b>	<b>\$ 671.47</b>	<b>\$ 730.87</b>

**HIGHWAY DESIGN-BUILD CONTRACT**

The price proposals for the highway construction contract were opened on October 28, 2010 and the technical scores for each team's technical proposal were announced. Monroe Bypass Constructors was selected based on the best value procurement process. The team's lump sum price of \$367.7 million included the costs for final design and Construction Engineering and Inspection (CEI). However, due to delays caused by litigation, the Project was suspended from May 2012 until May 2014. To compensate the design-build team for damages and inflation, NCDOT has supplemented the design-build team with an additional \$99.61M, which includes an additional \$2.53M in design fees as a result of the delay. Also included within this sum are damages paid to date of \$2.84M for idle equipment, demobilization, remobilization, and calculating new costs to complete the Project. Details of these cost increase are discussed in the following sections.

**DAMAGES FOR PROJECT DELAYS**

On May 22, 2012, due to an adverse court ruling, NCDOT gave notice of suspension to Monroe Bypass Constructors to stop all further work on the Project. The suspension was caused by conditions beyond the control of and not the fault of the Contractor. NCDOT determined that if and when the construction restarted, an adjustment to the contract costs would be warranted. This suspension was rescinded by NCDOT on May 18, 2014. Due to this suspension, change orders for the Project have consisted of adjustments and revisions to the original contract, as well as compensation for labor and equipment associated with the delay.

The design-build team's request for compensation for labor and associated equipment is comprised of two parts, compensation for affected labor made idle as a result of the work suspension and compensation for extra work

necessitated by the work suspension. At the time of the work suspension, the design-build team had 112 positions staffed to the Project in management/construction, design/consulting and CEI. Due to the projected length of the suspension, the design-build team worked to reassign project personnel as quickly as possible to other current projects where needed, as well as bidding on new projects in the interim. The design-build team requested compensation for the personnel that were not fully utilized or billable on other projects. The NCDOT agreed to provide this compensation for essential project personnel retained to work on this Project if and when it recommenced. In addition, the design-build team performed some extra work during the suspension, such as contract reviews with all subcontractors and material suppliers, and the subsequent recalculation of escalation and/or continuation costs. The design-build team submitted monthly damage claims for both of these types of labor compensation. Equipment costs requested are for reimbursement of vehicles for affected personnel and the construction field office already established for project use. The total cost of these delay-related damages is \$2.84 million.

Costs related to delay claims were not included in the original budget. NCDOT does not anticipate the payment of additional damages for litigation related project delays; as of Fiscal Year 2016, all of these damages have been paid to the design-build team.

### DESIGN COST INCREASE

NCDOT also agreed to compensate the design-build team for inflationary delays associated with the engineering and design work. During this time, labor rates at the prime design firm were adjusted annually between 2011 and 2014. The overall increase was 14.2%. The overhead rate for the firm was also adjusted from 149% in October 2010 to 162.98% in May 2014. The design sub-consultants experienced similar adjustments to their labor and overhead rates. Overall, NCDOT agreed to increase the design fees by 16.4%. This increase only applied to the work remaining at the time of the work stoppage. Payment of the change order will be prorated over the remaining contract period; as of June 30, 2016, \$2.15 million of the \$2.53 million change order has been paid to the design-build team. NCDOT does not anticipate an additional change order for design cost increases.

Costs related to delay claims and change orders for inflation were not included in the original budget. The current budget accounts for these costs.

### CONSTRUCTION COST INCREASE

The design-build team also requested additional compensation for the delay-related construction cost increase. The design-build team supplied updated escrow bid documents as the basis for the change order. NCDOT and the design-build team agreed to a construction cost increase of approximately \$94.25 million. As part of this change order, NCDOT also removed Construction Engineering and Inspection (CEI) services from the scope of work. As a result, the ensuing change order amount for adding the construction cost increases and deducting the CEI scope was \$76.06 million. Payment of the change order will be prorated over the remaining contract period. As of June 30, 2016, more than \$38.8 million has been paid toward this change order. NCDOT does not anticipate an additional change order for construction cost increases.

### CHANGE ORDERS

Costs related to change orders for inflationary delays were not included in the original budget; however, the budget did include a contingency of \$26.6 million for “traditional” change orders such as owner-directed changes and unknown conditions.

At the request of NCDOT and NCTA, the design-build team has been issued 18 engineering and permit related change orders totaling \$350,573 as of Fiscal Year 2016. These change orders cover the additional engineering costs for such tasks as revising the tolling scheme to an all-mainline tolling scenario, revising certain service roads and access points to reduce right-of-way costs, and updating field surveys of environmental resources in order to obtain the required permits.

The current budget includes an allowance of almost \$26.6 million for change orders, including the \$350,573 for change orders described above. NCDOT anticipates fairly sizable additional change orders for noise walls, LED lighting, additional turn lanes, changes to design standards, and other owner-directed changes that are expected to arise during construction. Although additional change orders are expected, the NCDOT believes that the current allowance of \$26.6 million is adequate and is unlikely to be fully utilized. The estimate is unchanged at this time.

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### CONSTRUCTION ENGINEERING AND INSPECTION SERVICES

As discussed above and in Chapter 3, the NCDOT also removed the CEI scope of work from the design-build contract; subsequently, NCDOT entered into a contract directly with Summit Design and Engineering Services to perform CEI services directly for the Department. The value of this cost-plus, not-to-exceed contract is \$18,187,091.

These costs were included in the original budget as part of the design-build scope of work. Because these services are now being performed under the direct supervision of NCDOT, the extra costs of quality assurance testing will not be required. Although NCDOT estimates that this budget has the potential to underrun by approximately \$5.0 million, the estimate for CEI is unchanged at this time.

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### DIESEL FUEL AND ASPHALT CEMENT PRICE ADJUSTMENT RESERVE ACCOUNTS

The Department is bearing the risk of rising diesel fuel and asphalt cement prices during the construction period. The converse is also true; if the prices drop, then NCDOT will reduce payments to the design-build team to reflect the lower price.

The base prices of diesel fuel and asphalt cement had dropped to relatively low levels when contract bids were opened in 2010, at \$2.24/gallon and \$460.00/ton, respectively. A contract provision and quantity-based formula enables the design-build contractors' monthly invoices to be adjusted up or down as the prices of these commodities change from the base prices.

### DIESEL FUEL RESERVE ACCOUNT AND COST TRENDS

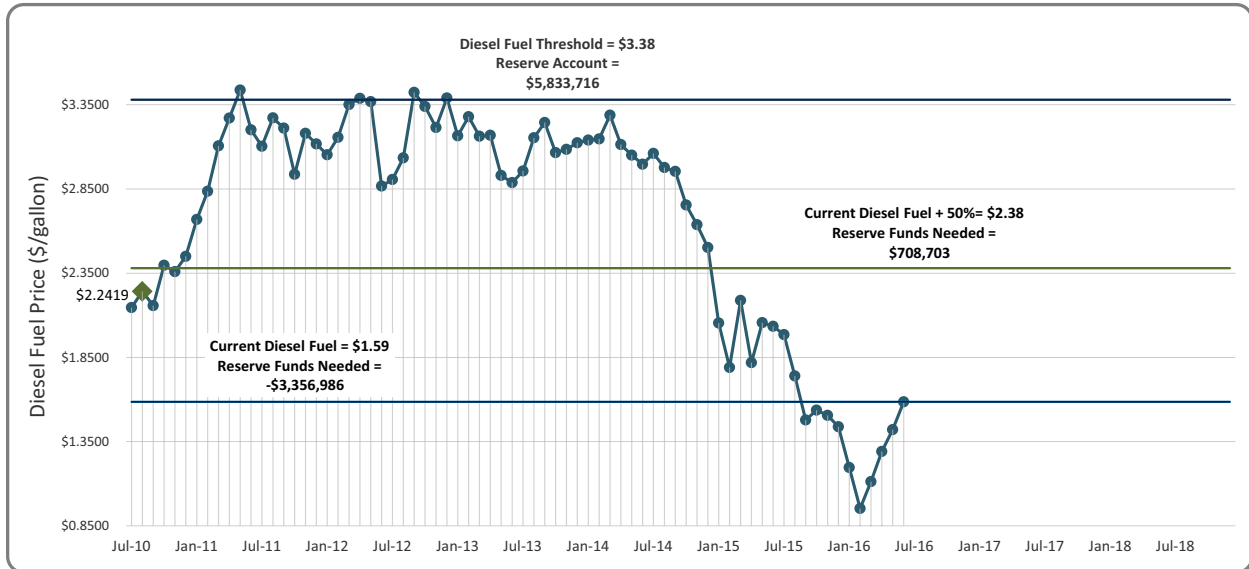
For the Initial Financial Plan, the Department assumed that the terminal price of diesel fuel would average \$3.38/gallon during the construction period, a 50% increase from the 2010 contractual base price. From August 2010 through June 2016, the base price of diesel fuel ranged between \$0.95/gallon and \$3.44/gallon, but generally remained around or below the threshold. If the price continues to remain historically low or even increases by 50% over current levels, the Department will not expend the budgeted reserve account of \$5.8 million. Rather than take the risk for rising fuel prices, NCDOT opted to purchase a fuel hedge that will allow the agency to release the contingency at a future date as needed. On April 26, 2016, NCDOT executed a hedge agreement with Barclays Bank with the following terms:

- Total Notional Quantity: 4,673,026 gallons
- May 1, 2016 through November 30, 2018
- Strike Price: \$2.00/gallon

- Total Premium: \$322,438.79
- Available Contingency: \$4.4M to \$5.2M

**Exhibit 10** illustrates the six-year history of diesel fuel prices, including the base price, threshold for the reserve account, and potential for cost savings. As of June 30, 2016, the NCDOT has realized \$440,200 in fuel adjustment credits from the design-build team. Regardless of the fuel hedge, these credits will continue during construction as long as the price of diesel fuel stays below the base price of \$2.2419/gallon.

**Exhibit 10: Diesel Fuel Price Trend**

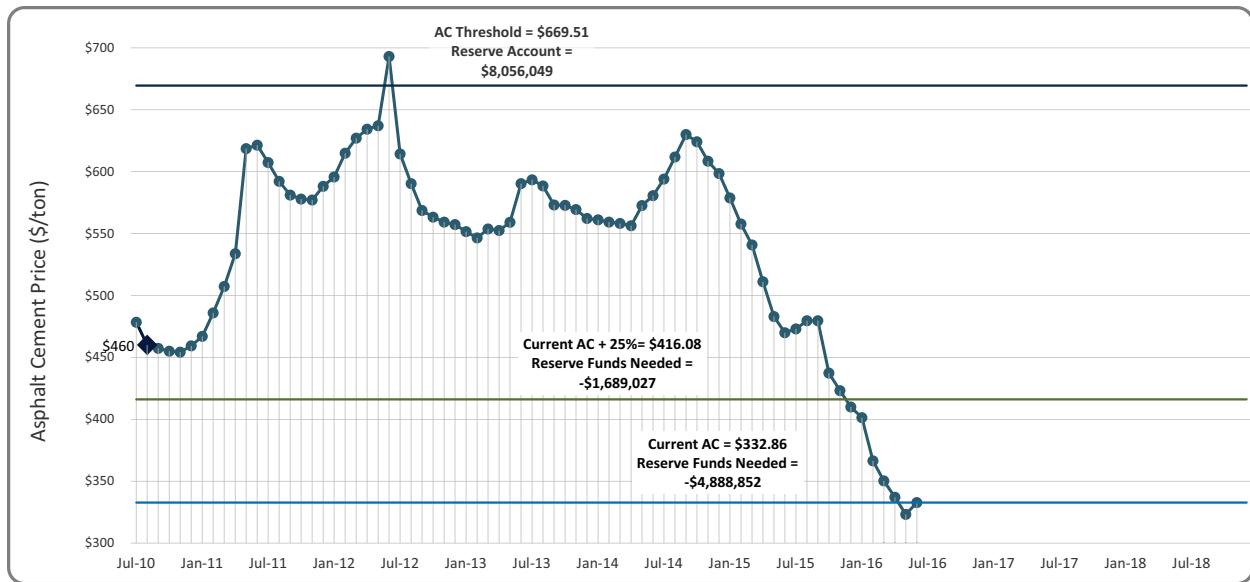


**ASPHALT CEMENT RESERVE ACCOUNT AND COST TRENDS**

For the Initial Financial Plan, the Department assumed that the terminal price of asphalt cement would average \$661.00/ton during the construction period, a 44% increase from 2010 prices. With a more volatile price history than diesel fuel, the price of asphalt cement ranged between \$323/ton and \$693/ton between August 2010 and June 2016, with an average price during that time of \$536.95/ton. Similar to the scenario with fuel prices, if the asphalt cement price continues to remain low or even increases by 25%, the Department will not expend the budgeted reserve account of \$8.1 million. Although an underrun looks likely at this time, the prices over time are very unstable; therefore, the Department is not currently budgeting for an underrun. **Exhibit 11** illustrates the six-year history of asphalt cement prices, including the base price, threshold for the reserve account, and potential for cost savings. As of June 30, 2016, the NCDOT has realized \$57,600 in asphalt cement adjustment credits from the design-build team.



**Exhibit 11: Asphalt Cement Price Trend**



**RIGHT OF WAY ACQUISITION**

In 2010, right-of-way cost estimates for the approximately 670 remaining impacted parcels were developed using the right of way limits shown on the functional roadway design plans for the Monroe Expressway. The appraisers researched tax records and recent sales data to develop preliminary values. The estimate of \$187 million included conservative contingencies for unwilling sellers and condemnations.

Since the original right-of-way cost estimate of \$187 million was completed for the Initial Financial Plan, the following details have impacted either the amount of right of way needed or its associated cost:

- Real estate market has flattened or experienced deflation in certain areas.
- During the latter phase of project planning, the median width was reduced from 70 feet to 46 feet. This action reduced the parcel count by 30%, from 670 parcels to 474 parcels. The overall footprint and right of way needed for the Project was likewise reduced.
- During design of the final right-of-way plans, the design-build team further reduced the project footprint.
- Service roads have been proposed to eliminate total takes or otherwise limit damages to property owners.
- The acquisition of right of way was delayed from the 2012-2013 timeframe to the 2015-2016 timeframe.

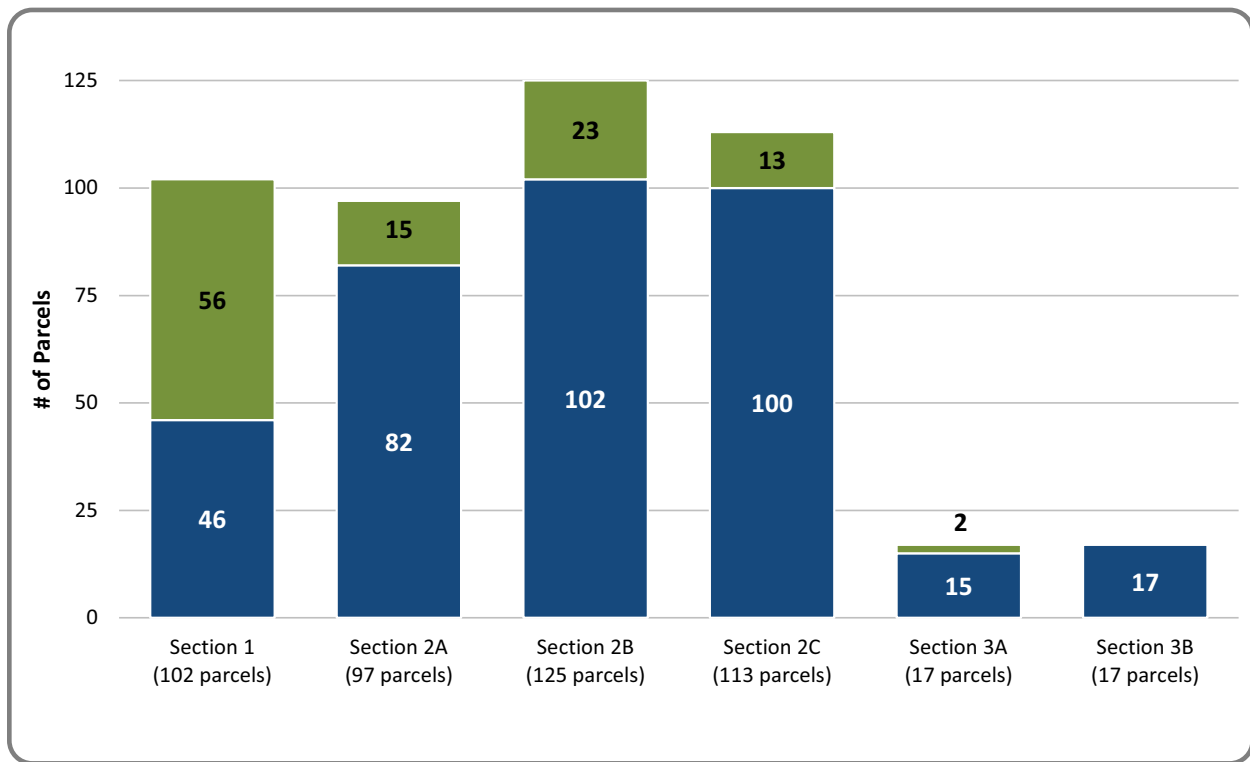
As an added incentive to minimize right of way on the western end of the Project (where the proposed expressway is located between the frontage roads), the design-build team will be responsible for the cost of any additional right of way required for their proposed design.

As of November 14, 2016, all 471 parcels required for this project have either been settled (362 parcels) or filed for condemnation (109 parcels). The Attorney General’s Office is handling the condemnation cases and is working to reach settlements through continued negotiations. It is the experience of both NCTA and NCDOT that most condemned parcels are negotiated without going to trial; the Attorney General’s Office feels that the majority of the remaining condemned parcels on this Project will also settle in this manner. All condemnation cases are anticipated to be settled by late 2019, but the exact schedule is unknown at this time. As a conservative measure, all condemned cases are assumed to settle for two times the appraised value. For comparison, the 14 condemned parcels that have

settled to date were paid an average of 176% of appraised value. NCDOT and its right-of-way program management consultant have done an analysis of the parcels remaining to be purchased and settled through condemnation. As a result, NCDOT is projecting an underrun of the original budget of more than \$40 million. In light of this, the current budget has reduced the anticipated right of way budget by \$40 million to \$147.3 million.

**Exhibit 12** shows the status of right-of-way acquisition by section as of November 14, 2016.

**Exhibit 12: Parcel Acquisition Status**



## NCDOT LABOR AND ADMINISTRATION

The estimates for administrative expenses and contingency funds were prepared in close coordination with NCTA staff. The budgeted administrative expenses include construction administration, engineering coordination, design reviews by in-house staff and consultants, mediation costs during construction, surcharges from the NCDOT accounting system, railroad force account charges, as well as a contingency for unexpected costs.

When originally contracted, NCTA planned to utilize an independent construction management consultant to manage the day-to-day construction operations. Since that time, NCDOT Division 10 forces have assumed this responsibility. There has been no net change in the overall budget for construction administration; however, the \$12 million originally budgeted to be outsourced has been added to the NCDOT Labor and Administration line item.

## TOLL INTEGRATION

Estimates for toll integration were based on the unit prices shown in the Triangle Expressway contracts; these contracts were awarded in 2010. Quantity estimates for the Monroe Expressway were developed assuming a similar

concept of operations as Triangle Expressway. Variability in unit costs, quantities, and inflation was built into the Monte Carlo cost estimate simulation. In general, unit costs were assumed to vary between 90% and 120% of the base costs. At the time of the Initial Financial Plan, the Project was scheduled to be open to toll traffic in 2016. Annual inflation was assumed to vary between 2.5% and 4%; toll integration costs were escalated from current values to the anticipated years of expenditure in 2014 and 2015. Because the plans were conceptual in nature, a contingency was also added to the toll integration elements. The Project is currently scheduled to open in November 2018. Budgetary adjustments to account for additional inflation beyond 2015 have not been made.

## ROADSIDE TOLL COLLECTION SYSTEM

When the original estimate was developed in 2010, a combination of mainline and ramp tolling zones was assumed. The base estimate included 32 tolled travel lanes and 11 tolled outside shoulders (43 total instrumented lanes). Under the revised all-mainline tolling scheme, in which the elevated section will not be tolled and the shoulders will no longer be tolled as travel lanes, the system will include 28 tolled travel lanes. Although there has been a reduction in both the number of tolled travel lanes and shoulder instrumentation, the original estimate of \$12.63 million is unchanged from the Initial Financial Plan. Items included in roadside toll collection system cost estimate include cameras, vehicle profilers, pavement loops, uninterrupted power supplies, CCTV surveillance cameras, and software.

## ELECTRONIC TOLL COLLECTION SYSTEM

The Monroe Expressway will use a similar Electronic Toll Collection System as the Triangle Expressway. The quantities of readers and antennas were estimated based on the number of tolled lanes and toll zones. As with the roadside toll collection system, the Monte Carlo simulation model accounted for possible variability in these quantities. The original budget also included a line item for transponder purchases of approximately \$1.5 million. Presently, the original estimate of \$3.97 million is unchanged from the Initial Financial Plan.

## BACK OFFICE SYSTEM

The Back Office System developed for Triangle Expressway was sized to handle future projects such as the Monroe Expressway. Other items in the budget include application software, installation, and testing. NCTA will begin scoping and negotiating the extra work order with Xerox in 2016. Presently, the original estimate of \$2.14 million is unchanged from the Initial Financial Plan.

## CUSTOMER SERVICE CENTER

Staffing and operations of the NC Quick Pass Customer Service Center near the Triangle Expressway is being performed by AECOM. The existing operations contract with AECOM will be amended to accommodate the additional personnel requirements. The initial budget of \$1.41 million is unchanged for the current plan of finance.

## CONSULTANT SERVICES

NCTA has budgeted \$3.31 million for consultant services during the toll integration phase. These consultants will advise and assist NCTA with procurement, contracting, design, installation, and testing of the roadside toll collection system, the back office system, and the electronic toll collection system. This budget is unchanged from the initial plan of finance.

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## LANDSCAPING

The landscaping work will be accomplished through one or more separate contracts, which will be advertised after construction is underway. The budgeted amount for landscape implementation is \$5,908,855, which is approximately 1.5 percent of the construction cost. This amount has been included in the project budget as a separate item.

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## UTILITY RELOCATION

The utility relocation cost estimates were prepared by MA Engineering Associates. They coordinated extensively with the existing utility owners within the Project limits, such as Duke Energy, Verizon, Alltel, Time Warner Cable, Piedmont Natural Gas, etc. The initial utility relocation estimate of \$4.76 million is unchanged.

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## STIPENDS AND INCENTIVES

A stipend amount of \$250,000 was paid to both of the unsuccessful design-build teams.

Incentives and disincentives to the design-build contractor to meet certain schedule milestones are included in the construction contract. In the event that substantial completion is achieved by the negotiated completion date (assuming a date no later than November 27, 2018), and toll collection and enforcement technology is fully implemented, a bonus of \$3 million will be paid to the team. If the substantial completion date is met, but the toll integrator has not yet completed installation of the toll system, then the design-build team will receive a completion bonus of \$2 million. The purpose of this tiered completion bonus is to encourage cooperation between the design-build team and the toll integrator. In the event that the substantial completion date is not met, then the design-build team will be liable for liquidated damages in the amount of \$25,000 per calendar day for each day of delay in reaching this milestone. In addition, for each day of delay that the team does not meet their proposed final completion date, the team will be liable for liquidated damages in the amount of \$10,000 per calendar day of delay.

Additional incentives are in the design-build contract to encourage environmental excellence during construction. The design-build team will be eligible for an incentive in the amount of \$150,000 if construction operations have been performed in accordance with all environmental regulations and specifications, and the design-build team does not receive any Immediate Corrective Actions (ICA), Continuances of Immediate Correction Action (CICA), Notices of Violation (NOV), and/or Cease and Desist (C&D) orders at any time during the Project. The design-build team's first NOV or C&D violation will result in forfeiture of the entire incentive payment. For each ICA or CICA, the team will forfeit \$50,000 until the entire amount is forfeited. On March 13, 2015, the NCDOT Roadside Environmental Unit issued an Erosion and Sedimentation Report to the design-build contractor that stated that "Immediate Corrective Action (ICA) / Permit Consultation" was needed. Per the conditions in the contract, this ICA notification caused the design-build team to forfeit \$50,000 of the environmental excellence incentive payment. On May 11, 2016, following an on-site inspection, the NC Division of Water Resources issued a Notice of Violation (NOV) to the design-build team. Due to this violation of the permit conditions, the design-build team then forfeited the remainder of the environmental excellence incentive payment. This amount has been reduced from \$150,000 to \$0 in the project budget. On August 12, 2016, following an on-site inspection, the North Carolina Division of Water Resources issued a Notice of Violation (NOV) to the design-build team. The violation occurred as a result of contractor error at a culvert site and improper installation and maintenance of erosion control of sediment and erosion measures at another site. This violation and each subsequent violation of the permit conditions will result in liquidated damage assessments of \$12,500 for any type of violation.

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## PUBLIC EDUCATION AND OUTREACH

The NCTA has set aside a budget of \$3.43 million for public education and information efforts regarding a public information campaign for the Monroe Expressway. The focus of this public information and education campaign will be the development and implementation of a plan for the sale and distribution of electronic toll tags to be used in conjunction with NCTA toll roads. The efforts will include research and market surveys to provide the NCTA advice and alternatives for its public information and education campaign; creation and implementation of a comprehensive public education and outreach campaign to increase knowledge, perception and understanding of the need for and benefits of the NCTA toll roads, including developing a strategy and content for print, television, radio and direct mail components of a public outreach campaign.

## CHAPTER 10 | CASH FLOW PROJECTIONS

Quarterly projections of cash flow required to construct the Monroe Expressway are shown in **Exhibit 13**. Quarterly cash flows are based upon the actual expenditures through June 30, 2016 (Q4 FY16) and then the anticipated schedule of design-build construction, right of way acquisition, and other activities. The highway design-build contract is utilizing a monthly payment based upon verified progress of work. If construction progress is slower than scheduled, payment will be made only for the amount of work actually accomplished in a given month.

Tolling is expected to be initiated with the completion of the Project on or before November 27, 2018, which takes into account the delays due to litigation. The final completion of the Project is currently scheduled to be no later than May 28, 2019.

Exhibit 13: Cash Flow Summary

DESCRIPTION/QUARTER	Budget	FY 12 thru	Jul-Sept 15	Oct-Dec 15	Jan-Mar 16	Apr-Jun 16	Jul-Sept 16	Oct-Dec 16	Jan-Mar 17	Apr-Jun 17
		FY 15	Q1 FY16	Q2 FY16	Q3 FY16	Q4 FY16	Q1 FY17	Q2 FY17	Q3 FY17	Q4 FY17
<b>HIGHWAY DESIGN-BUILD CONTRACT</b>										
DESIGN-BUILD CONTRACT LESS CEI	\$ 449,424,194	\$ 59,419,029	\$ 23,468,324	\$ 18,514,586	\$ 30,068,219	\$ 67,249,306	\$ 34,675,235	\$ 28,326,199	\$ 28,613,941	\$ 29,343,495
LANDSCAPING	\$ 5,909,217	\$ -	\$ -	\$ -	\$ 4,967	\$ 13,122	\$ -	\$ -	\$ 221,582	\$ 221,582
DIESEL FUEL ADJ RESERVE ACCT	\$ 5,833,787	\$ -	\$ (21,207)	\$ (70,261)	\$ (136,092)	\$ (212,644)	\$ 153,270	\$ 23,880	\$ 87,581	\$ 246,325
AC ADJ RESERVE ACCT	\$ 8,050,603	\$ -	\$ -	\$ -	\$ (5,447)	\$ (52,172)	\$ 10,010	\$ -	\$ 200,000	\$ 1,402,500
INCENTIVES	\$ 3,000,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
CEI BY SUMMIT	\$ 18,183,632	\$ 20,412	\$ 336,542	\$ 432,239	\$ 1,153,867	\$ 1,889,139	\$ 1,318,564	\$ 1,182,161	\$ 963,916	\$ 1,182,161
STIPENDS	\$ 500,000	\$ 500,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>ROW &amp; UTILITIES</b>										
RIGHT OF WAY	\$ 136,057,086	\$ 33,846,642	\$ 14,555,643	\$ 16,468,919	\$ 13,792,574	\$ 12,518,338	\$ 12,381,254	\$ 5,972,935	\$ 4,070,847	\$ 4,762,021
RIGHT OF WAY CONSULTANTS	\$ 11,211,739	\$ 5,933,528	\$ 1,010,818	\$ 946,857	\$ 1,049,122	\$ 601,714	\$ 784,949	\$ 335,285	\$ 201,844	\$ 112,136
UTILITIES	\$ 4,759,188	\$ -	\$ 21,559	\$ -	\$ 90,543	\$ 713,911	\$ 951,882	\$ 951,882	\$ 542,097	\$ 416,448
<b>TOLL INTEGRATION</b>										
BACK OFFICE SYSTEM	\$ 2,138,200	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 106,910	\$ 106,910	\$ 106,910
TOLL OPS	\$ 1,407,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 70,350	\$ 70,350	\$ 70,350
ROADSIDE TOLL COLLECTION SYSTEM	\$ 12,630,600	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 631,530	\$ 631,530	\$ 631,530	\$ 631,530
ETC CONTRACTOR	\$ 3,967,750	\$ 13,540	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 184,895	\$ 198,385	\$ 198,385
TOLLING CONSULTANTS	\$ 3,306,290	\$ -	\$ -	\$ 21,112	\$ 147,139	\$ 353,304	\$ 165,325	\$ 165,325	\$ 165,325	\$ 165,325
<b>NCDOT/NCTA IN-HOUSE COSTS &amp; RESERVES</b>										
NCTA CONSULTANTS	\$ 532,492	\$ 24,031	\$ -	\$ 32,494	\$ 182,018	\$ 135,805	\$ 25,781	\$ 12,576	\$ 12,576	\$ 6,288
DOT ADMIN/TRANSFER SURCHARGE	\$ 2,362,640	\$ 493,482	\$ -	\$ 1,314,493	\$ 47,205	\$ 47,205	\$ 35,404	\$ 47,205	\$ 47,205	\$ 47,205
NCDOT LABOR & CONSTR. MGMT.	\$ 16,007,390	\$ 545,648	\$ 92,330	\$ 137,951	\$ 141,482	\$ 133,972	\$ 1,280,891	\$ 1,280,891	\$ 1,280,891	\$ 1,120,780
MARKETING & OUTREACH	\$ 3,433,693	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
RAILROAD FORCE ACCOUNT	\$ 109,013	\$ 22,935	\$ 1,105	\$ 3,638	\$ -	\$ 81,334	\$ -	\$ -	\$ -	\$ -
CHANGE ORDER CONTINGENCY	\$ 26,215,153	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 1,310,758	\$ 1,310,758	\$ 2,621,515	\$ 2,621,515
MISCELLANEOUS PROJECT COSTS	\$ 15,830,836	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 786,582	\$ 1,573,163	\$ 1,573,163	\$ 1,573,163
<b>TOTAL</b>	<b>\$ 730,870,501</b>	<b>\$ 100,819,247</b>	<b>\$ 39,465,113</b>	<b>\$ 37,802,029</b>	<b>\$ 46,535,596</b>	<b>\$ 83,472,336</b>	<b>\$ 54,511,435</b>	<b>\$ 42,175,946</b>	<b>\$ 41,609,659</b>	<b>\$ 44,228,119</b>

DESCRIPTION/QUARTER	Budget	Jul-Sept 17	Oct-Dec 17	Jan-Mar 18	Apr-Jun 18	Jul-Sept 18	Oct-Dec 18	Jan-Mar 19	Apr-Jun 19	Jul-Sept 19	Oct-Dec 19
		Q1 FY18	Q2 FY18	Q3 FY18	Q4 FY18	Q1 FY19	Q2 FY19	Q3 FY19	Q4 FY19	Q1 FY20	Q2 FY20
<b>HIGHWAY DESIGN-BUILD CONTRACT</b>											
DESIGN-BUILD CONTRACT LESS CEI	\$ 449,424,194	\$ 29,578,754	\$ 18,947,698	\$ 18,468,450	\$ 30,519,593	\$ 24,519,122	\$ 5,236,038	\$ 1,673,628	\$ 802,575		
LANDSCAPING	\$ 5,909,217	\$ 221,582	\$ 221,582	\$ 886,328	\$ 886,328	\$ 886,328	\$ 886,328	\$ 369,303	\$ 369,303	\$ 356,304	\$ 364,576
DIESEL FUEL ADJ RESERVE ACCT	\$ 5,833,787	\$ 714,943	\$ 256,357	\$ 533,718	\$ 2,798,428	\$ 1,140,708	\$ 318,781				
AC ADJ RESERVE ACCT	\$ 8,050,603	\$ 1,390,000	\$ 230,890	\$ 230,000	\$ 1,725,000	\$ 2,102,172	\$ 817,650				
INCENTIVES	\$ 3,000,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 3,000,000	\$ -	\$ -	\$ -	\$ -
CEI BY SUMMIT	\$ 18,183,632	\$ 1,273,096	\$ 1,273,096	\$ 963,916	\$ 1,229,447	\$ 1,229,447	\$ 1,273,096	\$ 625,636	\$ 745,671	\$ 691,109	\$ 400,116
STIPENDS	\$ 500,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>ROW &amp; UTILITIES</b>											
RIGHT OF WAY	\$ 136,057,086	\$ 4,081,732	\$ 2,721,155	\$ 2,721,155	\$ 2,721,155	\$ 1,360,577	\$ 1,360,577	\$ 1,360,577	\$ 680,289	\$ 680,697	\$ -
RIGHT OF WAY CONSULTANTS	\$ 11,211,739	\$ 112,136	\$ 44,854	\$ 11,214	\$ 11,214	\$ 11,214	\$ 11,214	\$ 11,214	\$ 11,214	\$ 11,214	\$ -
UTILITIES	\$ 4,759,188	\$ 416,448	\$ 416,448	\$ 59,493	\$ 59,493	\$ 59,493	\$ 59,493	\$ -	\$ -	\$ -	\$ -
<b>TOLL INTEGRATION</b>											
BACK OFFICE SYSTEM	\$ 2,138,200	\$ 106,910	\$ 106,910	\$ 106,910	\$ 213,820	\$ 213,820	\$ 213,820	\$ 213,820	\$ 213,820	\$ 213,820	\$ 213,820
TOLL OPS	\$ 1,407,000	\$ 70,350	\$ 70,350	\$ 70,350	\$ 140,700	\$ 140,700	\$ 140,700	\$ 140,700	\$ 140,700	\$ 140,700	\$ 140,700
ROADSIDE TOLL COLLECTION SYSTEM	\$ 12,630,600	\$ 631,530	\$ 1,263,060	\$ 1,263,060	\$ 1,263,060	\$ 1,263,060	\$ 1,263,060	\$ 1,263,060	\$ 631,530	\$ 631,530	\$ 631,530
ETC CONTRACTOR	\$ 3,967,750	\$ 198,385	\$ 595,155	\$ 595,155	\$ 396,770	\$ 396,770	\$ 396,770	\$ 396,770	\$ 198,385	\$ 198,385	\$ -
TOLLING CONSULTANTS	\$ 3,306,290	\$ 171,938	\$ 198,390	\$ 198,390	\$ 297,585	\$ 297,585	\$ 297,585	\$ 330,650	\$ 165,325	\$ 165,986	\$ -
<b>NCDOT/NCTA IN-HOUSE COSTS &amp; RESERVES</b>											
NCTA CONSULTANTS	\$ 532,492	\$ 6,288	\$ 6,288	\$ 6,288	\$ 6,602	\$ 12,576	\$ 12,576	\$ 12,576	\$ 12,576	\$ 12,576	\$ 12,576
DOT ADMIN/TRANSFER SURCHARGE	\$ 2,362,640	\$ 47,205	\$ 47,205	\$ 47,205	\$ 47,205	\$ 23,603	\$ 23,603	\$ 23,603	\$ 23,603	\$ -	\$ -
NCDOT LABOR & CONSTR. MGMT.	\$ 16,007,390	\$ 1,122,381	\$ 1,120,780	\$ 1,120,780	\$ 1,120,780	\$ 1,040,724	\$ 960,668	\$ 960,668	\$ 960,668	\$ 944,657	\$ 640,446
MARKETING & OUTREACH	\$ 3,433,693	\$ -	\$ -	\$ -	\$ -	\$ 858,423	\$ 858,423	\$ 858,423	\$ 858,423	\$ -	\$ -
RAILROAD FORCE ACCOUNT	\$ 109,013	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
CHANGE ORDER CONTINGENCY	\$ 26,215,153	\$ 2,621,515	\$ 2,621,515	\$ 2,621,515	\$ 2,621,515	\$ 1,310,758	\$ 1,310,758	\$ 1,310,758	\$ 1,310,758	\$ 1,310,758	\$ 1,310,758
MISCELLANEOUS PROJECT COSTS	\$ 15,830,836	\$ 1,573,163	\$ 1,573,163	\$ 1,573,163	\$ 728,469	\$ 786,582	\$ 943,898	\$ 786,582	\$ 786,582	\$ 786,582	\$ 786,582
<b>TOTAL</b>	<b>\$ 730,870,501</b>	<b>\$ 44,338,357</b>	<b>\$ 31,714,898</b>	<b>\$ 31,477,091</b>	<b>\$ 46,787,165</b>	<b>\$ 37,653,661</b>	<b>\$ 19,385,039</b>	<b>\$ 10,337,968</b>	<b>\$ 7,911,421</b>	<b>\$ 6,144,318</b>	<b>\$ 4,501,103</b>

**CHAPTER 11 | IMPLEMENTATION SCHEDULE**

The implementation schedule for the Monroe Expressway is shown in *Exhibit 14*.

**Exhibit 14: Project Implementation and Financing Schedule**

Activity	Anticipated Start	Anticipated Completion
Design-Build Highway Construction	November 2011 (awarded contract)	July 1, 2016 (original completion date)
	May 3, 2012 (put on hold)	November 2018 (revised opening date)
	May 2014 (re-start design)	
	May 2015 (groundbreaking)	May 2019 (final completion)
Comprehensive Traffic & Revenue Study	July 2015	April 2016 (Draft)
		November 2016 (Final)
FY 16 Finance Plan Update	July 2016	September 30, 2016
Roadside Toll Collection System	April 2016 (Issue RFP)	November 2018
	February 2017 (NTP)	
TIFIA/Bond Financing Application	July 2016	November 2016
AVI Readers and Transponders	February 2017 (NTP)	November 2018
BOS Contract Modification	Mid-2017	August 2018
Toll Operations Contract Modification	Mid-2017	August 2018
CSC Storefront	Late 2017	August 2018
Landscaping Installation	Early 2018 (NTP)	Fall 2019



## CHAPTER 12 | OPERATIONS, MAINTENANCE, RENEWAL AND REPLACEMENT

### TOLL COLLECTION SYSTEM OPERATION AND MAINTENANCE

Operation and maintenance of the Monroe Expressway Toll Collection System will be provided by an RTCS and BOS integrator with oversight by NCTA personnel. The operations and maintenance of the system includes all preventive, predictive and corrective maintenance, and will ensure the highest level of accuracy and availability as required through established performance measures. The up-front and ongoing costs for public outreach and sales of transponders are also included in the O&M estimate.

In addition to normal maintenance, the requirements also include 24-hour, seven days a week of on-call maintenance services. Minimum response times, depending on time of day and on priority of the malfunction, will be specified. The toll collection system will be required to generate its own system malfunction and maintenance messages, which will be used in conjunction with toll collection staff reports, to alert maintenance staff of problems. The mandate of this program is to maintain the capability of the system to collect tolls 24 hours per day, 365 days per year.

All forecasted operations costs were estimated based on empirical data gathered while operating and maintaining NCTA's open toll facility, the Triangle Expressway. Specifically, operations costs are estimated on a per-transaction basis, by applying a per-transaction cost to transaction estimates provided in the *Draft Monroe Expressway Traffic and Toll Revenue Study* (June 3, 2016). In addition, considerations were made for estimates regarding the percentage of drivers paying tolls via transponder versus video-toll customers. The estimated operations costs are inherently conservative in that while a portion of the operations costs would be "shared" with other operating toll facilities (i.e., the Triangle Expressway), the estimate does not assume such considerations.

### TRAFFIC OPERATIONS

From the Metrolina Regional Transportation Management Center, NCTA will monitor video and data feeds from the Monroe Expressway for traffic management, maintenance, and security concerns. Staff will work closely with local NCDOT personnel, the maintenance contractors, and the toll integrators to proactively address any needs detected. Incident Management Assistance Patrols (IMAP) will also be included as part of the ITS and Operations program. Dedicated IMAP vehicles will be assigned to the Monroe Connector Bypass to aid stranded motorists, provide temporary traffic control, and assist in incident clearance of disabled vehicles and debris. IMAP operations will be closely coordinated with local IMAP patrol routes and procedures. IMAP drivers will also be involved in spotting and reporting maintenance and security concerns. Dedicated North Carolina State Highway Patrol (NCSHP) officers will also be assigned to patrol the corridor. IMAP and NCSHP communications hardware and procedures will be consistent with current NCDOT/NCSHP practices.

### ROUTINE ROADWAY MAINTENANCE

Routine maintenance costs include recurring and routine maintenance activities associated with the highway, such as mowing, snow and litter removal, guardrail and signing maintenance, and regular repairs to the pavement structure. Similar to the model used for Triangle Expressway, it is assumed that NCDOT Division 10 will have overall responsibility for the routine maintenance of the Monroe Expressway, and will ensure its safe and efficient operation. The maintenance activities will be performed through a combination of in-house and subcontracted vendors and suppliers.

The NCTA has developed an in-house model for estimating operations and maintenance costs by utilizing the following: actual contract values procured for the Triangle Expressway where possible, available cost data for certain administrative costs, as well as data available to NCTA for contracted maintenance services for similar roadway facilities. In addition, the cost projections are based on NCTA's Business Policies and Procedures Manual and have been adjusted to reflect anticipated organizational changes. These available costs have been adjusted to fit the Monroe Expressway, with modifications made for the tolling configuration and anticipated volumes. HNTB assisted in the development and review of the operations and maintenance model. Sound management practices and an effective program of inspection and maintenance will be essential in maintaining the facilities in good repair and working condition. These baseline costs have been projected to the year 2058 and are presented in **Exhibit 14**.

The NCTA will monitor all operating and major maintenance costs by utilizing in-house business solutions to track all related expenditures monthly, including but not limited to: professional fees, payments to contractors, maintenance materials and supplies, employee labor, utilities, insurance recoveries, mail delivery costs, collections fees, interoperability expenses, credit card expenses, processing fees and public outreach costs. All tracked expenditures are reviewed by NCTA executive staff monthly, and reported to the NCTA Board of Directors quarterly.

The plan of finance assumes that operations and maintenance costs of the tolled freeway will be funded by toll revenues. The non-tolled, elevated section leading up to the toll facility will be maintained by NCDOT Division 10 using typical NCDOT maintenance funding sources (not toll revenues). If, at any time the toll revenues fail to cover operations and maintenance expenses, NCDOT commits to replenish the Operating Reserve Fund and Renewal & Replacement Fund, both pursuant to the trust indenture, which allows Senior and Subordinate debt service to be paid before O&M Expenses and R&R Costs.

The NCTA is mandated by State law and the terms of the Trust Agreement to maintain a safe highway facility in sound condition. An effective maintenance policy will contribute significantly to ensuring a safe highway for system users, as well as preserving the investment. Routine maintenance for the new facilities is anticipated to include, but not be limited to, maintenance of the following items:

- Concrete and asphalt pavement surfaces
- Bridge deck, superstructure, substructure
- Pavement markings and signage
- Mowing and landscaping
- Snow and ice removal
- Drainage, stormwater systems and slopes
- Roadside protection (guardrail, barrier, attenuation)
- Lighting
- Tolling and ITS equipment
- Litter and obstruction removal
- Building infrastructure
- Traffic control devices
- Emergency maintenance services

Regular maintenance will be performed by Division 10 forces or specialty contractors. Specialty contracts may be developed for mowing, snow and ice removal, litter pick-up, etc. The NCTA will be responsible for preparing an

annual operations and maintenance plan and budget along with routine maintenance assessments. The maintenance contractors will be required to perform maintenance activities in a safe and efficient manner with a minimum effect on traffic operations.

## REPAIR AND REHABILITATION

During the initial years of operation, the new facility should require relatively minor upkeep. However, as the many elements of the facility are subjected to aging and wear, increasing amounts of maintenance and rehabilitation will be required. In addition to being responsible for building the Monroe Expressway, operating and maintaining the facility, paying off its bond indebtedness, and operating with a positive cash flow, the NCDOT and NCTA are also required to protect, preserve and maintain the properties it will construct. In order to protect the investments in its properties, revenues are to be allocated annually to a Renewal and Replacement Account established in connection with the issuance of bonds to finance the Monroe Expressway. Amounts in the Renewal and Replacement Account can be disbursed only for the purpose of paying for the cost of:

- Unusual or extraordinary maintenance or repairs, maintenance or repairs not recurring annually, and renewals and replacements, which includes major items of equipment. Examples include asphalt overlays, pavement markings, and toll equipment upgrades.
- Repairs or replacements resulting from an emergency caused by some extraordinary occurrence, as characterized by a certificate signed by an Authorized Representative of the NCTA and filed with the Trustee stating that the moneys in the Revenue Fund and insurance proceeds, if any, available therefore are insufficient to meet such emergency.
- Paying all or any part of the cost of any capital improvement to the facility.

The assumed inflation rates for operation and maintenance expenses (O&M) and renewal and replacement (R&R) costs reflect those used by CDM Smith in the *Traffic and Revenue Study*. It is our opinion that the costs projected for the operation and maintenance of the Monroe Expressway are reasonable estimations of future costs assuming that the Project facility is operated and maintained under procedures and practices typical for the toll road industry. Sound management practices and an effective program of inspection and maintenance will be essential in maintaining the facilities in good repair and working condition.

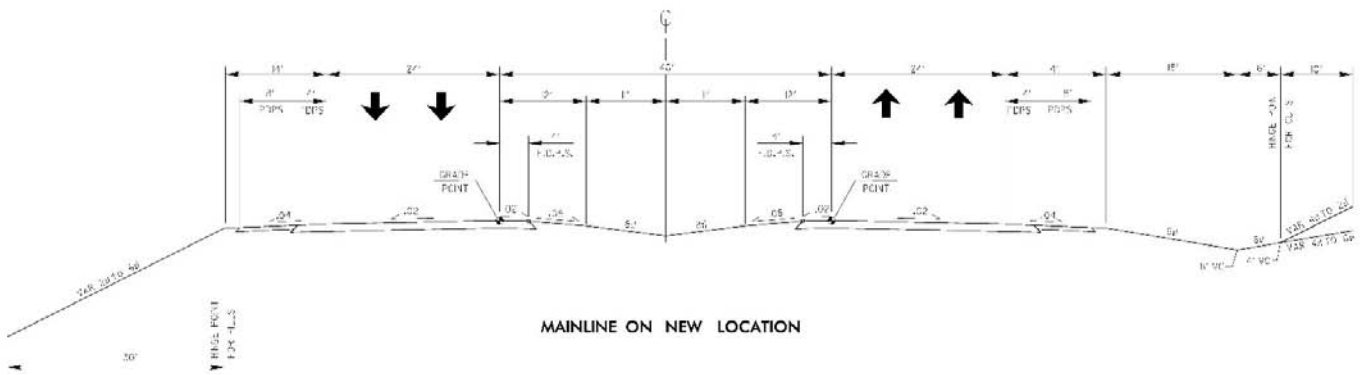
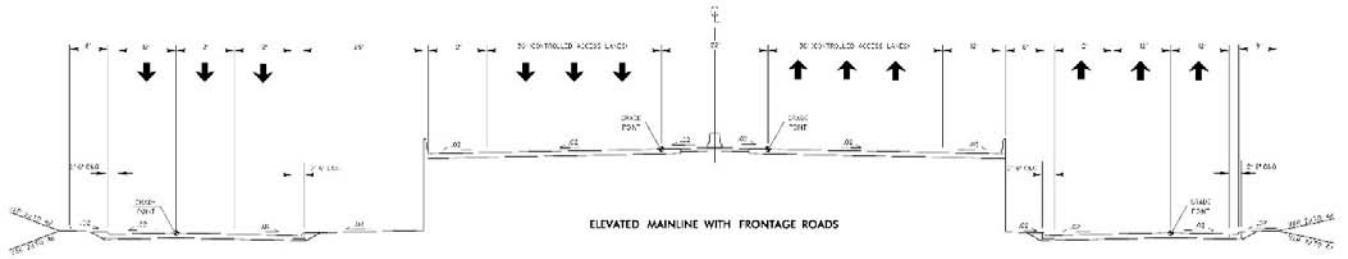
In light of the fact that the Monroe Expressway will be an entirely new facility, covered in part by warranties for the initial operations under terms of the design-build contract, deposit amounts shall be appropriate to meet the projected needs listed in **Exhibit 15**. The amounts in **Exhibit 15** reflect an asphalt pavement design, as selected by the design-build team. The projected amounts shall be reviewed on an annual basis by the NCTA in conjunction with the annual inspections and updated as appropriate to meet the needs of the preservation of the facility. In addition, the NCDOT is also approved through a resolution to provide contingent funding support for construction, operations and maintenance, and renewal and replacement expenses. Such guarantees of support are contained in the Trust Agreement.

**Exhibit 15: Projected O&M and R&R Expenses (FY 2019 – FY 2058)**

FY	Operations	Maintenance	R&R	Total
2019	\$ 3,834,000	\$ 769,500	\$ -	\$ 4,603,500
2020	\$ 9,090,000	\$ 1,574,000	\$ -	\$ 10,664,000
2021	\$ 11,682,000	\$ 1,610,000	\$ -	\$ 13,292,000
2022	\$ 13,384,000	\$ 1,647,000	\$ -	\$ 15,031,000
2023	\$ 14,123,000	\$ 1,685,000	\$ -	\$ 15,808,000
2024	\$ 14,538,000	\$ 1,724,000	\$ -	\$ 16,262,000
2025	\$ 14,868,000	\$ 1,764,000	\$ 652,000	\$ 17,284,000
2026	\$ 14,838,000	\$ 1,801,000	\$ -	\$ 16,639,000
2027	\$ 14,917,000	\$ 1,839,000	\$ -	\$ 16,756,000
2028	\$ 15,000,000	\$ 1,877,000	\$ -	\$ 16,877,000
2029	\$ 15,087,000	\$ 1,917,000	\$ 2,753,000	\$ 19,757,000
2030	\$ 15,154,000	\$ 1,957,000	\$ -	\$ 17,111,000
2031	\$ 15,205,000	\$ 1,998,000	\$ 27,144,000	\$ 44,347,000
2032	\$ 15,261,000	\$ 2,040,000	\$ -	\$ 17,301,000
2033	\$ 15,319,000	\$ 2,083,000	\$ -	\$ 17,402,000
2034	\$ 15,379,000	\$ 2,127,000	\$ -	\$ 17,506,000
2035	\$ 15,441,000	\$ 2,172,000	\$ -	\$ 17,613,000
2036	\$ 15,505,000	\$ 2,218,000	\$ -	\$ 17,723,000
2037	\$ 15,572,000	\$ 2,264,000	\$ 827,000	\$ 18,663,000
2038	\$ 15,640,000	\$ 2,312,000	\$ -	\$ 17,952,000
2039	\$ 15,711,000	\$ 2,360,000	\$ 3,388,000	\$ 21,459,000
2040	\$ 15,784,000	\$ 2,410,000	\$ -	\$ 18,194,000
2041	\$ 15,849,000	\$ 2,460,000	\$ -	\$ 18,309,000
2042	\$ 15,906,000	\$ 2,512,000	\$ -	\$ 18,418,000
2043	\$ 15,966,000	\$ 2,565,000	\$ 40,303,000	\$ 58,834,000
2044	\$ 16,027,000	\$ 2,619,000	\$ -	\$ 18,646,000
2045	\$ 16,092,000	\$ 2,674,000	\$ -	\$ 18,766,000
2046	\$ 16,142,000	\$ 2,730,000	\$ -	\$ 18,872,000
2047	\$ 16,178,000	\$ 2,787,000	\$ -	\$ 18,965,000
2048	\$ 16,215,000	\$ 2,845,000	\$ -	\$ 19,060,000
2049	\$ 16,253,000	\$ 2,905,000	\$ 10,469,000	\$ 29,627,000
2050	\$ 16,293,000	\$ 2,966,000	\$ -	\$ 19,259,000
2051	\$ 16,332,000	\$ 3,028,000	\$ -	\$ 19,360,000
2052	\$ 16,365,000	\$ 3,092,000	\$ -	\$ 19,457,000
2053	\$ 16,407,000	\$ 3,157,000	\$ -	\$ 19,564,000
2054	\$ 16,446,000	\$ 3,223,000	\$ -	\$ 19,669,000
2055	\$ 16,488,000	\$ 3,291,000	\$ 44,699,000	\$ 64,478,000
2056	\$ 16,532,000	\$ 3,360,000	\$ -	\$ 19,892,000
2057	\$ 16,577,000	\$ 3,431,000	\$ -	\$ 20,008,000
2058	\$ 16,624,000	\$ 3,503,000	\$ -	\$ 20,127,000

**APPENDIX A: TYPICAL SECTIONS**

## Typical Sections



**APPENDIX E**

**FORM OF PROPOSED OPINION OF BOND COUNSEL**

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January 31, 2017

Board of Directors  
North Carolina Turnpike Authority  
Raleigh, North Carolina

**North Carolina Turnpike Authority  
Monroe Expressway Toll Revenue Bonds**

**\$119,455,000 Series 2016A**

**\$17,596,904.35 Series 2016C  
(Capital Appreciation Bonds)**

Gentlemen:

We have examined the applicable law and certified copies of proceedings and documents relating to the issuance by the North Carolina Turnpike Authority (the “Authority”) of its Monroe Expressway Toll Revenue Bonds, Series 2016A in the aggregate principal amount of \$119,455,000 (the “2016A Bonds”) and Monroe Expressway Toll Revenue Bonds, Series 2016C (Capital Appreciation Bonds) in the initial aggregate principal amount of \$17,596,904.35 (the “2016C Bonds” and, together with the 2016A Bonds, the “Bonds”) to finance, in part, the costs of the Monroe Expressway, a turnpike project in Mecklenburg and Union Counties, North Carolina (the “Project”), and to refund certain prior bonds of the Authority (the “Prior Bonds”). Reference is made to the forms of the Bonds for additional information concerning their details, payment and redemption provisions and the proceedings pursuant to which they are issued.

The Bonds recite that they are issued under and pursuant to (i) the Constitution and laws of the State of North Carolina, (ii) bond orders of the Authority adopted on November 14, 2011, and November 3, 2016, authorizing, among other things, the issuance of the Bonds (together, the “Bond Order”), (iii) a Trust Agreement, dated as of November 1, 2011, between the Authority and Wells Fargo Bank, N.A., as trustee (the “Trustee”), as amended and restated as of December 1, 2016 (the “Trust Agreement”), and (iv) Article 6H of Chapter 136, as amended, of the General Statutes of North Carolina (the “Authority Act”), and The State and Local Government Revenue Bond Act, Article 5 of Chapter 159 of the North Carolina General Statutes, as amended (the “Revenue Bond Act” and, together with the Authority Act, the “Act”) for the purpose of providing funds, together with any other available funds, (a) to pay costs of land acquisition, design, construction and equipping of the Project, (b) to provide funds to pay a portion of interest on the Bonds, (c) to fund a reserve fund for the Bonds, (d) to refund the Prior Bonds, and (e) to pay costs incurred in connection with the issuance of the Bonds. The Bonds are equally and ratably secured by a pledge of, and payable from, toll and other revenues from the Project, including amounts remaining from State of North Carolina appropriations to the Authority after provision for payment of debt service on certain other bonds of the Authority (together, “Revenues”). Pursuant to the Trust Agreement and a Loan Agreement dated as of January 31, 2017, between the Authority and the United States Department of

Transportation, under the Transportation Infrastructure Finance and Innovation Act of 1998, amended, the Authority has contracted for a loan for costs of the Project of up to \$166,500,000 in principal amount, subject to adjustment, and issued its TIFIA Bond in such amount evidencing its obligation to repay such loan (the "TIFIA Bond"). The TIFIA Bond initially is secured by and payable from Revenues on a basis subordinate to the Bonds but in certain events may become secured in parity therewith. Additional indebtedness secured as to the lien on Revenues on a parity with or subordinate to the Bonds and the TIFIA Bond may be issued or secured thereunder pursuant to the terms of the Trust Agreement. All terms not defined herein are as defined in the Trust Agreement.

Without undertaking to verify the same by independent investigation, we have relied on (a) computations provided to BondResource Partners, LP, Harrisburg, Pennsylvania, independent accountants, the mathematical accuracy of which has been verified by them, relating to the yield of investments in the escrow fund established in connection with the refunding of the Prior Bonds, the sufficiency of such investments to pay when due the principal of and interest on the Prior Bonds and the yield on the Bonds, and (b) certifications by representatives of the Authority, the North Carolina Department of Transportation and the North Carolina Local Government Commission as to certain facts relevant to both our opinion and requirements of the Internal Revenue Code of 1986, as amended (the "Code"). The Authority has covenanted to comply with the provisions of the Code regarding, among other matters, the use, expenditure and investment of the proceeds of the Bonds and the timely payment to the United States of any arbitrage rebate amounts with respect to the Bonds, all as set forth in the proceedings and documents relating to the issuance of the Bonds (the "Covenants").

Based on the foregoing and in accordance with customary opinion practice, we are of the opinion that:

1. The Bonds have been authorized and issued in accordance with the Constitution and statutes of the State of North Carolina, including the Act, and constitute valid and legally binding limited obligations of the Authority, payable as to principal and interest solely from Revenues. The Bonds do not create or constitute a debt or pledge of the faith and credit of the State of North Carolina or any political subdivision or agency thereof, including the Authority.

2. The Bond Order and the Trust Agreement have been duly adopted and delivered by the Authority, and the Trust Agreement constitutes a valid and legally binding agreement of the Authority which assigns and pledges the Revenues to the Trustee and is enforceable against the Authority in accordance with its terms.

3. The rights of the holders of the Bonds and the enforceability of such rights, including enforcement by the Trustee of the obligations of the Authority under the Trust

Agreement, may be limited or otherwise affected by (a) bankruptcy, insolvency, reorganization, fraudulent conveyance, moratorium and other laws affecting the rights of creditors generally and (b) principles of equity, whether considered at law or in equity.

4. Under current law, interest, including accrued original issue discount (“OID”) on the Bonds (a) is not included in gross income for federal income tax purposes and (b) is not an item of tax preference for purposes of the federal alternative minimum income tax imposed on individuals and corporations; however, with respect to corporations (as defined for federal income tax purposes) subject to the alternative minimum income tax, such interest is taken into account in determining adjusted current earnings for purposes of computing such tax. In the case of the Series 2016A Bonds maturing in 2041, and for each maturity of Series 2016C Bonds (together, the “OID Bonds”), the difference between (i) the stated principal amount [maturity value for Series 2016C Bonds] of each maturity of the OID Bonds and (ii) the initial offering price to the public (excluding bond houses and brokers) at which a substantial amount of such maturity is sold, will constitute OID; OID will accrue for federal income tax purposes on a constant-yield-to-maturity method based on regular compounding; and a holder’s basis in such a Bond will be increased by the amount of OID treated for federal income tax purposes as having accrued on the Bond while the holder holds the Bond. The opinions in the preceding sentences are subject to the condition that there is compliance subsequent to the issuance of the Bonds with all requirements of the Code that must be satisfied in order that interest thereon not be included in gross income for federal income tax purposes. Failure of the Authority to comply with the Covenants could cause interest, including accrued OID, on the Bonds to be included in gross income for Federal income tax purposes retroactively to their date of issue. We express no opinion regarding other federal tax consequences of the ownership of or receipt or accrual of interest on the Bonds.

5. Under current law, interest, including accrued OID, on the Bonds is exempt from State of North Carolina income taxes.

Our services as bond counsel to the Authority for the Bonds have been limited to rendering the foregoing opinion based on our review of such legal proceedings as we deem necessary to approve the validity of the Bonds and the tax status of the interest thereon. We have not made any investigation concerning the Project, the Revenues, or the financial resources of the Authority and therefore we express no opinion as to the accuracy or completeness of any information, including the Preliminary Official Statement dated December 1, 2016, amended as of January, 20, 2017, or the Official Statement dated January 25, 2017, with respect to the Bonds, that may have been relied upon by anyone in making the decision to purchase Bonds.

Very truly yours,

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**APPENDIX F**

**DTC'S BOOK-ENTRY-ONLY SYSTEM**

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## APPENDIX F

### DTC'S BOOK-ENTRY-ONLY SYSTEM

The Depository Trust Company, New York, New York (“DTC”), will act as securities depository for the Series 2016 Bonds. The Series 2016 Bonds will be issued as fully-registered bonds registered in the name of Cede & Co. (DTC’s partnership nominee) or such other name as may be requested by an authorized representative of DTC. One fully-registered Series 2016 Bond for each maturity in the aggregate principal amount of such maturity will be deposited with DTC, or with the Trustee on DTC’s behalf.

DTC, the world’s largest depository, is a limited-purpose trust company organized under the New York Banking Law, a “banking organization” within the meaning of the New York Banking Law, a member of the Federal Reserve System, a “clearing corporation” within the meaning of the New York Uniform Commercial Code and a “clearing agency” registered pursuant to the provisions of Section 17A of the Securities Exchange Act of 1934. DTC holds and provides asset servicing for issues of U.S. and non-U.S. equity issues, corporate and municipal debt issues, and money market instruments that DTC’s participants (“Direct Participants”) deposit with DTC. DTC also facilitates the post-trade settlement among Direct Participants of sales and other securities transactions in deposited securities, through electronic computerized book-entry transfers and pledges between Direct Participants’ accounts. This eliminates the need for physical movement of securities certificates. Direct Participants include both U.S. and non-U.S. securities brokers and dealers, banks, trust companies, clearing corporations and certain other organizations. DTC is a wholly-owned subsidiary of The Depository Trust & Clearing Corporation (“DTCC”). DTCC is the holding company for DTC, National Securities Clearing Corporation and Fixed Income Clearing Corporation, all of which are registered clearing agencies. DTCC is owned by the users of its regulated subsidiaries. Access to the DTC system is also available to others such as both U.S. and non-U.S. securities brokers and dealers, banks, trust companies and clearing corporations that clear through or maintain a custodial relationship with a Direct Participant, either directly or indirectly (“Indirect Participants”). DTC has Standard & Poor’s rating of AA+. The DTC Rules applicable to its Participants are on file with the Securities and Exchange Commission. More information about DTC can be found at [www.dtcc.com](http://www.dtcc.com).

Purchases of the Series 2016 Bonds under the DTC system must be made by or through Direct Participants, which will receive a credit for the Series 2016 Bonds on DTC’s records. The ownership interest of each actual purchaser of the Series 2016 Bonds (“Beneficial Owner”) is in turn to be recorded on the Direct and Indirect Participants’ records. Beneficial Owners will not receive written confirmation from DTC of their purchase. Beneficial Owners are, however, expected to receive written confirmations providing details of the transaction, as well as periodic statements of their holdings, from the Direct or Indirect Participants through which the Beneficial Owner entered into the transaction. Transfers of ownership interests in the Series 2016 Bonds are to be accomplished by entries made on the books of Direct and Indirect Participants acting on behalf of Beneficial Owners. Beneficial Owners will not receive certificates representing their ownership interests in the Series 2016 Bonds, except in the event that use of the book-entry system for the Series 2016 Bonds is discontinued.

To facilitate subsequent transfers, all Series 2016 Bonds deposited by Direct Participants with DTC are registered in the name of DTC’s partnership nominee, Cede & Co., or such other name as may be requested by an authorized representative of DTC. The deposit of the Series 2016 Bonds with DTC and their registration in the name of Cede & Co. or such other DTC nominee do not effect any change in beneficial ownership. DTC has no knowledge of the actual Beneficial Owners of the Series 2016 Bonds; DTC’s records reflect only the identity of the Direct Participants to whose accounts the Series 2016

Bonds are credited, which may or may not be the Beneficial Owners. The Direct and Indirect Participants are responsible for keeping account of their holdings on behalf of their customers.

Conveyance of notices and other communications by DTC to Direct Participants, by Direct Participants to Indirect Participants and by Direct Participants and Indirect Participants to Beneficial Owners of the Series 2016 Bonds will be governed by arrangements among them, subject to any statutory or regulatory requirements as may be in effect from time to time. Beneficial Owners of the Series 2016 Bonds may wish to take certain steps to augment transmission to them of notices of significant events with respect to the Series 2016 Bonds, such as redemptions, tenders, defaults and proposed amendments to the security documents. For example, Beneficial Owners of the Series 2016 Bonds may wish to ascertain that the nominee holding the Series 2016 Bonds for their benefit has agreed to obtain and transmit notices to Beneficial Owners. In the alternative, Beneficial Owners may wish to provide their names and addresses to the registrar and request that copies of notices be provided directly to them.

Redemption notices will be sent to DTC. If less than all the Series 2016 Bonds are being redeemed, DTC's practice is to determine by lot the amount of the interest of each Direct Participant in such issue to be redeemed.

Neither DTC nor Cede & Co. (nor such other DTC nominee) will consent or vote with respect to the Series 2016 Bonds unless authorized by a Direct Participant in accordance with DTC's Procedures. Under its usual procedures, DTC will mail an Omnibus Proxy to the Authority as soon as possible after the record date. The Omnibus Proxy will assign Cede & Co.'s consenting or voting rights to those Direct Participants to whose accounts the Series 2016 Bonds are credited on the record date (identified in a listing attached to the Omnibus Proxy).

Principal and interest payments on the Series 2016 Bonds will be made to Cede & Co. or such other nominee as may be requested by an authorized representative of DTC. DTC's practice is to credit Direct Participants' accounts upon DTC's receipt of funds and corresponding detail information from the Authority or the Trustee on each payable date in accordance with their respective holdings shown on DTC's records. Payments by Participants to Beneficial Owners will be governed by standing instructions and customary practices, as is the case with securities held for the accounts of customers in bearer form or registered in "street name," and will be the responsibility of such Participants and not of DTC, the Authority, or the Trustee, subject to any statutory or regulatory requirements as may be in effect from time to time. Payments of principal and interest to Cede & Co. (or such other nominee as may be requested by an authorized representative of DTC) is the responsibility of the Authority and the Trustee, disbursement of such payments to Direct Participants shall be the responsibility of DTC, and disbursements of such payments to the Beneficial Owners shall be the responsibility of the Direct and Indirect Participants.

DTC may discontinue providing its services as depository with respect to the Series 2016 Bonds at any time by giving reasonable notice to the Authority or the Trustee. Under such circumstances, in the event that a successor depository is not obtained, Series 2016 Bonds are required to be printed and delivered. The Authority may decide to discontinue use of the system of book-entry-only transfers through DTC (or a successor securities depository). In that event, Series 2016 Bonds are required to be printed and delivered.

The information in this Official Statement concerning DTC and DTC's book-entry system has been obtained from DTC, and the Authority takes no responsibility for the accuracy thereof.





