

**NEW ISSUE**

Ratings: See "RATINGS" herein.

*This Official Statement has been prepared by the North Carolina Turnpike Authority and the North Carolina Local Government Commission to provide information on the Series 2009 Bonds. Selected information is presented on this cover page for the convenience of the user. To make an informed decision regarding the Series 2009 Bonds, a prospective investor should read this Official Statement in its entirety. Unless indicated, capitalized terms used on this cover page have the meanings given in the Official Statement.*

**\$270,083,108.85****NORTH CAROLINA TURNPIKE AUTHORITY****Triangle Expressway System Senior Lien Revenue Bonds****\$234,910,000 Triangle Expressway System Revenue Bonds, Series 2009A****\$35,173,108.85 Triangle Expressway System Revenue Bonds, Series 2009B****Dated: Date of Delivery****Due: as shown on inside front cover***Tax Treatment*

In the opinion of Bond Counsel, which is based on existing law and assumes continuing compliance by the Authority with certain covenants to comply with the requirements of the Internal Revenue Code of 1986, as amended (the "Code"), interest on the Series 2009 Bonds will not be includable in the gross income of the owners thereof for purposes of federal income taxation and will not be a specific preference item for purposes of computing the alternative minimum tax imposed by the Code on corporations and other taxpayers, including individuals. In addition, such interest will not be includable in the adjusted current earnings of corporations for purposes of computing alternative minimum tax imposed by the Code on corporations. In the opinion of Bond Counsel, which is based on existing law, interest on the Series 2009 Bonds will be exempt from all State of North Carolina income taxes. See "LEGAL MATTERS—TAX TREATMENT."

*Redemption*

The Series 2009A Bonds are subject to optional redemption on or after January 1, 2019. The Series 2009A Term Bonds are subject to mandatory sinking fund redemption as described herein. The Series 2009B Bonds are not subject to redemption prior to their maturities. See THE SERIES 2009 BONDS—Optional Redemption."

*Security*

The Series 2009 Bonds will be special obligations of the Authority, secured by and payable from the Receipts (hereinafter defined) of the Triangle Expressway System described in this Official Statement and, under certain circumstances, the proceeds of the Series 2009 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 2009 Bonds, and no Owner of the Series 2009 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 Receipts in connection with any default on the Series 2009 Bonds.*

*Bond Insurance*

The scheduled payment of principal of and interest when due on the Series 2009 Bonds will be guaranteed under a financial guaranty insurance policy to be issued concurrently with the delivery of the Series 2009 Bonds by Assured Guaranty Corp. ("Assured Guaranty").

*Interest Payment Dates*

Interest on the Series 2009A Bonds will be paid on January 1 and July 1, commencing January 1, 2010. Interest on the Series 2009B Bonds will not be paid currently, but will be paid upon the maturity thereof. See "THE SERIES 2009B BONDS—Interest Rate Provisions of Series 2009B Bonds."

*Method of Ownership*

Book-entry Only

*Denominations*

\$5,000 or any whole multiple thereof.

*Closing/Settlement*

July 29, 2009

*Bond Counsel*

Womble Carlyle Sandridge &amp; Rice, PLLC, Raleigh, North Carolina

*Co-Underwriters' Counsel*

Bode, Call &amp; Stroupe, L.L.P., Raleigh, North Carolina and Rand &amp; Gregory, PA, Fayetteville, North Carolina

*Trustee and Bond Registrar*

Wells Fargo Bank, N.A., Jacksonville, Florida

The Series 2009 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 the validity, the tax treatment of interest on the Series 2009 Bonds and certain other matters.

**Merrill Lynch & Co.****BB&T Capital Markets****Loop Capital Markets, LLC****Wells Fargo Securities****Banc of America Securities LLC****Citi****RBC Capital Markets****J.P. Morgan****Siebert Brandford Shank & Co., LLC****Southwest Securities, Inc.***The date of this Official Statement is July 15, 2009.*

## MATURITY SCHEDULE

### \$57,270,000 Series 2009A Current Interest Serial Bonds

<u>Due January 1</u>	<u>Principal Amount</u>	<u>Interest Rate</u>	<u>Yield</u>	<u>CUSIP</u>
2019	\$ 600,000	4.500%	4.60%	65830RAA7
2020	2,195,000	4.750	4.77	65830RAB5
2021	3,940,000	5.000	5.00	65830RAC3
2022	5,355,000	5.000	5.12	65830RAD1
2023	7,435,000	5.250	5.25	65830RAE9
2024	9,860,000	5.125	5.29	65830RAF6
2025	12,640,000	5.250	5.38	65830RAG4
2026	15,245,000	5.375	5.47	65830RAH2

\$60,315,000 Series 2009A 5.50% Term Bonds Due January 1, 2029, Yield 5.52 % CUSIP 65830RAJ8

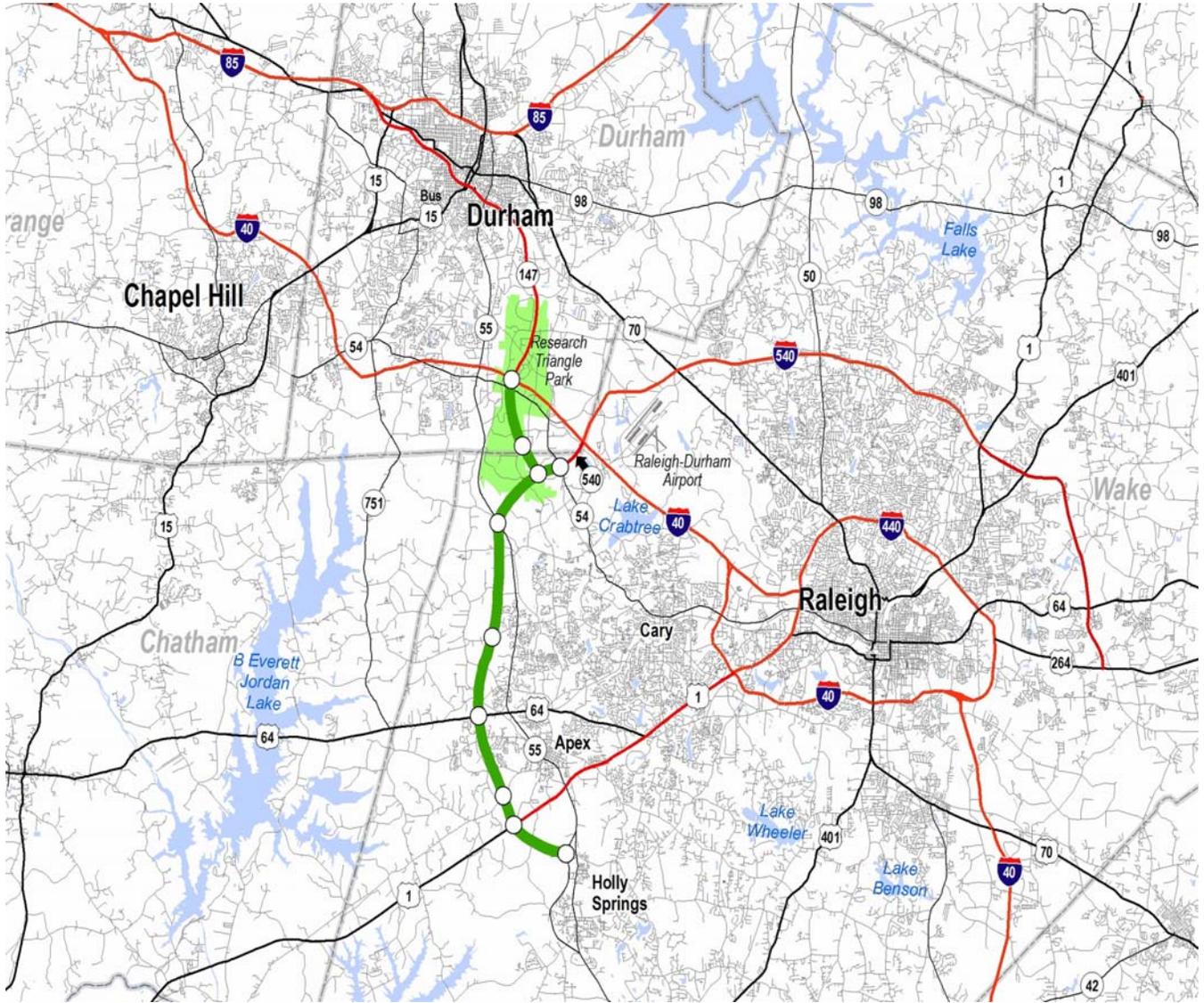
\$117,325,000 Series 2009A 5.75% Term Bonds Due January 1, 2039, Yield 5.80 % CUSIP 65830RAK5

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### \$35,173,108.85 Series 2009B Capital Appreciation Bonds

<u>Due January 1</u>	<u>Initial Price Per \$5,000 Amount Payable at Maturity</u>	<u>Aggregate Initial Offering Price</u>	<u>Approximate Yield to Maturity</u>	<u>CUSIP</u>
2030	\$ 1,291.30	\$ 1,141,509.20	6.74%	65830RAL3
2031	1,183.70	401,274.30	6.84	65830RAM1
2032	1,085.30	363,575.50	6.93	65830RAN9
2033	1,000.15	6,404,960.60	6.99	65830RAP4
2034	927.15	6,229,520.85	7.02	65830RAQ2
2035	859.00	6,053,373.00	7.05	65830RAR0
2036	797.40	5,871,256.20	7.07	65830RAS8
2037	739.95	5,672,456.70	7.09	65830RAT6
2038	688.25	3,035,182.50	7.10	65830RAU3

# North Carolina Turnpike Authority Triangle Expressway



 Triangle Expressway

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# **NORTH CAROLINA TURNPIKE AUTHORITY**

## AUTHORITY MEMBERS

Eugene A. Conti, Jr.	Chairman
Lanny Wilson	Vice Chairman
Perry R. Safran	Secretary/Treasurer
Anthony Fox	Member
Sang J. Hamilton, Sr.	Member
William C. Lackey, Jr.	Member
Robert L. Spencer, Jr.	Member
Robert D. Teer, Jr.	Member
E. David Redwine	Member

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## MANAGEMENT STAFF

David W. Joyner	Executive Director
James J. Eden	Chief Operating Officer
R. Grady Rankin	Chief Financial Officer
Steven D. DeWitt	Chief Engineer
Carolyn D. Johnson	General Counsel
Reid Simons	Director of Government and Public Affairs

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## FINANCIAL ADVISOR

Public Financial Management, Inc. - Orlando, Florida

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## BOND COUNSEL

Womble Carlyle Sandridge & Rice, PLLC - Raleigh, North Carolina

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## TRAFFIC CONSULTANT

Wilbur Smith Associates

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## GENERAL ENGINEERING CONSULTANT

HNTB Corporation

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 2009 Bonds offered hereby, nor shall there be any offer or solicitation of such offer or sale of the Series 2009 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 2009 Bonds implies that the information herein is correct as of any date subsequent to the date thereof.

The information contained herein has been obtained from the Authority and other sources believed to be reliable. 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.

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 respective 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.

Assured Guaranty makes no representation regarding the Series 2009 Bonds or the advisability of investing in the Series 2009 Bonds. In addition, Assured Guaranty has not independently verified, makes no representation regarding, and does not accept any responsibility for the accuracy or completeness of this Official Statement or any information or disclosure contained herein, or omitted herefrom, other than with respect to the accuracy of the information regarding Assured Guaranty supplied by Assured Guaranty and presented under the heading “BOND INSURANCE” and “APPENDIX I – Specimen Financial Guaranty Insurance Policy.”

**IN CONNECTION WITH THIS OFFERING, THE UNDERWRITERS MAY OVERALLOT OR EFFECT TRANSACTIONS THAT STABILIZE OR MAINTAIN THE MARKET PRICE OF THE SERIES 2009 BONDS AT A LEVEL ABOVE THAT WHICH MIGHT OTHERWISE PREVAIL IN THE OPEN MARKET. SUCH STABILIZING, IF COMMENCED, MAY BE DISCONTINUED AT ANY TIME.**

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**State of North Carolina**  
**Department of State Treasurer**

JANET COWELL  
Treasurer

*State and Local Government Finance Division  
and the Local Government Commission*

T. VANCE HOLLOMAN  
Deputy Treasurer

**Official Statement**  
**of the North Carolina Local Government Commission**

**Concerning**

**NORTH CAROLINA TURNPIKE AUTHORITY**  
**Triangle Expressway System Senior Lien Revenue Bonds**  
**\$234,910,000 Triangle Expressway System Revenue Bonds, Series 2009A**  
**\$35,173,108.85 Triangle Expressway System Revenue Bonds, Series 2009B**

**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 \$270,083,108.85 Triangle Expressway System Senior Lien Revenue Bonds, consisting of \$234,910,000 Triangle Expressway System Revenue Bonds, Series 2009A (the "Series 2009A Bonds") and \$35,173,108.85 Triangle Expressway System Revenue Bonds, Series 2009B (the "Series 2009B Bonds," and, together with the Series 2009A Bonds, the "Series 2009 Bonds"). The Series 2009 Bonds will be issued pursuant to applicable provisions of law, a bond order adopted by the Authority on November 20, 2008, as amended on April 15, 2009 and May 7, 2009, a Trust Agreement, dated as of June 1, 2009 (the "Trust Agreement"), between the Authority and Wells Fargo Bank, N.A., as trustee (the "Trustee"), and a First Supplemental Trust Agreement, dated as of July 1, 2009 (the "First Supplemental Trust Agreement"), between the Authority and the Trustee.

The Series 2009 Bonds are the first issue of Senior Lien Bonds by the Authority under the Trust Agreement.

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 and the First Supplemental Trust Agreement, see APPENDIX B hereto. Capitalized terms used herein and not otherwise defined have the meanings given such terms in the Trust Agreement and the First Supplemental Trust Agreement unless otherwise indicated.

Authorization. The Series 2009 Bonds are being issued pursuant to The Public Toll Roads and Bridges Act, Article 6H of Chapter 136 of the North Carolina General Statutes, 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"), an order adopted by the Authority on November 20, 2008, as amended on April 15, 2009 and May 7, 2009, the Trust Agreement and the First Supplemental Trust Agreement.

Security. The Series 2009 Bonds will be special obligations of the Authority, secured by and payable from the Receipts (hereinafter defined) of the Triangle Expressway System (hereinafter defined)

and, under certain circumstances, the proceeds of the Series 2009 Bonds, investment earnings and certain other proceeds. As defined in the Trust Agreement, “Receipts” include a portion of the amounts to be received by the Authority from an annual appropriation of \$25,000,000 to the Authority from the State of North Carolina as described below under “PLAN OF FINANCE – State Appropriated Revenues; State Appropriated Revenue Bonds.” **Most of such annual appropriation from the State will be used to pay debt service on the Authority’s \$352,675,000 State Appropriation Revenue Bonds, Series 2009B (Federally Taxable – Issuer Subsidy – Build America Bonds) (the “State Appropriation Revenue Bonds”) being issued concurrently herewith.** The Series 2009 Bonds will be additionally secured by certain funds, accounts and subaccounts held by the Trustee under the Trust Agreement and the First Supplemental Trust Agreement.

The Trust Agreement provides that the Series 2009 Bonds will be secured by a pledge, charge and lien upon the Receipts on a parity with any other Senior Lien Indebtedness (hereinafter defined) secured by the Trust Agreement.

See “SECURITY AND SOURCES OF PAYMENT FOR THE SERIES 2009 BONDS” herein.

Purpose and Plan of Finance. The Series 2009 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 Triangle Expressway System, an approximately 19-mile toll road facility to be built in Durham and Wake Counties, North Carolina (the “Triangle Expressway System”), (b) to provide funds to pay the interest on the Series 2009 Bonds until July 1, 2013, (c) to pay the premium for the Bond Insurance Policy issued by Assured Guaranty Corp. (“Assured Guaranty”) with respect to the Series 2009 Bonds, (d) to fund the Senior Lien Parity Reserve Account in the amount of the initial Senior Lien Parity Reserve Account Requirement and (e) to pay certain costs incurred in connection with the issuance of the Series 2009 Bonds.

Certain right-of-way and roadway to comprise portions of the Triangle Expressway System were acquired and constructed previously by the North Carolina Department of Transportation (“NCDOT”). NCDOT will lease such right-of-way and roadway to the Authority as further described herein. Additionally, certain of the preliminary engineering, design and development costs of the Triangle Expressway System and environmental mitigation costs are being provided to the Authority by the NCDOT. The remaining costs of the Triangle Expressway System will be paid from the proceeds of the State Appropriation Revenue Bonds and a subordinated loan (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 July 1, 2009, between the Authority and USDOT (the “TIFIA Loan Agreement”).

The Authority and the Triangle Expressway System. See “THE AUTHORITY” herein for certain information regarding the Authority and “THE TRIANGLE EXPRESSWAY SYSTEM” herein for particular information regarding the Triangle Expressway System toll road project being undertaken by the Authority. The Authority has entered into two separate agreements with private parties for the design and construction of the portions of the Triangle Expressway System to be designed and constructed with proceeds of the Series 2009 Bonds. See “THE TRIANGLE EXPRESSWAY SYSTEM – Construction of the Project” for a discussion of such contractual arrangements and APPENDIX C for a summary of such contracts.

Consultants Reports. Wilbur Smith Associates (the “Traffic Consultant”) has prepared the comprehensive traffic and revenue study attached hereto as APPENDIX D, which sets forth the estimated traffic and revenue for the Triangle Expressway System. HNTB Corporation, the General Engineering Consultant (the “GEC”) has prepared the GEC’s Report attached hereto as APPENDIX E, which, among

other things, describes the location, construction cost estimates, construction schedule and operation and maintenance expense cost estimates for the Triangle Expressway System.

Details of Bonds. The Series 2009 Bonds will be dated the date of delivery thereof. Interest on the Series 2009A Bonds will be payable on January 1 and July 1, beginning January 1, 2010, at the rates shown on the inside front cover. Interest on the Series 2009B Bonds will not be paid currently, but will be payable upon maturity as described below under “THE SERIES 2009 BONDS.” Principal of the Series 2009 Bonds will be payable, subject to prior redemption as described herein, on January 1 in the years and amounts shown on the inside front cover.

The Series 2009 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 2009 Bonds. The Bond Registrar will make payment of principal of and interest on the Series 2009 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 2009 Bonds. Individual purchases of the Series 2009 Bonds by the beneficial owners will be made in denominations of \$5,000 or whole multiples thereof payable at maturity. See APPENDIX H hereto for more information regarding DTC and the book-entry-only system.

The scheduled payment of principal of and interest when due on the Series 2009 Bonds will be guaranteed under a financial guaranty insurance policy to be issued concurrently with the delivery of the Series 2009 Bonds by Assured Guaranty. See “BOND INSURANCE.”

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 2009 Bonds. Womble, Carlyle Sandridge & Rice, PLLC, Raleigh North Carolina, is serving as Bond Counsel. Bode, Call and Stroupe, L.L.P., Raleigh, North Carolina and Rand & Gregory, PA, Fayetteville, North Carolina, are serving as co-counsel to the Underwriters. Carolyn Johnson, Esq., Raleigh, North Carolina, is the Authority Attorney. Wells Fargo Bank, N.A., Jacksonville, Florida, is serving as the Trustee and Bond Registrar. Public Financial Management, Inc., Orlando, Florida, is acting as financial advisor to the Authority in connection with the issuance of the Series 2009 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. 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, five potential toll facilities have been identified by the General Assembly for development by the Authority as turnpike projects.

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 by the Authority Board. Currently, Eugene A. Conti, Jr., the North Carolina Secretary of Transportation, serves as the Chair of the Authority Board. 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 are the current members of the Authority Board and a brief biography of each member.

*Eugene A. Conti, Jr.* is the Chairman of the Authority's Board and is Secretary of the NCDOT. Mr. Conti was appointed as Secretary to NCDOT in January 2009. He has over 30 years of public service and private business management experience. From 2001-2003, he served as Chief Deputy Secretary for NCDOT, responsible for cash management, safety initiatives, transportation planning and programming, and technology. Before his appointment to Chief Deputy Secretary in 2001, he served three years as Assistant Secretary for Transportation Policy at the United States Department of Transportation as an advisor to the United States Transportation Secretary on infrastructure, finance, transportation safety, environmental impacts, economic growth, technology and mobility, and strategic planning. Mr. Conti worked with a private engineering firm from 2003 until he was appointed Secretary of NCDOT. From 1995-1998, he served as Secretary of the Maryland Department of Labor, Licensing and Regulation.

*Lanny Wilson* is Vice Chairman of the Authority's Board. He also serves as a member of the North Carolina State Board of Transportation, and is currently chair of the Board's Motor Vehicles, Access Management, and Transportation Improvement Program committees. He serves as Chair of the Wilmington Metropolitan Planning Organization and is a member of the 21st Century Transportation Committee. He previously served for four years on the North Carolina Real Estate Commission. Mr. Wilson was former General Counsel and Vice President of Boney Wilson & Sons, Inc., and is currently involved in several family owned and operated businesses.

*Perry R. Safran* serves as the Authority's Secretary/Treasurer. He is an attorney with Safran Law Offices in Raleigh. Mr. Safran is a member of state and federal law groups and a licensed general contractor. He is currently vice-chairman of the Centennial Authority of the RBC Center and is a former member of the City Council for the City of Raleigh.

*Anthony Fox* is a partner at Parker Poe Adams & Bernstein LLP, a law firm in Charlotte. Mr. Fox is a former board member for the North Carolina Association of Municipal Attorneys and is active in the North Carolina State Bar where he served as a member on its Board of Continuing Legal Education. He currently is serving a four-year term on the North Carolina Banking Commission.

*Sang J. Hamilton, Sr.* currently serves as a member of the North Carolina Real Estate Commission, the Winton Democratic Precinct Committee, the C.S. Brown Cultural Center & Museum, Twelve Sportsmen's Club, the Newport News Shipyard Commuter's Club, and the Eastern NC Civic Group.

*William C. Lackey, Jr.* has been engaged in the real estate business for twenty-five years. He is Vice President of Sales for John Wieland Homes and Neighborhoods, Charlotte region. Mr. Lackey worked for The Allen Tate Company for over 18 years, with twelve years as Senior Vice President. He served for seven years on the North Carolina Real Estate Commission and currently serves on the North Carolina Housing Finance Agency Board of Directors.

*Robert L. Spencer, Jr.* is a Senior Vice President in Commercial Banking for RBC Centura in Charlotte. He has worked for almost 30 years in corporate and commercial banking roles as well as commercial risk management.

*Robert D. Teer, Jr.* is president of Teer Associates, a Durham-based real estate development, construction and property management/leasing company. Mr. Teer also serves on the Board of the Raleigh-Durham Airport Authority.

*E. David Redwine* has been an independent insurance broker in his family-owned business, Coastal Insurance, for over 35 years. Mr. Redwine was elected to the North Carolina House of Representatives in 1984 and served 10 terms. He was Chairman of the House Appropriations Committee during his tenure. He was elected to the Board of Trustees of East Carolina University in 2003.

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

*David W. Joyner*, who was appointed as the Authority's first Executive Director in June 2005, has a nearly 30 year career spanning work in federal, state and local government. His assignments included an Intergovernmental and Congressional Relations Officer and Special Assistant to the Secretary of the United States Department of Transportation. He was also the first person named Vice President-State Government Affairs for Burson-Marsteller, the nation's largest public relations/public affairs firm. As such he managed a nationwide corps of lobbyists and oversaw state affairs strategies for many of the nation's Fortune 500 companies. In 1994, Mr. Joyner co-founded State Capitol Strategies, Inc., a fifty state legislative bill tracking and issues analysis company that was later sold to the Washington Post. More recently, he served as a consultant to Womble Carlyle Sandridge and Rice Administration Services. Mr. Joyner is a native of Rocky Mount and a graduate of the University of North Carolina at Chapel Hill.

*R. Grady Rankin* serves as the Authority's Chief Financial Officer and was previously president of State Capital Resource Center, Inc., which specializes in advising early stage companies in business development and finance. Until mid-1998, Mr. Rankin was chief executive officer of State Capital Strategies, Inc. Mr. Rankin has significant experience founding and building start-up companies. He was co-founder of the Regulatory Resource Center, which publishes on the internet for subscribers the full text of all proposed regulations in all 50 states. In 1986, Mr. Rankin founded International Canine Genetics, Inc, a veterinary biotechnology company. Mr. Rankin also held senior management positions with FMC Corporation and W.R Grace and Company. A native of Gastonia, Mr. Rankin served in the United States Navy from 1966 to 1970. After tours of duty in Vietnam and Panama, he graduated summa cum laude from Western Carolina University with bachelor of science in Business Administration and was awarded an MBA from Harvard Business School.

*Steven DeWitt, PE*, is the Authority's Chief Engineer and is responsible for all engineering activities relating to the planning, design and construction of the Authority's turnpike projects. He previously served as NCDOT's Director of Construction. Mr. DeWitt's 22 year career with NCDOT included a variety of positions in construction management, contract procurement and other related activities. He is a graduate of the University of North Carolina at Charlotte and holds a Bachelor of Science Degree in Civil Engineering. He is a licensed professional engineer in North Carolina. Mr. DeWitt's professional activities also include leadership roles on various committees with the Transportation Research Board ("TRB") and the American Association of State Highway and Transportation Officials ("AASHTO"). Mr. DeWitt serves as Chairman of the TRB Construction Section, serves as Chairman of the TRB Project Delivery Committee, and is a member of the TRB Construction Management Committee. He has been a long time member of the AASHTO Subcommittee on Construction. He serves as Co-Chairman of the FHWA/AASHTO Expert Technical Group on Construction Management.

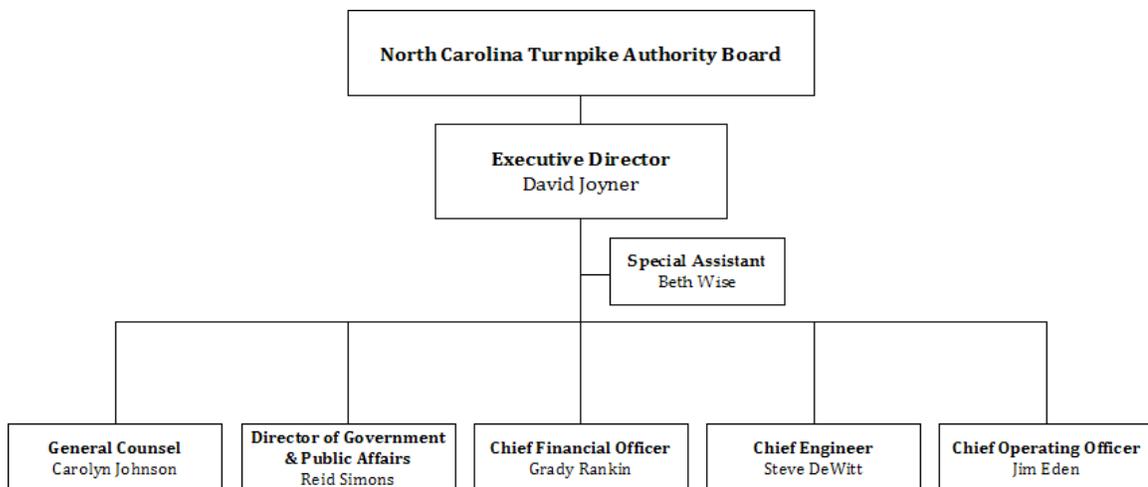
*James J. Eden*, brings over 35 years of toll road experience to his role as Chief Operating Officer for the Authority. As Assistant Chief Engineer with the Pennsylvania Turnpike Commission (PTC), he managed all facilities design, construction and maintenance, including the design and replacement of the toll collection and ITS systems. He co-authored the industry's first Management Online Maintenance System (MOMS). He broke new ground as a founding member of the Interagency Group/E-ZPass. In this role, Mr. Eden also served on the policy committee which developed and implemented the policies and procedures used in Electronic Toll Collection (ETC) today. He was recruited as Director of ETC –

ACS for Lockheed Martin specifically to help advance their toll business. During his tenure, the business unit developed several new products including state of the art customer service and operations systems, lane systems, and violation processing systems, growing from a startup to a \$225 million per year business. In addition to his responsibilities at the Authority, Mr. Eden currently serves on the board of the International Bridge Tunnel and Turnpike Association.

*Carolyn Johnson*, with approximately 22 years experience in state, local and regional government, has focused on transit and new start transportation infrastructure programs during the last ten years of her legal practice. Immediately prior to employment with the Authority, Ms. Johnson was employed for over six years as the senior legal advisor to the Charlotte Area Transit System. In this capacity she was instrumental in the development of Charlotte’s \$462.7 million dollar light rail passenger system throughout the planning and construction phases. Key achievements included acquiring railroad right-of-way and negotiating related corridor access agreements, and securing major federal and State funding while providing day-to-day oversight for on-going transit operations and construction projects. Ms. Johnson has been employed also in capacities as General Counsel to the Triangle Transit Authority in Research Triangle Park, Senior Legislative Analyst to the North Carolina General Assembly, and Assistant City Attorney in Durham. She is a graduate of the University of North Carolina at Chapel Hill and Washington and Lee University School of Law.

*Reid Simons* is the Authority’s Director of Government and Public Affairs. Ms. Simons is responsible for the Authority’s legislative and government activities, as well as policy and community relations for the organization. Ms. Simons began her career as a public information officer to Governor James Hunt, then later for Governor Michael Easley. Later, she worked for the North Carolina Department of Commerce in its Job Development Investment Grant program. In 2005, Ms. Simons went to work for the private sector as the Public Affairs Manager for Time Warner Cable. During her tenure with Time Warner, she served on the Women in Cable Board and received two national Beacon Awards for the community relations programs she developed. She joined the Authority in her present position in 2006. Ms. Simons is a native of Greensboro, North Carolina and a graduate of North Carolina State University with a degree in Communication and Public Relations.

The following is an organizational chart of the Authority’s administration.



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 and collect tolls and fees for the use of the Turnpike Projects. The Triangle Expressway System will be the first toll project to be

financed by the Authority. In addition to the Triangle Expressway System, the Authority is proceeding with plans for financing and constructing four additional toll road projects in the State. These projects consist of a new toll road facility to be built in and around Monroe, North Carolina, a new toll road facility to be built in Gaston County, North Carolina, a toll bridge to be built in Wilmington, North Carolina and a toll bridge to connect the North Carolina Outer Banks to the mainland. None of the other projects will be cross-collateralized with the Triangle Expressway System.

The Authority and NCDOT entered into a Master Agreement, dated July 13, 2006 (the “Master Agreement”). This Master Agreement sets forth the responsibilities each party assumes and procedures that will be observed for the purpose of furthering the financing, constructing, equipping, operating or maintaining Turnpike Projects in accordance with the Authority Act. The Master Agreement establishes terms and conditions under which NCDOT provides general funding and project assistance to the Authority. The Master Agreement provides for entering into project specific agreements to establish terms and conditions under which NCDOT will provide funding and assistance for each turnpike project.

North Carolina law provides that operation and project development costs of the Authority are eligible administrative expenses to be paid by NCDOT. Any funds allocated to the Authority pursuant to this authorization are to be repaid by the Authority from toll revenues as soon as possible, subject to any restrictions included in the agreements entered into by the Authority in connection with the issuance of the Authority’s bonds. To date, NCDOT has advanced over \$95 million for Authority operations and project development costs of all of the turnpike projects undertaken by the Authority, including costs of Triangle Expressway System.

## **THE SERIES 2009 BONDS**

### **Authorization**

The issuance of the Series 2009 Bonds received the required approval of the North Carolina Local Government Commission (the “LGC”) on November 4, 2008, as amended on April 7, 2009. 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 2009 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 legislation enacted by the General Assembly in 2009, 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 2009 Bonds will be dated the date of delivery thereof and will bear interest from their date. Interest on the Series 2009A Bonds will be payable on each January 1 and July 1, beginning January 1, 2010, at the rates shown on the inside front cover and will mature, subject to prior redemption as described below, on January 1 in the years and amounts shown on the front cover. The Series 2009 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 2009 Bonds by the beneficial owners will be made in denominations of \$5,000 or whole multiples thereof.

### **Book-Entry Only**

The Series 2009 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 2009 Bonds. The Trustee will make payments of principal of and interest on the Series 2009 Bonds to DTC, which will in turn remit such payments to DTC participants for subsequent distribution to the beneficial owners of the Series 2009 Bonds. See APPENDIX H hereto for more information regarding DTC and the book-entry-only system.

### **Interest Rate Provisions of Series 2009B Bonds**

Interest on the Series 2009B 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 2009B Bond at the initial offering price set forth in this Official Statement on the date of issuance and who holds such Series 2009B 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 lifetime of the Series 2009B Bond at the approximate yield to maturity shown in this Official Statement. The amount payable on the Series 2009B Bonds at any given time is referred to as the “Compounded Amount.”

Appendix A sets forth a Table of Compounded Amounts for the Series 2009B Bonds, which shows the Compounded Amounts of the Series 2009B Bonds on each January 1 and July 1, per \$5,000 payable at maturity. Compounded Amounts at times between the dates shown in the table will be interpolated on a straight-line basis.

### **Redemption Provisions**

Optional Redemption. The Series 2009A Bonds maturing on January 1, 2020, and thereafter are subject to redemption, at the option of the Authority, either in whole or in part on any date on or after January 1, 2019, at a redemption price equal to 100% of the principal amount of Series 2009A Bonds to be redeemed, plus accrued interest to the redemption date.

The Series 2009B Bonds are not subject to redemption prior to maturity.

Sinking Fund Redemption. The Series 2009A Bonds maturing on January 1, 2029, 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 January 1 in the years and amounts as follows:

<u>Year</u>	<u>Amount</u>
2027	\$ 17,540,000
2028	20,015,000
2029*	22,760,000

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\* Maturity.

The Series 2009A Bonds maturing on January 1, 2039, 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 January 1 in the years and amounts as follows:

<u>Year</u>	<u>Amount</u>
2030	\$ 21,315,000
2031	27,010,000
2032	30,015,000
2033	2,000,000
2034	2,000,000
2035	2,000,000
2036	2,000,000
2037	2,000,000
2038	2,000,000
2039*	26,985,000

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\* Maturity.

Redemption Provisions. At least 30 days, but not more than 60 days, prior to the redemption date for Series 2009A Bonds, 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 2009A Bonds to be redeemed in whole or in part; provided, however, that notices to DTC will be sent by registered or certified mail or by other electronic means as may be required by the operation procedures of DTC. Failure to mail any such notice to any Owner or any defect in such notice will not affect the validity of any proceedings for such redemption as to any other Owner to whom such notice is properly given. The Bond Registrar will also cause such notice of redemption to be mailed, by registered or certified mail, to one securities depository and at least two national information services that disseminate redemption information; provided, however, that failure to give such notice or any defect therein will not affect the validity of any proceedings for such redemption.

If less than all of the Series 2009A Bonds are called for redemption, the Series 2009A Bonds or portions thereof to be redeemed will be selected by the Authority in its discretion. If less than all the Series 2009A Bonds of any one maturity are called for redemption, the Series 2009A Bonds of such maturity to be redeemed will be selected by the Bond Registrar by lot; provided, however that so long as the only Owner of the Series 2009A Bonds is DTC, such selection will be made by DTC by lot. The Series 2009A Bonds may be redeemed only in whole multiples of \$5,000, and in selecting the Series 2009A Bonds for redemption, each \$5,000 portion of principal of the Series 2009A Bonds shall be counted as one Series 2009A Bond for such purpose. If a portion of a Series 2009A Bond is called for redemption, a new Series 2009A Bond 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 2009A Bonds or portions thereof so called for redemption shall become due and payable on the redemption date, and interest on such Series 2009A 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 2009A 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 2009A 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 2009A 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.

## **PLAN OF FINANCE**

Costs of the Triangle Expressway System will be financed with the proceeds of the Series 2009 Bonds, proceeds of the State Appropriation Revenue Bonds issued concurrently with the Series 2009 Bonds, disbursements to the Authority from USDOT under the TIFIA Loan and interest earnings on amounts in the Project Fund. Certain design and engineering costs, development costs, right-of-way and roadway which will comprise a portion of the Triangle Expressway System and environmental mitigation costs are being provided to the Authority by the NCDOT. NCDOT and the Authority have also entered into an Operations and Maintenance Expenses Guaranty Agreement (the "Operations and Maintenance Expenses Guaranty"), pursuant to which NCDOT has agreed to advance to the Authority amounts necessary to pay Operations and Maintenance Expenses of the Triangle Expressway System in the event that the Receipts of the Triangle Expressway System are not sufficient for such purpose. In addition, in a separate Construction Completion Assurance and Standby Renewal and Replacement Funding Agreement, dated April 15, 2009 (the "Construction Completion and Renewal and Replacement Guaranty") between the Authority and NCDOT, NCDOT has agreed (i) to provide advances required to complete construction of the Initial Project in the event that the sources described above are not sufficient and (ii) to make advances to fund any deficiencies in the Renewal and Replacement Reserve Fund created under the Trust Agreement in the event that sufficient Receipts are not received in order to make the required deposits to the Renewal and Replacement Reserve Fund.

### **Proceeds of the Series 2009 Bonds**

Pursuant to the Trust Agreement and the First Supplemental Trust Agreement, the proceeds of the Series 2009 Bonds will be applied (a) to pay a portion of the costs of land acquisition, design, construction and equipping of the Triangle Expressway System, (b) to pay the interest on the Series 2009 Bonds until July 1, 2013, (c) to pay the premium for the Bond Insurance Policy issued by Assured Guaranty Corp. ("Assured Guaranty") with respect to the Series 2009 Bonds, (d) to fund the Senior Lien Parity Reserve Account in the amount of the Senior Lien Parity Reserve Account Requirement and (e) to pay certain of the costs incurred in connection with the issuance of the Series 2009 Bonds.

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

In July 2008, the General Assembly of North Carolina enacted legislation that included a provision creating a continuing annual appropriation to the Authority of \$25,000,000 for the Triangle Expressway System to service debt and fund required reserves in connection with bonds issued to finance the Triangle Expressway System. Pursuant to the legislation, amounts so appropriated may be used by the Authority to pay debt service or related financing costs and expenses on revenue bonds or notes issued by the Authority to finance the costs of Triangle Expressway System or to fund debt service reserves, operating reserves, and similar reserves in connection therewith. This State appropriation for the Triangle Expressway System is defined in the Trust Agreement and herein as the "State Appropriated Revenues."

Under the plan of finance, the Authority has entered into a separate Trust Agreement, dated as of July 1, 2009 (the "State Appropriation Revenue Bond Trust Agreement"), pursuant to which the Authority has issued the State Appropriation Revenue Bonds, which are secured solely by the State Appropriated Revenues and investment earnings thereon and certain funds provided in the State Appropriation Revenue Bond Trust Agreement. The State Appropriation Revenue Bonds will not be

secured by the tolls or other revenues of the Triangle Expressway System or any funds held under the Trust Agreement. Under the State Appropriation Revenue Bond Trust Agreement, amounts not needed in any fiscal year to make debt service payments on the State Appropriation Revenue Bonds will be withdrawn from the State Appropriation Revenue Bond Trust Agreement and deposited to the Revenue Fund under the Trust Agreement. Upon such withdrawal from the State Appropriation Revenue Bond Trust Agreement, the amounts so transferred shall be transferred free and clear of the lien on and pledge of the Revenues created under the State Appropriation Revenue Bond Trust Agreement and the amounts so transferred will constitute “Revenues” and “Receipts” under the Trust Agreement.

The legislation providing for the annual appropriation provides that the appropriation is to be made to the Authority as a transfer from the North Carolina Highway Trust Fund. The North Carolina Highway Trust Fund is a separate fund of the State, separate from the State’s General Fund and the State’s Highway Fund. Revenues for the Highway Trust Fund are generated by a 3% highway use tax on the retail value of motor vehicles purchased or titled in North Carolina, 25% of all motor fuel tax revenues and a portion of certain fees shared for the issuance of certificates of title, other fee increases and certain investment earnings. For the fiscal years ended June 30, 2007 and 2008, total revenues of the Highway Trust Fund, excluding federal receipts, were \$1,115,001,011 and \$1,060,058,225, respectively. The legislation provides for the annual transfer of the \$25,000,000 from the Highway Trust Fund to the Authority without further action by the General Assembly.

The Authority has received the annual appropriation of \$25,000,000 for the State’s fiscal year ending June 30, 2009 and such amount has been deposited with the Trustee under the Trust Agreement. This amount has been expended to fund origination charges in connection with the TIFIA Loan or will be applied at the time of issuance of the Series 2009 Bonds to fund capitalized interest on the Series 2009 Bonds and the State Appropriation Revenue Bonds.

The legislation states that it is the intention of the General Assembly that the enactment of this annual appropriation and the issuance of bonds or notes by the Authority in reliance thereon shall not in any manner constitute a pledge of the faith and credit and taxing power of the State of North Carolina, and nothing contained therein shall prohibit the General Assembly from amending the annual appropriation to decrease or eliminate the amount annually appropriated to the Authority. Thus, the legislation creating the State Appropriated Revenues may be amended or repealed by the General Assembly of North Carolina in any future budget year. To the extent the appropriation legislation is not so repealed or amended, however, the amounts received by the Authority pursuant to the appropriation are pledged to secure the obligations of the Authority under the State Appropriation Revenue Bond Trust Agreement, and, to the extent described above, the Bonds and other Indebtedness issued or incurred under the Trust Agreement, including the Series 2009 Bonds.

### **Build America Bond Interest Subsidy Payments for State Appropriation Revenue Bonds**

In connection with the issuance of the State Appropriation Revenue Bonds, the Authority will make an irrevocable election to have the special rules for “Build America Bonds” created under the American Recovery and Reinvestment Act of 2009 apply to the State Appropriation Revenue Bonds. Under the Build America Bond program, an issuer of municipal bonds that meet the requirements of the program may elect to designate the Bonds as Build America Bonds, upon which interest on the municipal bonds is not excluded from gross income for purposes of the federal income taxation. Under the Code, an issuer of a Build America Bonds may apply to receive payments (“Interest Subsidy Payments”) directly from the Secretary of the United States Treasury. The amount of an Interest Subsidy Payment is set in the Code at 35% of the corresponding interest payable on the related Build America Bond. To receive a Interest Subsidy Payment, under currently existing procedures, the issuer of the Build American Bond must file a tax return (now designated as Form 8038-CP) between 90 and 45 days prior to the corresponding bond interest payment date, with such issuer to receive the Interest Subsidy Payment

contemporaneously with the interest payment date with respect to the Build America Bond. Depending on the timing of the filing and other factors, the Interest Subsidy Payment may be received before or after the corresponding interest payment date.

For the State Appropriation Revenue Bonds to be and remain qualified under the federal requirements, the Authority must comply with certain requirements and must establish certain facts and expectations with respect to the State Appropriation Revenue Bonds, the use and investment of proceeds thereof and the use of property financed thereby. In the State Appropriation Revenue Bond Trust Agreement, the Authority has covenanted that so long as the State Appropriation Revenue Bonds remain Outstanding, it will comply with the procedures and requirements of the Code and applicable regulations as necessary to allow the Authority to receive Interest Subsidy Payments with respect to the State Appropriation Revenue Bonds. If the Authority fails to file the necessary tax return in a timely fashion, however, it is possible that the Authority will not receive an Interest Subsidy Payment. Interest Subsidy Payments are subject to offset against certain amounts that may, for unrelated reasons, be owed by the Authority to an agency of the United States of America. The amount of any Interest Subsidy Payment is subject to legislative changes by Congress. Interest Subsidy Payments will only be paid if the State Appropriation Revenue Bonds are qualified under the federal program. No assurances are provided that the Authority will receive Interest Subsidy Payment. In order to alleviate the risk of a late payment by the United States Treasury, the State Appropriation Revenue Bond Trust Agreement creates a debt service reserve equal to the maximum Interest Subsidy Payments for any year.

Under the plan of finance, the Interest Subsidy Payments to be received by the Authority with respect to the State Appropriation Revenue Bonds are intended to be used, together with the State Appropriated Revenues to pay debt service on the State Appropriation Revenue Bonds. Following the payment of scheduled debt service on the State Appropriation Revenue Bonds, as described above, any remaining State Appropriation Revenues will be withdrawn from the State Appropriation Revenue Bond Trust Agreement and deposited to the Revenue Fund under the Trust Agreement. In the event that for any reason the Authority does not receive a scheduled Interest Subsidy Payment, more of the State Appropriated Revenues will be required to pay debt service on the State Appropriation Revenue Bonds, thereby eliminating the amount available for transfer to the Revenue Fund under the Trust Agreement.

### **TIFIA Loan**

The Authority and the USDOT have entered into the TIFIA Loan Agreement, pursuant to which the Authority is authorized, subject to the conditions set forth in the TIFIA Loan Agreement, to borrow up to \$386,662,363 from USDOT to pay or reimburse the Authority for payment of “Eligible Project Costs” of the Triangle Expressway System. The unpaid balance of the TIFIA Loan bears interest at an interest rate of 4.25%. 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 obligations to make the loan repayments required under the TIFIA Loan Agreement will be secured by a pledge under the Trust Agreement of the Receipts. The pledge of Receipts to secure the TIFIA loan repayments will be generally subordinate to the payment of Senior Lien Indebtedness, including the Series 2009 Bonds. Upon the occurrence of an Event of Default that is a Bankruptcy-Related Event under the Trust Agreement while obligations are still owed to USDOT under the TIFIA Loan Agreement, however, 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, except that USDOT will not be entitled to be paid from amounts on deposit in the Senior Lien Parity Reserve Account. See “SECURITY AND SOURCES OF PAYMENT FOR THE SERIES 2009 BONDS – TIFIA Indebtedness Upon Occurrence of Bankruptcy-Related Event.”

Debt service will be payable on the TIFIA Loan on each January 1 and July 1 of each year, commencing January 1, 2016. The final maturity date of the TIFIA Loan is July 1, 2047.

## **Contributions By NCDOT**

As described below under “THE TRIANGLE EXPRESSWAY SYSTEM” an approximately 2.8 mile segment of the Triangle Expressway is now in existence and in use. Upon completion of construction of the first phase of the Triangle Expressway System, this existing segment will be converted to a toll facility and control thereof will be delivered to the Authority for operation as part of the Triangle Expressway System. In addition, as of the date hereof, approximately 260 acres of the right-of-way required for the remaining portion of the Triangle Expressway System is owned by NCDOT. Such right-of-way will be delivered to the Authority for the construction of highway thereon for operation as part of the Triangle Expressway System. Title ownership of the real estate comprising the entire Triangle Expressway System will be held by the NCDOT, which will lease the real estate to the Authority under a Lease Agreement, to be executed in accordance with the Project Specific Agreement for the Triangle Expressway System, between the Authority and NCDOT. See “THE TRIANGLE EXPRESSWAY SYSTEM - Project Specific Agreement for Triangle Expressway and Executory Contract For Lease of Right-of-Way for Triangle Expressway and Lease Agreement” below.

In addition, prior to the date hereof, the NCDOT and the Authority have incurred approximately \$30,800,000 in costs for the initial planning, design, permitting and implementation of the Triangle Expressway System and certain environmental mitigation costs. Neither the Authority nor the NCDOT will seek any reimbursement of such costs from the proceeds of the Series 2009 Bonds or any other source. As such, such amounts would constitute additional contributions towards the cost of the Triangle Expressway System by the NCDOT. Pursuant to arrangements between the Authority and the NCDOT, such amounts advanced are required to be repaid, with interest, following payment of all other obligations of the Authority under the Trust Agreement, and the Triangle Expressway System will revert to the NCDOT.

## **Contributions of Right-of-Way by Third Parties**

Several entities are contributing right-of-way to the Authority for the purposes of constructing the Triangle Expressway. The Research Triangle Foundation is contributing approximately 90 acres of land, comprised of 5 parcels, with an appraised value of \$12,600,750. Additionally, the Town of Cary is donating 15.5 acres of land with an appraised value of approximately \$2,000,000.

## **Construction Completion Assurance**

The Initial Project will be built pursuant to design build contracts described below under the caption “THE TRIANGLE EXPRESSWAY SYSTEM.” Such contracts are fixed price contracts, 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 Initial 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 Construction Completion and Renewal and Replacement Guaranty to provide additional funding to provide for the completion of the Initial Project. The Construction Completion and Renewal and Replacement Guaranty provides that such payments are to be paid by NCDOT from amounts then available in the State Highway Trust Fund, subject to appropriation and availability of funds for such use in the State Highway Trust Fund. In the event that the Authority determines that it is necessary to request funds from the NCDOT to provide for completion of the Initial Project, the Authority is to provide notice as soon as such necessity comes to the attention of the NCDOT and will cooperate with the appropriate officials of the NCDOT such that, to the extent practicable, the timing of payments to pay the remaining Costs of the Initial Project pursuant to the undertaking set forth above will not disrupt NCDOT’s other construction projects underway and being funded from the State Highway Trust Fund.

The Authority is required to repay the obligations to NCDOT described above from Receipts, but only after payment of current debt service and the funding of any deficiency in reserve funds under the Trust Agreement and funding of required deposits to the Operations and Maintenance Expense Fund pursuant to the Trust Agreement or from amounts deposited and held in the General Reserve Fund.

### **Operations and Maintenance Expense Guaranty**

As described below under “SECURITY AND SOURCES OF PAYMENT FOR THE SERIES 2009 BONDS,” the payment of Operations and Maintenance Expenses of the Triangle Expressway System is payable from Receipts after the prior payment of debt service on Senior Lien Bonds, Subordinate Lien Bonds, the TIFIA Loan and the funding of certain debt service and related reserves. In order to assure a source of funds for payment of Operations and Maintenance Expenses of the Triangle Expressway System, the Authority and the NCDOT have entered into the Operations and Maintenance Expense Guaranty Agreement.

The Operations and Maintenance Expense Guaranty Agreement provides that in the event that there is a deficiency in the Receipts such that there are not funds available in the Operations and Maintenance Expense Fund to pay Operations and Maintenance Expenses, the Authority will make a request to NCDOT to fund the deficiency in the Operations and Maintenance Expenses Fund, and those expenses will be funded by NCDOT. The Authority will be required to repay any amount so advanced, with interest. To assure that funds are available as needed to make payments under the Operations and Maintenance Expense Guaranty Agreement, the Trust Agreement creates an Operations and Maintenance Expenses Reserve Fund that the Authority would draw upon to pay required Operations and Maintenance Expenses.

All payments from NCDOT to the Authority under the Operations and Maintenance Expense Guaranty Agreement are to be repaid to NCDOT, with interest, from Receipts as described below under “SECURITY AND SOURCES OF PAYMENT FOR THE SERIES 2009 BONDS — Application of Receipts.”

### **Renewal and Replacement Reserve Fund Guaranty**

The Trust Agreement creates a Renewal and Replacement Fund as a special fund to which deposits are to be made from Receipts to pay all or a portion of the cost of unusual or extraordinary maintenance, repairs, renewals or replacements or capital improvements related to the Triangle Expressway System. Under the Trust Agreement, deposits to the Renewal and Replacement Fund are to be made from Receipts 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 2009 BONDS-- Application of Receipts.” In order to assure that the Renewal and Replacement Fund is funded as required, the NCDOT has undertaken pursuant to the Construction Completion and Renewal and Replacement Guaranty to fund any deficiency in the Renewal and Replacement Fund from the amount that is required at the time to be on deposit in the Renewal and Replacement Fund.

The Authority is required to repay the obligations to NCDOT described above from Receipts, but only after payment of current debt service and the funding of any deficiency in reserve funds under the Trust Agreement and funding of required deposits to the Operations and Maintenance Expense Fund pursuant to the Trust Agreement or from amounts deposited and held in the General Reserve Fund.

## **SECURITY AND SOURCES OF PAYMENT FOR THE SERIES 2009 BONDS**

### **General**

The Series 2009 Bonds will be special obligations of the Authority, secured by and payable from the Receipts of the Triangle Expressway System and, under certain circumstances, the proceeds of the Series 2009 Bonds, investment earnings and certain net insurance and other proceeds.

**The principal of and interest on the Series 2009 Bonds shall not be payable from the general funds of the Authority, 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 2009 Bonds, and no Owner of Series 2009 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 Receipts in connection with any default thereon.**

As described below under “Application of Receipts,” the payment of Operations and Maintenance Expenses of the Triangle Expressway System is payable from Receipts 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 2009 Bonds and other Senior Lien Indebtedness is secured by a “gross revenue” pledge of the Receipts of the Triangle Expressway System.

### **Project Fund**

The proceeds of the Series 2009 Bonds (less the amount representing capitalized interest) 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, will be used to pay a portion of the costs of the Triangle Expressway System and the costs incurred in connection with the issuance of the Series 2009 Bonds. Amounts on deposit in the Project Fund derived from proceeds of the Series 2009 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 2009 Bonds pending the application of such amounts to pay costs of the Triangle Expressway System and other lawful charges against such Subaccount.

See APPENDIX B — “Summary of Certain Provisions of the Trust Agreement — Project Fund” for certain provisions of the Trust Agreement relating to the expenditure of amounts in the Project Fund to pay costs of the Triangle Expressway System.

### **Pledge of Receipts**

The Receipts of the Triangle Expressway System are pledged to the payment of, and as security for (a) any Senior Lien Parity Debt, Subordinate Lien Parity Debt and TIFIA Indebtedness and (b) any Senior Lien Derivative Agreement Regularly Scheduled Payments and Subordinate Lien Derivative Agreement Regularly Scheduled Payments incurred pursuant to the Trust Agreement.

The term “Receipts” for any particular period means all receipts, revenues, income, proceeds and money received in any period by or for the Authority in respect of the Triangle Expressway System, 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 Triangle Expressway System, and all other income derived by the Authority from the operation or ownership of the Triangle Expressway System, the proceeds of use and occupancy or business interruption insurance and amounts received as liquidated

damages under contracts for construction of the Triangle Expressway System and the portion of the State Appropriated Revenues transferred to the Revenue Fund from the State Appropriation Revenue Bonds Trust Agreement. See APPENDIX B hereto for a complete definition of Receipts.

### **Senior Lien Parity Reserve Account**

The Trust Agreement creates a special account of the Senior Lien Debt Service Fund (described below) designated the Senior Lien Parity Reserve Account. 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 Parity Reserve Account. If any Senior Lien Indebtedness is secured by the Senior Lien Parity Reserve Account, the Authority must fund the Senior Lien Parity Reserve Account in an amount equal to the Senior Lien Parity Reserve Account 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 Parity Reserve Account, such Senior Lien Indebtedness will have no claim on the Senior Lien Parity Reserve Account.

The Series 2009 Bonds will be secured by the Senior Lien Parity Reserve Account. A deposit of \$27,008,311 will be made to the Senior Lien Parity Reserve Account from proceeds of the Series 2009 Bonds to fund the initial Senior Lien Parity Reserve Account Requirement, as described in the following paragraph. Moneys on deposit in the Senior Lien Parity Reserve Account (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 Parity Reserve Account to the extent that moneys on deposit in the Senior Lien Debt Service Fund and Accounts thereof for such payment are insufficient therefor.

Initially, the Senior Lien Parity Reserve Account Requirement will be equal to 10% of the stated principal amount of the Series 2009 Bonds (provided that the initial offering prices to the public of the Series 2009B Bonds will be used in lieu of the stated principal amount for purposes of the 10% limitation). Thereafter, the Senior Lien Parity Reserve Account Requirement will be adjusted annually on the first day of each Fiscal Year to equal the Maximum Long-Term Debt Service Requirement for the Senior Lien Bonds and Senior Lien Parity Debt secured by the Senior Lien Parity Reserve Account for the current Fiscal Year and the next succeeding four Fiscal Years to the extent such amount exceeds the initial deposit to the Senior Lien Parity Reserve Account Requirement at the time of issuance of the Series 2009 Bonds. In that the annual debt service for the Series 2009 Bonds will increase over time, such increases will result in corresponding increases to the Senior Lien Parity Reserve Account Requirement that will be funded from Receipts. See Appendix B —” Definitions of Certain Terms and Summaries of the Trust Agreement and the First Supplemental Trust Agreement” for a more detailed description of the Senior Lien Parity Reserve Account Requirement.

A Senior Lien Resolution authorizing Senior Lien Indebtedness may also provide for the creation of a Special Reserve Account to be maintained by the Trustee or a Depositary that will secure only the Senior Lien Indebtedness authorized by such Senior Lien Resolution. The Series 2009 Bonds will not be secured by a Special Reserve Account.

### **Other Funds and Accounts**

Revenue Fund. The Revenue Fund is held by the Trustee. The Authority will deposit all Receipts 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 six separate accounts known as the Capitalized Interest Account, the Interest Account, the Principal Account, the Sinking Fund Account, the Redemption Account and the Senior Lien Parity

Reserve Account. Each Supplemental Agreement authorizing a Series of Bonds will provide for the creation, to the extent applicable, of separate subaccounts within the Capitalized Interest Account, the Interest Account, the Principal Account, the Sinking Fund Account and the Redemption Account relating to the Series of Bonds authorized by such Supplemental 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 receipts to pay debt service on Subordinate Lien Indebtedness (at present, the Plan of Finance does not contemplate the issuance or incurrence of any subordinated indebtedness other than the TIFIA Loan). Deposit to such Fund from Receipts is subordinate to the deposits required to be made to the Senior Lien Debt Service Fund.

TIFIA Debt Service Fund. In addition to the Senior Lien Debt Service Fund, the Trust Agreement creates a TIFIA Debt Service Fund, to which deposits will be made from receipts to pay debt service on the TIFIA Loan commencing July 1, 2015. Deposit to such Fund from Receipts is subordinate to the deposits required to be made to the Senior Lien Debt Service Fund.

Hedging Acquisition Account. The Trust Agreement creates a special account designated the Hedging Acquisition Account, which requires that certain deposits be made to such account in the event the Authority issues variable interest rate bonds and enters into a hedging arrangement in connection therewith. The purpose of the Hedging Acquisition Account is to assure that funds are available to pay the termination payments the Authority might be required to pay if such hedge were terminated. The Authority has no present plans to issue variable interest rate bonds under the Trust Agreement.

Operations and Maintenance Expenses Fund. Moneys held for the credit of the Operations and Maintenance Expenses Fund are to be used only to pay all or a portion of the cost of any Operating Expenses of the Triangle Expressway System.

Renewal and Replacement Fund. Moneys held for the credit of the Renewal and Replacement Fund are to be used to pay all or a portion of the cost of unusual or extraordinary maintenance, repairs, renewals or replacements or capital improvements related to the Triangle Expressway. In the Authority's sole discretion, amounts on deposit in the Renewal and Replacement Fund may be used to make debt service payments with respect to Senior Indebtedness, Subordinate Lien Indebtedness, the TIFIA Loan, any Senior Lien Derivative Agreement or Subordinate Lien Derivative 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 Triangle Expressway System or to pay or redeem Bonds and Parity Debt in the manner set forth in the Trust Agreement.

### **Application of Receipts**

The Trust Agreement provides that on the last Business Day of each month, the Trustee shall withdraw all Receipts 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 Receipts at the end of each month, see "See "Summary of the Trust Agreement – Application of Receipts" in APPENDIX B hereto for a more detailed description of the application of the Receipts):

(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 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 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 the amount in the Senior Lien Parity Reserve Account is less than the Senior Lien Parity Reserve Account Requirement or the amount in any Senior Lien Special Reserve Account is less than the applicable Senior Lien Special Reserve Account Requirement, (1) one-twelfth (1/12) of the amount required to make up any deficiency in the Senior Lien Parity Reserve Account and (2) to the Trustee or other Person holding a Senior Lien Special Reserve Account, one-twelfth (1/12) of the amount required to make up any deficiencies in any Senior Lien Special Reserve Account as provided in the Supplemental Agreement or Parity Debt Resolution creating any Senior Lien Special Reserve Accounts for deposit in such Senior Lien Special Reserve Accounts; provided, however, that if there shall not be sufficient Receipts to satisfy all such deposits and payments, such deposits and payments shall be made for deposit to the Senior Lien Parity Reserve Account and each Senior Lien Special Reserve Account ratably according to the amount so required to be deposited or paid;

(d) to the appropriate subaccounts of the Subordinate Lien Debt Service Fund amounts needed to pay principal of and interest on Subordinate Lien Bonds or Subordinate Lien Parity Debt;

(e) to the Subordinate Lien Parity Reserve Account, if any, and any Subordinate Lien Special Reserve Account, the amount required to make up any deficiencies therein;

(f) beginning July 1, 2015, to the credit of the TIFIA Debt Service Fund an amount equal to the greater of (i) the amount of interest payable on any Outstanding TIFIA Indebtedness on the next Interest Payment Date for such TIFIA Indebtedness (if such Interest Payment Date is within seven months of such deposit) divided by the number of deposits to be made to the TIFIA Debt Service Fund with respect to interest on such TIFIA Indebtedness on or prior to such Interest Payment Date and (ii) forty-five percent (45%) of the remaining Receipts available after making all of the deposits and payments required by subsection (a) to (e), inclusive, above, provided, however, that with the prior written consent of USDOT, the amount to be deposited to the TIFIA Debt Service Fund may be reduced to an amount less than the amount described in (i) and (ii); and provided further that if in connection with the formulation of the Annual Budget, the Authority determines that the percentage specified above is not sufficient to ensure payment in full of all of the principal and interest on the Outstanding TIFIA Indebtedness prior to its final stated maturity date, the Authority shall increase such percentage in a manner determined by the Authority to be necessary to ensure payment in full of all of the principal and interest on the Outstanding TIFIA Indebtedness prior to its final stated maturity date;

(g) to the Hedging Acquisition Account, the amount of the requirement therefor;

(h) 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;

(i) to the credit of the Operating Reserve Fund such amount as shall be necessary to make the amount on deposit therein equal to one-fourth (1/4) of the total budgeted Operations and Maintenance Expenses of the Triangle Expressway System for the current Fiscal Year as set forth in the Annual Budget;

(j) to the credit of the Renewal and Replacement Fund one-twelfth (1/12) of the total amount, if any, required to be deposited therein in such Fiscal Year as set forth in the Annual Budget;

(k) to NCDOT any amounts necessary to reimburse NCDOT for any Operating Advance made by NCDOT to the Authority pursuant to the O&M Guaranty Agreement or any payments by NCDOT to the Authority pursuant to the Construction Completion and Renewal and Replacement Guaranty, together with interest thereon, at the rates and in the manner provided in the O&M Guaranty Agreement or the Construction Completion and Renewal and Replacement Guaranty;

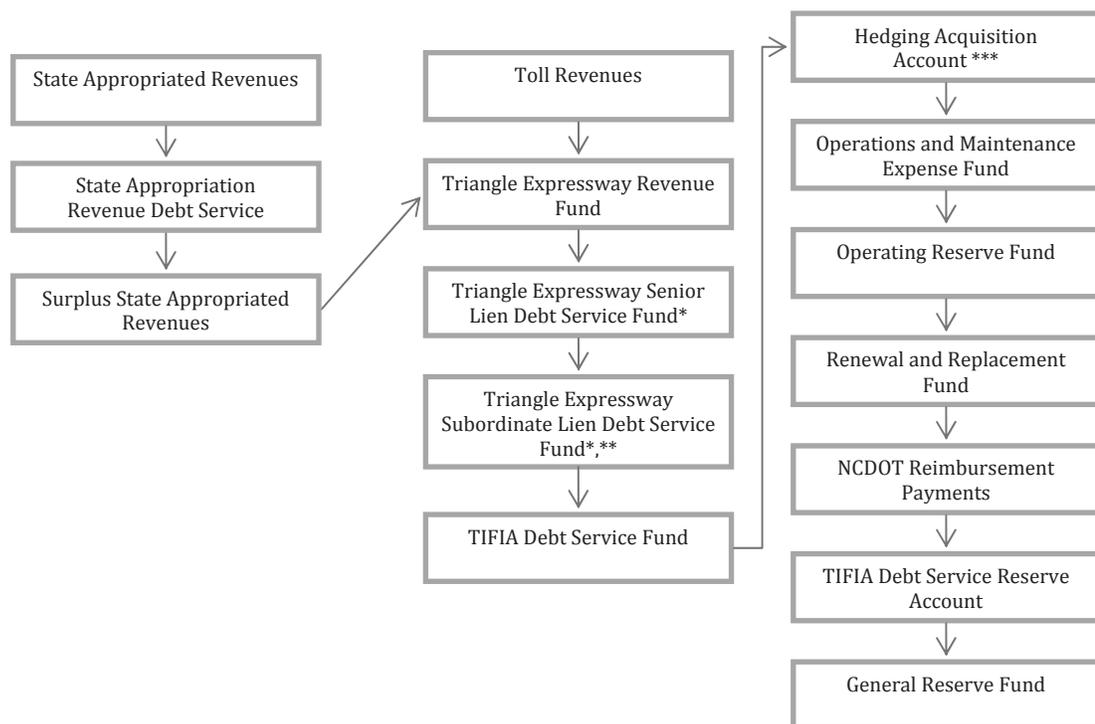
(l) to the credit of the TIFIA Debt Service Reserve Account created under the Trust Agreement the amount then needed for the TIFIA Debt Service Reserve Account to equal the requirement therefor, but only to the extent that Receipts for the then current Fiscal Year exceed the projected Receipts for such Fiscal Year; and

(m) After all deposits are made in accordance with subsections (a) through (l) above, any remaining moneys shall be deposited in the General Reserve Fund.

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

In the case of the occurrence and continuance of a Bankruptcy-Related Event, 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 Parity Reserve Account or any Senior Lien Special Reserve Account.

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



\* Deposits to the following Accounts in the following order of priority until Account requirement is funded: Interest Account, Principal Account and Sinking Fund Account, Senior Lien Parity Reserve Account.

\*\* The Authority does not have any current plans to issue Subordinate Lien Turnpike Revenue Bonds (excluding the TIFIA Bond).

\*\*\* The Hedging Acquisition Account would only be used if the Authority were to issue variable interest rate bonds. At present, the Authority has no plans to issue such Bonds.

**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 Triangle Expressway System, 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 Triangle Expressway System 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 Triangle Expressway System, 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 be not less than 110% of (x) the Long-Term Debt Service Requirement for Senior Lien Indebtedness, Subordinate Lien Indebtedness and TIFIA Indebtedness for such Fiscal Year and (y) the deposits to be made to the Senior Lien Parity Reserve Account and Subordinate Lien Parity Reserve Account for such Fiscal Year.

The Trust Agreement contains certain additional provisions regarding the Authority's covenants as to tolls. See "Summary of the Trust Agreement--Rate Covenant" in APPENDIX B hereto for such additional details

### **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, the Authority may issue or incur additional Senior Lien Indebtedness secured by a pledge, charge and lien upon the Net Receipts on a parity with the Series 2009 Bonds.

In general, Long-Term 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 its rate covenant as described below 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 Senior Lien Indebtedness is incurred through the final maturity date of all Senior Lien Indebtedness, the forecasted Revenues in each such Fiscal Year is at least 140% of the Long-Term Debt Service Requirement with respect to all 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 in each such Fiscal Year is at least (x) 130% of (1) the Long-Term Debt Service Requirement with respect to all Outstanding Senior Lien Indebtedness, Subordinate Lien Indebtedness and TIFIA Indebtedness (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 (2) the amounts to be deposited in such Fiscal Year, the Senior Lien Parity Reserve Account and the Subordinate Lien Parity Reserve Account, and (y) the Loan Life Coverage Ratio is a least 130%; and

(iv) a report of a Traffic Consultant showing that the projected Receipts in each Fiscal Year will be sufficient so that all Outstanding TIFIA Indebtedness will be fully retired by its final maturity date.

The Trust Agreement contains certain additional provisions setting forth additional requirements for the issuance of Senior Lien Indebtedness and certain additional conditions under which Senior Lien Indebtedness may be incurred. See "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, the Authority may issue or incur Subordinated Indebtedness secured by a pledge, charge and lien upon Net Receipts subordinate to the payment of Senior Lien Indebtedness, and the Authority may incur Derivative Agreement Obligations that, to the extent hereafter permitted by statute or judicial decision, may be secured by a pledge, charge and lien upon Net Receipts subordinate to the payment of Senior Lien Indebtedness and Senior Subordinated Indebtedness. See “Summary of the Trust Agreement - Limitation on Subordinated Indebtedness” in APPENDIX B hereto.

## **THE TRIANGLE EXPRESSWAY SYSTEM**

### **General**

The “Triangle Expressway” will extend for approximately 18.8 miles from the interchange of I-40 and NC 147 on the north end to the NC 55 Bypass near Holly Springs, North Carolina on the south end. It will include an approximately one mile segment extending northward from the NC 540/Triangle Parkway interchange to the NC 54 interchange along the roadway currently designated as NC 540. The Triangle Expressway will extend the planned and partially complete “Outer Loop” around the greater Raleigh, North Carolina area. With the Triangle Expressway in place, travelers would have a limited access, six-lane, high-grade facility from I-40 to the NC 55 Bypass near Holly Springs, reducing congestion on the heavily-utilized parallel NC 55. The Triangle Expressway would also improve access into the Research Triangle Park and other area employment centers.

The map set forth on the inside cover page shows the route of the Triangle Expressway and the surrounding area.

The Triangle Expressway would follow a generally north-south orientation parallel to NC 55. Nine interchanges will be constructed as part of the project. The availability of this road will significantly improve access to a rapidly developing area within the Triangle region, which is projected to have substantial increases in both population and employment over the next 25 years. A portion of NC 55 has recently been widened to a minimum of four lanes, with left-turn lane provisions.

The Triangle Expressway is expected to open for service in two phases. The first phase, which will be the northernmost portion of the Triangle Expressway, will have two separate northern entry points. The first entry point is the roadway now designated as NC 540, sometimes referred to as the Northern Wake Expressway, which runs through the southern portion of the Research Triangle Park from NC 54 to NC 55 near Morrisville, North Carolina. The second northern entry point will be a new 3.4 mile roadway to be constructed from NC 147 to connect with NC 540 at a point between NC 54 and NC 55. The portion of the Triangle Expressway System running from these two points to NC 55 is planned to be in service as a toll road within thirty months upon issuance of the Series 2009 Bonds. This new road to be constructed in this phase is sometimes referred to as the “Triangle Parkway.” The Northern Wake Expressway between NC 54 and NC 55 is in operation now as a free facility, but will be re-designated as part of the Triangle Expressway when the Triangle Parkway segment is opened to traffic. The second phase, commonly referred to as the “Western Wake Freeway,” will run from NC 55 (the end of the first phase) to the NC 55 Bypass at Holly Springs, North Carolina and is planned to be in service approximately one year following the opening of the Triangle Parkway, or 42 months after the issuance of the Series 2009 Bonds. The Triangle Parkway and the Western Wake Freeway are being financed with the proceeds of the Series 2009 Bonds and the TIFIA Loan.

On August 5, 2008, the Authority opened bids for the Triangle Expressway highway design-build projects. S.T. Wooten Corporation was the successful proposer for the design and construction of the

Triangle Parkway project with a bid amount of \$137,450,000. For the Western Wake Freeway project, the successful proposer was Raleigh-Durham Roadbuilders, a joint venture consisting of Archer Western Contractors, Ltd. and Granite Construction Corp. with a bid amount of \$446,460,000. These contracts are referred to herein collectively as the “Design-Build Contracts” and the contracting party thereunder is herein referred to as a “Design-Build Contractor.” The Authority will give notice to proceed with delivery of services under the Design-Build Contracts upon the sale of the Series 2009 Bonds. A summary of the Design-Build Contracts is set forth in APPENDIX C to this Official Statement.

### **Project Specific Agreement for Triangle Expressway and Executory Contract For Lease of Right-of-Way for Triangle Expressway and Lease Agreement**

The Authority and NCDOT entered into a Project Specific Agreement for Triangle Expressway and Executory Contract for Lease of Right-of-Way for Triangle Expressway (the “Project Specific Agreement”) on March 6, 2008. The Project Specific Agreement establishes the terms and conditions under which NCDOT will support the Authority in its efforts to finance, construct, equip, operate and maintain the Triangle Expressway System in accordance with the Authority Act. The Authority and the NCDOT will enter into a Lease Agreement (the “Lease Agreement”) under which the NCDOT will lease to the Authority all rights-of-way necessary for the Triangle Expressway System, including NC 540 that is currently open to traveling public, for one dollar per year. The Lease Agreement will provide the Authority uninterrupted access to and full use of the Triangle Expressway System rights-of-way up to and until the Authority ceases to operate the Triangle Expressway System as a toll facility, at which time it will revert back to NCDOT. The Lease Agreement is executable upon the Authority securing appropriate funding, and acquiring and conveying to NCDOT all remaining rights-of-way necessary for the Triangle Expressway System. Prior to the effective date of the Lease Agreement, the Authority is granted the right to enter and commence work pursuant to encroachment terms and conditions set forth in the Lease Agreement. Upon the termination of the Lease Agreement the Project will revert to the NCDOT.

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

At present, the NCDOT owns approximately 260 acres of the right-of-way required for the Triangle Expressway System corridor. In addition, the Town of Cary is contributing approximately 15.5 acres of right-of-way for the Western Wake Freeway portion of the project. The Research Triangle Foundation has agreed to contribute approximately 90 acres of right-of-way for the Triangle Parkway portion of the corridor. The Authority will acquire the balance of the right-of-way with proceeds of the Series 2009 Bonds, the State Appropriation Revenue Bonds and the TIFIA Loan.

The Authority has established formal policies and procedures for the acquisition of all right-of-way under its purview. Acquisition of all right-of-way will be in accordance with established NCDOT and Federal Highway Administration (FHWA) policies and procedures as outlined in the NCDOT Right-of-Way Manual except as noted within the Authority’s policy. All acquisition 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 approximately 230 parcels to acquire through the corridor. The Authority has engaged a consulting firm specializing in right of way services for governmental entities to perform the vast majority of these services for the Authority. The right-of-way consultant has committed to having all acquisition completed within 12 to 18 months from issuance of the Series 2009 Bonds. Right-of-way acquisition for the Triangle Expressway will begin immediately upon sale of the Series 2009 Bonds. Each Design-Build Contractor team has presented its desired acquisition priority for the right-of-way needed for its respective project. The right-of-way consultant has already begun the appraisal process to begin the acquisition process immediately upon issuance of the Series 2009 Bonds.

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 Western Wake Corridor has been under corridor protection by the NCDOT since 1993. The legislatively authorized corridor protection concept limits development within the expected corridor of a future highway construction project. Under corridor protection and advanced acquisition, NCDOT has purchased approximately 260 acres within the right-of-way limits. Because this corridor protection has limited the permissible commercial and residential development in the corridor, it will be easier for the Authority to acquire any necessary right-of-ways required for the project. In addition, because the development of the area was limited by the corridor protection rules, the cost of acquiring the land will be lower than if the land were more developed.

### **Construction of the Project**

Each Design-Build Contract provides that the applicable Design-Build Contractor will design and construct the project in accordance with the route for the highway designated by the Authority. The applicable 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 for the Triangle Parkway provides for a bonus of \$1,500,000 if substantial completion (as defined in the Design-Build Contract) of the Triangle Parkway is achieved on schedule. The Triangle Parkway Design-Build Contract also provides that the Design-Build Contractor will be liable for liquidated damages in the amount of \$10,000 per calendar day for each day of delay in achieving substantial completion and \$5,000 per calendar day for each day of delay in achieving final completion of the Triangle Parkway.

The Design-Build Contract for the Western Wake Freeway provides for a bonus of \$3,000,000 if substantial completion of the Western Wake Freeway 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 Western Wake Freeway.

A summary of the project budget for Triangle Parkway and Western Wake Freeway is set forth below under the caption “GEC REPORT.”

### **Major Contract Contingencies**

Both of the Design-Build Contracts are fixed fee, lump sum contracts that limit 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.

Provisions have been included in the Design-Build Contracts 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 Contractors. If the price of these materials drops from a base price index as provided in the Construction RFP, the Authority will deduct money from the Design-Build Contractors. This scenario has been anticipated and is shown in the construction budget above. 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.

The value of the highway Design-Build Contracts for the Triangle Expressway System is \$583,910,000. Each Design-Build Contractor is required to provide a payment and performance bond equal to its respective Design-Build Contract amount. See “APPENDIX C – SUMMARY OF CERTAIN PROVISIONS OF THE DESIGN-BUILD CONTRACTS – Payment and Performance Bonds.” Such payment and performance bonds are intended to assure that the obligations of the Design-Build Contractors to construct the Initial Project are performed in the event that such Design-Build Contractors fail to do so. Additionally, as referenced above, liquidated damages will be assessable from the respective Design-Build team on each contract for failure to perform within the Design-Build Contract time requirements. These liquidated damage provisions provide an additional layer of performance protection in the Design-Build Contracts.

### **Description of the Design-Build Contractors**

#### Triangle Parkway Design-Build Contractor

The successful Design-Build Contract proposer on the Triangle Parkway is comprised of the S. T. Wooten Corporation as the lead contractor and Rummel, Klepper & Kahl, LLP (RK&K) as the lead consultant. In addition to the Triangle Parkway Project, S.T. Wooten Corporation and RK&K have teamed on three other design-build projects in North Carolina.

S.T. Wooten Corporation is a privately owned construction and concrete supply company. Based in Wilson, North Carolina, S.T. Wooten Corporation is the second largest highway contractor headquartered in North Carolina. Organized in 1952, they have completed numerous NCDOT construction projects during their history, most recently including the US 70 Clayton Bypass and the US 264 Wilson Bypass. In addition, they have performed as the lead contractor on four NCDOT design-build projects. S.T. Wooten Corporation consists of eight operating divisions: Asphalt, Commercial, Concrete Products, Equipment, Highway-Heavy, Structures, Utilities, and Incidental Concrete.

Formed in 1923 and based in Maryland, RK&K is a privately held engineering firm specializing in transportation, civil, structural, environmental, sanitary, and construction engineering. The 628-person firm provides design services throughout the Mid-Atlantic and Southeastern United States. The Raleigh based office will be leading the design efforts for the Triangle Parkway.

#### Western Wake Freeway Design-Build Contractor

The successful Design-Build Contract proposer on the Western Wake Freeway project is Raleigh-Durham Roadbuilders, a joint venture between Archer Western Contractors, Ltd, and Granite Construction Company. The lead design consultant for the team is The LPA Group.

Archer Western Contractors, a subsidiary of The Walsh Group, brings national experience to this project. The Walsh Group is currently ranked among the nation’s Top 20 overall Contractors, the 4th largest highway, and 2nd largest bridge contractor according to Engineering News-Record rankings. Archer Western Contractors, a general contracting, construction management, and design-build firm, was established in 1983 and is based in Atlanta, Georgia. A privately held corporation, Archer Western constructs highways and bridges, wastewater and water treatment plants, rapid transit systems, and various types of industrial buildings.

Granite Construction Company also brings substantial construction experience to the project. As with Archer Western, Granite Construction Company is a national contractor specializing in the construction of roads, tunnels, bridges, airports, and other infrastructure-related projects. Shares in Granite Construction Company are traded on the New York Stock Exchange under the symbol GVA.

The LPA Group, incorporated in 1983 in Columbia South Carolina, has offices across the southeastern United States, including three within North Carolina. The LPA Group has worked on multiple design-build projects in North Carolina including two major interstate widening projects on I-85 and the US 64 Knightdale Bypass project east of Raleigh. The LPA Group is a privately held corporation.

**Status of Permitting**

All major environmental permits and other permits necessary for the construction of the Triangle Expressway System have been obtained. See “APPENDIX C – SUMMARY OF CERTAIN PROVISIONS OF THE DESIGN-BUILD CONTRACTS – GOVERNMENT APPROVALS – Environmental Permits” for a discussion of certain provisions of the Design-Build Contracts regarding environmental permits.

**Total Sources and Uses for Triangle Expressway System**

The following table shows the estimated sources and uses of funding for the Triangle Expressway System, net of amounts contributed by NCDOT and capitalized interest on the TIFIA Loan (which is added to the TIFIA Loan balance):

<u>Sources</u>	
State Appropriation Revenue Bonds	\$ 351,858,545 *
Series 2009 Bonds	268,548,455 *
TIFIA Loan	386,662,000
Annual Appropriation for Fiscal Year Ending June 30, 2009	<u>25,000,000</u>
Total Sources	<u>\$ 1,032,069,000</u>
<u>Uses</u>	
Construction and Acquisition Costs **	\$ 877,795,452
Senior Lien Debt Service Reserve Fund	27,008,311
State Appropriation Revenue Bonds Reserve Fund	7,913,790
Capitalized Interest on Series 2009 Bonds **	48,755,259
Capitalized Interest on State Appropriation Revenue Bonds **	42,427,681
TIFIA Loan Origination Charge	10,500,000
Cost of Issuance	<u>17,668,507</u>
Total Uses	<u>\$ 1,032,069,000</u>

\* Net of original issue discount.

\*\* Net of assumed interest earnings.

## **Open Road Tolling**

The Authority intends to utilize an all-electronic, non-stop “open road” tolling system for the Triangle Expressway System 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 Triangle Expressway. Regular customers may pay their tolls via a pre-paid transponder based account. Customers using the Triangle 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. Cash payment customers will be able to make their payments at service centers throughout the State.

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

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

The Authority is underway with the procurement of the roadside toll systems and account management technology and services through a request for proposals process that will enable competitive selection of qualified firms to provide state-of-the-art solutions to non-stop tolling. The procurement is designed to allow for extensive testing and trials months before the Triangle Expressway System is open to toll traffic and revenue collection begins.

Technical proposals and price proposals were received by the Authority on February 2, 2009. The proposals provide a detailed response on how the proposed integrator’s solution will comply with the system specifications and the operational and functional requirements. The technical proposals are currently being evaluated. Following the proposal evaluations, the Authority will follow up with shortlisted firms for site visits and oral presentations. Once complete a final ranking will be completed with contracts to be awarded to selected vendors in November 2009.

The Authority engaged senior toll technology consultants with experience in major toll procurements to develop the toll system requirements and specifications package. The procurement process is intended to result in agreements that require high performance standards with minimal stipulation as to exact equipment recommendations. To enable the participation of the most qualified vendors in specific fields, the solicitation was divided into three categories, each of which is described below: (1) the Roadside Toll Collection System (RTCS), (2) the Back Office System (BOS) and (3) Operation Services. Vendors had the option to pursue separate contract sections or bundled sections, and were able to offer traditional system sales or alternate leasing and financing structures, all to enable the Authority to get the best competitive value for each portion of the required toll system.

The Roadside Toll Collection System is the system for detecting use of the roadway, captured either through a transponder or 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 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/violations 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.

The Operation Services contractor will provide for the operations of the customer service center and the video and violations processing center (VPC). The operations portion will provide customer service, image reviews, account management, violation processing, 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. Initial services may eventually be expanded to multiple satellite walk-in centers.

After the award of one or multiple toll collection contracts, 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 contracts 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.

### **Selection of Electronic Toll Collection Transponder & Reader Technology**

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 April, 2009. 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. ETC system final selection and Board approval will be completed by the end of November, 2009. Technology selected under this request for proposal process will potentially set the foundation for other planned toll facilities throughout North Carolina.

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, they will work directly with the Authority to cooperatively plan for the ETC system's maintenance and transponder marketing support.

The selected ETC Contractor will coordinate with the Roadside Toll Collection System (RTCS) contractor to ensure seamless and accurate operation with and within the RTCS. Moreover, the ETC contractor will interface with the Back Office System (BOS) 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 purchasing by the general public.

### **Intelligent Transportation System**

The Intelligent Transportation System (ITS) for the Triangle Expressway will be procured under one contract through a request for proposals process now underway. The Authority and the successful proposer will execute a Design-Build contract for the project. A contract is expected to be executed in November 2009. The ITS will provide video and data sharing with the Authority, NCDOT, and Triangle Expressway users and will facilitate data sharing with the toll collection system to allow for congestion pricing and other variable pricing schemes.

The Intelligent Transportation System will consist of roadside devices including closed circuit television (CCTV) cameras, microwave vehicle detection stations (MVDS), full-matrix dynamic message signs (DMS) and a road weather system (RWIS). The ITS Design-Build team 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 proposed National Guard Joint Headquarters Building in Raleigh. This \$56 million facility will also serve as an emergency management center and is expected to open in July 2011. A small size traffic management center (TMC) will also be equipped for the Authority in a Customer Service Center facility 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 Triangle Expressway from the Customer Service Center location.

### **Toll Collection Enforcement**

The Authority will maintain a Customer Service Center in the vicinity of Triangle 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 Triangle Expressway system and a toll is not paid within 15 days after the travel occurs, the Authority will send a bill within 90 days after the travel occurs 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 \$6.00 processing fee to the toll amount the person owes with a maximum of \$48.00 in processing fees allowed against that person in a calendar year. A person who receives one or more bills for unpaid tolls during the first or second 6-month period in a year and who does not pay the amount on these bills within 30-days after the end of such 6-month period 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.

A person whose motor vehicle registration renewal is blocked may pay to the Division of Motor Vehicles of the Department of Transportation the amount owed for unpaid tolls, processing fees, and civil penalties due when renewing the vehicle registration. The Division must remit to the Authority the amount of tolls, fees, and civil penalties collected. The Division's costs of collecting tolls, fees, and civil penalties are considered a necessary expense of the operation of the Authority, and the Authority must reimburse the Division for these costs.

If a person receiving a bill asks for a review of the bill for use of the Triangle 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 Receipts 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.

### **Maintenance of the Project**

The Authority plans to employ a “single contractor” comprehensive maintenance approach to perform routine operation and maintenance services for the roadway, bridges, and other infrastructure on the Triangle Expressway. 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 after all other debt payments are made. If the Authority is unable to fund the maintenance costs after satisfying debt payments, the Operations and Maintenance Expense Guaranty Agreement with NCDOT ensures that operating and maintenance costs will be paid by the Department.

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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 2009 Bonds.

Fiscal Year Ending <u>June 30,</u>	<u>Series 2009A Bonds</u>		<u>Series 2009B Bonds<sup>1</sup></u>	<u>Total</u>
	<u>Principal</u>	<u>Interest</u>		
2010		\$ 12,024,124		\$ 12,024,124
2011		13,038,206		13,038,206
2012		13,038,206		13,038,206
2013		13,038,206		13,038,206
2014		13,038,206		13,038,206
2015		13,038,206		13,038,206
2016		13,038,206		13,038,206
2017		13,038,206		13,038,206
2018		13,038,206		13,038,206
2019	\$ 600,000	13,024,706		13,624,706
2020	2,195,000	12,959,075		15,154,075
2021	3,940,000	12,808,444		16,748,444
2022	5,355,000	12,576,069		17,931,069
2023	7,435,000	12,247,025		19,682,025
2024	9,860,000	11,799,194		21,659,194
2025	12,640,000	11,214,731		23,854,731
2026	15,245,000	10,473,222		25,718,222
2027	17,540,000	9,581,163		27,121,163
2028	20,015,000	8,548,400		28,563,400
2029	22,760,000	7,372,088		30,132,088
2030	21,315,000	6,133,381	\$ 4,420,000	31,868,381
2031	27,010,000	4,744,038	1,695,000	33,449,038
2032	30,015,000	3,104,569	1,675,000	34,794,569
2033	2,000,000	2,184,138	32,020,000	36,204,138
2034	2,000,000	2,069,138	33,595,000	37,664,138
2035	2,000,000	1,954,138	35,235,000	39,189,138
2036	2,000,000	1,839,138	36,815,000	40,654,138
2037	2,000,000	1,724,138	38,330,000	42,054,138
2038	2,000,000	1,609,138	22,050,000	25,659,138
2039	<u>26,985,000</u>	<u>775,819</u>		<u>27,760,819</u>
Total	<u>\$234,910,000</u>	<u>\$265,071,521</u>	<u>\$205,835,000</u>	<u>\$705,816,521</u>

Note: Amounts may not total due to rounding.

<sup>1</sup> Debt service consists of maturing principal plus compounded interest payable upon maturity or redemption.

## TRAFFIC AND REVENUE REPORT

The Traffic Consultant has prepared the Traffic and Revenue Report (the “Traffic and Revenue Report”) attached hereto as APPENDIX D, which sets forth the estimated traffic and revenue for the Triangle Expressway System. 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.

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

1. The Triangle Parkway (NC 147 to NC 540) will open to traffic and NC 540 (NC 54 to NC 55) will convert to a toll section by January 1, 2012. The Western Wake Freeway (NC 55 near Morrisville to NC 55 Bypass near Holly Springs) will open to traffic by January 1, 2013.

2. The existing southern terminus of NC-147 at T.W. Alexander Drive will close upon the completion of the first section of the Triangle Expressway in January 2012.

3. Improvements in the current Transportation Improvement Program, including the widening of some existing toll free routes and construction of HOV lanes on I-40, will be implemented by 2030.

4. Tolls would be charged for three vehicle classes and two payment types and will be increased annually. The toll rates and tolling zone locations are shown later in the Traffic and Revenue Report.

5. No new toll-free facilities or additional capacity will be constructed during the projection period, other than those in the Region's current Transportation Improvement Plans.

6. The Triangle Expressway System will operate in a cashless environment. Both electronic toll collection and video tolling will be used. However, provisions will be made for drivers to register their license plate by paying in cash at off-site locations.

7. The percentage of ETC and video customers will be as described later in the Traffic and Revenue Report.

8. Revenue leakage due to unreadable or uncollectible ETC or video transactions, or any transactions that cannot be processed and payment collected will occur. 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. Economic growth in the project study area and associated travel demand would occur as forecast by the independent economist. The current economic recession is assumed to "bottom out" by the end of 2009, with recovery beginning by the first quarter of 2010. For purposes of this analysis, a three-year lag in previously developed socioeconomic forecasts is assumed to represent the net impact of the recession.

10. The traffic and revenue forecasts were then adjusted to estimate the impacts of the current recession.

11. Inflation will average 2.5 percent per year.

12. The Triangle Expressway System will be well maintained, efficiently operated, effectively signed, and promoted to encourage maximum usage and to reach the assumed percentage goals for ETC and video usage.

13. Motor fuel will remain in adequate supply throughout the forecast period. Fuel prices are assumed to gradually increase back to levels approaching \$3.00 per gallon by 2011, and remain at that level, in real terms after adjustment for inflation, throughout the forecast period.

14. No national or regional emergency will arise that would abnormally restrict the use of motor vehicles.

Following is a summary of the study process.

Previous reports and study materials related to the proposed Triangle Expressway were reviewed. This information included previous traffic analysis and transportation modeling analysis prepared by the two Metropolitan Planning Organizations (MPOs) in the area, the Capital Area MPO (CAMPO) and the Durham-Chapel Hill-Carrboro MPO (DCHC MPO). Previously collected data was reviewed and updated as necessary. Inventories of the corridor operating conditions including traffic counts and speed-delay studies were conducted. Information on the planned transportation improvement program was reviewed to determine its prospective impact on the traffic and revenue potential of the Triangle Expressway.

Two types of surveys were conducted in the study area. An origin-destination (OD) survey was conducted to identify current travel patterns and trip characteristics. The information obtained in this survey was used to supplement the Triangle Regional Model (TRM). Stated preference surveys were also conducted to provide value-of-time data for use in the toll diversion models. Interactive, notepad-based interviews were held at various employment centers, shopping areas, and government offices. Interactive, internet-based surveys were also conducted with OD survey participants who responded to the internet link provided on the OD survey card.

The Triangle Regional Model used in earlier, preliminary studies was also used for this study. This traffic model covers all of Wake, Durham, and Orange Counties as well as adjacent portions of Chatham, Johnston, Harnett, Granville, and Franklin Counties. A new model platform and revised socioeconomic data was under development during this study but was not adopted by the MPOs in time for use in this study. Consequently the older model was used with new socioeconomic forecasts as described below. Vehicle operating cost parameters were also established specific to the study corridor.

The socioeconomic data used in the original TRM trip generation process was replaced by more recent forecasts prepared by the MPO and adjusted by an independent economist. Accordingly, new trip tables were developed by applying the new socioeconomic data to the trip generation, trip distribution, and mode choice modules of the TRM. In addition, the current recession is expected to affect future traffic and revenue on the Triangle Expressway. Following a review of regional socioeconomic conditions, revisions to the traffic and revenue forecasts were made as described below.

The revised base-year model was calibrated in the immediate project area to achieve the best traffic volume assignments compared to observed traffic counts and observed speeds during speed-delay studies. The model also was updated to reflect committed highway improvements.

Toll sensitivity curves were developed for 2012 traffic volumes, assuming a full year of operation, and 2030 volumes to determine optimum toll rates. These optimum rates were then used to conduct traffic assignments for other years.

The refined models were used to run a series of traffic assignments, both with and without the proposed Triangle Expressway System. A review was made of the reasonableness of the travel demand estimates, particularly under a toll condition, using various evaluation techniques such as select link, corridor share, and capture rate.

The current recession will likely induce a “lag” in economic development in the project corridor and throughout the region. Accordingly adjustments were made to the base forecasting models to reflect an assumed three-year lag in economic development as a result of the recession over the first few years of

operation with a full economic recovery assumed to occur by sometime between 2020 and 2030. The following adjustments to the base model were made:

- Model runs at 2012 levels were made using trip tables reflecting 2009 levels of economic development (nominal three-year lag);
- Model runs at 2015 levels were made using trip tables reflective of base 2013 economic forecast (nominal lag of two years);
- Model runs at 2020 levels were made using trip tables representative of base 2019 economic conditions (nominal one-year lag); and
- Model runs at 2030 levels were made using the base 2030 trip tables (assumed full recovery from recession).

In addition to the specific recession impact approach described above, the updated traffic and revenue model runs also assumed reduced motor fuel costs as compared with forecasts developed in the summer of 2008. Previously, fuel prices were assumed to be in the range of \$3.75 - \$4.00 per gallon; the new analysis reflected opening year fuel price levels closer to \$2.50, assumed to increase nominally to \$3.00 and remain generally constant, in real terms, thereafter.

Annual estimates of traffic and revenue from the proposed Triangle Expressway were developed for the base-case condition from opening year 2012 through 2030. The forecasts beyond 2030 were based on a computational extrapolation of modeling results from 2030. Revenue estimates in the early years of the projection period were adjusted to reflect ramp-up, a pattern of gradual build-up in demand for new toll facilities.

Finally a series of sensitivity tests was also performed to provide additional information on the sensitivity of the forecasts to changes in key parameters.

## **GEC REPORT**

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

- Authority management and organizational structure summary
- Triangle Expressway project technical description
- Project engineering design status and standards
- Toll collection operations plan
- Routine maintenance and renewal and replacement program
- Operations and maintenance cost estimates
- Project costs and schedule
- Environmental considerations
- Public involvement process

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 original capital cost estimates were based on the available design information at the time of the report and prior to bid openings for the Design-Build roadway contracts. Since that time, the bids for the Design-Build highway contracts have been opened and the best value selections have been made. The cost estimate summary shown below, as well as in Addendum 3 of the GEC Report, reflects the bids received on August 5, 2008 for the Design-Build highway contracts, as well as the most recent cost assumptions and information available.
- Contractor bids were based on fuel and asphalt binder prices as of July 1, 2008, which were at near record levels. Prices for these commodities have since dropped substantially. The Contractors' prices will be adjusted according to the current commodity price at the time certain construction activities occur, in accordance with the price adjustment clauses as outlined in the Design-Build Contracts. The adjustments shown here assume a 50% increase above July 2009 prices. These adjustments are negative due to the substantial decrease in prices that has occurred since July 2008.
- The capital cost items that are not included in the Design-Build Contracts include landscaping, toll system integration and ITS, right of way, utility relocation, construction management and oversight, and other Authority expenses such as Design-Build Contract stipends, financial incentives for early completion by a Design-Build Contractor, and management reserves. In summary, these costs were estimated as follows:
  - Landscaping: One percent of the estimated cost for the highway construction contracts was set aside for landscaping along the project corridor.
  - Toll System Integration and ITS: The ITS and tolling equipment needs were based on the number and location of tolling zones, 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 230 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.
  - Utility Relocation: The Authority enlisted the services of two qualified utility relocation firms, TBE Group and Mulkey Inc., to assess the utility relocations required, coordinate with the utility owners, and prepare relocation cost estimates. Both firms applied a 20% contingency factor to their estimates.
  - Construction Management and Oversight: The Authority selected a qualified construction engineering and management firm, Mulkey Inc., to oversee the construction of the Triangle Expressway. The Authority and Mulkey have entered into a cost-plus contract that will cover

labor, expenses, overhead, and profit. A 5% contingency was also included to cover unanticipated charges.

- Authority Expenses and Reserves: Reserves include the costs of Design-Build stipends to unsuccessful proposers (\$600,000), early completion incentives for Design-Build Contractors (\$4,500,000), incentives for environmental excellence during construction (\$300,000), and administrative reserves (\$4,470,000).
- Operations and Maintenance (O&M) cost estimates were based on the planning level information provided by the Authority and compared with industry data for appropriateness. Final O&M costs will be defined by future contracts and refined Authority O&M requirements.
- O&M cost estimates assume certain costs are not the responsibility of the Authority and by others as noted in the report.

The following is a summary of the Project construction budget, as shown in Addendum 3 of the GEC Report:

<u>Item</u> <u>Segment</u>	<u>Cost</u>		<u>Total</u>
	<u>Triangle Parkway &amp; Northern Wake Expressway</u>	<u>Western Wake Freeway</u>	
<i>Design-Build Construction</i>	--	--	--
Highway Design-Build Contract	\$137,450,000	\$446,460,000	\$583,910,000
Adjustment based on anticipated lower fuel/asphalt binder prices*	(1,910,000)	(4,590,000)	(6,500,000)
Landscaping	1,340,000	4,440,000	5,780,000
ITS	3,850,000	5,930,000	9,780,000
Toll Integration	<u>3,470,000</u>	<u>5,770,000</u>	<u>9,240,000</u>
Design-Build Contracts Totals	<u>144,200,000</u>	<u>458,010,000</u>	<u>602,210,000</u>
<i>Authority Costs</i>			
Right-of-Way and Right-of-Way Settlement Costs	24,520,000	203,630,000	228,150,000
Utility Relocation	4,000,000	14,600,000	18,600,000
Authority Construction Oversight	5,050,000	13,910,000	18,960,000
Authority Expenses and Reserves	670,000	3,800,000	4,470,000
Stipends/Incentives**	<u>1,850,000</u>	<u>3,550,000</u>	<u>5,400,000</u>
Authority Costs Total	<u>36,090,000</u>	<u>239,490,000</u>	<u>275,580,000</u>
Project Total Costs	<u>\$180,290,000</u>	<u>\$697,500,000</u>	<u>\$877,790,000</u>

\* Design-Build Contract bids were based on fuel and asphalt binder prices as of July 1, 2008, which were at near-record levels. Prices for these commodities have since dropped substantially. The Contractors' prices will be adjusted according to the current commodity price at the time certain construction activities occur, in accordance with the price adjustment clauses as outlined in the Design-Build Contracts. The adjustments shown here assume a 50% increase above July 2009 prices. These adjustments are negative due to the substantial decrease in prices that has occurred since July 2008.

\*\* The budget for stipends and incentives includes stipends to the unsuccessful proposers, in addition to incentives for early completion and environmental excellence during construction.

## 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 2009 Bonds and the TIFIA Loan, estimated debt service coverage ratios for Senior Lien Bonds and for Senior Lien Bonds and the TIFIA Loan, projected Operation and Maintenance Expenses, projected deposits to and expenditures from the Renewal and Replacement Fund and remaining deposits to (from) the General Reserve Fund for each of the fiscal years ending June 30, 2010 through June 30, 2049.

Amounts in the “Total Revenue” column are taken from the “Total Net Revenue” column of the report of the Traffic Consultant set forth in “APPENDIX D – TRAFFIC AND REVENUE REPORT – TABLE 6-14, Annual Toll Transactions and Revenue Forecasts (Fiscal Year) Triangle 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 \$25,000,000, less the amount thereof scheduled to be used to pay debt service on the State Appropriation Revenue Bonds. Amounts in the “Series 2009 Bonds Debt Service,” “Capitalized Interest,” “Series 2009 Debt Service Fund Earnings” and “Senior Lien Debt Service” columns are estimated as of the date of the Preliminary Official Statement. Amounts in the Senior Lien Parity Reserve Account” column consist of the estimated future deposits to the Senior Lien Parity Reserve Account to meet the requirement thereof as annual debt service on the Series 2009 Bonds increases. Amounts in the “TIFIA Debt Service” column are estimated as of the date of the Preliminary Official Statement. Amounts in the “Operations and Maintenance Requirement” and Renewal and Replacement Requirement columns are taken 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 E – GEC REPORT – TABLE 1.” 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 Repair and Replacement Requirement and the Operations and Maintenance Requirement in the event that Total Revenues are not sufficient for such purposes.

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

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

Fiscal Year	Total Revenue	Net State Appropriation <sup>(1)</sup>	Appropriation		Total Pledged Revenue	Series 2009		Series 2009 Net Debt Service	
			Debt Service Fund Earnings	Debt Service		2009 Bonds Debt Service	Capitalized Interest		
2010	-	25,000	-	-	25,000	12,024	12,024	-	-
2011	-	25,000	-	-	25,000	13,038	13,038	-	-
2012	680	25,000	-	-	25,680	13,038	13,038	-	-
2013	6,616	10,303	178	178	17,097	13,038	13,038	-	-
2014	17,618	10,303	178	178	28,099	13,038	-	608	12,431
2015	23,704	10,303	178	178	34,185	13,038	-	608	12,431
2016	28,818	10,303	178	178	39,299	13,038	-	608	12,431
2017	32,138	6,986	178	178	39,302	13,038	-	608	12,431
2018	35,719	3,406	178	178	39,303	13,038	-	608	12,431
2019	39,705	1,176	178	178	41,059	13,625	-	608	13,017
2020	44,293	1,178	178	178	45,649	15,154	-	608	14,546
2021	49,075	1,177	178	178	50,430	16,748	-	608	16,141
2022	53,803	2	178	178	53,983	17,931	-	608	17,323
2023	59,059	3	178	178	59,240	19,682	-	609	19,073
2024	64,988	3	178	178	65,169	21,659	-	626	21,033
2025	71,570	3	178	178	71,751	23,855	-	660	23,194
2026	77,164	5	178	178	77,347	25,718	-	698	25,021
2027	81,372	3	178	178	81,554	27,121	-	735	26,386
2028	85,704	4	178	178	85,886	28,563	-	768	27,796
2029	90,407	4	178	178	90,589	30,132	-	799	29,333
2030	95,610	3	178	178	95,791	31,868	-	831	31,037
2031	100,354	4	178	178	100,536	33,449	-	865	32,584
2032	104,388	3	178	178	104,569	34,795	-	898	33,896
2033	108,617	1	178	178	108,796	36,204	-	930	35,274
2034	113,006	4	178	178	113,188	37,664	-	946	36,718
2035	117,574	0	178	178	117,752	39,189	-	946	38,243
2036	121,965	0	178	178	122,144	40,654	-	946	39,708
2037	126,165	1	178	178	126,344	42,054	-	946	41,108
2038	130,505	5	178	178	130,688	25,659	-	946	24,713
2039	134,998	2	89	89	135,089	27,761	-	473	27,288
2040	139,650	25,000	-	-	164,650	-	-	-	-
2041	143,430	25,000	-	-	168,430	-	-	-	-
2042	146,299	25,000	-	-	171,299	-	-	-	-
2043	149,223	25,000	-	-	174,223	-	-	-	-
2044	152,205	25,000	-	-	177,205	-	-	-	-
2045	155,249	25,000	-	-	180,249	-	-	-	-
2046	158,349	25,000	-	-	183,349	-	-	-	-
2047	161,514	25,000	-	-	186,514	-	-	-	-
2048	164,743	25,000	-	-	189,743	-	-	-	-
2049	168,036	25,000	-	-	193,036	-	-	-	-

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

Fiscal Year	Series 2009 Debt Service Coverage	Senior Lien Parity Reserve Account Deposit	TIFIA Debt Service	TIFIA Reserve Account Deposit/ (Withdrawal)	Series 2009 and TIFIA Debt Service Coverage	TIFIA LLCR <sup>(2)</sup>	Operations and Maintenance Requirement	Renewal and Replacement Requirement	General Reserve Deposit/ (Withdrawal)
2010	-	-	-	1,000	-	5.94	-	-	24,000
2011	-	-	-	-	-	3.82	-	-	25,000
2012	-	-	-	-	-	3.00	5,068	2,655	17,957
2013	-	-	-	-	-	2.75	10,233	2,644	4,220
2014	2.26	-	-	-	-	2.71	10,758	2,633	2,278
2015	2.75	-	16,607	-	1.18	2.74	10,761	2,623	(8,236)
2016	3.16	-	19,869	-	1.22	2.79	11,802	2,612	(7,415)
2017	3.16	-	19,869	-	1.22	2.82	12,318	2,602	(7,918)
2018	3.16	-	19,869	-	1.22	2.86	12,924	2,593	(8,513)
2019	3.15	-	19,869	-	1.25	2.90	13,586	2,583	(7,997)
2020	3.14	-	19,869	-	1.33	2.95	14,304	2,573	(5,644)
2021	3.12	-	19,869	-	1.40	2.99	14,308	2,563	(2,451)
2022	3.12	-	19,869	-	1.45	3.04	15,160	2,552	(923)
2023	3.11	113	19,869	-	1.52	3.08	15,941	4,969	(725)
2024	3.10	1,442	19,869	-	1.54	3.12	16,789	4,947	1,088
2025	3.09	1,569	21,145	-	1.56	3.17	17,709	4,926	3,208
2026	3.09	1,736	22,766	-	1.56	3.23	18,475	4,905	4,445
2027	3.09	1,581	24,114	-	1.57	3.29	19,101	4,884	5,488
2028	3.09	1,346	25,535	-	1.57	3.36	19,800	4,863	6,547
2029	3.09	1,410	26,931	-	1.57	3.45	20,535	4,842	7,538
2030	3.09	1,460	28,482	-	1.57	3.54	21,307	4,821	8,683
2031	3.09	1,525	29,892	-	1.57	3.66	21,468	4,800	10,266
2032	3.08	1,465	31,143	-	1.57	3.78	22,302	4,780	10,982
2033	3.08	1,400	32,455	-	1.57	3.93	23,069	5,804	10,794
2034	3.08	-	34,412	-	1.59	4.11	23,856	5,779	12,424
2035	3.08	-	35,779	-	1.59	4.33	24,672	5,755	13,304
2036	3.08	-	37,096	-	1.59	4.59	25,509	5,731	14,100
2037	3.07	-	38,356	-	1.59	4.91	26,377	5,707	14,797
2038	5.29	-	47,689	-	1.81	5.51	27,274	5,683	25,329
2039	4.95	-	48,511	-	1.78	6.25	28,204	5,659	25,428
2040	-	-	74,093	-	2.22	8.55	29,167	5,635	55,755
2041	-	-	75,794	-	2.22	13.57	30,127	5,612	56,898
2042	-	-	77,085	-	2.22	42.56	31,090	5,589	57,536
2043	-	-	32,932	(2,084)	5.65	-	32,092	1,346	109,937
2044	-	-	-	-	-	-	33,127	1,346	142,733
2045	-	-	-	-	-	-	34,196	1,345	144,708
2046	-	-	-	-	-	-	35,299	1,345	146,705
2047	-	-	-	-	-	-	36,441	1,345	148,728
2048	-	-	-	-	-	-	37,619	1,345	150,779
2049	-	-	-	-	-	-	38,836	1,346	152,855

<sup>(1)</sup> Annual Appropriation less Series 2009 Appropriation Revenue Bonds Debt Service.

<sup>(2)</sup> (Net Present Value of Project Surplus Receipts + Amounts on Deposit in TIFIA Reserve and General Reserve) / Outstanding TIFIA Indebtedness.

## **RISK FACTORS**

The following is a discussion of certain risk factors that should be considered in evaluating an investment in the Series 2009 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 2009 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 Triangle Expressway System and upon projections as to estimated Revenues and Operations and Maintenance Expenses. See “APPENDIX D – TRAFFIC AND REVENUE REPORT” and “APPENDIX E – 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 Triangle Expressway System**

As described in “THE TRIANGLE EXPRESSWAY SYSTEM” herein, the undertaking consists of the planning, designing, engineering and construction of the Triangle Expressway System (as described in the GEC Report attached as APPENDIX E). The Authority has entered into the Design-Build Contracts with the Design-Build Contractors. Each of the Design-Build Contracts is a fixed price, lump sum contract obligating the applicable Design-Build Contractor to perform the design, utility relocation, construction, construction engineering and inspection of the respective segment of the Triangle Expressway System 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 Triangle Expressway System will not exceed current estimates, or that the completion of the Triangle Expressway System will not be delayed beyond the estimated completion dates.

Specifically, while the Design-Build Contracts shift to the Design-Build Contractors a significant amount of the risk and responsibility for time delays and cost increases associated with design, engineering, utility relocation and construction, the Design-Build Contracts ultimately allow for increases in price and extensions of time for performance in certain cases, including, but not limited to, 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” so as to delay “Substantial Completion” or “Final Acceptance” beyond the applicable deadline, as each of such terms within quotations are defined in APPENDIX C). Moreover, there are currently no final plans and specifications for the construction of the Triangle Expressway System and the Authority is relying on the Design-Build Contractors 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 Contractors can design and engineer the Triangle Expressway System 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 Contracts. Further, the responsibility of the applicable Design-Build Contractor for all phases of design and engineering under its Design-Build Contract may increase the impact that any financial instability, insolvency or bankruptcy of the applicable Design-Build Contractor, or any entity guaranteeing the obligations of the applicable Design-Build Contractor, could have on the cost of, or completion date for, the Triangle Expressway System.

### **Payment and Performance Bonds**

A potential purchaser of the Series 2009 Bonds can have no assurance that any Design-Build Contractor or subcontractor, guarantor, surety or property insurer will be willing or capable of meeting its responsibilities in connection with the Triangle Expressway System 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 applicable Design-Build Contractor, there can be no assurance that the payment and performance bonds provided by the applicable 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 applicable 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 applicable 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 Triangle Expressway System. In addition, there can be no assurance that the Authority will recover any amounts under the performance bonds and payment bonds provided by the applicable Design-Build Contractor or any other contractor related to the Triangle Expressway System.

### **Liquidated Damages**

The amount of liquidated damages the applicable Design-Build Contractor could be required to pay in connection with the Triangle Expressway System 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. Liquidated damages, if paid, may not be sufficient to enable the Authority to pay the principal and interest on the Series 2009 Bonds and the other amounts required to be paid under the Trust Agreement. There are numerous events that could cause an extension of the schedule and that could result in increased costs for the Triangle Expressway System.

The amount of liquidated damages included in the Design-Build Contract for delay is unlimited. See “APPENDIX C – SUMMARY OF CERTAIN PROVISIONS OF THE DESIGN-BUILD CONTRACTS – Contract Completion Dates and Liquidated Damages Unlimited.” Liquidated damages, however, are payable by the applicable Design-Build Contractor only under certain circumstances and even if paid, may not be sufficient to cover debt service payments on the 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 Triangle Expressway System 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 Authority-provided permits, revocation of such permits and approvals and litigation, among other things.

### **Limited Insurance Coverage**

Although the applicable Design-Build Contractor is required to provide insurance during construction of the Triangle Expressway System, such required insurance policies 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 2009 Bonds.

Each applicable Design-Build Contractor for the Triangle Expressway System 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 for freight rail and/or \$10,000,000 for passenger rail is required by the Design-Build Contracts. The Design-Build Contracts require \$5,000,000 in aggregate coverage for freight and \$10,000,000 for passenger per annum. 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.

## **Operating Risks**

When completed, the Triangle Expressway System will be a new toll facility having no independent operating history. Accordingly, the operations of the Triangle Expressway System to generate Receipts in amounts sufficient to pay debt service on the Series 2009 Bonds when due will be subject to the risks inherent in the establishment of any new toll facilities. The ability to repay the Series 2009 Bonds will be dependent on the volume of traffic that utilizes the Triangle Expressway System 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 Triangle Expressway System; 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 2009 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 Triangle Expressway System increase substantially and additional debt must be issued to fund such increase.

## **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" and "APPENDIX D – 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.

## **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 2009 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 Triangle 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 motor fuel prices will be approximately \$3.00 per gallon in 2011 in future year dollars and will increase at the assumed average annual inflation rate of 2.5 percent and (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 a motor fuel price of \$6.00 per gallon in 2012 in future year dollars would reduce gross toll revenues by approximately 7 to 8 percent. See “APPENDIX D – TRAFFIC AND REVENUE REPORT.”

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

As detailed under “SECURITY AND SOURCES OF PAYMENT FOR THE SERIES 2009 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 2009 TIFIA Bond, the 2009 TIFIA Bond will be deemed to be a Senior Lien Obligation, and the USDOT will be deemed to be the Secured Owner of such Senior Lien Obligation. In such event, the 2009 TIFIA Bond would be secured by and payable from the Trust Estate (except for the Senior Lien Parity Reserve Account) on a basis equal to that of other Outstanding Senior Lien Obligations.

## **Unpredictability of Investment Earnings**

As described in “SECURITY AND SOURCES OF PAYMENT FOR THE SERIES 2009 BONDS – Project Fund,” the Authority expects to fund a portion of the costs of the Triangle Expressway System 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 Triangle Expressway System. 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 Triangle Expressway System 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 Triangle Expressway System. See “APPENDIX E – GEC REPORT.”

## **Limitation and Enforceability of Remedies**

The remedies available to Owners of the Series 2009 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 2009 BONDS. See “APPENDIX B —”Summary of Certain Provisions 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 Bonds will be qualified to the extent that the enforceability of certain legal rights related to the 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 First Supplemental Trust Agreement, the Authority will undertake, for the benefit of the beneficial owners of the Series 2009 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, 2009, 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, 2009, the financial and statistical data as of the date not earlier than the end of the preceding Fiscal Year for the information included in the table under the heading "Projected Cash Flow and Debt Service Coverage" to the extent such items are not included in the audited financial statements referred to in (a) above.

(c) in a timely manner, notice of any of the following events with respect to the Series 2009 Bonds, if material:

- (1) principal and interest payment delinquencies;
- (2) non-payment related defaults;
- (3) unscheduled draws on debt service reserves reflecting financial difficulties;
- (4) unscheduled draws on any credit enhancements reflecting financial difficulties;
- (5) substitution of any credit or liquidity providers, or their failure to perform;
- (6) adverse tax opinions or events affecting the tax-exempt status of the Series 2009 Bonds;
- (7) modification to rights of the beneficial owners of the Series 2009 Bonds;
- (8) redemption of any of the Series 2009 Bonds, except for mandatory sinking fund redemption;
- (9) defeasances;

- (10) release, substitution or sale of any property securing repayment of the Series 2009 Bonds;  
and
- (11) rating changes.

(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.

At present, Section 159-34 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 First Supplemental 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 2009 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. 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 2009 Bonds.

Pursuant to the First Supplemental 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 any such modification will be done in a manner consistent with Rule 15c2-12 issued under the Securities Exchange Act of 1934, as it may be amended from time to time ("Rule 15c2-12"), and provided further 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 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 beneficial owners of the Series 2009 Bonds, as determined either by the Trustee or bond counsel, or by the approving vote of the Owners of a majority in principal amount of the Series 2009 Bonds 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 2009 Bonds.

## 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 2009 Bonds, the Trust Agreement or the First Supplemental Trust Agreement or contesting the validity or the authority or proceedings for the authorization, execution or delivery of the Series 2009 Bonds, the Trust Agreement or the First Supplemental 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 2009 Bonds are subject to the approval of Womble Carlyle Sandridge & Rice, PLLC, Raleigh, North Carolina, Bond Counsel. Certain legal matters will be passed upon for the Authority by Carolyn Johnson, Esq., Raleigh, North Carolina, General Counsel to the Authority, and for the Underwriters by Bode Call & Stroupe, L.L.P., Raleigh, North Carolina and Rand & Gregory, PA, Fayetteville, North Carolina, co-counsel to the Underwriters.

## TAX TREATMENT

### **Opinion of Bond Counsel**

In the opinion of Bond Counsel, which is based on existing law and assumes continuing compliance by the Authority with certain covenants to comply with the requirements of the Internal Revenue Code of 1986, as amended (the "Code"), regarding, among other matters, use, expenditure and investment of Series 2009 Bond proceeds, and the timely payment of certain investment earnings to the United States Treasury, interest on the Series 2009 Bonds will not be includable in the gross income of the owners thereof for purposes of federal income taxation. Bond Counsel is also of the opinion that interest on the Series 2009 Bonds will not be a specific preference item for purposes of the alternative minimum tax imposed by the Code on corporations and other taxpayers, including individuals. Pursuant to the American Reinvestment and Recovery Act, such interest will not be includable in the adjusted current earnings of certain corporations for purposes of computing the alternative minimum tax imposed by the Code on corporations. Bond Counsel is also of the opinion, under existing law, that interest on the Series 2009 Bonds will be exempt from all State of North Carolina income taxes.

The Code and other laws of taxation, including the laws of taxation of the State of North Carolina, of other states and of local jurisdictions, may contain other provisions that could result in tax consequences, upon which Bond Counsel renders no opinion, as a result of the ownership or transfer of the Series 2009 Bonds or the inclusion in certain computations of interest that is excluded from gross income for purposes of federal and North Carolina income taxation.

### **Original Issue Discount**

The initial public offering prices of the Series 2009A Bonds maturing on January 1, 2019, 2020, 2022, 2024, 2025, 2026, 2029 and 2039 and of all of the maturities of the Series 2009B Bonds (collectively, the "Discount Bonds") are less than the amounts payable at maturity. An amount not less than the difference between the initial offering prices to the public (excluding bond houses, brokers or similar persons or organizations acting in the capacity of underwriters, placement agents, wholesalers or other intermediaries) of the Discount Bonds and the amounts payable at maturity constitutes original issue

discount. Under existing federal income tax law and regulations, the original issue discount on a Discount Bond is interest not includable in the gross income of an owner who purchases such Discount Bond in the original offering at the initial public offering price thereof and holds it to maturity, and such owner will not realize taxable gain upon payment of such Discount Bond at maturity. Owners who purchase Discount Bonds at a price other than the initial offering price or who do not purchase Discount Bonds in the initial public offering should consult their tax advisors with respect to the consequences of the ownership of such Discount Bonds. An owner who purchases a Discount Bond in the initial offering at the initial offering price and holds such Discount Bond to maturity is deemed under existing federal tax laws and regulations to accrue original issue discount on a constant yield basis under Section 1288 of the Code from the date of original issue. An owner's adjusted basis in a Discount Bond is increased by accrued original issue discount for purposes of determining gain or loss on sale, exchange or other disposition of such Discount Bond. Accrued original issue discount may be taken into account as an increase in the amount of tax-exempt interest received or deemed to have been received for purposes of determining various other tax consequences of owning a Discount Bond even though there will not be a corresponding cash payment.

Owners of Discount Bonds should consult their own tax advisors regarding the calculation of accrued original issue discount for Federal income tax purposes, including various special rules relating thereto, and state and local tax consequences, in connection with the ownership or disposition of Discount Bonds.

### **Other Tax Consequences**

Ownership or transfer of, or the accrual or receipt of interest on, the Series 2009 Bonds may result in collateral federal, State of North Carolina, other state or local tax consequences to certain taxpayers, including, without limitation, financial institutions, property and casualty insurance companies, certain foreign corporations doing business in the United States, certain S corporations with excess passive income, individual recipients of Social Security or Railroad Retirement benefits, taxpayers who may be deemed to have incurred or continued indebtedness to purchase or carry tax-exempt obligations, taxpayers who may be eligible for the federal earned income tax credit and taxpayers subject to franchise, estate, inheritance, gift or capital gains taxes. Prospective purchasers of the Series 2009 Bonds should consult their tax advisors as to any such possible collateral tax consequences. Except to the extent covered in their legal opinion, Bond Counsel expresses no opinion regarding any such collateral tax consequences.

No assurance can be given that future legislation, including amendments to the Code or interpretations thereof, if enacted into law, or certain litigation or judicial decisions, if upheld, will not contain provisions or produce results which could, directly or indirectly, reduce the benefit of the excludability of interest on the Series 2009 Bonds from gross income for federal income tax purposes.

The Internal Revenue Service (the "Service") has an ongoing program of auditing tax-exempt obligations to determine whether, in the view of the Service, interest on such tax-exempt obligations is includable in the gross income of the owners thereof for federal income tax purposes. No assurances can be given as to whether or not the Service will commence an audit of the Series 2009 Bonds.

Interest paid on tax-exempt obligations, such as the Series 2009 Bonds, will be subject to information reporting in a manner similar to interest paid on taxable obligations. Although such reporting requirement does not, in and of itself, affect the excludability of interest with respect to the Series 2009 Bonds from gross income for federal income tax purposes, such reporting requirement causes the payment of interest with respect to the Series 2009 Bonds to be subject to backup withholding if such interest is paid to beneficial owners who (a) are not "exempt recipients" and (b) either fail to provide certain identifying information (such as the beneficial owner's taxpayer identification number) in the

required manner or have been identified by the Service as having failed to report all interest and dividends required to be shown on their income tax returns. Generally, individuals are not exempt recipients, whereas corporations and certain other entities generally are exempt recipients. Amounts withheld under the backup withholding rules from a payment to a beneficial owner would be allowed as a refund or credit against such beneficial owner's federal income tax liability provided the required information is furnished to the Service.

## **BOND INSURANCE**

### **The Insurance Policy**

Concurrently with the issuance of the Series 2009 Bonds, Assured Guaranty Corp. ("Assured Guaranty" or the "Insurer") will issue its financial guaranty insurance policy (the "Policy") for the Series 2009 Bonds. The Policy guarantees the scheduled payment of principal of and interest on the Series 2009 Bonds when due as set forth in the form of the Policy included as an exhibit to this Official Statement.

The Policy is not covered by any insurance security or guaranty fund established under New York, California, Connecticut or Florida insurance law.

### **The Insurer**

Assured Guaranty is a Maryland-domiciled insurance company regulated by the Maryland Insurance Administration and licensed to conduct financial guaranty insurance business in all fifty states of the United States, the District of Columbia and Puerto Rico. Assured Guaranty commenced operations in 1988. Assured Guaranty is a wholly owned, indirect subsidiary of Assured Guaranty Ltd. ("AGL"), a Bermuda-based holding company whose shares are publicly traded and are listed on the New York Stock Exchange under the symbol "AGO." AGL, through its operating subsidiaries, provides credit enhancement products to the U.S. and global public finance, structured finance and mortgage markets. Neither AGL nor any of its shareholders is obligated to pay any debts of Assured Guaranty or any claims under any insurance policy issued by Assured Guaranty.

Assured Guaranty's financial strength is rated "AAA" (negative outlook) by Standard & Poor's, a division of The McGraw-Hill Companies, Inc. ("S&P"), "Aa2" (on review for possible downgrade) by Moody's Investors Service, Inc. ("Moody's") and "AA" (evolving) by Fitch, Inc. ("Fitch"). Each rating of Assured Guaranty should be evaluated independently. An explanation of the significance of the above ratings may be obtained from the applicable rating agency. The above ratings are not recommendations to buy, sell or hold any security, and such ratings are subject to revision or withdrawal at any time by the rating agencies. Any downward revision or withdrawal of any of the above ratings may have an adverse effect on the market price of any security guaranteed by Assured Guaranty. Assured Guaranty does not guaranty the market price of the securities it guarantees, nor does it guaranty that the ratings on such securities will not be revised or withdrawn.

### ***Recent Developments***

#### Ratings

On July 1, 2009, S&P published a Research Update in which it affirmed its "AAA" counterparty credit and financial strength ratings on Assured Guaranty. At the same time, S&P revised its outlook on Assured Guaranty to negative from stable. Reference is made to the Research Update, a copy of which is available at [www.standardandpoors.com](http://www.standardandpoors.com), for the complete text of S&P's comments.

On May 20, 2009, Moody's issued a press release stating that it had placed the "Aa2" insurance financial strength rating of Assured Guaranty on review for possible downgrade. Reference is made to the press release, a copy of which is available at [www.moodys.com](http://www.moodys.com), for the complete text of Moody's comments.

In a press release dated May 4, 2009, Fitch announced that it had downgraded the insurer financial strength rating of Assured Guaranty to "AA" from "AAA" and placed such rating on Rating Watch Evolving. Reference is made to the press release, a copy of which is available at [www.fitchratings.com](http://www.fitchratings.com), for the complete text of Fitch's comments.

There can be no assurance as to the outcome of Moody's review or the timing of when such review may be completed, or as to the further action that Fitch or S&P may take with respect to Assured Guaranty.

For more information regarding Assured Guaranty's financial strength ratings and the risks relating thereto, see AGL's Annual Report on Form 10-K for the fiscal year ended December 31, 2008, which was filed by AGL with the Securities and Exchange Commission ("SEC") on February 26, 2009, and AGL's Quarterly Report on Form 10-Q for the quarterly period ended March 31, 2009, which was filed by AGL with the SEC on May 11, 2009.

### **Acquisition of FSA**

On July 1, 2009, AGL acquired the financial guaranty operations of Financial Security Assurance Holdings Ltd. ("FSA"), the parent of financial guaranty insurance company Financial Security Assurance, Inc.

#### *Capitalization of Assured Guaranty Corp.*

As of March 31, 2009, Assured Guaranty had total admitted assets of \$1,926,329,505 (unaudited), total liabilities of \$1,570,615,119 (unaudited), total surplus of \$355,714,386 (unaudited) and total statutory capital (surplus plus contingency reserves) of \$1,109,717,908 (unaudited) determined in accordance with statutory accounting practices prescribed or permitted by insurance regulatory authorities.

#### *Incorporation of Certain Documents by Reference*

The portions of the following documents relating to Assured Guaranty are hereby incorporated by reference into this Official Statement and shall be deemed to be a part hereof:

- The Annual Report on Form 10-K of AGL for the fiscal year ended December 31, 2008 (which was filed by AGL with the SEC on February 26, 2009); and
- The Quarterly Report on Form 10-Q for the quarterly period ended March 31, 2009 (which was filed by AGL with the SEC on May 11, 2009).

All consolidated financial statements of Assured Guaranty and all other information relating to Assured Guaranty included in documents filed by AGL with the SEC pursuant to Section 13(a), 13(c), 14 or 15(d) of the Securities Exchange Act of 1934, as amended, subsequent to the date of this Official Statement and prior to the termination of the offering of the Series 2009 Bonds shall be deemed to be incorporated by reference into this Official Statement and to be a part hereof from the respective dates of filing such consolidated financial statements.

Any statement contained in a document incorporated herein by reference or contained herein under the heading “BOND INSURANCE-The Insurer” shall be modified or superseded for purposes of this Official Statement to the extent that a statement contained herein or in any subsequently filed document which is incorporated by reference herein also modifies or supersedes such statement. Any statement so modified or superseded shall not be deemed, except as so modified or superseded, to constitute a part of this Official Statement.

Copies of the consolidated financial statements of Assured Guaranty incorporated by reference herein and of the statutory financial statements filed by Assured Guaranty with the Maryland Insurance Administration are available upon request by contacting Assured Guaranty at 1325 Avenue of the Americas, New York, New York 10019 or by calling Assured Guaranty at (212) 974-0100. In addition, the information regarding Assured Guaranty that is incorporated by reference in this Official Statement that has been filed by AGL with the SEC is available to the public over the Internet at the SEC’s web site at <http://www.sec.gov> and at AGL’s web site at <http://www.assuredguaranty.com>, from the SEC’s Public Reference Room at 450 Fifth Street, N.W., Room 1024, Washington, D.C. 20549, and at the office of the New York Stock Exchange at 20 Broad Street, New York, New York 10005.

Assured Guaranty makes no representation regarding the Series 2009 Bonds or the advisability of investing in the Series 2009 Bonds. In addition, Assured Guaranty has not independently verified, makes no representation regarding, and does not accept any responsibility for the accuracy or completeness of this Official Statement or any information or disclosure contained herein, or omitted herefrom, other than with respect to the accuracy of the information regarding Assured Guaranty supplied by Assured Guaranty and presented under the heading “BOND INSURANCE”.

#### **LEGALITY FOR INVESTMENT**

Section 159-140 of the General Statutes of North Carolina provides that the Series 2009 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 2009 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.

#### **RATINGS**

Moody’s Investors Service (“Moody’s”), Standard & Poor’s Ratings Services, a division of The McGraw-Hill Companies, Inc. (“S&P”), and Fitch Ratings (“Fitch”), are expected to give the Series 2009 Bonds the respective ratings of “Aa2,” “AAA” and “AA” on the understanding that Assured Guaranty will issue the Policy simultaneously with the issuance of the Series 2009 Bonds. Moody’s, S&P and Fitch have given the Series 2009 Bonds the respective underlying ratings, of “Baa3,” “BBB-” and “BBB-.”

Further explanation of the significance of such ratings may be obtained from Moody’s, S&P and Fitch. The Authority and Assured Guaranty have provided to Moody’s, S&P and Fitch certain information not included in this Official Statement. The ratings are not a recommendation to buy, sell or hold the Series 2009 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, S&P or Fitch. Such action may have an adverse effect on the market price of the Series 2009 Bonds. Neither the Authority, the Local Government Commission nor the Underwriters have undertaken any responsibility after the issuance of the Series 2009 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 to purchase all of the Series 2009 Bonds, if any of the Series 2009 Bonds are to be purchased, at a purchase price equal to 100% of the principal amount thereof, and less original issue discount of \$1,534,653.95, and less an underwriters' discount of \$1,780,735.43. The obligation of the Underwriters to pay for the Series 2009 Bonds is subject to certain terms and conditions set forth in the Bond Purchase Agreement.

The Underwriters may offer and sell the Series 2009 Bonds to certain dealers (including dealers depositing the Series 2009 Bonds into investment trusts) and others at prices lower than the initial public offering prices stated on the cover page hereof. The public offering prices may be changed from time to time by the Underwriters.

Wells Fargo Securities is the trade name for certain capital markets and investment banking services of Wells Fargo & Company and its subsidiaries, including Wachovia Bank, National Association.

Citigroup Inc., parent company of Citigroup Global Markets Inc., an underwriter of the Series 2009 Bonds, has entered into a retail brokerage joint venture with Morgan Stanley. As part of the joint venture, Citigroup Global Markets Inc. will distribute municipal securities to retail investors through the financial advisor network of a new broker-dealer, Morgan Stanley Smith Barney LLC. This distribution arrangement became effective on June 1, 2009. As part of this arrangement, Citigroup Global Markets Inc. will compensate Morgan Stanley Smith Barney LLC for its selling efforts with respect to the Series 2009 Bonds.

J.P. Morgan Securities Inc., one of the underwriters of the Series 2009 Bonds, has entered into an agreement (the "Distribution Agreement") with UBS Financial Services Inc. for the retail distribution of certain municipal securities offerings, including the Series 2009 Bonds, at the original issue prices. Pursuant to the Distribution Agreement (if applicable for this transaction), J.P. Morgan Securities Inc. will share a portion of its underwriting compensation with respect to the Series 2009 Bonds with UBS Financial Services Inc.

**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 2009 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/ Vance Holloman  
Secretary

NORTH CAROLINA TURNPIKE AUTHORITY

By: /s/ Eugene A. Conti, Jr.  
Chairman

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**APPENDIX A**

**COMPOUNDED AMOUNTS FOR CAPITAL APPRECIATION BONDS**

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**APPENDIX B**

**DEFINITIONS OF CERTAIN TERMS AND SUMMARIES OF THE  
TRUST AGREEMENT AND THE FIRST SUPPLEMENTAL TRUST AGREEMENT**

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**DEFINITIONS OF CERTAIN TERMS AND SUMMARIES OF THE TRUST AGREEMENT  
AND THE FIRST SUPPLEMENTAL TRUST AGREEMENT**

**DEFINITIONS**

In addition to the defined terms set forth in the Official Statement to which this Appendix B is attached, the following is a summary of certain definitions set forth in the Trust Agreement, the First Supplemental Trust Agreement and used in this Official Statement. Capitalized terms used herein and not otherwise defined have the meanings given such terms in the Trust Agreement and the First Supplemental Trust Agreement.

“Additional Project” means any addition, acquisition, improvement, betterment, extension or equipping of or relating to the Initial Project as authorized by the Act, or any previous Additional Project that has become part of the Triangle Expressway System and located within the geographic boundaries comprising the Capital Area Metropolitan Planning Organization and the Durham, Chapel Hill, Carrboro Metropolitan Planning Organization; provided, however, that the term “Additional Project” will not include any Non-System Project unless the Authority specifically identifies such Non-System Project as an Additional Project upon compliance with the provisions of the Trust Agreement.

“Additional Projects Account” means an account in the Project Fund created and so designated by the Trust Agreement.

“Annual Budget” means the Authority’s budget for the Triangle Expressway System for a Fiscal Year adopted pursuant to the Authority’s bylaws, rules and regulations as in effect from time to time.

“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” means the Board of Directors of the Authority, as the governing body thereof.

“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 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 with the Trustee for such purpose.

“Balloon Long-Term Indebtedness” means 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 (a) an involuntary proceeding will be commenced or an involuntary petition will be filed seeking (i) liquidation, reorganization or other relief in respect of the Authority or any of its debts, or of a substantial part of the assets of the Authority, under any Insolvency Law, or (ii) the appointment of a receiver, trustee, liquidator, custodian, sequestrator, conservator or

similar official for the Authority for a substantial part of the assets of the Authority, and, in any case referred to in the foregoing subclauses (i) and (ii), such proceeding or petition will continue undismissed for 60 days or an order or decree approving or ordering any of the foregoing will be entered; or (b) the Authority will (i) apply for or consent to the appointment of a receiver, trustee, liquidator, custodian, sequestrator, conservator or similar official for the Authority or for a substantial part of the assets of the Authority, or (ii) generally not be paying its debts with respect to the Triangle Expressway System as they become due unless such debts are the subject of a bona fide dispute, or become unable to pay its debts generally as they become due, or (iii) make a general assignment for the benefit of creditors, or (iv) consent to the institution of, or fail to contest in a timely and appropriate manner, any proceeding or petition with respect to it described in clause (a) of this definition, or (v) 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, or (vi) file an answer admitting the material allegations of a petition filed against it in any proceeding referred to in the foregoing subclauses (i) through (v), inclusive, of this clause (b), or (vii) take any action for the purpose of effecting any of the foregoing; or (c) (i) all or a substantial part of the Triangle Expressway System or the Trust Estate will be sold or otherwise disposed of in a public or private sale or disposition pursuant to a foreclosure of any liens or security interest thereon securing the Senior Lien Indebtedness, or (ii) all or a substantial part of the Triangle Expressway System or the Trust Estate will be transferred pursuant to a sale or disposition in lieu of foreclosure.

“Base Case Projections” means the projected Receipts of the Project for a Fiscal Year as set forth in the initial financial plan prepared by the Authority and delivered to the USDOT pursuant to Section 21 of the TIFIA Loan Agreement and filed with the Trustee pursuant to the Trust Agreement.

“Bond” or “Bonds” means, collectively, the Senior Lien Bonds and the Subordinate Lien Bonds.

“Bond Insurance Policy” means, with respect to the Trust Agreement, a municipal bond insurance policy or similar arrangement permitted by the Act and obtained or established in connection with the incurrence of any Bonds or other.

“Bond Insurance Policy” means, with respect to the Series 2009 Bonds, the financial guaranty insurance Bond Insurance Policy issued by the Bond Insurer insuring payment when due of the principal of and interest on the Series 2009 Bonds as provided therein.

“Bond Insurer” means, with respect to the Trust Agreement, the Person providing a Bond Insurance Policy. “Bond Insurer” means, with respect to the Series 2009 Bonds, Assured Guaranty Corp., a Maryland-domiciled insurance company, or any successor thereto.

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

“Bond Registrar” means, with respect to the Series 2009 Bonds, Wells Fargo Bank, N.A.

“Bond Year” means, with respect to the Series 2009 Bonds, the period commencing on July 1 of any year and ending on June 30 of the following year, provided that the first Bond Year will begin on the date of issuance of the Series 2009 Bonds.

“Business Day” means any day other than a Saturday, a Sunday or a day on which offices of the United States Government 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, in Raleigh, North Carolina or in the city where the principal or designated office of the Trustee is located.

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

“Capital Improvements Budget” for any Fiscal Year means the budget for capital improvements adopted by the Authority in accordance with the Trust Agreement.

“Capitalized Interest 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 Trust Agreement.

“Chief Financial Officer” means the person appointed or employed by the Authority to perform the duties imposed on the Chief Financial Officer by the Trust Agreement.

“Completion Date” means the date of acquisition or completion of the Initial Project and any Additional Project, or of any segment of the foregoing, as the case may be, as certified by the Authority pursuant to the Trust Agreement.

“Completion Indebtedness” means any Long-Term Indebtedness incurred for the purpose of financing the completion of the Initial Project or 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 the Initial Project or 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 will be applicable, in accordance with the general plans and specifications for the Initial Project or 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 will not exceed 5% of the aggregate principal amount of the Long-Term Indebtedness originally incurred by the Authority to finance the costs of the Initial Project or any Additional Project.

“Compounded Amount” means with respect to Capital Appreciation Bonds of any Series, the amount set forth in a Supplemental Agreement as the amount representing the initial public offering price, plus the accumulated and compounded interest on such Capital Appreciation Bonds. “Compounded Amount” as applied only to any Series 2009B Capital Appreciation Bond, means at any January 1 or July 1 the respective amounts set forth in the First Supplemental Trust Agreement. After the maturity date of any Series 2009B Bond, “Compounded Amount” will mean the Compounded Amount of such Series 2009B Bond on such maturity date. “Compounded Amount” will also further mean in respect of each \$5,000 amount payable at maturity of each Series 2009B Bond, on a date other than a January 1 or July 1, the Compounded Amount on the next preceding January 1 or July 1 plus the portion of the difference between the Compounded Amount on the next preceding January 1 or July 1 and the next succeeding January 1 or July 1 that the number of days from the next preceding January 1 or July 1 to the date for which the determination is being calculated bears to the total number of days from the next preceding January 1 or July 1 to the next succeeding January 1 or July 1 (computed on the basis of a 360-day year).

“Construction and Renewal and Replacement Agreement” means the Construction Completion Assurance and Standby Renewal and Replacement Funding Agreement, dated as of April 15, 2009, between the Authority and NCDOT, including any supplement or amendment thereto.

“Credit Facility” means 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 incurrence of any 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 the interest on which is payable on the Interest Payment Dates provided therefor in any Supplemental Agreement.

“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 any interest on any Bond of any Series which is payable, but is not punctually paid or duly provided for, on any Interest Payment Date.

“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 will 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, will 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 will mean the State of North Carolina and North Carolina local government bond issuers, and, to the extent permitted by law, states other than the State of North Carolina 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 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 the portion of any Indebtedness meeting the requirements set forth in clauses (a) and (b) below:

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

(b) (i) if such Indebtedness bears interest at a variable rate, such Derivative Agreement provides that during the Derivative Period, the Authority will pay to the provider of the Derivative Agreement a fixed rate (the “Synthetic Fixed Rate”) and the provider of the Derivative Agreement will pay 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 will pay to the provider of the Derivative Agreement a variable rate (the “Synthetic Variable Rate”) and the provider of the Derivative Agreement will 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 Triangle Expressway System 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 the Trust Agreement and described in “THE TRUST AGREEMENT – Events of Default” below.

“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 will be dissolved or liquidated or will no longer perform the functions of a securities rating agency, “Fitch” will be deemed to refer to any other nationally recognized securities rating agency designated by the Authority by notice to the Trustee.

“General Engineering Consultant” means any engineer or firm of engineers of 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.

“General Reserve Fund” means the fund created and designated the North Carolina Turnpike Authority Triangle Expressway General Reserve Fund by 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 (a) stripped Government Obligations stripped by the United States Treasury itself and (b) interest only portions of obligations issued by the Resolution Funding Corporation.

“Grant Anticipation Notes” means any grant anticipation notes issued by the Authority in compliance with the provisions of the Trust Agreement.

“Hedging Acquisition Account” means the account in the Senior Lien Debt Service Fund created and so designated by the Trust Agreement.

“Hedging Acquisition Account Requirement” means the amount to be deposited from time to time to the credit of the Hedging Acquisition Account in accordance with the requirements of the TIFIA Loan Agreement. The Hedging Acquisition Account Requirement, if any, will be computed by the Authority at the beginning of each Fiscal Year, subject to the approval of USDOT, and will be funded during that Fiscal Year pursuant to the Trust Agreement.

“Holder” means the holder or owner of Senior Lien Parity Debt, Subordinate Lien Parity Debt or TIFIA Indebtedness.

“Indebtedness” means all obligations incurred or assumed by the Authority in connection with the ownership or operation of the Triangle Expressway System:

(a) for payments of principal and interest with respect to borrowed money, including any obligation to repay a Credit Provider for moneys drawn to pay and retire or purchase Indebtedness and including 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 will include only such obligations as are secured by Receipts, (ii) Indebtedness will not include any State Appropriation Revenue Bonds, and (iii) any obligation to pay a Credit Provider for moneys drawn to purchase, but not pay and retire, Indebtedness will 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.

“Initial Offering Price” means the price at which the Series 2009B Bonds are offered for sale to the public or sold to the initial purchasers thereof at the time of sale thereof without reduction to reflect underwriter’s discount.

“Initial Project” means the land, easements, rights of way, capital improvements and equipment financed with the proceeds of the Series 2009 Bonds, the State Appropriation Revenue Bonds and the TIFIA Series 2009 Bond, as more particularly described in the Supplemental Agreement for the Series 2009 Bonds and the TIFIA Loan Agreement.

“Initial Project Account” means the account in the Project Fund created and so designated by the Trust Agreement.

“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 Triangle Expressway Insurance and Condemnation Award Fund by the Trust Agreement.

“Insurance Consultant” means any Person or firm having a favorable reputation in the State for skill and experience in dealing with the insurance requirements of road and highway systems similar to the Triangle Expressway System and in performing the duties to be imposed upon the Insurance Consultant by the Trust Agreement, including, without limitation, the Risk Manager for the State Department of Insurance.

“Interest 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 Trust Agreement.

“Interest Payment Date” means, with respect to any Series of Bonds, each of the interest payment dates provided for in the Supplemental Agreement relating to such Series, and with respect to any Parity Debt or TIFIA Indebtedness, each of the interest payment dates provided for in the Parity Debt Resolution or TIFIA Loan Agreement relating to such Parity Debt or TIFIA Indebtedness.

“Interest Payment Date” means, with respect to the Series 2009 Bonds, any January 1 or July 1, commencing January 1, 2010, notwithstanding that in respect of a Series 2009B Bond all of such interest will be paid upon maturity.

“Investment Obligations” means, to the extent permitted by law, any investment authorized by Section 159-30 of the General Statutes of North Carolina, as such statute may be amended from time to time, or any successor statute.

“Loan Life Coverage Ratio” means a ratio where the numerator is equal to the net present value of projected total Receipts, as determined by the Traffic Consultant, after meeting the requirements of the Trust Agreement, for each Fiscal Year from and including the Fiscal Year in which such calculation is made to and including the Fiscal Year in which the final maturity of the TIFIA Indebtedness occurs, plus the sum of the amounts on deposit in the TIFIA Reserve Fund and General Reserve Fund as of the last Business Day of the previous Fiscal Year, and the denominator is equal to the principal amount of TIFIA Indebtedness Outstanding as of the date of such calculation. The discount rate for the net present value calculation will be equal to the interest rate on the TIFIA Indebtedness.

“Local Government Commission” means the 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 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 banking institution or an investment banking institution knowledgeable in financing of Triangle Expressway System 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 will 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 will 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 will 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 will 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 will 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 will 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 will 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 will 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 to principal or interest on Outstanding Long-Term Indebtedness will not include principal or interest payable from investment earnings on the Senior Lien Debt Service Fund, the Subordinate Lien Debt Service Fund, any Senior Lien Special Reserve Account, any Subordinate Lien Special Reserve Account or any other fund or account established by the Authority that are required to be used to pay the principal of or interest on Indebtedness; and (c) the aggregate of the payments to be made with respect to principal and interest on Outstanding Long-Term Indebtedness will not include principal or interest payable from Qualified Escrow Funds; and

(e) the deposits required to be made for any period in respect of interest on any Outstanding Senior Lien Bonds, Subordinate Lien Bonds or TIFIA Bonds issued or incurred under the Trust Agreement will be reduced by the amount of any investment earnings on the Funds and Accounts created in the Debt Service Fund.

“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 will 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 will also include the current portion of Long-Term Indebtedness. Long-Term Indebtedness will only include the obligations described in (a), (b) and (c) to the extent that such obligations are Indebtedness, as defined in the Trust Agreement.

“Maximum Long-Term Debt Service Requirement” means the highest Long-Term Debt Service Requirement for the present and any succeeding Fiscal Year.

“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 will be dissolved or liquidated or will no longer perform the functions of a securities rating agency, “Moody’s” will be deemed to refer to any other nationally recognized securities rating agency designated by the Authority by notice to the Trustee.

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

“Net Eminent Domain Proceeds” means the gross proceeds paid to the Authority as a final award for the taking by Eminent Domain of any of the Triangle Expressway System 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 Triangle Expressway System 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 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 Triangle Expressway System but which are specifically designated by resolution of the Authority Board as not being part of the Triangle Expressway System and are not otherwise thereafter designated as an Additional Project pursuant to the Trust Agreement.

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

“O&M Guaranty Agreement” means the Operating and Maintenance Expense Guaranty Agreement, dated as of August 20, 2008, between the Authority and NCDOT, including any supplement or amendment thereto.

“Operating Advance” means any payment received by the Authority from NCDOT pursuant to the terms of the O&M Guaranty Agreement to replenish amounts drawn from the Operating Reserve Fund pursuant to the Trust Agreement.

“Operating Expenses” means the Authority’s current expenses for the operation, maintenance and repair of the Triangle Expressway System as determined in accordance with generally accepted accounting principles, 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;
- (c) salaries, benefits and other compensation;
- (d) operating lease payments;
- (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 Triangle Expressway System;
- (h) fees and expenses of the Trustee or its counsel, any Bond Registrar, Depositary, Traffic Consultant, tender agent, paying agent or Bond Insurer, fees and expenses payable to the USDOT pursuant to the terms of any TIFIA Loan Agreement, legal expenses, Credit Facility fees, remarketing fees and fees of consultants or professionals; and

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

but Operating Expenses will not include:

(a) any reserves for extraordinary replacements or repairs;

(b) any allowance for depreciation or any amortization of financing expense;

(c) any deposits to any fund, account and subaccount created under the Trust Agreement or any Supplemental Agreement, Parity Debt Resolution or TIFIA Loan Agreement and payments of principal, premium, if any, and interest on Indebtedness from such funds, accounts and subaccounts;

(d) 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 Receipts; or

(e) 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 Triangle Expressway Operating Reserve Fund by the Trust Agreement.

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

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

(a) Bonds theretofore canceled by the Bond Registrar or delivered to the Bond Registrar for cancellation;

(b) Bonds deemed to be no longer Outstanding pursuant to the redemption provisions set forth in the Trust Agreement and described in this Official Statement;

(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 with the Trust Agreement and described in “THE TRUST AGREEMENT – Defeasance” below; and

(e) Bonds constituting Put Indebtedness deemed to have been purchased in accordance with the provisions of the applicable Supplemental Agreement in lieu of which other Bonds have been delivered under such Supplemental Agreement.

When used with reference to Parity Debt or TIFIA Indebtedness, “Outstanding” means, as of a particular date, all Parity Debt and TIFIA Indebtedness except:

(a) Parity Debt and TIFIA Indebtedness theretofore canceled by the Authority;

(b) Parity Debt and TIFIA 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 Parity Debt and TIFIA Indebtedness is to be paid or redeemed the principal amount of or Redemption Price of, and the interest accruing to such date on, the Parity Debt and TIFIA Indebtedness to be paid or redeemed, has been deposited with an escrow agent in trust for the Holders of such Parity Debt and TIFIA Indebtedness; Defeasance Obligations will be deemed to be sufficient to pay or redeem Parity Debt and TIFIA 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 Parity Debt and TIFIA Indebtedness to such date;

(c) Parity Debt and TIFIA Indebtedness in exchange for or in lieu of which other Parity Debt or TIFIA Indebtedness has been delivered under the documentation securing such Parity Debt or TIFIA Indebtedness;

(d) Parity Debt and TIFIA Indebtedness deemed to have been paid in accordance with the defeasance or like provisions of the Parity Debt Resolution or TIFIA Resolution providing for the issuance of the Parity Debt or TIFIA Indebtedness; and

(e) Parity Debt and TIFIA Indebtedness constituting Put Indebtedness deemed to have been purchased in accordance with the provisions of the applicable Parity Debt Resolution or TIFIA Loan Agreement in lieu of which other Parity Debt or TIFIA Indebtedness has been incurred under the Parity Debt Resolution or 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.

“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 will 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 will 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 in addition to any charge created or permitted by the Trust Agreement upon the Triangle Expressway System or any part thereof or on the Receipts:

(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 2009 Bonds 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 will be discharged in the ordinary course of business and without undue delay or the validity of the same will 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 Triangle Expressway System (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 Triangle Expressway System);

(e) liens on any Non-System Projects;

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

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

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

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

"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 will be deemed to evidence the same debt as the lost, destroyed or stolen Bond.

"Principal" means (a) with respect to any Capital Appreciation Bond, the Compounded Amount thereof (the difference between the stated amount to be paid at maturity and the Compounded 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 case "Principal" means the initial public offering price of a Capital Appreciation Bond and the difference between the Compounded Amount and the initial public offering price will be deemed to be interest and (b) with respect to any Current Interest Bond, the principal amount of such Bond or Indebtedness payable at maturity or in satisfaction of a Sinking Fund Requirement, if applicable.

"Principal 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 Trust Agreement.

"Principal Payment Date" means any date established by any Supplemental Agreement, Parity Debt Resolution or TIFIA Loan Agreement for the payment of principal of Bonds, Parity Debt or TIFIA Indebtedness, whether at maturity or pursuant to an amortization requirement or otherwise.

"Project Fund" means the fund created and designated the North Carolina Turnpike Authority Triangle Expressway Project Fund by the Trust Agreement.

“Put Indebtedness” means 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.

“Receipts” means all receipts, revenues, income, proceeds and money received in any period by or for the Authority in respect of the Triangle Expressway System, including, but 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 Triangle Expressway System, and all other income derived by the Authority from the operation or ownership of the Triangle Expressway System, 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 State for use in connection with the Triangle Expressway System, to the extent such proceeds are deposited in the Revenue Fund and are available for use in the same manner as other Receipts under the provisions of the Trust Agreement, including, without limitation, the State Appropriated Revenues; provided, however, that State Appropriated Revenues will not constitute Receipts under the Trust Agreement until such time as such amounts are withdrawn from the State Appropriation Revenue Bond Trust Agreement and deposited to the Revenue Fund;

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

(e) 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 will not be included in “Receipts”:

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

(ii) the proceeds from the sale or disposition of all or any part of the Triangle Expressway System;

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

(iv) 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;

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

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

(vii) 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 Receipts under the provisions of the Trust Agreement;

(viii) 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; and

(ix) the proceeds of any indebtedness of the Authority.

“Redemption 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 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 in the Supplemental Agreement relating to such Series.

“Regular Record Date” means, with respect to the Series 2009 Bonds, the 15th day of the month preceding any Interest Payment Date, whether or not a Business Day.

“Renewal and Replacement Fund” means the fund created and designated the North Carolina Turnpike Authority Triangle Expressway Renewal and Replacement Fund by the Trust Agreement.

“Reserve Alternative Instrument” means an unconditional insurance policy or surety bond or irrevocable letter of credit or guaranty deposited in the Senior Lien Parity Reserve Account, a Senior Lien Special Reserve Account, the Subordinate Lien Parity Reserve Account or a Subordinate Lien Special Reserve Account 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 Parity Reserve Account Requirement, a Senior Lien Special Reserve Account Requirement, the Subordinate Lien Parity Reserve Account Requirement or a Subordinate Lien Special Reserve Account Requirement. The Reserve Alternative Instrument will 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 Senior Lien Resolution providing for a Senior Lien Special Reserve Account or in a Subordinate Lien Resolution providing for a Subordinate Lien Special Reserve Account, the provider of a Reserve Alternative Instrument will be (a) an insurer that has been assigned either (A) one of the two highest policyholder ratings accorded insurers by A. M. Best & Co. or any comparable service or (B) 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).

"Revenue Bond Anticipation Notes" means 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 Triangle Expressway Revenue Fund by the Trust Agreement.

"Revenues" means revenues of the Triangle Expressway System, as determined in accordance with generally accepted accounting principles; provided, however, that revenues will include, without limiting the generality of the foregoing:

(a) proceeds of use and occupancy or business interruption insurance; and

(b) 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 State for use in connection with the Triangle Expressway System, to the extent such proceeds are deposited in the Revenue Fund and are available for use in the same manner as other Receipts under the provisions of the Trust Agreement, including, without limitation, the State Appropriated Revenues; provided, however, that State Appropriated Revenues will not constitute Revenues under the Trust Agreement until such time as such amounts are withdrawn from the State Appropriation Revenue Bond Trust Agreement and deposited to the Revenue Fund; and

(c) 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 will not be included in "Revenues":

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

(ii) the proceeds from the sale or disposition of all or any part of the Triangle Expressway System;

(iii) 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;

(iv) 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.

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

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

(vii) 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 Receipts under the provisions of the Trust Agreement;

(viii) 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;

(ix) any payments received by the Authority under any Derivative Agreement;

(x) the proceeds of any security deposits or moneys received to make refunds to users of the Triangle Expressway System; and

(xi) the proceeds of any indebtedness of the Authority.

“S&P” means Standard & Poor’s Ratings Services, a Division of The McGraw-Hill Companies, Inc., and its successors and assigns, and if such entity will be dissolved or liquidated or will no longer perform the functions of a securities rating agency, “S&P” will be deemed to refer to any other nationally recognized securities rating agency designated by the Authority by notice to the Trustee.

“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 will 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 will 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 Lien Bonds” means the Series 2009 Bonds and any other bonds issued under the provisions of the Trust Agreement and secured on a parity with each other and any Senior Lien Parity Debt and Senior Lien Derivative Agreement Regularly Scheduled Payment by the Trust Agreement.

“Senior Lien Debt Service Fund” means the fund created and designated the North Carolina Turnpike Authority Triangle Expressway Senior Lien Debt Service Fund by 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 Triangle Expressway System and not evidenced by Bonds which is secured on a parity (as so designated in the Parity Debt Resolution) with the Senior Lien Bonds by a pledge, charge and lien upon the Receipts as provided in the Trust Agreement, including, without limiting the generality of the foregoing, and described in “THE TRUST AGREEMENT – Security” below.

“Senior Lien Parity Reserve Account” means the account in the Senior Lien Debt Service Fund created and so designated by the Trust Agreement.

“Senior Lien Parity Reserve Account Requirement” means, initially at the time of issuance of the Series 2009 Bonds, the least of (i) the Maximum Long-Term Debt Service Requirement for all Senior Lien Bonds and Senior Lien Parity Debt secured by the Senior Lien Parity Reserve Account, (ii) 125% of the average annual Long-Term Debt Service Requirement for all Senior Lien Bonds and Senior Lien Parity Debt secured by the Senior Lien Parity Reserve Account and (iii) 10% of the stated principal amount of all Senior Lien Bonds and Senior Lien Parity Debt secured by the Senior Lien Parity Reserve Account; provided, however, that if any Series of Senior Lien Bonds or Senior Lien Parity Debt secured by the Senior Lien Parity Reserve Account has 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 will be used in lieu of the stated principal amount for purposes of the 10% limitation. Thereafter, the Senior Lien Parity Reserve Account will be adjusted annually on the first day of each Fiscal Year to equal the Maximum Long-Term Debt Service Requirement for the Senior Lien Bonds and Senior Lien Parity Debt secured by the Senior Lien Parity Reserve Account for the current Fiscal Year and the next succeeding four Fiscal Years to the extent such amount exceeds the initial deposit to the Senior Lien Parity Reserve Account Requirement at the time of issuance of the Series 2009 Bonds. The Senior Lien Parity Reserve Account 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 any Supplemental 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.

“Senior Lien Special Reserve Account” means a special debt service reserve account, if any, created by a Senior Lien Resolution as a debt service reserve account only for the particular Senior Lien Indebtedness authorized thereby.

“Senior Lien Special Reserve Account Requirement” means the amount required to be placed or maintained in a Senior Lien Special Reserve Account as may be required by the Senior Lien Resolution creating such account. The Senior Lien Special Reserve Account Requirement may be composed of cash, Investment Obligations or Reserve Alternative Instruments or any combination of the foregoing, as the Authority may determine.

“Serial Bonds” means the Bonds of any Series that are stated to mature in consecutive annual installments.

“Serial Bonds” means, with respect to the Series 2009 Bonds, the Series 2009A Bonds maturing January 1, 2019 to 2026, inclusive, and the Series 2009B Bonds.

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

“Series 2009 Bonds” means, collectively, the Series 2009A Bonds and the Series 2009B Bonds.

“Series 2009A Bonds” means the North Carolina Turnpike Authority Triangle Expressway System Senior Lien Revenue Bonds, Series 2009A, issued pursuant to the Trust Agreement and the First Supplemental Trust Agreement. The Series 2009A Bonds are Current Interest Bonds, as defined in the Trust Agreement.

“Series 2009B Bonds” means the North Carolina Turnpike Authority Triangle Expressway System Senior Lien Revenue Bonds, Series 2009B, issued pursuant to the Trust Agreement and the First Supplemental Trust Agreement. The Series 2009B Bonds are Capital Appreciation Bonds, as defined in the Trust Agreement.

“Series 2009 Subaccount of the Interest Account” means the subaccount created and so designated by the First Supplemental Trust Agreement.

“Series 2009 Subaccount of the Principal Account” means the subaccount created and so designated by the First Supplemental Trust Agreement.

“Series 2009 Subaccount of the Redemption Account” means the subaccount created and so designated by the First Supplemental Trust Agreement.

“Series 2009 Subaccount of the Sinking Fund Account” means the subaccount created and so designated by the First Supplemental Trust Agreement.

“Short-Term Indebtedness” means 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.

“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 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 of the Trust Agreement.

“Sinking Fund Requirement” means with respect to any Series of Bonds, the Sinking Fund Requirement provided in the Supplemental Agreement relating to such Series. “Sinking Fund Requirement” means, with respect to the Series 2009 Bonds, with respect to the Term Bonds and for any Bond Year, the principal amount fixed or computed for retirement by purchase or redemption on or prior to January 1 of the following Bond Year.

The Sinking Fund Requirements for the Term Bonds will be initially the respective principal amounts of such Term Bonds for retirement on each January 1 as fixed in the Supplemental Agreement.

If during any Bond Year, the total principal amount of Term Bonds retired by purchase or redemption under the provisions of the Supplemental Agreement will be greater than the amount of the Sinking Fund Requirement for such Term Bonds, the subsequent Sinking Fund Requirements for such Term Bonds will be reduced in such amount aggregating the amount of such excess as will be specified in an Officer’s Certificate filed with the Trustee on or prior to July 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 Appropriation Revenue Bond Trust Agreement” means the Trust Agreement, dated as of June 1, 2009, between the Authority and the Trustee as trustee thereunder, authorizing, among other things, the issuance of revenue bonds thereunder secured by the State Appropriated Revenues to pay a portion of the costs of the Initial Project.

“Subordinate Lien Bonds” means any bonds issued under the provisions of the Trust Agreement and secured on a parity with each other and any Subordinate Lien Parity Debt and Subordinate Lien Derivative Agreement Regularly Scheduled Payment by the Trust Agreement.

“Subordinate Lien Debt Service Fund” means the fund created and designated the North Carolina Turnpike Authority Triangle Expressway Subordinate Lien Debt Service Fund by the Trust Agreement.

“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 Triangle Expressway System and not evidenced by Subordinate Lien Bonds which is secured on a parity (as so designated in the Parity Debt Resolution) with the Subordinate Lien Bonds by a pledge, charge and lien upon the Receipts as provided in the Trust Agreement, including, without limiting the generality of the foregoing, as described in “THE TRUST AGREEMENT – Security” below.

“Subordinate Lien Parity Reserve Account” means the account in the Senior Lien Debt Service Fund created and so designated by the Trust Agreement.

“Subordinate Lien Parity Reserve Account Requirement” means the amount required to be placed or maintained in a Subordinate Lien Parity Reserve Account as may be required by the Subordinate Lien Resolution first providing for the funding of the Subordinate Lien Parity Reserve Account. The Subordinate Lien Parity Reserve Account Requirement may be composed of cash, Investment Obligations or Reserve Alternative Instruments, or any combination of the foregoing, as the Authority may determine.

“Subordinate Lien Resolution” means any Supplemental 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.

“Subordinate Lien Special Reserve Account” means a special debt service reserve account, if any, created by a Subordinate Lien Resolution as a debt service reserve account only for the particular Subordinate Lien Indebtedness authorized thereby.

“Subordinate Lien Special Reserve Account Requirement” means the amount required to be placed or maintained in a Subordinate Lien Special Reserve Account as may be required by the Subordinate Lien Resolution creating such account. The Subordinate Lien Special Reserve Account Requirement may be composed of cash, Investment Obligations or Reserve Alternative Instruments or any combination of the foregoing, as the Authority may determine.

“Supplemental 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.

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

“Term Bonds” means, in respect of the Series 2009 Bonds, the Series 2009A Bonds maturing on January 1, 2029 and 2039.

“TIFIA Debt Service Fund” means the fund created and designated the North Carolina Turnpike Authority Triangle Expressway TIFIA Debt Service Fund by the Trust Agreement.

“TIFIA Debt Service Account” means the special account in the TIFIA Debt Service Fund created and so designated by the Trust Agreement.

“TIFIA Debt Service Reserve Account” means the special account in the TIFIA Debt Service Fund created and so designated by the Trust Agreement.

“TIFIA Debt Service Reserve Account Requirement” initially means \$1,000,000. Thereafter, until the amount on deposit in the TIFIA Debt Service Reserve Account equals 10% of the amount of the Outstanding TIFIA Indebtedness as of June 30 of the previous Fiscal Year, the TIFIA Debt Service Reserve Account Requirement will be an ascending amount computed for each Fiscal Year and will be an amount equal to (i) the TIFIA Debt Service Reserve Account Requirement computed for the prior Fiscal

Year, plus (ii) 10% of the amount, if any, the Receipts received in such Fiscal Year exceed the amount projected for such Fiscal Year in the Base Case Projections. When the TIFIA Debt Service Reserve Account Requirement is an amount equal to 10% of the amount of the Outstanding TIFIA Indebtedness as of June 30 of the previous Fiscal Year, the TIFIA Debt Service Reserve Account Requirement will be an amount equal to 10% of the amount of the Outstanding TIFIA Indebtedness as of June 30 of the previous Fiscal Year.

“TIFIA Indebtedness” means the TIFIA Series 2009 Bond and any additional bonds or other secured loan from the USDOT, as 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.*, as the same may be amended from time to time, with respect to the Triangle Expressway Project, and secured by the pledge, charge and lien on the Receipts in the manner provided in the Trust Agreement.

“TIFIA Loan Agreement” means the TIFIA Loan Agreement, to be entered between the USDOT and the Authority, including any supplements or amendments thereto with respect to the TIFIA Indebtedness evidenced by the TIFIA Series 2009 Bond and any other Loan Agreement or similar instrument executed and delivered by the Authority providing for the incurrence of other TIFIA Indebtedness.

“TIFIA Series 2009 Bond” means the North Carolina Turnpike Authority Triangle Expressway Revenue Bond, TIFIA Series 2009, to be dated the date of issuance thereof, issued by the Authority to the USDOT pursuant to the Trust Agreement hereof to evidence the obligation of the Authority to pay the loan repayments to the USDOT, or its assigns, pursuant to the TIFIA Loan Agreement.

“Traffic and Revenue Study” means the Comprehensive Traffic and Revenue Study, dated April 6, 2009, of Wilbur Smith Associates.

“Traffic Consultant” means any traffic and revenue consultant or firm of traffic and revenue consultants of 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.

“Triangle Expressway System” means, collectively, Initial Project and any Additional Projects.

“Trust Estate” means, collectively, the (a) money and Investment Obligations in the Project Fund (to the extent provided in the Trust Agreement), the Revenue Fund, the Senior Lien Debt Service Fund, the Subordinate Lien Debt Service Fund, the TIFIA Debt Service Fund, the Insurance and Condemnation Award Fund and the General Reserve Fund under the Trust Agreement and Accounts established under the Supplemental Agreements relating to their issuance, except that the Senior Lien Parity Reserve Account will be held solely for the benefit of the Senior Lien Parity Debt secured thereby notwithstanding the provisions relating to Parity Debt and TIFIA Indebtedness in the Trust Agreement, the Subordinate Lien Parity Reserve Account will be held solely for the benefit of the Subordinate Lien Parity Debt secured thereby, the TIFIA Debt Service Reserve Account will be held solely for the benefit of the TIFIA Indebtedness and any fund or account created by a Supplemental Agreement to the extent such Supplemental Agreement expressly excludes such fund or account, (b) the Receipts, except upon the disbursement of Receipts for deposit or credit to NCDOT or for deposit or credit to the Operations and Maintenance Expense Fund, the Operating Reserve Fund or the Renewal and Replacement Fund, (c) unless otherwise provided in a Supplemental 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.

“USDOT” means the United States Department of Transportation.

## **THE TRUST AGREEMENT**

### **Project Fund**

A special fund is established with the Trustee and designated the “North Carolina Turnpike Authority Triangle Expressway Project Fund” and within the Project Fund there are established two special accounts designated the “Initial Project Account” and the “Additional Projects Account,” respectively. The proceeds of the Series 2009 Bonds to be used for payment of the Costs of the Initial Project will be deposited by the Trustee in the Initial Project Account. Unless otherwise provided in a Supplemental Agreement, the proceeds of any Series of Bonds to be used for providing any Additional Project will be deposited upon the delivery of such Series of Bonds into a separate subaccount in the Additional Projects Account to be created by the Supplemental Agreement providing for the issuance of the Bonds financing such Additional Project.

The money in the Project Fund will 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 or in the Supplemental Agreement, will, 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 the applicable Supplemental Agreement and will be held for the security of such Owners.

Upon the execution and delivery of the Trust Agreement, but prior to the date of the issuance of the Series 2009 Bonds, the Authority intends to arrange for an initial deposit with the Trustee of \$25,000,000, such amount comprising the State Appropriated Revenues for the State’s fiscal year ending June 30, 2009. Such amount will be deposited by the Trustee upon receipt to the credit of the Initial Project Account. At any time after the time of such deposit until the time the Series 2009 Bonds are issued under the Trust Agreement, the Authority may direct the Trustee pursuant to an Officer’s Certificate to apply such amounts in any manner directed by the Authority, including, without limitation, for the payment to USDOT of its origination fee expected to be charged in connection with the TIFIA Series 2009 Bond, for deposit to the Funds and Account created under the Trust Agreement and for the deposit to the funds and accounts created under the State Appropriation Trust Agreement. So long as the Trustee will follow the directions of the Authority, the Trustee will have no liability arising out of the application of such funds for such purpose or responsibility for determining the appropriateness of the application. Any amounts remaining at the time of issuance of the Series 2009 Bonds will be applied in the manner directed by the Authority at the time of issuance of the Series 2009 Bonds. If at any time prior to the issuance of the Series 2009 Bonds the Authority determines that the Series 2009 Bonds will not be issued and the Trust Agreement will be rescinded, then the Trustee will deposit the remaining amount of the initial deposit to such fund or account as will be directed by the Authority. Pending application, the initial deposit amount will be invested as provided in the Trust Agreement.

### **Establishment of Funds**

In addition to the Project Fund, there are established the following funds:

- (a) North Carolina Turnpike Authority Triangle Expressway Revenue Fund;
- (b) North Carolina Turnpike Authority Triangle Expressway Senior Lien Debt Service Fund, in which there are established seven special accounts to be known as the Capitalized Interest Account, the Interest Account, the Principal Account, the Sinking Fund Account, the

Redemption Account, the Senior Lien Parity Reserve Account and the Hedging Acquisition Account;

(c) North Carolina Turnpike Authority Triangle Expressway Subordinate Lien Debt Service Fund, in which there are established six special accounts to be known as the Capitalized Interest Account, the Interest Account, the Principal Account, the Sinking Fund Account, the Redemption Account and the Subordinate Lien Parity Reserve Account;

(d) North Carolina Turnpike Authority Triangle Expressway Renewal and Replacement Fund;

(e) North Carolina Turnpike Authority Triangle Expressway TIFIA Debt Service Fund, in which there are established two special accounts to be known as the TIFIA Debt Service Account and the TIFIA Debt Service Reserve Account;

(f) North Carolina Turnpike Authority Triangle Expressway Operations and Maintenance Expense Fund;

(g) North Carolina Turnpike Authority Triangle Expressway Operating Reserve Fund;

(h) North Carolina Turnpike Authority Triangle Expressway General Reserve Fund; and

(i) North Carolina Turnpike Authority Triangle Expressway Insurance and Condemnation Award Fund.

The Revenue Fund, the Senior Lien Debt Service Fund, the Subordinate Lien Debt Service Fund and the TIFIA Debt Service Fund and the accounts and subaccounts therein and the Insurance and Condemnation Award Fund and the General Reserve Fund will be established with and held by the Trustee. The Renewal and Replacement Fund, the Operations and Maintenance Expense Fund and the Operating Reserve Fund will be established with and held by a Depository selected by the Authority.

A Senior Lien Resolution may provide for the creation of a Senior Lien Special Reserve Account for the Senior Lien Indebtedness authorized by such Senior Lien Resolution and for the deposit of moneys to and withdrawal of moneys from such Account. A Senior Lien Special Reserve Account created for any Series of Bonds will 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 Depository may hold the Senior Lien Special Reserve Account 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 Subordinate Lien Special Reserve Account for the Subordinate Lien Indebtedness authorized by such Subordinate Lien Resolution and for the deposit of moneys to and withdrawal of moneys from such Account. A Subordinate Lien Special Reserve Account created for any Series of Bonds will 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 Depository may hold the Subordinate Lien Special Reserve Account 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 pursuant to the Trust Agreement will be held in trust and applied as provided in the Trust Agreement and, pending such application, the money in such funds, accounts and subaccounts therein will 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 therein or in any Supplemental Agreement.

Each Supplemental Agreement will provide, to the extent applicable, for the creation of a separate subaccount within the Capitalized Interest Account, 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 will bear the designation of such Series of Bonds. A Supplemental Agreement for Senior Lien Bonds may provide that such Senior Lien Bonds authorized thereby may be additionally secured by the Senior Lien Parity Reserve Account or a Senior Lien Special Reserve Account or it may provide that there will 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 Senior Lien Special Reserve Account or is not secured by any debt service reserve fund, such Series of Senior Lien Bonds will have no claim on the Senior Lien Parity Reserve Account or any other Senior Lien Special Reserve Account. A Supplemental Agreement for Subordinate Lien Bonds may provide that such Subordinate Lien Bonds authorized thereby may be additionally secured by the Subordinate Lien Parity Reserve Account or a Subordinate Lien Special Reserve Account or it may provide that there will 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 Subordinate Lien Special Reserve Account or is not secured by any debt service reserve fund, such Series of Subordinate Lien Bonds will have no claim on the Subordinate Lien Parity Reserve Account or any other Subordinate Lien Special Reserve Account.

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 as mentioned in the Trust Agreement and described in “THE TRUST AGREEMENT – Application of Money in Interest Account and Capitalized Interest Account” below, an account or accounts for the payment of principal, whether at maturity or pursuant to an amortization requirement, as mentioned in the Trust Agreement and described in “THE TRUST AGREEMENT – Application of Money in Interest Account and Capitalized Interest Account” below. 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 Parity Reserve Account or a Senior Lien Special Reserve Account or it may provide that there will not be any debt service reserve account in respect of such Senior Lien Parity Debt. If Senior Lien Parity Debt is secured by a Senior Lien Special Reserve Account or is not secured by any debt service reserve account, such Senior Lien Parity Debt will have no claim on the Senior Lien Parity Reserve Account.

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 as mentioned in the Trust Agreement and described in “THE TRUST AGREEMENT – Application of Money in Interest Account and Capitalized Interest Account” below, an account or accounts for the payment of principal, whether at maturity or pursuant to an amortization requirement, as mentioned in the Trust Agreement and described in “THE TRUST AGREEMENT – Application of Money in Interest Account and Capitalized Interest Account” below. 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 Parity Reserve Account or

a Subordinate Lien Special Reserve Account or it may provide that there will not be any debt service reserve account in respect of such Subordinate Lien Parity Debt. If Subordinate Lien Parity Debt is secured by a Subordinate Lien Special Reserve Account or is not secured by any debt service reserve account, such Subordinate Lien Parity Debt will have no claim on the Subordinate Lien Parity Reserve Account.

The Authority will provide to the Trustee a certified or otherwise authentic copy of each Parity Debt Resolution and each Derivative Agreement adopted or entered into by the Authority and will otherwise provide the Trustee with such information and documents as the Trustee will request to assure that the Trustee is advised of the payments to be made pursuant to such Parity Debt Resolutions and Derivative Agreements as provided in the Trust Agreement.

### **Application of Receipts**

Except as otherwise expressly provided for in the Trust Agreement, all Receipts will be deposited on a daily basis when received in the Revenue Fund.

All Derivative Agreement Regularly Scheduled Payments received by the Authority will be deposited in the Revenue Fund upon receipt. Any Derivative Agreement Additional Payments received by the Authority from any counterparty under a Derivative Agreement will be deposited in the General Reserve Fund upon receipt. The Authority will provide the Trustee with written schedules of all Derivative Agreement Regularly Scheduled Payments prior to any such deposits in the Reserve Fund.

The Authority is issuing the State Appropriation Revenue Bonds pursuant to the State Appropriation Revenue Bond Trust Agreement to pay certain Costs of the Triangle Expressway System not being funded with the proceeds of Bonds and Parity Debt issued under the Trust Agreement. Pursuant to the State Appropriation Revenue Bond Trust Agreement, the Authority has provided that all State Appropriated Revenue will be deposited as received in the Revenue Fund of the State Appropriation Revenue Bond Trust Agreement to be used to pay principal and interest on the State Appropriation Revenue Bonds. The State Appropriation Revenue Bond Trust Agreement further provides that amounts in excess of the amount needed to pay such debt service is to be withdrawn from the State Appropriation Revenue Bond Trust Agreement and deposited to the Revenue Fund under the Trust Agreement. Upon such deposit, but not prior to such deposit, State Appropriated Revenues will constitute “Revenues” and “Receipts” 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, the Authority and the NCDOT have entered into the O&M Guaranty Agreement, pursuant to which the NCDOT has agreed to provide additional funding for the deposits to be made to the Operating Reserve Fund in the event the Receipts are not sufficient to make the deposits thereto as provided in the Trust Agreement and described in paragraph (j) in “SECURITY AND SOURCES OF PAYMENT FOR THE SERIES 2009 BONDS – Application of Receipts” in this Official Statement. In the event that funds from NCDOT are required to make the deposit to the Operating Reserve Fund, the Authority will provide such notices, financial information and additional documentation to NCDOT as may be needed or requested by NCDOT to provide for the timely payment by NCDOT of the amounts needed to fund such deposit. Such payments will be deposited as received to the Operating Reserve Fund and applied as provided in the Trust Agreement and described in “THE TRUST AGREEMENT – Application of Money in the Operating Reserve Fund” below.

In order to assure that the Authority will have sufficient funds to maintain the quality and sustainability of the Triangle Expressway System, the Authority and the NCDOT have entered into the

Construction and Renewal and Replacement Agreement, pursuant to which the NCDOT has agreed to provide additional funding for the deposits to be made to the Renewal and Replacement Fund in the event the Receipts are not sufficient to make the deposits thereto as provided in the Trust Agreement and described in paragraph (k) in “SECURITY AND SOURCES OF PAYMENT FOR THE SERIES 2009 BONDS – Application of Receipts” in this Official Statement. In the event that funds from NCDOT are required to make the deposit to the Renewal and Replacement Fund, the Authority will provide such notices, financial information and additional documentation to NCDOT as may be needed or requested to NCDOT to provide for the timely payment by NCDOT of the amounts needed to fund the deposit. Such payments will be deposited as received to the Renewal and Replacement Fund and applied as provided in the Trust Agreement and described in “THE TRUST AGREEMENT – Application of Money in the Operating Reserve Fund” below.

### **Application of Money in Interest Accounts and Capitalized Interest Accounts**

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 applicable Supplemental Agreement, the Trustee will 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 will remit or otherwise set aside the amount due and payable to the Owners as provided in the Supplemental Agreements.

Unless otherwise provided by a Supplemental Agreement, on the date of issuance of any Series of Bonds, an Authorized Officer will deliver to the Trustee a schedule of transfers to be made from the applicable subaccount in the respective Capitalized Interest Accounts to the applicable subaccount of the respective Interest Accounts. The Trustee will make such transfers as required by the schedule of an Authorized Officer.

If the Authority fails to deposit with the Trustee the amounts required to be deposited in the applicable subaccount of the respective Interest Accounts as provided in the Trust Agreement, or if the balance in the applicable subaccount of the respective Interest Accounts on the Business Day next preceding an Interest Payment Date is insufficient to pay interest coming due on the Bonds on such Interest Payment Date, the Trustee will notify the Authority 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 will transfer an amount sufficient to cure the same, drawing only upon funds (a) in the case of Senior Lien Bonds secured by the Senior Lien Parity Reserve Account, from the Senior Lien Parity Reserve Account, (b) in the case of Senior Lien Bonds secured by a Senior Lien Special Reserve Account, from such Senior Lien Special Reserve Account, if any, securing such Series of Senior Lien Bonds, (c) in the case of Subordinate Lien Bonds secured by the Subordinate Lien Parity Reserve Account, from the Subordinate Lien Parity Reserve Account and (d) in the case of Subordinate Lien Bonds secured by a Subordinate Lien Special Reserve Account, from such Subordinate Lien Special Reserve Account, if any, securing such Series of Subordinate Lien Bonds.

### **Application of Money in Principal Account**

Not later than 10:00 A.M. on each Principal Payment Date, the Trustee will 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 at their respective maturities. The Bond Registrar will remit or otherwise set aside the amount due and payable to the Owners as provided in the Supplemental Agreements.

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 will withdraw such money therefrom and will 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 pursuant to the Trust Agreement, (b) deposit, if and to the extent determined by the Authority, into the Senior Lien Parity Reserve Account or any Senior Lien Special Reserve Account such amounts as may be determined by the Authority in order to make the amounts on deposit therein equal to the Senior Lien Parity Reserve Account Requirement or the Senior Lien Special Reserve Account Requirement, as the case may be, and (c) otherwise make the deposits required by the Trust Agreement.

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 will withdraw such money therefrom and will 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 pursuant to the Trust Agreement, (b) deposit, if and to the extent determined by the Authority, into the Subordinate Lien Parity Reserve Account or any Subordinate Lien Special Reserve Account such amounts as may be determined by the Authority in order to make the amounts on deposit therein equal to the Subordinate Lien Parity Reserve Account Requirement or the Subordinate Lien Special Reserve Account Requirement, as the case may be, and (c) otherwise make the deposits required by the Trust Agreement.

If the Authority fails to deposit with the Trustee the amounts required to be deposited in the applicable subaccounts of the respective Principal Accounts as provided in the Trust Agreement, or if the balance in the applicable subaccount of the respective 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 will notify the Authority 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 will transfer an amount sufficient to cure the same, drawing only upon funds (a) in the case of Senior Lien Bonds secured by the Senior Lien Parity Reserve Account, from the Senior Lien Parity Reserve Account, (b) in the case of Senior Lien Bonds secured by a Senior Lien Special Reserve Account, from such Senior Lien Special Reserve Account, if any, securing such Series of Senior Lien Bonds, (c) in the case of Subordinate Lien Bonds secured by the Subordinate Lien Parity Reserve Account, from the Subordinate Lien Parity Reserve Account and (d) in the case of Subordinate Lien Bonds secured by a Subordinate Lien Special Reserve Account, from such Subordinate Lien Special Reserve Account, if any, securing such Series of Subordinate Lien Bonds.

### **Application of Money in Sinking Fund Account**

Money held for the credit of the subaccounts in the Sinking Fund Account will be applied to the retirement, purchase, redemption or payment of Term Bonds in the manner provided in the applicable Supplemental 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 as provided in the Trust Agreement, 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 will notify the Authority 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 will transfer an amount sufficient to cure the same, drawing only upon funds (a) in the case of Senior Lien Bonds secured by the Senior Lien Parity Reserve Account, from the Senior Lien Parity Reserve Account, (b) in the case of Senior Lien Bonds secured by a Senior Lien Special Reserve Account, from such Senior Lien Special Reserve Account, if any, securing such Series of Senior Lien Bonds, (c) in the case of Subordinate Lien Bonds secured by the Subordinate Lien Parity Reserve Account, from the Subordinate Lien Parity Reserve Account and (d) in the case of Subordinate Lien Bonds secured by a Subordinate Lien Special Reserve Account, from such Subordinate Lien Special Reserve Account, if any, securing such Series of Subordinate Lien Bonds.

**Deposit and Application of Money in Senior Lien Parity Reserve Account, any Senior Lien Special Reserve Account, Subordinate Lien Parity Reserve Account and any Subordinate Lien Special Reserve Account; Determination of Deficiencies**

(a) If a Senior Lien Resolution provides that the Senior Lien Indebtedness incurred thereunder is to be secured by the Senior Lien Parity Reserve Account, 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 Parity Reserve Account in an amount equal to the Senior Lien Parity Reserve Account Requirement. If a Senior Lien Resolution provides that the Senior Lien Indebtedness incurred thereunder is to be secured by a Senior Lien Special Reserve Account, 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 Senior Lien Special Reserve Account in an amount equal to the Senior Lien Special Reserve Account 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 Parity Reserve Account, 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 Parity Reserve Account in an amount equal to the Subordinate Lien Parity Reserve Account Requirement. If a Subordinate Lien Resolution provides that the Subordinate Lien Indebtedness incurred thereunder is to be secured by a Subordinate Lien Special Reserve Account, 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 Subordinate Lien Special Reserve Account in an amount equal to the Subordinate Lien Special Reserve Account Requirement for such Subordinate Lien Indebtedness.

(b) The Trustee will use amounts in the Senior Lien Parity Reserve Account to make transfers, or use moneys provided under a Reserve Alternative Instrument to make deposits, in the order specified in the Trust Agreement, in respect of all Senior Lien Indebtedness secured by the Senior Lien Parity Reserve Account, to the appropriate subaccounts of the Interest Account, 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 Parity Reserve Account when due, whenever and to the extent the money on deposit for such purposes is insufficient. The Trustee will use amounts in the Subordinate Lien Parity Reserve Account to make transfers, or use moneys provided under a Reserve Alternative Instrument to make deposits, in the order specified in the Trust Agreement, in respect of all Subordinate Lien Indebtedness secured by the Subordinate Lien Parity Reserve Account, 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 Parity Reserve Account when due, whenever and to the extent the money on deposit for such purposes is insufficient. Moneys or Investment Obligations on deposit in the Senior Lien Parity Reserve Account, the Subordinate Lien Parity Reserve Account, any Senior Lien Special Reserve Account or any Subordinate Lien Special Reserve Account will be used to satisfy deficiencies prior to any draw on a Reserve Alternative Instrument.

(c) The Trustee will use amounts in any Senior Lien Special Reserve Account held by it to make transfers or use moneys provided under a Reserve Alternative Instrument to make deposits, in the order specified in the Trust Agreement, in respect of the particular Senior Lien Indebtedness secured by such Senior Lien Special Reserve Account, to the appropriate subaccounts of the Interest Account, 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 Senior Lien Special Reserve Account when due, whenever and to the extent the money on deposit for such purposes is insufficient. The Trustee will use amounts in any Subordinate Lien Special Reserve Account held by it to make transfers or use moneys provided under a Reserve Alternative Instrument to make deposits, in the order specified in the Trust Agreement, in respect of the particular Subordinate Lien Indebtedness secured by such Subordinate Lien Special Reserve Account, 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 requirement in respect thereof on Subordinate Lien Parity Debt secured by such Subordinate Lien Special Reserve Account when due, whenever and to the extent the money on deposit for such purposes is insufficient.

(d) Any deficiency in the Senior Lien Parity Reserve Account, the Subordinate Lien Parity Reserve Account, any Senior Lien Special Reserve Account and any Subordinate Lien Special Reserve Account resulting from the withdrawal of moneys therein will be made up over the twelve-month period immediately following the month in which such withdrawal is made by monthly deposits of one-twelfth (1/12) of the amount of such deficiency, such deposits to be made pursuant to the Trust Agreement, as applicable. Any deficiency resulting from a draw on a Reserve Alternative Instrument will 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 Parity Reserve Account, the Subordinate Lien Parity Reserve Account, any Senior Lien Special Reserve Account or any Subordinate Lien Special Reserve Account 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.

(e) Unless a Reserve Alternative Instrument will be in effect, if on any date of valuation pursuant to the Trust Agreement as described in “THE TRUST AGREEMENT – Valuation” below, the amount on deposit in the Senior Lien Parity Reserve Account is less than 90% of the Senior Lien Parity Reserve Account Requirement, the Authority will deposit into the Senior Lien Parity Reserve Account monthly one-twelfth (1/12) of the amount required as of such date to bring the amount then on deposit in the Senior Lien Parity Reserve Account up to the Senior Lien Parity Reserve Account Requirement. Any such deficiency may be satisfied through the deposit of additional moneys or the providing of an additional, or increase in a, Reserve Alternative Instrument. Any deficiency in the Subordinate Lien Parity Reserve Account or any Senior Lien Special Reserve Account or Subordinate Lien Special Reserve Account resulting from a valuation of the Investment Obligations therein pursuant to the Trust Agreement

as described in “THE TRUST AGREEMENT – Valuation” below will be made up as provided in the relevant Senior Lien Resolution or Subordinate Lien Resolution.

### **Application of Money in the Redemption Account**

The Trustee will 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 clause (c) below, and if instructed to do so in writing by an Authorized Officer, the Trustee will 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, will 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 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 will 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 will 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 clause (c) below, the Trustee will call for redemption on a date permitted by the applicable Supplemental 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 will be called for redemption at any one time unless the Trustee is so instructed by the Authority. The Trustee will 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 will 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 any one 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 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 Supplemental Agreement relating to the Bonds to be redeemed specifies otherwise, (A) the Trustee will apply such money to the purchase of one or more Series of Bonds as it will 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 will be redeemed as provided in the applicable Supplemental Agreement.

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

### **Application of Money in Operating Reserve Fund**

Moneys held for the credit of the Operating Reserve Fund will 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 Budget, but only to the extent that amount held in the Operations and Maintenance Expense Fund are not sufficient for such purpose.

In addition to the deposits required by the Trust Agreement as described in paragraph (j) in “SECURITY AND SOURCES OF PAYMENT FOR THE SERIES 2009 BONDS – Application of Receipts” in this Official Statement, the Authority will deposit to the credit of the Operating Reserve Fund any amounts received by NCDOT as an Operating Advance pursuant to the terms of the O&M Guaranty Agreement.

### **General Reserve Fund**

Moneys held for the credit of the General Reserve Fund will be used for any legally available purpose, including, without limitation, the payment of Operating Expenses, the payment of capital improvements, repayment of any amount owed to NCDOT pursuant to the O&M Guaranty Agreement and the Construction and Renewal and Replacement Agreement, the funding of any Non-System Project and the payment of any Derivative Agreement Additional Payments.

In no event will money be released by the Trustee from the General Reserve Fund for an expenditure not related to the Triangle Expressway System or for a Non-System Project unless the Authority will have certified to the Trustee in writing that: (i) the Authority is current on all payments then required to be paid under the TIFIA Loan Agreement and the TIFIA Debt Service Reserve Account is funded at the TIFIA Debt Service Reserve Account Requirement, (ii) all amounts owed to NCDOT under the O&M Guaranty Agreement and the Construction and Renewal and Replacement Agreement have been paid, (iii) the Authority will have delivered a certificate to the Trustee and the USDOT (and the Trustee will have received such certificate) demonstrating that after such release, (x) the Revenues, in each ensuing Fiscal Year as shown in a statement of a Traffic Consultant to be delivered with such certificate, are at least 130% of (1) the Long-Term Debt Service Requirement with respect to all Outstanding Senior Lien Indebtedness, Subordinate Lien Indebtedness and TIFIA Indebtedness for such Fiscal Year and (2) the amounts, if any, to be deposited to the Renewal and Replacement Fund, the Senior Lien Parity Reserve Account, the Subordinate Lien Parity Reserve Account and the TIFIA Debt Service Reserve Account for such Fiscal Year and (y) the Loan Life Coverage Ratio is at least 130%, and (iv) no Event of Default will have occurred and be continuing under the Trust Agreement.

An amount equal to 25% of the amount to be released for a Non-System Project will upon written direction by the Authority be applied to the prepayment of the TIFIA Indebtedness.

## Security

As security for the payment of all 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 therein, 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.

Any Receipts disbursed by the Trustee for deposit in the Operations and Maintenance Expense Fund, the Operating Reserve Fund or the Renewal and Replacement Fund, and any Receipts disbursed to NCDOT pursuant to the Trust Agreement, will no longer constitute Receipts within the meaning of the Trust Agreement and will no longer be subject to the pledge, charge and lien upon the Trust Estate created by the Trust Agreement.

The pledge, charge and lien upon the Trust Estate will be effective and operate immediately, without any recording or filing of any financing statement or other notice, and the Trustee will have the right to collect and receive the Receipts 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 2009 Bonds issued thereunder until all Bonds, Parity Debt, Senior Lien Derivative Agreement Regularly Scheduled Payments, Subordinate Lien Derivative Agreement Regularly Scheduled Payments and TIFIA 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.

The aforementioned pledge, charge and lien upon the Trust Estate will not inhibit the sale or disposition of any portion of the Triangle Expressway System in accordance with the Trust Agreement and will 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.

The pledge, charge and lien upon the Trust Estate will 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 Bonds and Subordinate Lien Parity Debt, 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 Bonds, the Senior Lien Parity Debt and the Senior Lien Derivative Agreement Regularly Scheduled Payments and (3) third, for the security for the payment of the TIFIA Indebtedness, including the interest thereon, which (other than during any period where such TIFIA Indebtedness will become Senior Lien Bonds pursuant to the Trust Agreement) is junior and subordinate to the pledge charge and lien upon the Trust Estate securing the Senior Lien Bonds, the Senior Lien Parity Debt, the Senior Lien Derivative Agreement Regularly Scheduled Payments, the Subordinate Lien Bonds, the Subordinate Lien Parity Debt and the Subordinate Lien Derivative Agreement Regularly Scheduled Payments.

Notwithstanding any of the foregoing to the contrary, in the case of the occurrence and continuance of a Bankruptcy-Related Event, 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 Parity Reserve Account or any Senior Lien Special Reserve Account.

## **Security for Deposits**

Any and all money received by the Authority under the provisions of the Trust Agreement will be deposited as received with the Trustee or one or more other Depositaries as provided in the Trust Agreement, and all money so deposited with the Trustee will be trust funds under the terms of the Trust Agreement, and, to the extent permitted by law in the case of the Project Fund, will 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 will be continuously secured, for the benefit of the Authority and the Owners and Holders of Bonds and Senior Lien 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 will 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 will be represented by Investment Obligations purchased under the provisions of described in this clause as an investment of such money.

All money deposited with the Trustee or any Depository will 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 will be continuously invested and reinvested by the Trustee or the Depositaries, whichever is applicable, in Investment Obligations or held as cash to the extent investment or reinvestment in Investment Obligations is not practicable. Except as described below 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, be provided in the applicable Supplemental Agreement.

Except as described below with respect to the Senior Lien Parity Reserve Account, Subordinate Lien Parity Reserve Account and TIFIA Debt Service Reserve Account, Investment Obligations will mature or be redeemable at the option of the holder thereof not later than the respective dates when the money held for the credit of such funds, accounts and subaccounts will be required for the purposes intended.

Investment Obligations in the Senior Lien Parity Reserve Account, Subordinate Lien Parity Reserve Account or TIFIA Debt Service Reserve Account will (a) mature or (b) be redeemable at the option of the holder of such Investment Obligation so that all such Investment Obligations will have an average life of not more than ten (10) years after the date of such investment.

Notwithstanding the forgoing, no Investment Obligations pertaining to any Series in any fund, account or subaccount will 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 clause,

the maturity date of any repurchase agreement will be deemed to be the stated maturity date of such agreement and not the maturity dates of the underlying obligations.

An Authorized Officer or his designee will 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 described in this clause, and the Trustee or such Depository will then invest such money as so directed. The Trustee or any Depository may request additional direction or authorization from the Authorized Officer or his designee in writing with respect to the proposed investment of money under the provisions of the Trust Agreement. Upon receipt of such directions, the Trustee or any Depository will invest, subject to the provisions of the Trust Agreement, such money in accordance with such directions. If no such directions are given, then any uninvested funds will 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 or TIFIA Indebtedness in the case of funds held in the Senior Lien Debt Service Fund, the Subordinate Lien Debt Service Fund or the TIFIA Debt Service Fund. The Trustee or any Depository will have no liability for investments made in accordance with the Trust Agreement.

Investment Obligations acquired with money in or credited to any fund, account or subaccount established under the Trust Agreement will 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 will 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 will 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, will be subject to the pledge of the Trust Estate in accordance with the Trust Agreement as described in “THE TRUST AGREEMENT – Security” above, except as follows:

Any investment earnings received on amounts deposited in the Senior Lien Debt Service Fund (including the Senior Lien Parity Reserve Account, to the extent that the amount on deposit in the Senior Lien Parity Reserve Account is equal to the Senior Lien Parity Reserve Account Requirement), will be transferred to the Interest Account of the Senior Lien Debt Service Fund. Any investment earnings received on amounts deposited in the Subordinate Lien Parity Reserve Account, to the extent that the amount on deposit in the Subordinate Lien Parity Reserve Account is equal to the Subordinate Lien Parity Reserve Account Requirement, will be transferred to the Revenue Fund. Any investment earnings received on amounts deposited in the TIFIA Debt Service Reserve Account, to the extent that the amount on deposit in the TIFIA Debt Service Reserve Account is equal to the TIFIA Debt Service Reserve Account Requirement, will be transferred to the Revenue Fund. Any investment earnings on any Special Reserve Account will be transferred or deposited in the manner specified in the Supplemental Agreement or Parity Debt Resolution establishing such Special Reserve Account.

Any such interest accruing and any such profit realized will not be credited or transferred to any other fund, account or subaccount unless there will be no deficiency in the respective fund, account or subaccount. If there will be a deficiency in any fund, account or subaccount, any such interest or profit will 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 will 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 will 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 will 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.

For purposes of making any investment under the Trust Agreement, the Trustee or any Depository may consolidate money held by it in any fund, account or subaccount with money in any other fund, account or subaccount. Transfers from any fund, account or subaccount to the credit of any other fund, account or subaccount provided for in the Trust Agreement may be effectuated on the books and records of the Trustee, the Authority or any Depository without any actual transfer of funds or liquidation of investments. Investment Obligations purchased with consolidated funds will be allocated to each fund, account or subaccount on a pro rata basis in accordance with the initial amount so invested from each such fund, account or subaccount.

Unless otherwise directed by the Authority, Investment Obligations may be purchased by the Trustee or any Depository through its own investment division or other bank facilities established for such purpose.

## **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 will 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 General Reserve Fund, will be valued as of the last day of each Fiscal Year. When a valuation is made by the Trustee, the Trustee will report the result of such valuation to the Authority within thirty (30) days after such valuation. In addition, Investment Obligations will 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 will not be required to value Investment Obligations more than once in any calendar month.

Whenever, following a valuation on the last day of each Fiscal Year as described above, the value of the cash and Investment Obligations in the Senior Lien Parity Reserve Account held by the Trustee, plus accrued interest to the date of valuation, is less than 90% of the Senior Lien Parity Reserve Account Requirement, the Trustee will compute the amount by which the Senior Lien Parity Reserve Account Requirement exceeds the balance in the Senior Lien Parity Reserve Account and will immediately give

the Authority notice of such deficiency and the amount necessary to cure the same in accordance with the Trust Agreement.

Whenever the value of the cash and Investment Obligations in the Senior Lien Parity Reserve Account held by the Trustee, plus accrued interest to the date of valuation, is greater than the Senior Lien Parity Reserve Account Requirement, the Trustee will compute the amount by which the balance in the Senior Lien Parity Reserve Account exceeds the Senior Lien Parity Reserve Account Requirement, and the Authority will be entitled to transfer such excess to the credit of the Interest Account of the Senior Lien Debt Service Fund or to pay interest on Senior Lien Bonds or Senior Lien Parity Debt secured by the Senior Lien Parity Reserve Account in the manner directed by the Authority in an Officer's Certificate filed with the Trustee; provided, however, that nothing in the Trust Agreement will require the Authority to liquidate or sell any Investment Obligation held in the Senior Lien Parity Reserve Account for purposes of making such transfer.

Whenever the value of the cash and Investment Obligations in the Subordinate Lien Parity Reserve Account held by the Trustee, plus accrued interest to the date of valuation, is greater than the Subordinate Lien Parity Reserve Account Requirement, the Trustee will compute the amount by which the balance in the Subordinate Lien Parity Reserve Account exceeds the Subordinate Lien Parity Reserve Account Requirement, and the Authority will be entitled to transfer such excess to the credit of the Interest Account of the Subordinate Lien Debt Service Fund or to pay interest on Subordinate Lien Bonds or Subordinate Lien Parity Debt secured by the Subordinate Lien Parity Reserve Account in the manner directed by the Authority in an Officer's Certificate filed with the Trustee; provided, however, that nothing in the Trust Agreement will require the Authority to liquidate or sell any Investment Obligation held in the Subordinate Lien Parity Reserve Account for purposes of making such transfer.

#### **Payment of Principal, Interest, Premium and Other Amounts**

The Authority will 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, Parity Debt and TIFIA 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, Parity Debt and TIFIA Indebtedness and the documentation authorizing and securing such Bonds, Parity Debt and TIFIA Indebtedness and in any Derivative Agreement, according to the true intent and meaning thereof.

The Bonds, Parity Debt and TIFIA Indebtedness are special obligations of the Authority payable solely from the Receipts, the Authority's right to receive the same, and money, Investment Obligations and Reserve Alternative Instruments held in the applicable funds, accounts and subaccounts created under the Trust Agreement for each such Series of Bonds and the income from Investment Obligations in such funds, accounts and subaccounts. The Bonds, Parity Debt and TIFIA Indebtedness will be secured as provided in the Trust Agreement. The Bonds, Parity Debt and TIFIA Indebtedness will 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 will be payable solely from the Receipts and other income or assets pledged under the Trust Agreement. The Authority will not be obligated to pay the principal of, premium, if any, or interest on the Bonds, Parity Debt and TIFIA Indebtedness except from the Receipts 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, Parity Debt and TIFIA Indebtedness. The Authority has no taxing power.

## **Extension of Interest Payment**

If the time for the payment of the interest on any Bond, Parity Debt or TIFIA Indebtedness is extended, whether or not such extension is by or with the consent of the Authority, such interest so extended will not be entitled in case of default under the Trust Agreement to the benefit or security of the Trust Agreement and in such case the Owner of the Bond, Parity Debt or TIFIA Indebtedness for which the time for payment of interest was extended will be entitled only to the payment in full of the principal of all Bonds, Parity Debt and TIFIA Indebtedness then Outstanding and of interest for which the time for payment will not have been extended. The time for the payment of the interest on any Bond or Parity Debt will not be extended in respect of any Bond or Parity Debt covered by a Bond Insurance Policy or Credit Facility without the consent of the Bond Insurer or the Credit Provider.

## **Rate Covenant**

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 Triangle Expressway System, 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.

In addition, 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 Triangle Expressway System, 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 (x) the Long-Term Debt Service Requirement for Senior Lien Indebtedness, Subordinate Lien Indebtedness and TIFIA Indebtedness for such Fiscal Year and (y) the deposits to be made to the Senior Lien Parity Reserve Account and Subordinate Lien Parity Reserve Account and the TIFIA Debt Service Reserve Account for such Fiscal Year.

In addition, 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 Triangle Expressway System, 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 Loan Life Coverage Ratio will be not less than 130%.

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 Triangle Expressway System, 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 Receipts will be sufficient in each Fiscal Year to make all of the deposits described in (a) through (h), inclusive, of the Official Statement under the heading "Security and Sources of Payment For the Series 2009 Bonds—Application of Receipts."

If the Authority fails to comply with the covenants described above, it shall 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 Triangle Expressway System 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. 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 rate covenants shall not constitute an Event of Default under the Trust Agreement. In the event of any failure to comply with the rate covenants 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 or the Owners or Holders of not less than 25% in aggregate principal amount of the Senior Lien Indebtedness, Subordinate Lien Indebtedness or TIFIA Indebtedness then Outstanding may, and the Trustee shall, upon the request of the Owners or Holders of not less than 25% in aggregate principal amount of the Senior Lien Indebtedness, Subordinate Lien Indebtedness or TIFIA Indebtedness then Outstanding and upon being indemnified to its satisfaction, 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 rate covenants. 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 Triangle Expressway System in compliance with any final order, decree or judgment entered in any such proceeding or modification thereof.

#### **Limitation on Senior Lien Indebtedness**

In addition to the incurrence of Long-Term Senior Lien Indebtedness by meeting the requirements described in the Official Statement under the heading "Security and Sources of Payment For the Series 2009 Bonds—Parity and Subordinated Indebtedness," the Authority may incur additional Senior Lien Indebtedness as described in this section.

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 the Initial Project or 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.

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 any 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 (1) for Fiscal Years ending prior to the maturity of all TIFIA Indebtedness, the Long-Term Debt Service Requirement on account of all Long-Term

Indebtedness constituting Senior Lien Indebtedness Outstanding immediately prior to the incurrence of such Long-Term Indebtedness to accomplish such refunding, including the Long-Term Indebtedness to be refunded and (2) for Fiscal Years ending after the maturity of all TIFIA Indebtedness, 110% of the Long-Term Debt Service Requirement on account of all Long-Term Indebtedness constituting Senior Lien Indebtedness Outstanding immediately prior to the incurrence of such Long-Term Indebtedness to accomplish such refunding, including the Long-Term Indebtedness to be refunded, provided that there is no limit for Fiscal Years beginning after the final maturity date of all Long-Term Indebtedness Outstanding prior to the proposed 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.

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, (iii) the Authority is then current in the payment of all debt service then due with respect to all TIFIA Indebtedness and (iv) evidence that such Senior Lien Indebtedness will be rated at an investment grade rating by Fitch, Moody's, S&P or any other nationally recognized securities credit rating agency.

Put Indebtedness constituting Senior Lien Indebtedness may be incurred if prior to the incurrence of such Put Indebtedness (i) the conditions for the incurrence of the Senior Lien Indebtedness 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 the Trust Agreement 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.

The Authority may enter into Derivative Agreements with respect to Derivative Indebtedness constituting Senior Lien Indebtedness and providing for Derivative Agreement Regularly Scheduled Payments to be made as Senior Lien Derivative Agreement Regularly Scheduled Payments without compliance with any other test under the Trust Agreement.

### **Limitation on Subordinate Lien Indebtedness**

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 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% the

Long-Term Debt Service Requirement with respect to all Outstanding Senior Lien Indebtedness, Subordinate Lien Indebtedness and TIFIA Indebtedness (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 that the Loan Life Coverage Ratio is a least 130%; and

(iii) a report of a Traffic Consultant stating that (1) 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 Receipts in each Fiscal Year will be sufficient to make all of the deposits in each such Fiscal Year described in (a) through (h), inclusive, of the Official Statement under the heading “Security and Sources of Payment For the Series 2009 Bonds—Application of Receipts.” and (2) that all Outstanding TIFIA Indebtedness will be fully retired by its final maturity date.

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 the Initial Project or 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.

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 any 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 by more than 10% than the Long-Term Debt Service Requirement on account of all Long-Term Indebtedness Outstanding immediately prior to the incurrence of such Long-Term Indebtedness to accomplish such refunding, including the Long-Term Indebtedness to be refunded, or (B) the incurrence of such Long-Term Indebtedness to accomplish the refunding will satisfy the requirements described in the first paragraph of this section..

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.

Put Indebtedness constituting Subordinate Lien Indebtedness may be incurred if prior to the incurrence of such Put Indebtedness (i) the conditions described in the first paragraph 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 the Trust Agreement 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.

Notwithstanding the foregoing, the Authority may enter into Derivative Agreements with respect to Derivative Indebtedness constituting Subordinate Lien Indebtedness and providing for Derivative Agreement Regularly Scheduled Payments to be made as Subordinate Lien Derivative Agreement Regularly Scheduled Payments without compliance with any other requirements under the Trust Agreement.

The Authority agrees that it will not incur any Subordinate Lien Indebtedness while any TIFIA Indebtedness is Outstanding without the consent of the USDOT, except that (i) the Authority may issue Revenue Bond Anticipation Notes constituting Subordinate Lien Indebtedness pursuant to Section 211 in anticipation of repayment thereof from the proceeds of TIFIA Indebtedness and (ii) the Authority may issue Subordinate Lien Indebtedness without the consent of USDOT if the Indebtedness could have been issued as Senior Lien Indebtedness as described above.

### **Covenants With Respect to Construction and Operation of the Triangle Expressway System**

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 covenants to establish and enforce reasonable rules and regulations governing the operation and use of the Triangle Expressway System, operate the Triangle Expressway System in an efficient and economical manner, maintain the properties constituting the Triangle Expressway System in good repair and in sound operating condition for so long as the same are necessary for the operation of the Triangle Expressway System, and comply with all valid acts, rules, regulations, orders and directions of any legislative, executive, administrative or judicial body that are applicable to the Triangle Expressway System.

The Authority shall adopt an Annual Budget for the Triangle Expressway System 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 Receipts budgeted for deposit in the Revenue Fund during such year, (c) the amounts to be deposited or paid under from Receipts, including the Operating Expenses, (d) the amount of Operating Expenses budgeted to be paid from NCDOT pursuant to the O&M Guaranty Agreement, (e) the amount of any deposits to be made to the Renewal and Replacement Fund from Receipts and (f) the amount of any deposits to be made to the Renewal and Replacement Fund pursuant to the Construction and Renewal and Replacement Agreement.

The Authority shall also adopt a Capital Improvements Budget for the Triangle Expressway System 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 General Reserve Fund, together with a statement of the purposes for which such amounts 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 Triangle Expressway System, whether the same are to be commenced, continued or completed during such Fiscal Year or thereafter. The Capital Improvements Budget may be part of the Annual Budget.

The Authority shall keep the funds, accounts, subaccounts, money and investments of the Triangle Expressway System 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 Triangle Expressway System 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 Triangle Expressway System. Reports of each such audit shall be filed with the Trustee, the Local Government Commission and the USDOT, 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 Triangle Expressway System 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 requirement 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.

## **Insurance**

The Authority covenants that it will maintain or cause to be maintained a practical insurance program, with reasonable terms, conditions, provisions and costs, which the Authority determines (i) will afford adequate protection against loss caused by damage to or destruction of the Triangle Expressway System or any part thereof and (ii) will provide the Authority reasonable protection from liability for bodily injury and property damage resulting from the construction or operation of the Triangle Expressway System. Furthermore, the Authority covenants that it will maintain use and occupancy insurance covering loss of Receipts by reason of necessary interruption, total or partial, in the use of the facilities of the Triangle Expressway System, due to loss or damage to any such facility in such amount as an Insurance Consultant determines will provide income during a period of interruption of not less than six months and computed on the basis of Revenues for the preceding Fiscal Year (or the estimated Revenues for the current Fiscal Year as estimated by the Insurance Consultant if the Triangle Expressway System was not in operation during the preceding Fiscal Year.

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. The Authority may also participate in self-insurance programs (except with respect to use and occupancy insurance) so long as the types and levels of such

self-insurance programs are determined in writing by an Insurance Consultant to be adequate coverage for the Authority.

### **Payment of Charges and Covenant Against Encumbrances**

The Authority shall not create or suffer to be created any lien or charge upon the Triangle Expressway System or any part thereof, or on the Receipts, 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 Triangle Expressway System and the operation of the Triangle Expressway System and lawful claims and demands for labor, materials, supplies or other objects that might by law become a lien upon the Triangle Expressway System or Receipts 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**

The Authority covenants that, except as described in this Section, it will not sell, exchange or otherwise dispose of the Triangle Expressway System 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 Triangle Expressway System, and the proceeds thereof 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 Triangle Expressway System if it determines by resolution:

(a) that the sale, exchange or other disposition thereof would not materially adversely affect the operating efficiency of the Triangle Expressway System and would not materially reduce Receipts; or

(b) that the sale, exchange or other disposition thereof would not materially adversely affect the ability of the Authority to comply with the rate covenants for the current and next succeeding Fiscal Year.

If the fair market value of any item of real or personal property to be sold, exchanged or otherwise disposed of in any Fiscal Year in accordance with the provisions of this Section shall be in excess of 3% of net property, plant and equipment of the Triangle Expressway System calculated in accordance with generally accepted accounting principles, or if the fair market value of any such item together with the fair market value of all other such items so disposed of in such Fiscal Year shall aggregate in excess of 3% of net property, plant and equipment of the Triangle Expressway System calculated in accordance with generally accepted accounting principles, then no such disposal shall be effected without first obtaining the written approval of a Traffic Consultant of the determinations to be made by the Authority with respect to such disposition under the provisions of this Section.

All buildings, structures and items of personal property that are constructed, placed or installed in or upon the properties constituting the Triangle Expressway System 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 Triangle Expressway System, and all real property acquired as an addition to, in replacement of, or as a substitute for real property constituting a part of the Triangle Expressway System shall thereupon become part of the Triangle Expressway System.

The Authority may lease, as lessor, all or any part of the Triangle Expressway System, or contract or agree for the performance by others, of operations or services on or in connection with the Triangle Expressway System or any part thereof, for any lawful purpose, provided, that:

(a) the Authority shall remain fully obligated and responsible under this 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 this Trust Agreement.

### **Non-System Projects, Addition of Non-System Projects to the Triangle Expressway System**

No Non-System Projects shall be financed by the Authority unless there shall be filed with the Authority and the Trustee:

(a) an opinion of counsel to the Authority to the effect that the Non-System Project or the indebtedness or other obligations incurred to finance such Non-System Project are not, directly or indirectly, secured by or payable from Receipts or issued under or secured by 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 Receipts or Revenues or impair the operating efficiency of the Triangle Expressway System, and

(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 will 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.

If Non-System Projects are financed by the Authority, the Authority shall put in place necessary measures in order to account for, and keep separate and apart from Receipts and Operating Expenses, the gross revenues received from the operation of such Non-System Projects, 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, the Authority may determine that a Non-System Project shall be redesignated as an Additional Project within the meaning of this Trust Agreement upon which such Non-System Project shall become a part of the Triangle Expressway System:

(i) the Authority Board shall adopt a resolution redesignating such Non-System Project as an Additional Project and a part of the Triangle Expressway System;

(ii) there shall be filed with the Trustee 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 Triangle Expressway System) 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 Current Expenses if such Non-System Project were part of the Triangle Expressway System), (B) any additional Current Expenses that would have been incurred by the Authority if such Non-System Project had been a part of the Triangle Expressway System (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; and

(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 upon compliance with the additional indebtedness limitations described above.

### **Events of Default**

Each of the following events is an Event of Default under the Trust Agreement:

(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 Triangle Expressway System as a result of the ownership, control or operation of the Triangle Expressway System, and any such judgment is not discharged within one hundred twenty (120) 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 will 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;

(e) receipt by the Trustee of written notice from the Holder of any Parity Debt or TIFIA Indebtedness that any event of default has occurred and is continuing under such Parity Debt or Parity Debt Resolution or TIFIA Loan Agreement, including the failure to pay when due and payable the principal of, premium, if any, and interest on such Parity Debt or TIFIA Indebtedness;

(f) the failure of the State to appropriate the State Appropriated Revenues or a failure of NCDOT to pay a payment required to be paid by NCDOT under the O&M Guaranty Agreement or the Construction and Renewal and Replacement Agreement;

(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 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 corrected, 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” will 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.

## **Remedies**

Notwithstanding anything in the Trust Agreement or in any Supplemental Agreement, Parity Debt Resolution or TIFIA Loan Agreement to the contrary, in no event will there be any acceleration of payment of principal of or interest on any Bonds, Parity Debt or TIFIA Indebtedness as a result of the occurrence of any Event of Default under the Trust Agreement or otherwise.

Upon the happening and continuance of any Event of Default, then and in every such case the Trustee may, and upon the written request of the Owners or Holders of not less than 25% in aggregate principal amount of the Bonds, Parity Debt and TIFIA Indebtedness then Outstanding will, proceed (subject to the provisions of the Trust Agreement) to protect and enforce its rights and the rights of the Owners or Holders of the Bonds, Parity Debt and TIFIA 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 therein granted or for the enforcement of any proper legal or equitable remedy, as the Trustee, being advised by counsel, chosen by the Trustee, will deem most effectual to protect and enforce such rights.

In the enforcement of any remedy under the Trust Agreement, the Trustee will 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, Parity Debt and TIFIA Indebtedness and unpaid, with interest on overdue payments of principal at the rate or rates of interest specified in such Bonds, Parity Debt and TIFIA Indebtedness, together with any and all costs and expenses of collection and of all proceedings under the Trust Agreement and under such Bonds, Parity Debt and TIFIA Indebtedness, without prejudice to any other right or remedy of the Trustee or of the Owners or Holders of the Bonds, Parity Debt and TIFIA 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 therein and in such Bonds, Parity Debt and TIFIA 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, Parity Debt and TIFIA Indebtedness under the provisions of the Trust Agreement and any Supplemental Agreement, Parity Debt Resolution or TIFIA Loan Agreement 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 will occur and be continuing, then, unless the same will then be prohibited under applicable law, a court of competent jurisdiction may appoint a receiver to administer and operate the Triangle Expressway System on behalf of the Authority, with full power to pay and to provide for the payment of principal of and interest on the Bonds, Parity Debt and TIFIA Indebtedness and Derivative Agreement Regularly Scheduled Payments as the same will 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 Triangle Expressway System, to apply Receipts derived from such operation in accordance with the provisions of the Trust Agreement and any Supplemental Agreement, Parity Debt Resolution, TIFIA Loan Agreement or Derivative Agreement, and to take such action to the extent permitted by law to cause to be remedied any Event of Default which will occur or will 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, Parity Debt, TIFIA Indebtedness and Derivative Agreement Regularly Scheduled Payments as aforesaid will 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 will not, by itself, constitute a separate Event of Default under the Trust Agreement.

### **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 Bonds 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 Bonds pursuant to the provisions of the Trust Agreement), whether through the exercise of the remedies provided for in the Trust Agreement or otherwise, will be applied, after payment of the reasonable fees and expenses of the Trustee 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 Bonds then due and payable in the order in which such installments became due and payable and, if the amount available will 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 Bonds;

second: to the payment to the persons entitled thereto of the unpaid principal of any Senior Lien Bonds that will have become due and payable (other than Bonds deemed to have been paid pursuant to the provisions of the Trust Agreement described in “THE TRUST AGREEMENT – Defeasance” below), in the order of their due dates, with interest on the overdue principal at a rate equal to the rate on such Senior Lien Bonds, and, if the amount available will not be sufficient to pay in full all of the amounts due on the Senior Lien Bonds 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

third: to the payment of the interest on and the principal of Senior Lien Bonds, to the purchase and retirement of Senior Lien Bonds, and to the redemption of Senior Lien Bonds, all in accordance with the provisions of the Trust Agreement.

(b) 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 Subordinate Lien Debt Service Fund is not sufficient to pay the interest on or the principal of the Subordinate Lien Bonds 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 Subordinate Lien Bonds pursuant to the provisions of the Trust Agreement), whether through the exercise of the remedies provided for in the Trust Agreement or otherwise, will be applied, after payment of the reasonable fees and expenses of the Trustee in exercising its rights and remedies thereunder:

first: to the payment to the persons entitled thereto of all installments of interest on Subordinate Lien Bonds then due and payable in the order in which such installments became due and payable and, if the amount available will 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 Bonds;

second: to the payment to the persons entitled thereto of the unpaid principal of any Subordinate Lien Bonds that will have become due and payable (other than Bonds deemed to have been paid pursuant to the provisions of the Trust Agreement described in “THE TRUST AGREEMENT – Defeasance” below), in the order of their due dates, with interest on the overdue principal at a rate equal to the rate on such Subordinate Lien Bonds, and, if the amount available will not be sufficient to pay in full all of the amounts due on the Subordinate Lien Bonds 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

third: to the payment of the interest on and the principal of Subordinate Lien Bonds, to the purchase and retirement of Subordinate Lien Bonds, and to the redemption of Subordinate Lien Bonds, all in accordance with the provisions of the Trust Agreement.

(c) Anything in the Trust Agreement to the contrary notwithstanding, if at any time the money in the TIFIA Debt Service Fund is not sufficient to pay the interest on or the principal of all TIFIA Indebtedness as the same become due and payable, such money, together with any money then available or thereafter becoming available for such purposes, whether through the exercise of the remedies provided for in the Trust Agreement or otherwise, will be applied, after payment of the reasonable fees and expenses of the Trustee in exercising its rights and remedies thereunder:

first: to the payment of all installments of interest on the TIFIA Indebtedness then due and payable in the order in which such installments became due and payable and, if the amount available will 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 TIFIA Indebtedness;

second: to the payment to the persons entitled thereto of the unpaid principal of any TIFIA Indebtedness that will have become due and payable (other than TIFIA Indebtedness deemed to have been paid pursuant to the provisions of the Trust Agreement described in “THE TRUST AGREEMENT – Defeasance” below), in the order of their due dates, with interest on the overdue principal at a rate equal to the rate on such TIFIA Indebtedness, and, if the amount available will not be sufficient to pay in full all of the amounts due on the TIFIA 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.

(d) Whenever money is to be applied by the Trustee pursuant to the provisions of the Trust Agreement described under this clause, such money will be applied by the Trustee at such times and from time to time as the Trustee in its sole discretion will 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, (b) setting aside such money as provided in the Trust Agreement in trust for the proper purpose will constitute proper application by the Trustee and (c) the Trustee will 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 will fix the date (which will be an Interest Payment Date unless the Trustee will 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 will cease to accrue. The Trustee will give such notice as it may deem appropriate of the fixing of any such date and will 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.

### **Control of Proceedings; Restrictions Upon Action; Notice of Default**

Anything in the Trust Agreement to the contrary notwithstanding, the Owners or Holders of a majority in aggregate principal amount of Bonds, Parity Debt and TIFIA Indebtedness at any time Outstanding will have the right, subject to the provisions of the Trust Agreement, 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 will be in accordance with law and the provisions of the Trust Agreement.

Except as provided in the Trust Agreement, no Owner or Holder of Bonds, Parity Debt or TIFIA Indebtedness will have any right to institute any suit, action or proceeding in equity or at law on any Bonds, Parity Debt or TIFIA Indebtedness or for the execution of any trust under the Trust Agreement or for any other remedy hereunder unless such Owner or Holder of Bonds, Parity Debt or TIFIA Indebtedness previously (a) has given to the Trustee written notice of the Event of Default on account of which suit, action or proceeding is to be instituted, (b) has requested the Trustee to take action after the right to exercise such powers or right of action, as the case may be, will have accrued, (c) has afforded the Trustee a reasonable opportunity either to proceed to exercise the powers granted by the Trust Agreement or to institute such action, suit or proceedings in its or their name, and (d) has offered to the Trustee reasonable security and satisfactory indemnity against the costs, expenses and liabilities to be incurred therein or thereby, and the Trustee will 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 hereunder. Notwithstanding the foregoing provisions of this clause and without complying therewith, the Owners or Holders of not less than 25% in aggregate principal amount of Bonds, Parity Debt and TIFIA Indebtedness then Outstanding may institute any such suit, action or proceeding in their own names for the benefit of all Owners or Holders of Bonds, Parity Debt and TIFIA Indebtedness. It is understood and intended that, except as otherwise above provided, no one or more Owners or Holders of Bonds, Parity Debt or TIFIA Indebtedness will 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 will be instituted, had and maintained in the manner therein provided and for the benefit of all Owners and Holders of Bonds, Parity Debt and TIFIA 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 therein provided.

The Trustee will mail to (a) all Owners of Bonds at their addresses as they appear on the registration books and (b) all Holders of Parity Debt or TIFIA Indebtedness and counterparties under Derivative Agreements providing for Derivative Agreement Regularly Scheduled Payments who will 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 will have occurred; provided, however that, except upon the happening of an Event of Default specified in the Trust Agreement and described in clauses (a) and (b) in "THE TRUST AGREEMENT – Events of Default" 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 will 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.

### **Concerning the Trustee**

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 will 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 will 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 will 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 will be determined solely by the express provisions of the Trust Agreement, and the Trustee will 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 will be read into the Trust Agreement against the Trustee and no permissive right of the Trustee under the Trust Agreement will 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 thereof is specifically required to be furnished to the Trustee, the Trustee will 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 will exist:

(i) the Trustee will not be liable for any error of judgment made in good faith by a responsible officer or officers of the Trustee unless it will be proved that the Trustee was negligent in ascertaining the pertinent facts, and

(ii) the Trustee will 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 25% or a majority, as the Trust Agreement will require, in aggregate principal amount of the Bonds, Parity Debt and TIFIA Indebtedness 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 will 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.

The Trustee will 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 by the Trust Agreement or in the enforcement of any rights and powers thereunder, until it will 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, will reimburse the Trustee from Receipts for all costs, expenses, outlays and counsel fees and other reasonable disbursements properly incurred in connection therewith. If the Authority fails to make such reimbursement, the Trustee may reimburse itself from any money in its possession under the provisions of the Trust Agreement and will be entitled to a preference therefor over any Indebtedness Outstanding.

The Trustee will 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 will have no responsibility in respect of the validity or sufficiency of the Trust Agreement, or in respect of the validity of Bonds, Parity Debt and TIFIA Indebtedness or the due issuance or execution and delivery thereof. The Trustee will be under no obligation to see that any duties therein imposed upon the Authority, any Bond Registrar, any consultant, any Depository (other than a Depository in which money will have been deposited by the Trustee under the provisions of the Trust Agreement) or any party other than itself, or any covenants therein contained on the part of any party other than itself to be performed, will be done or performed, and the Trustee will be under no obligation for failure to see that any such duties or covenants are so done or performed.

The Trustee will 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 will have been deposited by the Trustee under the provisions of the Trust Agreement). The Trustee will 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 will be made in accordance with the provisions of the Trust Agreement. The immunities and exemptions from liability of the Trustee under the Trust Agreement will extend to its directors, officers, employees and agents.

Except upon the happening of any Event of Default specified in clauses (a), (b), (e) or (f) described in "THE TRUST AGREEMENT – Events of Default" above, or the explicit report of an Event of Default pursuant to the Trust Agreement, the Trustee will 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 25% in aggregate principal amount of Bonds, Parity Debt and TIFIA Indebtedness then Outstanding.

Subject to the acceptance of appointment by a successor Trustee, the Trustee may resign and thereby become discharged from the trusts created by the Trust Agreement, 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 Senior Lien Parity Debt, not less than sixty (60) days before such resignation is to take effect, but such resignation will take effect immediately upon the appointment of a new Trustee under the Trust

Agreement if such new Trustee will be appointed before the time limited by such notice and will then accept the trusts under the Trust Agreement.

### **Supplemental Trust Agreements**

The Authority and the Trustee may, from time to time and at any time, execute and deliver supplemental trust agreements (which supplemental trust agreements will thereafter form a part hereof) as will 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, will 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 therein, 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 therein 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.

At least thirty (30) days prior to the execution and delivery of any supplemental trust agreement for any of the purposes set forth above, the Trustee will 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 Parity Debt and TIFIA Indebtedness. Such notice will briefly set forth in the nature of the proposed supplemental trust agreement and will 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 Parity Debt and TIFIA Indebtedness. A failure on the part of the Trustee to mail such notice will not affect the validity of such supplemental trust agreement.

The Owners and Holders of not less than a majority in aggregate principal amount of Senior Lien Indebtedness then Outstanding, the Owners and Holders of not less than a majority in aggregate principal amount of the Subordinate Lien Indebtedness then Outstanding and the Owners and Holders of not less than a majority in aggregate principal amount of the TIFIA Indebtedness then Outstanding will 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 therein contained will permit, or be

construed as permitting (a) an extension of the maturity of the principal of or the interest on any Senior Lien Indebtedness, Subordinate Lien Indebtedness or TIFIA Indebtedness without the consent of the Owner or Holder of such Senior Lien Indebtedness, Subordinate Lien Indebtedness or TIFIA Indebtedness, (b) a reduction in the principal amount of any Senior Lien Indebtedness, Subordinate Lien Indebtedness or TIFIA Indebtedness or the redemption premium or the rate of interest on any Senior Lien Indebtedness, Subordinate Lien Indebtedness or TIFIA Indebtedness without the consent of the Owner or Holder of such Senior Lien Indebtedness, Subordinate Lien Indebtedness or TIFIA Indebtedness, (c) the creation of a pledge, charge and lien upon the Receipts other than the pledge, charge and lien created by the Trust Agreement without the consent of all of the Owners and Holders of Senior Lien Indebtedness, Subordinate Lien Indebtedness or TIFIA Indebtedness then Outstanding, (d) a preference or priority of any Senior Lien Indebtedness, Subordinate Lien Indebtedness or TIFIA Indebtedness over any other Senior Lien Indebtedness, Subordinate Lien Indebtedness or TIFIA Indebtedness except as expressly provided by the Trust Agreement without the consent of all of the Owners and Holders of Senior Lien Indebtedness, Subordinate Lien Indebtedness or TIFIA Indebtedness then Outstanding or (e) a reduction in the aggregate principal amount of the any Senior Lien Indebtedness, Subordinate Lien Indebtedness or TIFIA Indebtedness required for consent to such supplemental trust agreement without the consent of all of the Owners and Holders of Senior Lien Indebtedness, Subordinate Lien Indebtedness or TIFIA Indebtedness then Outstanding. For purposes of clauses (a) through (e) of this paragraph, notwithstanding any provisions in the Trust Agreement or in any Supplemental Agreement or Parity Debt Resolution to the contrary, a Bond Insurer or Credit Provider will not be deemed to be the Owner or Holder of Senior Lien Indebtedness, Subordinate Lien Indebtedness or TIFIA Indebtedness.

Nothing contained in the Trust Agreement, however, will be construed as making necessary the approval by Owners or Holders of Senior Lien Indebtedness, Subordinate Lien Indebtedness or TIFIA Indebtedness of the execution and delivery of any supplemental trust agreement as authorized in the Trust Agreement. Furthermore, notwithstanding for the foregoing provisions of this clause, to the extent that the Holders or Owners of Senior Lien Indebtedness, Subordinate Lien Indebtedness or TIFIA Indebtedness, as the case may be, are not “affected” by the proposed supplemental trust agreement as provided in the Trust Agreement described in “THE TRUST AGREEMENT – Senior Lien Indebtedness, Subordinate Lien Indebtedness and TIFIA Indebtedness Affected” below, the consent of such Owners and Holders of not less than a majority in aggregate principal amount of Senior Lien Indebtedness, Subordinate Lien Indebtedness and TIFIA Indebtedness then Outstanding, as the case may be, will not be required as described 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 under this clause, the Trustee will cause notice of the proposed supplemental trust agreement to be mailed, postage prepaid, to all Owners Bonds affected thereby at their addresses as they appear on the registration books and to all Holders of Parity Debt and TIFIA Indebtedness affected thereby in accordance with the related Parity Debt Resolution or TIFIA Loan Agreement as of the date of mailing such notice. Such notice will briefly set forth the nature of the proposed supplemental trust agreement and will 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, Parity Debt and TIFIA Indebtedness. The Trustee will not, however, be subject to any liability to any Owner or Holder of Bonds, Parity Debt or TIFIA Indebtedness by reason of its failure to cause the notice required by the Trust Agreement to be mailed, and any such failure to cause the notice required by the Trust Agreement to be mailed and any such failure will not affect the validity of such supplemental trust agreement when consented to and approved as provided in the Trust Agreement.

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,

Subordinate Lien Indebtedness and TIFIA Indebtedness then Outstanding that are affected by a proposed supplemental trust agreement, which instrument or instruments will refer to the proposed supplemental trust agreement described in such notice and will 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 Senior Lien Indebtedness, Subordinate Lien Indebtedness or TIFIA Indebtedness whether or not such Owner or Holder will have consented thereto.

If the Owners or Holders of not less than a majority in aggregate principal amount of any Senior Lien Indebtedness, Subordinate Lien Indebtedness or TIFIA Indebtedness then Outstanding at the time of the execution and delivery of such supplemental trust agreement and that are affected, as defined in the Trust Agreement and described in “THE TRUST AGREEMENT – Senior Lien Indebtedness, Subordinate Lien Indebtedness and TIFIA Indebtedness Affected” below, by a proposed supplemental trust agreement have consented to and approved the execution and delivery thereof as provided in the Trust Agreement, to the extent permitted by law, no Owner or Holder of any Senior Lien Indebtedness, Subordinate Lien Indebtedness or TIFIA Indebtedness will 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 TIFIA Indebtedness Affected**

For purposes of the Trust Agreement, Senior Lien Indebtedness, Subordinate Lien Indebtedness or TIFIA Indebtedness will 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 TIFIA Indebtedness against the Authority or the rights of such Owners or Holders in the security for such Senior Lien Indebtedness, Subordinate Lien Indebtedness or TIFIA 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 TIFIA Indebtedness would be affected by any supplemental trust agreement, and any such determination will be conclusive upon the Owners and Holders of all Senior Lien Indebtedness, Subordinate Lien Indebtedness or TIFIA Indebtedness, whether theretofore or thereafter issued or incurred. The Trustee will not be liable for any such determination made in good faith.

#### **Defeasance**

When:

(a) the Bonds, Parity Debt and TIFIA Indebtedness secured by the Trust Agreement will 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 will be paid; and

(b) if the Bonds, Parity Debt and TIFIA Indebtedness will not have become due and payable in accordance with their terms, the Trustee or any Bond Registrar will 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, Parity Debt and TIFIA Indebtedness then Outstanding to

the maturity date or dates of such Bonds, Parity Debt and TIFIA 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, Parity Debt or TIFIA Indebtedness are to be called for redemption or prepayment, irrevocable instructions to call the Bonds, Parity Debt or TIFIA Indebtedness for redemption or prepayment will have been given by the Authority to the Trustee; and

(d) sufficient funds will 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;

then and in that case the right, title and interest of the Trustee in the funds, accounts and subaccounts mentioned in the Trust Agreement will 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 will release the Trust Agreement and will execute such documents to evidence such release as may be required by such counsel, and the Trustee will 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, Parity Debt or TIFIA Indebtedness. Otherwise, the Trust Agreement will be, continue and remain in full force and effect; provided, however, that in the event Defeasance Obligations will be deposited with and held by the Trustee or the Bond Registrar as provided in the Trust Agreement, (i) in addition to the requirements set forth in the Trust Agreement with respect to redemption, the Trustee, within thirty (30) days after such Defeasance Obligations will have been deposited with it, will cause a notice signed by the Trustee to be mailed, postage prepaid, to all Owners and to all Holders of Bonds, Parity Debt and TIFIA Indebtedness, setting forth (a) the date or dates, if any, designated for the redemption of the Bonds, Parity Debt or TIFIA Indebtedness, (b) a description of the Defeasance Obligations so held by it, and (c) that the Trust Agreement has been released in accordance with the provisions of the Trust Agreement, and (ii) (a) the Trustee will nevertheless retain such rights, powers and privileges under the Trust Agreement as may be necessary and convenient in respect of the Bonds, Parity Debt and TIFIA Indebtedness for the payment of the principal, interest and any premium for which such Defeasance Obligations have been deposited and (b) each Bond Registrar will 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, will 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 the Trust Agreement will be held in trust and applied to the payment, when due, of the obligations payable therewith.

### **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 will have no rights under the Trust Agreement to direct the method and place of conducting any remedial proceedings to be taken by the Trustee thereunder and will have no voting rights with respect thereto or for any other purpose under the Trust Agreement, but will only have the right to enforce those specific rights granted to such counterparties under the Trust Agreement, including, without limitation, those rights with respect to the application of moneys in the Revenue Fund.

## **THE FIRST SUPPLEMENTAL TRUST AGREEMENT**

### **Establishment of Subaccounts**

The following Subaccounts of the accounts of the Senior Lien Debt Service Fund are established by the First Supplemental Trust Agreement:

- (a) Series 2009 Subaccount of the Interest Account;
- (b) Series 2009 Subaccount of the Capitalized Interest Account;
- (d) Series 2009 Subaccount of the Principal Account;
- (e) Series 2009 Subaccount of the Redemption Account; and
- (f) Series 2009 Subaccount of the Sinking Fund Account.

The subaccounts mentioned above will be established with and held by the Trustee pursuant to the Trust Agreement and the First Supplemental Trust Agreement.

### **Receipts; Series 2009 Subaccount of the Capitalized Interest Account.**

(a) The Trustee will deposit or cause to be deposited, from Receipts held in the Revenue Fund, to the various accounts and subaccounts specified in the First Supplemental Trust Agreement the amounts provided by the Trust Agreement and described in "SECURITY AND SOURCES OF PAYMENT FOR THE SERIES 2009 BONDS – Application of Receipts" in this Official Statement.

(b) On the date of issuance of the Series 2009 Bonds, the Authority will cause to be deposited to the Series 2009 Subaccount of the Capitalized Interest Account, the amount of \$48,755,259. On each Interest Payment Date, commencing January 1, 2010, the Trustee will apply such funds in the Series 2009 Subaccount of the Capitalized Interest Account for payment of interest due on the Series 2009 Bonds on such Interest Payment Date. On July 1, 2013, the Trustee will transfer the balance of any funds remaining in the Series 2009 Subaccount of the Capitalized Interest Account to the Series 2009 Subaccount of the Interest Account (to be applied to pay interest on the Series 2009 Bonds on January 1, 2014).

(c) The Trustee will deposit to the Series 2009 Subaccount of the Redemption Account all amounts as will be delivered to the Trustee by the Authority from time to time with instructions that such amounts be so deposited.

### **Application of Money in the Series 2009 Subaccount of the Sinking Fund Account**

(a) To the extent funds have been deposited to the Series 2009 Subaccount of the Sinking Fund Account and are available, the Trustee will, at the request of the Authority, endeavor to purchase and cancel Term Bonds or portions thereof subject to redemption by operation of the Series 2009 Subaccount of the Sinking Fund Account or maturing on the next ensuing January 1 at the direction of an Authorized Officer. The purchase price of each such Term Bond will not exceed par plus accrued interest to the date of purchase. The Trustee will pay the interest accrued on such Term Bonds to the date of settlement therefor from the Series 2009 Subaccount of the Interest Account and the purchase price from the Series 2009 Subaccount of the Sinking Fund Account. No such purchase will be made by the Trustee from money in the Series 2009 Subaccount of the Sinking Fund Account within the period of forty-five (45) days immediately preceding any January 1 on which such Term Bonds are subject to redemption. If in

any Bond Year the sum of the amount on deposit in the Series 2009 Subaccount of the Sinking Fund Account for the payment of any Term Bonds and the principal amount of the Term Bonds that were purchased during such Bond Year pursuant to the provisions described in this paragraph (a) or delivered during such Bond Year to the Trustee by the Authority exceeds the Sinking Fund Requirement for the Outstanding Term Bonds for such Bond Year, the Trustee will endeavor to purchase Outstanding Term Bonds with such excess money.

(b) The Trustee will call for redemption on January 1 the Term Bonds then subject to redemption in a principal amount equal to the aggregate Sinking Fund Requirement for the Term Bonds for such Bond Year, less the principal amount of any such Term Bonds retired since the prior January 1 by purchase pursuant to paragraph (a) above or delivered during such Bond Year to the Trustee by the Authority. If the amount available in the Series 2009 Subaccount of the Sinking Fund Account on a January 1 is not equal to the Sinking Fund Requirement for the Term Bonds for the corresponding Bond Year less the principal amount of any such Term Bonds so delivered or purchased and retired, the Trustee will apply the amount available in the Series 2009 Subaccount of the Sinking Fund Account to the redemption of Term Bonds then subject to redemption so as to exhaust, to the extent practicable, the amount available. On each redemption date the Trustee will withdraw from the Series 2009 Subaccount of the Sinking Fund Account the amount required to pay the Redemption Price of the Term Bonds so called for redemption. The amount of interest on the Term Bonds so called for redemption will be paid from the Series 2009 Subaccount of the Interest Account. If such date is the stated maturity date of any Term Bonds, the Trustee will not call those Term Bonds for redemption but, on such maturity, will withdraw the amount required for paying the principal of such Term Bonds when due and payable.

If on any date there is money in the Series 2009 Subaccount of the Sinking Fund Account and no Term Bonds are then Outstanding or if on any payment date money remains therein after the mandatory redemption of Term Bonds in accordance with the Sinking Fund Requirement therefor, the Trustee will withdraw such money therefrom and will apply the same as follows and in the following order: (a) deposit in the Series 2009 Subaccount of the Interest Account, the Series 2009 Subaccount of the Principal Account and the Senior Lien Parity Reserve Account, the amounts, if any, required to be paid thereto in such month and (b) deposit all remaining amounts to the Revenue Fund.

If, in any Bond Year, by the application of money in the Series 2009 Subaccount of the Sinking Fund Account, the Trustee should purchase or receive from the Authority and cancel Term Bonds in excess of the aggregate Sinking Fund Requirement for such Bond Year, the Trustee will file with the Authority not later than the twentieth (20th) day prior to the next January 1 on which Term Bonds are to be redeemed, a statement identifying the Term Bonds purchased or delivered during such Fiscal Year and the amount of such excess. The Authority will thereafter cause an Officer's Certificate to be filed with the Trustee not later than July 15 of the following Bond Year setting forth with respect to the amount of such excess the Fiscal Years in which the Sinking Fund Requirements with respect to Term Bonds are to be reduced and the amount by which the Sinking Fund Requirements so determined are to be reduced.

Upon the retirement of any Term Bonds by purchase and redemption pursuant to the provisions of the Trust Agreement, the Trustee will file with the Authority a statement identifying such Bonds and setting forth the date of purchase or redemption, the amount of the purchase price or the Redemption Price of such Term Bonds, and the amount paid as interest thereon. The expenses incurred in connection with the purchase or redemption of any such Term Bonds will be paid by the Authority from the Revenue Fund or from any other available moneys.

## **Application of Money in the Series 2009 Subaccount of the Redemption Account**

The Trustee will apply money in the Series 2009 Subaccount of the Redemption Account to the purchase or redemption of Series 2009 Bonds as follows:

(a) Subject to the provisions of paragraph (c) below, the Trustee will endeavor to purchase and cancel Series 2009 Bonds or portions thereof, regardless of whether such Bonds or portions thereof are then subject to redemption, at the direction of an Authorized Officer, provided that the purchase price of each Series 2009 Bond will not exceed the Redemption Price that would be payable on the next redemption date to the Owner of such Series 2009 Bond under the provisions of the applicable Series 2009 Subaccount of the Redemption Account. The Trustee will pay the interest accrued on such Bonds or portions thereof to the date of settlement from the Series 2009 Subaccount of the Interest Account and the purchase price from the Series 2009 Subaccount of the Redemption Account, but no such purchase will be made by the Trustee from money in the Series 2009 Subaccount of the Redemption Account within the period of forty-five (45) days immediately preceding any date on which such Series 2009 Bonds or portions thereof are to be redeemed.

(b) Subject to the provisions of paragraph (c) below, the Trustee will call for redemption on a date permitted by the First Supplemental Trust Agreement such amount of Series 2009 Bonds or portions thereof as, with the redemption premium, if any, will exhaust the money then held in the Series 2009 Subaccount of the Redemption Account as nearly as may be practicable; provided, however, that not less than Fifty Thousand Dollars (\$50,000) in principal amount of the Series 2009 Bonds will be called for redemption at any one time unless the Trustee is so instructed by the Authority. The Trustee will pay the accrued interest on the Series 2009 Bonds or portions thereof to be redeemed to the date of redemption from the Series 2009 Subaccount of the Interest Account and the Redemption Price of such Bonds or portions thereof from the Series 2009 Subaccount of the Redemption Account. The Trustee will withdraw from the Series 2009 Subaccount of the Redemption Account and set aside the respective amounts required to pay the Redemption Price of the Series 2009 Bonds or portions thereof so called for redemption.

(c) Money in the Series 2009 Subaccount of the Redemption Account will be applied by the Trustee in each Fiscal Year to the purchase or the redemption of Series 2009 Bonds then Outstanding in accordance with the latest Officer's Certificate filed with the Trustee designating the Series 2009 Bonds to be redeemed, and if such Series 2009 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 (i) the Trustee will apply such money to the purchase of Series 2009 Bonds bearing the highest rate of interest, (ii) if Series 2009 Bonds of more than one maturity bear the same interest rate, the Trustee will redeem such Series 2009 Bonds in the inverse order of maturities, and (iii) if the Series 2009 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.

Upon the retirement of any Series 2009 Bonds by purchase or redemption, pursuant to the provisions of the First Supplemental Trust Agreement, the Trustee will file with the Authority a statement identifying such Series 2009 Bonds and setting forth the date of purchase or redemption, the amount of the purchase price or the Redemption Price of such Bonds and the amount paid as interest thereon. The expenses incurred by the Trustee in connection with the purchase or redemption of any such Series 2009 Bonds will be paid by the Authority from the Revenue Fund or from any other available moneys.

## **Payment of Principal, Interest and Premium and Pledge of Receipts**

The Authority covenants that it will promptly pay the principal of and the interest on every Series 2009 Bond issued under the provisions of the First Supplemental Trust Agreement at the places, on the dates and in the manner provided therein and in said Series 2009 Bonds, and any premium required for the retirement of said Series 2009 Bonds by purchase or redemption, according to the true intent and meaning thereof. The Authority further covenants that it will faithfully perform at all times all of its covenants, undertakings and agreements contained in the First Supplemental Trust Agreement and the Trust Agreement, or in any Series 2009 Bond executed, authenticated and delivered under the First Supplemental Trust Agreement or in any proceedings of the Authority pertaining thereto. The Authority represents and covenants that it is duly authorized under the Constitution and laws of the State, particularly the Act, to issue the Series 2009 Bonds authorized hereby and to pledge the Receipts in the manner and to the extent in the First Supplemental Trust Agreement and in the Trust Agreement set forth; that all action on its part for the issuance of the Series 2009 Bonds has been duly and effectively taken; and that such Series 2009 Bonds in the hands of the Owners thereof are and will be valid and binding special obligations of the Authority payable according to their terms.

## **Supplemental Trust Agreements**

The Authority may, from time to time and at any time, execute and deliver such Trust Agreements supplemental to the First Supplemental Trust Agreement (which supplemental Trust Agreements will thereafter form a part hereof) as will be substantially consistent with the terms and provisions of the First Supplemental Trust Agreement and, in the opinion of the Trustee, who may rely upon a written opinion of legal counsel, will not materially and adversely affect the interest of the Owners:

(a) to cure any ambiguity or formal defect or omission, to correct or supplement any provision in the First Supplemental Trust Agreement that may be inconsistent with any other provision therein, to make any other provisions with respect to matters or questions arising under the First Supplemental Trust Agreement or to modify, alter, amend, add to or rescind, in any particular, any of the terms or provisions contained in the First Supplemental Trust Agreement;

(b) to grant or to confer upon the Trustee for the benefit of the Owners any additional rights, remedies, powers, authority or security that may lawfully be granted to or conferred upon the Owners or the Trustee;

(c) to add to the covenants and agreements of the Authority in the First Supplemental Trust Agreement other covenants and agreements thereafter to be observed by the Authority or to surrender any right or power herein reserved to or conferred upon the Authority;

(d) to permit the qualification of the First Supplemental 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 First Supplemental 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

(e) to provide for the issuance of Series 2009 Bonds in bearer form.

At least thirty (30) days prior to the execution and delivery of any supplemental Trust Agreement for any of the purposes described under this clause, the Trustee will cause at the Authority's expense a notice of the proposed supplemental Trust Agreement to be mailed first-class, postage prepaid, to the

Local Government Commission and to all Owners of the Series 2009 Bonds. Such notice will briefly set forth the nature of the proposed supplemental Trust Agreement and will state that copies thereof are on file at the designated corporate trust office of the Trustee for inspection by all Owners of the Series 2009 Bonds. A failure on the part of the Trustee to mail such notice will not affect the validity of such supplemental Trust Agreement.

Subject to the terms and provisions contained in the First Supplemental Trust Agreement and described under this clause, and not otherwise, the Owners of not less than a majority in aggregate principal amount of the Series 2009 Bonds then Outstanding that will be affected, as defined in the Trust Agreement, by a proposed supplemental Trust Agreement will have the right, from time to time, anything contained in the First Supplemental Trust Agreement to the contrary notwithstanding, to consent to and approve the execution and delivery by the Authority and the Trustee of such supplemental Trust Agreement as will be 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 First Supplemental Trust Agreement or in any supplemental Trust Agreement; provided, however, that nothing therein contained will permit, or be construed as permitting (a) an extension of the maturity of the principal of or the interest on any Series 2009 Bond without the consent of the Owner of such Series 2009 Bond, (b) a reduction in the principal amount of any Series 2009 Bond or the redemption premium or the rate of interest thereon without the consent of the Owner of such Series 2009 Bond, (c) the creation of a pledge, charge and lien upon the Receipts other than the pledge, charge and lien created by the Trust Agreement without the consent of all Owners of the Series 2009 Bonds then Outstanding, (d) a preference or priority of any Series 2009 Bond over any other Series 2009 Bond without the consent of all Owners of the Series 2009 Bonds then Outstanding, or (e) a reduction in the aggregate principal amount of Series 2009 Bonds required for consent to such supplemental Trust Agreement without the consent of all Owners of the Series 2009 Bonds then Outstanding. Nothing contained in the First Supplemental Trust Agreement, however, will be construed as making necessary the approval by the Owners of the execution and delivery of any supplemental Trust Agreement as authorized in the First Supplemental Trust Agreement.

The Trustee will, at the expense of the Authority, such expense to be paid from the Revenue Fund or from any other available moneys, cause notice of the proposed supplemental Trust Agreement to be mailed, postage prepaid, to the Local Government Commission and all Owners of the Series 2009 Bonds as of the date such notice is mailed. Such notice will briefly set forth the nature of the proposed supplemental Trust Agreement and will state that copies thereof are on file at the principal corporate trust office of the Trustee for inspection by all Owners. The Trustee will not, however, be subject to any liability to any Owner by reason of its failure to mail such notice, and any such failure will not affect the validity of such supplemental Trust Agreement when approved and consented to as provided in the First Supplemental Trust Agreement.

Whenever, at any time within three (3) years after the date of the mailing of such notice, the Authority will deliver to the Trustee an instrument or instruments in writing purporting to be executed by the Owners of not less than a majority in aggregate principal amount of Series 2009 Bonds then Outstanding that are affected, as defined in the First Supplemental Trust Agreement, by a proposed supplemental Trust Agreement, which instrument or instruments will refer to the proposed supplemental Trust Agreement described in such notice and will 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, whether or not such Owner will have consented thereto.

If the Owners of not less than a majority in aggregate principal amount of the Series 2009 Bonds Outstanding at the time of the execution and delivery of such supplemental Trust Agreement and that are affected, as defined in the First Supplemental Trust Agreement, by a proposed Trust Agreement have consented to and approved the execution and delivery thereof as therein provided, to the extent permitted by law, no Owner will 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 enjoin or restrain the Authority or the Trustee from executing and delivering the same or from taking any action pursuant to the provisions thereof.

Upon the execution and delivery of any supplemental Trust Agreement pursuant to the provisions of the First Supplemental Trust Agreement, the First Supplemental Trust Agreement will be and be deemed to be modified and amended in accordance therewith, and the respective rights, duties and obligations under the First Supplemental Trust Agreement of the Authority, the Trustee and all Owners will thereafter be determined, exercised and enforced in all respects pursuant to the provisions of the First Supplemental Trust Agreement, as so modified and amended.

**APPENDIX C**

**SUMMARY OF CERTAIN PROVISIONS OF THE DESIGN-BUILD CONTRACTS**

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## APPENDIX C

### SUMMARY OF CERTAIN PROVISIONS OF THE DESIGN-BUILD CONTRACTS FOR THE TRIANGLE PARKWAY AND WESTERN WAKE FREEWAY

*Set forth below is a summary of certain provisions of the Design-Build Contracts for the Triangle Parkway and Western Wake Freeway. This summary is qualified in its entirety by reference to the Design-Build Contracts, copies of which can be obtained from the Authority. All capitalized terms used in the summary of the Design-Build Contracts and not otherwise defined therein shall have the meanings assigned them in the Design-Build Contracts.*

#### I. DESIGN-BUILD CONTRACT

“Design-Build” project delivery involves combining both design and construction responsibilities under a single contract, providing a single point of responsibility for those two critical project elements. Design-Build project delivery enhances the likelihood of timely project completion and cost control by permitting a variety of aspects of a project, including design, obtaining governmental permits and right-of-way, bidding, procurement and construction, to occur concurrently rather than in sequential completed steps.

The Triangle Expressway is expected to open for service in two phases. The first phase, which will be the northernmost portion of the Triangle Expressway, will have two separate northern entry points. The first entry point is the roadway now designated as NC 540 sometimes referred to as the Northern Wake Expressway, which runs through the southern portion of the Research Triangle Park from NC 54 to NC 55 near Morrisville, North Carolina. The second northern entry point will be a new 3.4 mile roadway to be constructed from NC 147 to connect with NC 540 at a point between NC 54 and NC 55. The portion of the Triangle Expressway System running from these two points to NC 55 is planned to be in service as a toll road within thirty months upon issuance of the Series 2009 Bonds. This new road to be constructed in this phase is sometimes referred to as the “Triangle Parkway.” The Northern Wake Expressway between NC 54 and NC 55 is in operation now as a free facility, but will be re-designated as part of the Triangle Expressway when the Triangle Parkway segment is opened to traffic. The second phase, commonly referred to as the “Western Wake Freeway,” will run from NC 55 (the end of the first phase) to the NC 55 Bypass at Holly Springs, North Carolina and is planned to be in service approximately one year following the opening of the Triangle Parkway, or 42 months after the issuance of the Series 2009 Bonds.

On July 11, 2008 and July 25, 2008, the Authority received Technical and Cost Proposals for the highway Design-Build contracts for the Triangle Parkway and Western Wake Freeway segments of the Project, respectively, from six groups of contractors, each of which was prequalified with respect to its financial condition by the Authority. On August 20, 2008, the Authority issued a Conditional Notice of Award for the Western Wake Freeway to Raleigh-Durham Roadbuilders, a joint venture between Archer Western Contractors, Ltd. and Granite Construction Company. The lead design consultant for the team is The LPA Group. Also on August 20, 2008 the Authority issued a Conditional Notice of Award for the Triangle Parkway to S.T. Wooten Corporation. Rummel, Klepper & Kahl, LLP is serving as the lead design firm for the S.T. Wooten team. The Contracts between Authority and the Design-Build Teams will be executed upon availability of funds. The terms and conditions of the two Contracts (other than pricing, liquidated damages, bonuses, fuel adjustments and guaranteed completion dates) are substantially similar.

The Authority believes the Design-Build Contracts will enable the Projects to be completed in a timely and cost-effective manner with limited risk of completion delays and increased costs. In this regard, the Design-Build Contracts allocate the risks associated with design defects, certain potential cost overruns, and certain construction delays to the Design-Build Teams rather than the Authority. However, under the Design-Build Contracts, the Authority has retained certain risks associated with the Project, including costs of: property acquisition, certain utility relocations, acquisition of initial environmental approvals, hazardous material remediation, and cost increases in asphalt cement and fuel attributable to inflation.

The costs of acquiring the Right-of-Way will be borne by the Authority. The costs of additional Right-of-Way or easements required by the Design-Build Team's design and construction methods will be borne by the respective Design-Build Team and are explicitly incorporated into the Design-Build Team's Price Proposal and lump sum contract amount. Delayed access to parcels of the right of way may entitle the Design-Build Team to day-for-day time extensions if it impacts the critical path.

## **II. RISKS ASSUMED BY THE AUTHORITY**

The Authority is responsible for:

- o Costs of relocation of utilities with substantiated prior rights. (See Design and Construction.)
- o Costs of acquiring the Right-of-Way as shown on the preliminary map. (See Design-Build Contract.)
- o Costs associated with the clean-up of hazardous, contaminated, and/or toxic material. (See Changes to the Contract Price – Hazardous Materials.)
- o Delays that are beyond the Design-Build Team's control and do not originate with the Design-Build Team's fault or negligence. (See Contract Completion Dates and Liquidated Damages – Time Extensions.)
- o Delays that result from the Authority's failure to make parcels of the project Right-of-Way available to the Design-Build Team. (See Contract Completion Dates and Liquidated Damages – Time Extensions.)
- o Costs of obtaining necessary written authority from railway companies for the establishment of a railway crossing or for the performance of work on railway right of way. (See Design and Construction.)
- o Acquisition of the USACE Section 404 Permit and the NCDENR (DWQ) Section 401 Water Quality Certification for this project. Modifications will be at the respective Design-Build Team's expense. (See Government Approvals – Environmental Approvals.)
- o Cost increases associated with a delay in financial close. (See General.)
- o Costs associated with price increases for fuel and asphalt cement. (See Fixed Price Contract.)
- o Certain costs related to alterations in the plans and/or details of construction by Authority. (See Changes to the Contract Price.)

- o Certain costs related to extra work ordered by Authority. (See Changes to the Contract Price.)
- o Certain costs and delays related to suspensions of the work ordered by Authority. (See Changes to the Contract Price)

### **III. RISKS ASSUMED BY THE DESIGN-BUILD TEAM**

The Design-Build Teams have assumed responsibility for the following delays, consequences and costs:

- o Site conditions differing from the subsurface investigation (Type 1 Differing Site Conditions). (See Contract Completion Dates and Liquidated Damages – Differing Site Conditions and Utility Relocations.)
- o Project design, including the use of portions of the Authority or NCDOT design(s), modifications of such design, or other designs submitted by the Design-Build Team. (See Design and Construction.)
- o Coordination with the utility companies following Conditional Notice of Award and costs of new water and sewer facilities, adjustments, and temporary structures. (See Design and Construction.)
- o Correction of non-conforming work and any latent defects. (See Final Acceptance.)
- o Claims resulting from project design and performance of the work, including indemnifying the Authority and NCDOT against such claims (See Design and Construction; Insurance and Indemnification.)
- o Protecting the project and repairing any damage prior to final acceptance. (See Design and Construction.)
- o Compliance with laws and regulations related to safety, health, and sanitation on the project site and ensuring the safety of workers. (See Design and Construction.)
- o Failure to attain Substantial and Final Completion by the dates specified in the Contract. (See Contract Completion Dates and Liquidated Damages.)
- o Obtaining approval for proposed changes in the Authority design. (See Design and Construction.)
- o Procuring all permits (not previously acquired by Authority) and licenses; paying all charges, fees, and taxes; and giving all notices necessary for the prosecution of the work. (See Design and Construction.)
- o Coordination with the Authority and preparation of documents related to environmental permit modifications. (See Governmental Approvals – Environmental Approvals.)

- o Performing environmental assessments for any new areas to be impacted that were not reviewed in the NEPA process. (See Governmental Approvals – Environmental Approvals.)
- o Obtaining historical preservation clearance and/or other regulatory permits related to borrow and waste sites. (See Governmental Approvals – Historical Preservation Permits.)
- o Correcting work that does not conform to the Design-Build Team’s warranties. (See Warranties.)
- o Obtaining and enforcing subcontractor warranties. (See Warranties.)
- o Delays not on a critical path. (See Contract Completion Dates and Liquidated Damages.)

#### **IV. FIXED CONTRACT PRICE**

The total price to be paid to the Triangle Parkway Design-Build Team for the performance of all of its obligations with respect to the Triangle Parkway Project is \$137,446,000. The total price to be paid to the Western Wake Freeway Design-Build Team for the performance of all of its obligations with respect to the Western Wake Freeway Project is \$446,460,000.

The contract price for either Contract may be increased by a change order (supplemental agreement) approved in accordance with contract terms or in the event that the Authority orders a suspension of work. In addition, there are bonuses and incentives built into the Contracts to encourage timely completion, cooperation among contractors and efforts at erosion control.

For each Contract, the price includes all equipment, materials, labor, and services relating to the Design-Build Team’s obligations under the Design-Build Contract (including all equipment and services provided by subcontractors and vendors and intellectual property rights necessary to perform the work), the Design-Build Team’s performance of all the work, and payment of all federal, state, and local taxes arising out of the Design-Build Team’s or any subcontractor’s performance of the work under the Design-Build Contract, including any increase in such taxes during the term of the Design-Build Contract, and including any private approvals or governmental approvals and any duties, fees, and royalties imposed with respect to any equipment, materials, labor, or services.

The Design-Build Contracts also permit price adjustments for increases (or decreases) in the cost of fuel and asphalt cement. These cost adjustments will apply for the difference between the price paid for these commodities and the base prices included in the Design-Build Contract. The base prices for diesel fuel and asphalt binder in the Triangle Expressway Contracts are \$4.0016 per gallon and \$628.85 per ton, respectively.

#### **Substantial Completion Bonuses**

To encourage timely completion and cooperation among the contractors who will impact this project, the Authority will pay a bonus of \$1.5 million if Substantial Completion for the Triangle Parkway segment is achieved by the Substantial Completion Date specified in the Triangle Parkway Contract and toll collection and enforcement technology is fully implemented with appropriate accuracy levels. The Triangle Parkway Design-Build Team will receive 85% of this bonus, with the remainder going to the ITS Contractor and the Toll Integrator. If the Triangle Parkway Project does not qualify for the bonus above, but achieves Substantial Completion by the date specified in the Contract, the Authority will pay

the Triangle Parkway Design-Build Team a \$1 million bonus. In addition, the Authority will pay a bonus of \$3 million if Substantial Completion for the Western Wake Freeway project is achieved by the Substantial Completion Date specified in the Western Wake Freeway Contract and toll collection and enforcement technology is fully implemented with appropriate accuracy levels. The Western Wake Freeway Design-Build Team will receive 85% of this bonus, with the remainder going to the ITS Contractor and the Toll Integrator. If the Western Wake Freeway Project does not qualify for the bonus above, but achieves Substantial Completion by the date specified in the Contract, the Authority will pay the Western Wake Freeway Design-Build Team a \$2 million bonus.

## **V. CHANGES TO THE CONTRACT PRICE**

In addition to adjustments in the contract price for changes in the prices of fuel and asphalt cement, the Design-Build Contracts allow changes in the contract price for distinct actions by the Authority and/or unanticipated issues and/or events. The Engineer has the authority to enter into Supplemental Agreements that amend the Contract and/or to provide authorized time extensions whenever necessary to complete the proposed construction. Supplemental Agreements become a part of the Contract when executed by the Engineer and an authorized representative of the Design-Build Team. The Contract allows for adjustments in the contract price in the following situations:

- (1) Alterations of Plans or Details of Construction
- (2) Suspensions of Work Ordered by the Engineer
- (3) Eliminated Contract Items
- (4) Extra Work
- (5) Hazardous Materials
- (6) Differing Site Conditions and Utility Relocations

### **Alterations of Plans or Details of Construction**

The Engineer has the right to make, at any time during the progress of the work, such alterations in the Contract as may be found necessary or desirable. The Engineer may make an adjustment in the affected contract unit or lump sum prices due to alterations in the Contract that he determines will materially change the character of the work and the cost of performing the work.

The Design-Build Team must notify the Engineer in writing prior to performing work which it believes is an alteration of the Contract which materially changes the character and cost of performing the work. After receiving such notification, the Engineer will investigate and determine whether the affected work materially changes the character and cost of performing the work. Once he has made his determination, the Engineer will provide written notification to the Design-Build Team. If the Engineer determines that the alteration is not a material change, and the Design-Build Team still intends to file a claim for additional compensation, the Design-Build Team must notify the Engineer in writing prior to beginning the altered work. Failure to notify the Engineer in writing prior to performing work in dispute will bar any claim for additional compensation.

## **Suspension of Work Ordered by the Engineer**

If the Engineer suspends in writing the work for a period of time not originally anticipated, customary, or inherent to the construction industry, and the Design-Build Team believes that additional compensation for idle equipment and/or labor is due as a result, the Design-Build Team must notify the Engineer of its intent to file a claim within 7 days of the suspension. After resuming work, the Design-Build Team has 14 calendar days to submit to the Engineer a written claim setting forth the reasons and support for an adjustment in compensation, including cost records.

The Design-Build Team can also request, in writing prior to or immediately upon any suspension, compensation for suspension without a written suspension by the Engineer, if it believes it has been prevented from performing all or any portion of the work for a period of time not originally anticipated, customary, or inherent to the construction industry because of conditions beyond the control of and not the fault of the Design-Build Team, its suppliers, or subcontractors at any tier.

If the Engineer agrees, the Engineer will issue a written suspension. If he disagrees, the Engineer will notify the Design-Build Team in writing. If the Design-Build Team disagrees with the Engineer's decision, it must submit its claim setting forth the reasons and support for a compensation adjustment to the Engineer within 14 days after the last day of the alleged suspension.

## **Eliminated Contract Items**

The Engineer may eliminate any item from the Contract. The Authority may reimburse the Design-Build Team for the verified cost of contract items partially completed prior to notification of their elimination, and pre-fabricated materials less their salvage value. No payment will be made for loss of anticipated profits.

## **Extra Work**

The Design-Build Team will perform extra work whenever it is deemed necessary or desirable by the Engineer. Extra work that is specifically authorized by the Engineer will be paid for either as the parties agree, or if the parties are unable to agree on payment, then the Engineer will issue a force account notice prior to the Design-Build Team beginning work. If the Design-Build Team is required to perform what it believes to be extra work, it must notify the Engineer in writing prior to performing such work. If the Engineer agrees that it is extra work, he will approve compensation as above, either as agreed by the parties or via force account. If the Engineer notifies the Design-Build Team that the work is not considered extra work, and the Design-Build Team still intends to file a claim for additional compensation, it must notify the Engineer in writing prior to beginning the work. Failure to provide such notice prior to performing the alleged extra work will bar any claim for additional compensation.

## **Hazardous Materials**

When the Design-Build Team's operations encounter or expose any abnormal condition that may indicate the presence of a hazardous, contaminated, and/or toxic material, such operations must be discontinued in the vicinity of the abnormal condition and the Engineer must be notified immediately. Upon notification by the Design-Build Team, the Engineer will investigate the work and, if necessary, suspend the work. The Design-Build Team's operations will not resume until so directed by the Engineer.

Disposal of the hazardous material will be made in accordance with the requirements and regulations of the Department of Human Resources and the Department of Environment, Health & Natural Resources.

The Design-Build Team will be paid for disposing of hazardous materials. If no such pay items have been established for the work involved, the Design-Build Team will perform the work and will be paid as provided for extra work. As an alternative, the Engineer may choose to have the work performed by others.

### **Differing Site Conditions and Utility Relocations**

No increase in the contract price is allowed for Type 1 differing site conditions\* (conditions differing from the subsurface investigation). The Design-Build Team is cautioned to make such independent investigation and examination as necessary to satisfy itself as to conditions to be encountered in the performance of the work and with respect to possible local material sources, the quality and quantity of material available from such property, and the type and extent of processing that may be required in order to produce material conforming to the requirements of the Contract. The Contract does not provide for increases relating to Type 2 site conditions.

## **VI. CONTRACT COMPLETION DATES AND LIQUIDATED DAMAGES**

The Western Wake Freeway Design-Build Team is obligated to achieve Substantial Completion and Final Completion by the dates specified in the Western Wake Freeway Contract. For the Western Wake Freeway Project, the Authority will be entitled to liquidated damages of \$25,000 per calendar day for failure to achieve Substantial Completion, and \$10,000 per calendar day for failure to achieve Final Completion. The Triangle Parkway Design-Build Team is obligated to achieve Substantial Completion and Final Completion by the dates specified in the Triangle Parkway Contract. For the Triangle Parkway Project, the Authority will be entitled to liquidated damages of \$10,000 per calendar day for failure to achieve Substantial Completion, and \$5,000 per calendar day for failure to achieve Final Completion.

Time extensions granted by the Authority according to the provisions of the Contract would apply to both the Substantial Completion Date and the Final Completion Date.

Each Design-Build Team is responsible for satisfying the following requirements prior to Substantial Completion: (i) through traffic has been placed along the Project or along the work so that all lanes and shoulders are open such that traffic can move unimpeded at the posted speed and intersecting roads and service roads are completed to the extent that they provide the safe and convenient use of the facility by the public; (ii) the final layers of pavement for all lanes and shoulders along the mainline alignment of the project are complete; (iii) all signs for the purposes of safe travel, enforcement of any applicable laws, and guidance of the public are complete and accepted, including any required for toll collection purposes; (iv) all guardrails, drainage devices, ditches, and embankments are completed; (v) remaining Project Work on the mainline alignment of the project consists of permanent pavement markings, permanent pavement markers or incidental construction that is away from the paved portion of the roadway; (vi) toll collection technology is implemented and operating, and revenue collection can begin; and (vii) a satisfactory warranty bond is executed and provided to the Authority.

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\* Type 1 differing site conditions are generally defined as conditions which differ materially from those expressly indicated in the reports and investigations furnished by the owner. Type 2 differing site conditions do not depend on what is depicted in the reports and investigations; rather, they are generally defined as conditions of an unusual nature that differ from what a bidder reasonably should have anticipated for work of the kind undertaken.

## **Time Extensions**

The Design-Build Contracts provide that the Substantial Completion Date and the Final Completion Date may only be changed by an extension approved in writing by the Engineer. Under the Design-Build Contract no extensions will be granted until a delay occurs which impacts the project's critical path, consumes all available float, and extends the work beyond the contract completion date or intermediate completion date.

The Engineer will only consider allowing time extensions (i) if the Design-Build Team's current controlling operation(s) are delayed by circumstances originating from work required under the Contract and beyond its control and without his fault or negligence, such as are commonly covered by a force majeure clause – change in law, natural disaster, etc., (ii) if changes in the work from that originally contemplated in the Contract are ordered by the Engineer and these changes result in reduction in quantities, elimination of items, additional work and/or extra work; or (iii) on a day-for-day basis (beyond an initial 20-day grace period) to the extent the Authority fails to make a parcel of Right-of-Way available and the Design-Build Team can show an impact on the critical path.

No time extension related to Right-of-Way access will be granted for indirect delays, such as weather, borrow availability, or seasonal construction limitations. When there are two or more causes for a critical delay, or in the case that two paths of activities are concurrently critical, the Engineer will only grant a time extension if all the causes for the critical delay are determined to be excusable.

## **Differing Site Conditions and Utility Relocations**

No extension of time will be allowed for Type 1 differing site conditions. The Design-Build Team is cautioned to make such independent investigation and examination as necessary to satisfy itself as to conditions to be encountered in the performance of the work and with respect to possible local material sources, the quality and quantity of material available from such property, and the type and extent of processing that may be required in order to produce material conforming to the requirements of the Contract. The Contract is silent with respect to Type 2 differing site conditions.

## **VII. EROSION AND SEDIMENTATION CONTROL INCENTIVES AND LIQUIDATED DAMAGES**

The Design-Build Team will be eligible for an incentive in the amount of \$150,000.00 if construction operations have been performed in accordance with all environmental regulations and the project 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 shall result in a forfeiture of the entire incentive noted above. The Design-Build Team will forfeit \$50,000.00 from the \$150,000.00 incentive noted above for each ICA and/or CICA violation. After the entire \$150,000.00 incentive is forfeited, Liquidated Damages in the amount of \$12,500.00 per any type of violation shall be deducted from the lump sum bid amount due the Design-Build Team.

## **VIII. DESIGN AND CONSTRUCTION.**

Among other things, the Design-Build Contract requires the Design-Build Team to:

- o Provide all necessary materials, machinery, implements, appliances, tools, labor, and other means of construction, except as otherwise noted, to perform all the work and required labor to design, construct and complete all the work necessary for the Contract, no later than the guaranteed Substantial Completion Date in accordance with the requirements of the Engineer, the Final RFP, the 2006 *NCDOT Standard Specifications for Roads and Structures*, specifications prepared by the North Carolina Turnpike Authority (Authority), NCDOT Special Provisions, and the Technical Proposals prepared by the Design-Build Teams, at the lump sum price(s).
- o Assume full responsibility, including liability, for the project design, including the use of portions of the Authority or NCDOT design, modification of such design, or other designs as may be submitted by the Design-Build Team.
- o Be fully and totally responsible for the accuracy and completeness of all work performed under this Contract, and indemnify and hold the Authority and the NCDOT harmless for any additional costs and all claims against the Authority or the State which may arise due to errors or omissions of the Authority or the NCDOT in furnishing the preliminary project designs and information, and of the Design-Build Team in performing the work.
- o Bear the cost of relocating, adjusting or installing water and sewer facilities when such adjustment or placement is made necessary by the construction of the project, and the provision of temporary utility facilities during adjustment. The Team is also responsible for the cost of utility coordination activities with all utility companies. Prior to selection of the Contractors, Authority was responsible for coordinating with the utility companies. For the Western Wake Freeway project, Authority retained the TBE Group as its “utilities coordinator” to coordinate the relocation of all utilities and draft all utility agreements. Likewise, the Authority retained Mulkey Inc. to serve as the utility coordinator for Triangle Parkway. The utility coordinators confirmed utility locations, types of facilities, utility owners and the cost responsibilities in order to coordinate the relocation of any utilities in conflict with the project.
- o For all work to be performed on railway right of way, to carry such railroad protective insurance and public liability and property damage insurance.
- o Obtain written authority from the railway corporation and bear all costs related to railroad crossings that are not at existing public crossings or required by the Contract, including installation, drainage, maintenance, any necessary insurance, watchman service, flagging protection, and removal of such private railway crossing. When the Design-Build Team is required by the Contract to transport materials or equipment across the tracks of any railway or to perform work on railway right of way, the Authority will obtain any necessary written authority from the railway company for the establishment of a railway crossing or for the performance of work on railway right of way.
- o Take every precaution to protect the project against injury or damage, and rebuild, repair, restore, and make good all injuries or damages to any portion of the work before final acceptance, at its expense.
- o Be responsible for all materials, and properly store them, if necessary, and provide suitable drainage of the roadway and erect necessary temporary structures at no cost to the Authority.

- o Comply with all applicable Federal, State, and local laws, ordinances, and regulations governing safety, health, and sanitation, and provide all safeguards, safety devices, and protective equipment, and take any other needed actions, on his own responsibility that are reasonably necessary to protect the life and health of employees on the job and the safety of the public, and to protect property in connection with the performance of the work covered by the Contract.
- o Be responsible for designing in accordance with the applicable documents and current revisions and supplements developed, published, or adopted for use by Authority which are to be used in the design of this project.
- o Inform the Authority Chief Engineer and the NCDOT State Alternative Delivery Engineer in writing of any proposed changes to the Authority and/or NCDOT preliminary designs, Technical Proposal and / or previously reviewed submittals, and obtain approval prior to incorporation.
- o Certify all plans, specifications, estimates and engineering data furnished by the Team.
- o Be fully and totally responsible for the accuracy and completeness of all work performed under this Contract.
- o Save the Authority and NCDOT harmless and be fully liable for any additional costs and all claims against the Authority and NCDOT which may arise due to errors, omissions and negligence of the Design-Build Team in performing the work required by this Contract.
- o Obtain written consent of the Authority prior to any assignment, subletting or transfer of the interest of the Design-Build Team in any of the work covered by the Contract, other than property searches and related services.
- o Perform all work in a manner satisfactory to the Authority and in accordance with the established customs, practices, and procedures of the NCDOT and Authority, and in conformity with the standards adopted by the American Association of State Highway Transportation Officials, and approved by the U.S. Secretary of Transportation as provided in Title 23, U.S. Code, Section 109 (b). The decision of the Authority will control in all questions regarding location, type of design, dimension of design, and similar questions.
- o Cooperate with the Engineer, his inspectors, and other contractors in every way possible, and give the work the constant attention necessary to facilitate progress and satisfactory performance.
- o Procure all permits and licenses except as otherwise specified; pay all charges, fees, and taxes; and give all notices necessary and incident to the due and lawful prosecution of the work.
- o For asphalt plants and concrete batch plants located on NCDOT or Authority rights-of-way, apply for and obtain all environmental permits and licenses, including stormwater permits, for plants prior to placement within the project limits or elsewhere on NCDOT or Authority rights-of-way. Use proven Best Management Practices and equip all plants

with such pollution control equipment and devices as is necessary to meet all applicable local, State and Federal pollution requirements. Conduct compliance monitoring and report findings to each applicable environmental regulatory agency according to their required frequency.

- o Conduct its work so as not to interfere with or hinder the progress or completion of the work being performed by other contractors, and cooperate with other contractor working within the limits of the same project.
- o Be responsible for any surveying, construction staking and layout required in the performance of the work, including the accuracy of lines, slopes, grades and other engineering work.
- o The Design-Build Team will be subject to oversight by the Authority Engineer and by a private engineering firm hired by Authority to provide construction and engineering oversight. (See Quality Control and Inspection).

## **IX. GOVERNMENT APPROVALS**

### **Environmental Permits**

The Authority has acquired the USACE Section 404 Permit and the NCDENR (DWQ) Section 401 Water Quality Certification for the Western Wake Freeway and Triangle Parkway projects. If modifications to these permits are necessary to accommodate the Design-Build Team's design, construction methods or utility relocations/construction, the Design-Build Team will be responsible for environmental agency coordination through Authority and preparing all documents required for the Authority to obtain permit modifications.

The Authority will not allow any contract time extensions associated with obtaining permit modifications, public involvement, environmental assessments, or additional agency coordination/approvals. Mobilization of personnel, materials, or equipment for site investigation or construction of the project will not occur in new jurisdictional areas impacted by design revisions, construction methods, and/or utility relocations/construction prior to obtaining the required permit modifications.

The Design-Build Team will be responsible for acquiring information and preparing permit drawings that reflect the impacts and minimization efforts as designed by the Design-Build Team. The permit modification application will consist of, at a minimum, a cover letter, permit drawings, half-size plans, completed impact forms, and a revised EEP acceptance letter, if necessary.

Direct coordination between the Design-Build Team, Authority, and NCDOT's State Alternative Delivery Engineer, will be necessary for proper development of the permit modification application. Upon completion of the permit modification application package, the Design-Build Team will forward the package to the Authority and NCDOT State Alternative Delivery Engineer concurrently, for review and acceptance.

Any temporary construction measures, including de-watering, borrow and waste sites, construction access, haul roads, etc. as well as all utility impacts will be addressed in the permit modification application. The Design-Build Team will also describe the construction methods for all structures. The description of the temporary impacts on jurisdictional resources will include restoration plans, schedules, and disposal plans.

In the event additional jurisdictional impacts beyond those identified in the permits received by the Authority result from design or construction details revised by the Design-Build Team, or from utility relocations or construction, suitable compensatory mitigation for the additional wetlands and streams will be the sole responsibility of the Design-Build Team.

The Design-Build Team will be required to analyze any new areas to be impacted that were not analyzed during the NEPA process or preparation of the permit application. This analysis will include performing all environmental assessments. The Design-Build Team will engage the services of a competent environmental consultant to conduct a full environmental investigation to include, but not be limited to, Federally Listed Threatened and Endangered Species, wetlands, streams, avoidance and minimization in jurisdictional areas, compensatory mitigation, FEMA compliance, historical, archaeological, and cultural resources surveys in these areas. The environmental consultant will obtain concurrence through NCDOT from the United States Fish and Wildlife Service to document compliance with Section 7 of the Endangered Species Act for those species requiring such concurrence. In addition, the Design-Build Team will fulfill any other requirements, including new or revised buffer rules, which may be imposed by the permitting agencies.

### **Historical Preservation Permits**

The Design-Build Team is responsible for obtaining certification from the State Historic Preservation Officer of the State Department of Cultural Resources certifying that the removal of borrow material from proposed borrow sources(s), or deposition of waste material to a proposed waste area will have no effect on any known district, site building, structure, or object, architectural and/or archaeological that is included or eligible for inclusion in the National Register of Historic Places, prior to the approval of any borrow sources developed for use on any project, or performance of any work on a proposed waste site.

## **X. PROGRESS PAYMENTS**

The Authority will make partial payments based upon the Engineer's review of the Design-Build Team's payment requests, which the Design-Build Team will prepare at least once a month on the date established by the Engineer. The Authority will not make a partial payment when the total value of work performed since the last partial payment, excluding mobilization, amounts to less than \$10,000.00. The Engineer may correct partial payments at any time prior to final payment, and these adjustments on partial payments will be final.

The Design-Build Team is obligated under the Design-Build Contract to use the most recent accepted cost-loaded CPM to estimate the value of the work performed and to submit the estimate of the value of the work performed and the updated cost-loaded schedule for each partial payment request. Failure to submit either part of the partial payment request will result in the Engineer withholding payment.

With each payment request, the Design-Build Team must certify that it has reviewed the cost-loaded CPM, that the payment request presents an accurate assessment of the level of completion of each work activity for which payment is being sought, and that the dollar value assigned to each work activity is reasonable and consistent with the dollar values assigned to all other work activities. The Engineer will only accept payment requests that have been certified by the Design-Build Team.

The Engineer will withhold from the partial payments amounts sufficient to cover any anticipated liquidated damages as determined by the Engineer. Authority will not pay interest to the Design-Build Team on payments that are withheld.

## **XI. CRITICAL PATH METHOD PROJECT SCHEDULE**

The Design-Build Team is required to use a cost-loaded Critical Path Method Project Schedule (CPM) for this project, which will assign a dollar value to each activity associated with the work, including the work of subcontractors, vendors, suppliers, utilities, railroads, permitting agencies, NCDOT, Authority, and all other parties associated with the Project.

### **Initial Cost-Loaded Critical Path Method Schedule (ICPM)**

The Design-Build Team has the option of submitting an interim CPM schedule within seven days of the Notice to Proceed, which can be used for the basis of payment requests for up to the first ninety days. After 90 days, or in lieu of the interim schedule, the Design-Build Team must submit for approval an Initial Cost Loaded Critical Path Method Schedule (ICPM), which will become the baseline schedule for the Project, and the first CPM of Record for the Project. The ICPM will include a schedule of all activities associated with the contract work, beginning with the “Notice to Proceed” and ending with “Project Completion.” Activities will be specifically described, and the ICPM will detail the nature, location, duration, value, float, predecessor and successor activities and various other attributes of each activity.

The Design-Build Team must submit a written narrative with the ICPM that explains the planned sequence of the work, the critical path, proposed phasing for the Project, the activity calendars, maintenance of traffic, milestone dates, labor and equipment resources, and the estimated payouts by month and by phase. The narrative will also explain how the Design-Build Team has provided for procurement of materials, weather, permitting requirements, environmental requirements, coordination with other contractors, coordination with local municipalities, coordination with ITS and Toll Integration Contractors, coordination with Authority’s right of way Agent, work to be performed in whole or in part by Authority or other government agencies, work to be performed by the utility companies, and any other scheduling assumptions made by the Design-Build Team.

The Engineer may reject the ICPM if it: does not adhere to the requirements of the Contract, makes unreasonable demands of Authority or third parties, or obscures the relationships between activities by over-use of start to start and finish to finish relationships or overuse of lag. The Engineer may also reject the ICPM if the dollar value assigned to any specific activity exceeds the Engineer’s estimate by more than 40% or \$100,000, or if the values assigned to activities expected to be completed early in the Project exceed the value assigned to the same or similar activities expected to finish late in the Project.

### **Schedule Updates**

The Design-Build Team will be responsible for providing schedule updates at least once every 35 days, as determined by the Engineer, until the final schedule is approved with 100% completion of all activities and all the work on the Project. Each schedule update will include an updated data date, actual start and finish dates for activities in the last period, new remaining durations for activities underway, and percent complete for each activity in the schedule. The Design-Build Team will use scheduling software to calculate early start/finish, late start/finish, total float and free float for each of the remaining activities in the schedule update.

### **Payout Schedule**

As part of the proposal process, the Design-Build Team will have submitted an “Anticipated Monthly Payout Schedule” that includes a monthly cost breakdown of the work anticipated to be

completed, beginning with the Notice to Proceed date and concluding with the Final Completion Date. The Anticipated Monthly Payment Schedule will parallel and agree with the project schedule submitted in the Technical Proposal, and conform to the maximum payout curve provided in the project special provisions.

The Authority's schedule of estimated completion progress for each project will be in accordance with the Design-Build Contracts.

## **XII. QUALITY CONTROL AND INSPECTION**

The Design-Build Team is required to employ an unaffiliated private engineering firm to perform Construction Engineering and Inspection (CEI). The CEI firm will be responsible for all quality control related construction inspection, field materials sampling and testing, and technician level contract administration for the construction of the project. The CEI firm will be responsible for ensuring that the project is constructed in close conformity with plans, specifications, and contract provisions, and for documenting any observed omissions, substitutions, defects, and deficiencies noted in the work.

All materials and work will be subject to inspection by the Engineer and/or the Engineer's representatives working on behalf of the Authority. The Design-Build Team is obligated to allow reasonable access to all parts of the work to the Engineer or his authorized representative, and furnish such information and assistance as is required to make a complete and detailed inspection.

If the Engineer requests it, the Design-Build Team, at any time before acceptance of the work, must remove or uncover such portions of the finished work as may be directed. After examination, the Design-Build Team must restore said portions of the work to the standard required by the specifications. The Design-Build Team is required to keep cost records of the work performed and if the uncovered work is found to be acceptable, the Authority will pay the Design-Build Team on a force account for the cost of uncovering, or removing, and the replacing of the covering or making good of the parts removed; but should the work so exposed or examined prove unacceptable, the uncovering, or removing, and the replacing of the covering or making good of the parts removed, will be at no cost to the Authority.

## **XIII. PAYMENT AND PERFORMANCE BONDS**

The Design-Build Team is required to provide the Authority with a payment and performance bond each in an amount equal to 100 percent of the amount of the Contract within 14 days after receiving written solicitation from Authority.

Each bond will include information on the date the bond is executed; the name of the principal; the name of the surety; the name of the contracting body; the amount of the bond; the contract number, and conditions required by North Carolina General Statute 44A-33. For the performance bond, the conditions will include representations that the principal and surety jointly and severally bind themselves and their heirs, executors, administrators, and successors to pay the Authority if the principal fails to perform and fulfill all the undertakings, covenants, terms, conditions, and agreements of the Contract during the original term and any extensions thereof that may be granted by the Authority, and during the life of any guaranty required under the Contract, and to perform all the undertakings, covenants, terms, conditions, and agreements of any and all duly authorized modifications of the Contract that may be made. The payment bond binds the principal and the surety in the same way to pay the Authority if the Principal fails to promptly make payment to all persons supplying labor and material in the prosecution of the work provided for the Contract, and any and all duly authorized modifications of the Contract that may be made. In both bonds, the sureties are to waive notice of contract modifications. The surety furnishing the bonds must be authorized to do business in North Carolina.

#### **XIV. FINAL ACCEPTANCE**

Upon apparent completion of the entire project, the Engineer will inspect the project for final acceptance. If all construction provided for and contemplated by the Design-Build Contract is found to be satisfactorily completed, the project will be accepted. Acceptance of any increment or part of a project will not operate to waive the assessment of all or any portion of liquidated damages assessable under the terms of the Contract.

When the inspection discloses any work, in whole or in part, as being unsatisfactory or incomplete, the Engineer will advise the Design-Build Team of such unsatisfactory or incomplete work, and the Design-Build Team will be required to immediately correct, repair, or complete such work. The project will not be accepted and the Design-Build Team will be responsible for the maintenance of the project and maintenance of traffic until all of the recommendations made at the time of the inspection have been satisfactorily completed. Should latent defects be discovered or become evident in an accepted portion of the project, the Design-Build Team must repair or replace such defective work at no cost to the Authority. However, upon expiration of the warranties described below, Design-Build Team will have no further liability to Authority for latent construction defects.

#### **XV. WARRANTIES**

Each Design-Build Team warrants that the work, as completed for the Project, meets all the requirements of the Contract Documents, is performed according to the released plans, and is in reasonably close conformity with the lines, grades, cross sections, dimensions, and material requirements, including tolerances shown in the Contract; that all materials and equipment furnished under the Contract Documents are of good quality and, when installed, are new; that all materials, as installed, are suitable for their intended use with appropriate testing conducted to ensure the materials meets or exceeds their design criteria; and that the Project is fit for use for the intended function. The Warranties regarding all elements of the Project will remain in effect until three years after the Final Acceptance Date. These warranties are binding on the Design-Build Team's successors, transferees, heirs, and assigns. The Design-Builder must furnish a single term warranty bond, in an amount of five percent of the lump sum contract amount, prior to contract award.

The appropriate Design-Build Team is required promptly to correct work rejected by the Authority for failing to conform to the Warranties, whether observed before or after the Final Acceptance Date, and will bear all costs of correcting such rejected work. Warranties will commence for each element of the Project on the Final Acceptance Date but in any event will not commence until all final acceptance punchlist items have been corrected and accepted by the Authority. If at any time within three years after the date on which the Warranties commenced with respect to any Project, or any portion of such Project is found to be not in accordance with the Warranties, the Design-Build Team and Authority must mutually agree when and how the Design-Build Team will remedy such violation.

The Design-Build Team is also required to obtain from all subcontractors and to cause to be extended to the Authority prudent representations, warranties, guarantees, and obligations with respect to design, materials, workmanship, equipment, tools, and supplies furnished by such subcontractors. During the Warranty period, the Design-Build Team will be responsible for enforcing or performing any subcontractor extended warranty.

#### **Warranty Bond**

The Design-Builder is required to furnish a single term warranty bond, in the amount of five percent of the lump sum contract price, prior to contract award. This bond will be applicable to the

Project Warranty and any specific Project elements set forth in the Contract Documents. The effective starting date of the warranty bond will be the proposed completion date of the project. The warranty bond will be released at the end of the warranty period. Should such extensions occur on specific project elements, there may be the opportunity to lower the bond amount for such extension to cover the warranty of the Corrective Work. The Design-Build Team will be liable to the Authority for any latent defects, fraud, or gross mistakes amounting to fraud, and with regard to the Authority's rights under any guaranty or warranty.

## **XVI. INSURANCE AND INDEMNIFICATION**

### **Insurance**

The applicable Design-Build Team for the Triangle Expressway System 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 for freight rail and/or \$10,000,000 for passenger rail is by the Contracts. The Contracts require \$5,000,000 in Aggregate coverage for freight and \$10,000,000 for passenger Per Annual. General liability insurance in the amount of \$1,000,000 per occurrence is required by the Professional Engineering Firm prequalification process utilized by Authority.

### **Indemnification**

The Design-Build Team is required to indemnify and save harmless the Authority Board and the NCDOT Board of Transportation and members and the Department of Transportation and Authority and their officers, agents, and employees from all suits, actions, or claims of any character brought for any injury or damages received or sustained by any person, persons, or property by reason of any act of the Design-Build Team, subcontractor, its agents or employees, in the performance of the contract.

The Design-Build Team's liability to save harmless and indemnify includes, but is not limited to, the following damages or claims related to the Design-Build Team's: failure to safeguard the work; failure to erect adequate barricades and post adequate warnings to the public of such barricades; use of defective materials or performance of defective work; infringement of patent, trademark, or copyright; failure to comply with or violations of laws, ordinances, orders, or decrees; blasting operations, regardless of negligence; failure to protect private or public property; or failure to control erosion in accordance with the Contract.

## **XVII. TERMINATION FOR CONVENIENCE**

The Authority may, in its sole discretion, terminate the Design-Build Contract and performance the work if any of the following conditions are present:

- (1) If it is impossible for the Design-Build Team to obtain critical materials for completion of the contract within a practical time limit, or
- (2) If it is impossible for the Design-Build Team to complete the work in accordance with the contract by reason of unanticipated conditions at the site, including slides and unstable subsoil,

without a major change in the design of the project and the Design-Build Team will be unduly delayed in completing the project by reason of such unanticipated conditions and changes in design, or

(3) If the Design-Build Team is prevented from proceeding with the contract as a direct result of an Executive Order of the President with respect to the prosecution of war or in the interest of national defense, or

(4) If the Design-Build Team is prevented from proceeding with the work required by the contract as a direct result of a restraining order, or other court order, or by reason of a permit requirement, and the Design-Build Team will be unduly delayed in completing the project by reason of such order or requirement, or

(5) If the Design-Build Team is prevented from proceeding with the work due to the unavailability of the site.

The Authority may also, in its sole discretion, terminate the Design-Build Contract and performance of the work in whole if the Authority determines that a termination is in the best public interest. If the Contract is terminated before completion of all items of work in the Contract, payment will be made for the actual number of acceptably completed items of work or acceptably completed portions thereof at the Contract unit or lump sum prices. If the Contract is terminated before completion of all items of work in the Contract and items of work are partially completed or not begun, payment will be made in accordance the provisions for eliminated items. (See “Changes in the Contract Price” above).

Upon request from the Design-Build Team, materials meeting the requirements of the Contract that were to have been incorporated into the work or were to remain the property of the Department or the Authority but are not used in the work will be paid for at the verified actual cost of such material delivered to a site designated by the Engineer, including any handling charges less any discount. No payment will be made for loss of anticipated profits.

Termination of a Contract will not relieve the Design-Build Team of its responsibilities for any completed portion of the work nor will it relieve his Surety, of its obligation for and concerning any just claims arising out of the work performed.

## **XVIII. TERMINATION FOR LACK OF FUNDS**

The Authority may terminate the Design-Build Contract in any fiscal year where funds will not be available for payment of the work to be performed during that fiscal year pursuant to the Contract. In the event of such termination of the Contract, the Design-Build Team shall be given a written notice of termination at least 60 days before completion of scheduled work for which funds are available. In the event of such termination, the Design-Build Team shall be paid for the work already performed in accordance with the Contract specifications.

## **XIX. DISPUTE RESOLUTION**

The Design-Build Contract provides for the resolution of disputes and claims arising thereunder by a Dispute Resolution Board composed of three persons, one selected by the Authority and approved by the Design-Build Team, one selected by the Design-Build Team and approved by the Authority and the third selected by the first two members. Any decision of the Dispute Resolution Board will be non-binding on the Authority and the Design-Build Team. However, the findings and recommendations of the Dispute Review Board will be admissible in subsequent proceedings.

At all times during the course of the dispute resolution process and during the course of litigation, the Design-Build Team is required to continue with the work, in a diligent manner and without delay, or conform to the Authority's decision or order, and will be governed by all applicable provisions of the Design-Build Contract. Because the decisions of the Dispute Resolution Board are non-binding, if either party disagrees with a decision, it may pursue other remedies, including litigation.

## **XX. DEFAULTS AND REMEDIES**

### **Declaration of Default**

The Authority will have the right to declare default of the Contract for breach by the Design-Build Team of any material term or condition of the Contract. Material breach by the Design-Build Team includes, but is not be limited to failure to begin work under the Contract within the time specified; failure to provide workmen, equipment, or materials adequate to perform the work in conformity with the Contract by the completion date; unsatisfactory performance of the work; refusal or failure to replace defective work; failure to maintain satisfactory work progress; failure to comply with equal employment opportunity contract requirements; insolvency or bankruptcy, or any act of insolvency or bankruptcy; failure to satisfy any final judgment within 10 calendar days after entry thereof; and making an assignment for benefit of creditors.

### **Sanctions**

In the event of a breach of the Contract by the Design-Build Team, the Authority will have the right, power and authority, in its sole discretion, without violating the Contract or releasing the surety: to assume full control of the prosecution of the Contract, directing Design-Build Team's agents, employees, and subcontractors in the performance of the work and in utilizing all materials, tools, machinery, equipment, and structures located on the project; to perform the work or any part thereof with Authority personnel and equipment or to utilize any or all materials and equipment located on the project that are suitable and acceptable; to relet the work upon such terms and conditions as the Authority deems appropriate; to employ any other methods that it may determine are required for completion of the Contract in an acceptable manner; and to withhold any sums due the Design-Build Team under the Contract without penalty or interest until the work is completed and accepted by the Authority.

### **Notice**

Before invoking any of the sanctions provided for herein, the Authority will give the Design-Build Team at least 7 calendar days written notice with a copy to the Surety, that will set forth the breach of Contract involved and the sanctions to be imposed. The Authority, in its discretion, may grant the Design-Build Team time in excess of 7 calendar days within which to comply with the Contract and the time allowed will be set forth in writing. If the Authority determines during such period that the Design-Build Team is not proceeding satisfactorily to compliance, it may impose the sanctions after 24 hours notice to the Design-Build Team. If the Authority determines that the Design-Build Team is not in compliance at the end of the time allowed, it may immediately impose any of the sanctions set forth herein and will advise the Design-Build Team, in writing, with a copy to the Surety of the sanctions imposed.

### **Payment**

After declaration of default has been made final, the Design-Build Team will be entitled to receive payment for work satisfactorily completed or portions of work satisfactorily completed, less any sums that may be due the Authority from the Design-Build Team. The Authority, at its election, may

retain the sum due the Design-Build Team, or any portion thereof, without interest or penalty, until the contract work is completed; or it may make payment to the Design-Build Team upon declaration of default for work satisfactorily completed to the date that notice of default is received by the Design-Build Team. The Design-Build Team may be required by the Engineer, however, to carry to a stage of completion satisfactory to the Engineer any work in progress, the value of which otherwise would be lost by immediate cessation of work. Payment for such work will be made upon the basis hereinafter set out.

If all costs and expenses incurred by the Authority arising out of the breach and imposition of sanctions, together with the total cost to the Authority of securing the performance of the work set forth in the Contract, exceed the sum that would have been payable under the Contract, the Design-Build Team and the Surety will be liable to the Authority for such excess and will pay such amount to the Authority.

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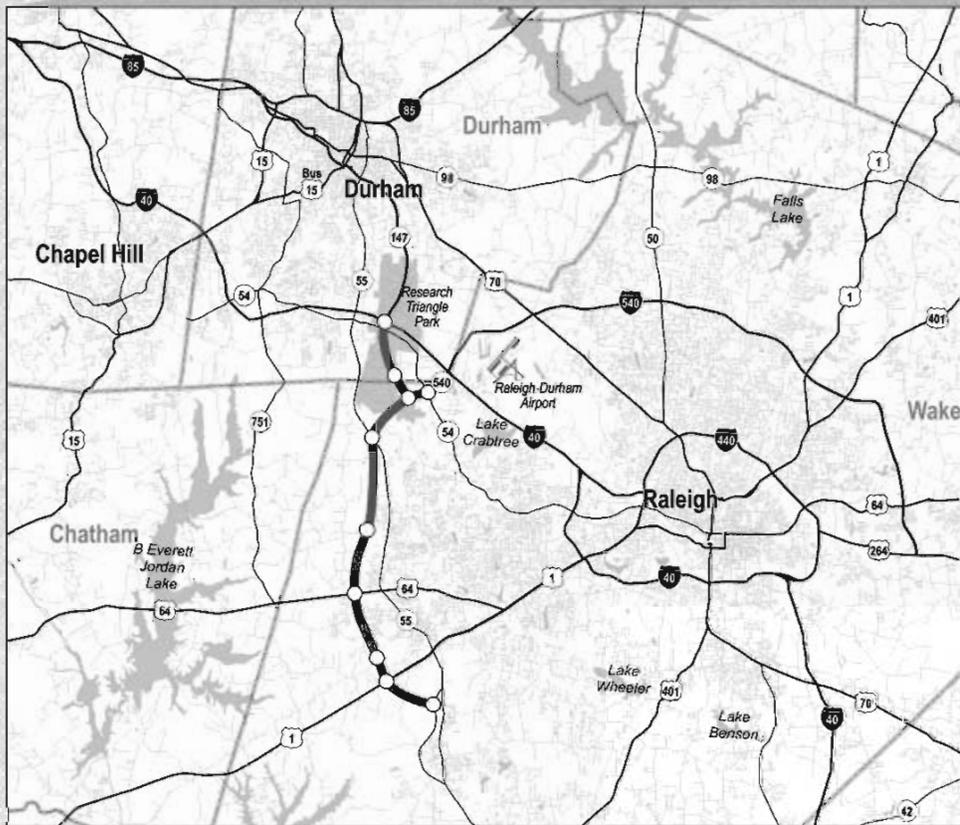
**APPENDIX D**  
**TRAFFIC AND REVENUE REPORT**

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# Triangle Expressway

# Comprehensive Traffic and Revenue Study

## Final Report



**Triangle Expressway**

# **Comprehensive Traffic and Revenue Study**

**Final Report**

Prepared For



Prepared By



April 2009



April 6, 2009

Mr. David Joyner  
Executive Director  
North Carolina Turnpike Authority  
5400 Glenwood Avenue  
Suite 400  
Raleigh, NC 27612

Re: **Comprehensive Traffic and Revenue Study – Proposed Triangle Expressway**

Dear Mr. Joyner:

Wilbur Smith Associates (WSA) is most pleased to submit this report summarizing the results of our comprehensive traffic and revenue study for the proposed Triangle Expressway in Wake and Durham Counties, North Carolina. This study was conducted at a level of detail that is considered sufficient for use in support of project financing.

The proposed Triangle Expressway (TriEx) is comprised of the Triangle Parkway that would extend from NC 147 to NC 540 through the Research Triangle Park and the Western Wake Freeway that would extend from NC 55 near Morrisville to NC 55 Bypass near Holly Springs. The connecting section between the Triangle Parkway and the Western Wake Freeway, a portion of NC 540 between NC 54 and NC 55, is currently in operation as a free facility and will become part of the Triangle Expressway when the Triangle Parkway is opened by 2012. The Western Wake Freeway is expected to open in 2013.

Toll operations and collection were important considerations during this study. Detailed analyses led the North Carolina Turnpike Authority (NCTA) board to decide to operate this toll facility as a free-flow, cashless system with electronic toll collection and video toll collection for customers without an electronic transponder.

We conducted additional economic and behavioral analyses for this study. An independent economist, the Kenan Institute of Private Enterprise of the Kenan-Flagler Business School at the University of North Carolina at Chapel Hill, reviewed and updated the latest regional socioeconomic forecasts that were used in the approved regional travel demand model. Travel characteristics and traveler behavior were also identified through origin-destination travel surveys and stated preference surveys. Finally, traffic and revenue estimates in this report were updated in March 2009 to reflect the impact of the current economic downturn. Methods used to complete this update are discussed in the report.

Our project manager, David Danforth, and other key members of the project team including Selvaraj Rayan, Will Letchworth, Bob Josef, and Cissy Szeto, as well as our subconsultant team, gratefully acknowledge the assistance provided by NCTA staff, CAMPO, DCHC, and others during the course of the study. We have appreciated this opportunity to be of service to the Authority.

Very truly yours,  
WILBUR SMITH ASSOCIATES

A handwritten signature in black ink, appearing to read 'Ed Regan III', written over a white background.

Edward J. Regan, III  
Executive Vice President

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# CHAPTER 1

## INTRODUCTION

The proposed Triangle Expressway (TriEx) in the Raleigh-Durham area is one of several candidate toll facility projects under consideration by the North Carolina Turnpike Authority (NCTA). Preliminary or “Level 2” traffic and revenue studies were conducted in 2006 for the TriEx and the NCTA decided to proceed with this “Level 3” study to support project financing on this approximate 18-mile facility that includes the Western Wake Freeway and Triangle Parkway.<sup>(1)</sup>

This report summarizes the results of a comprehensive traffic and revenue study which began in 2007. The study was initially completed, in draft form, in spring 2008. It was updated in mid-2008 to reflect rapidly increasing gasoline prices in effect at that time, culminating in the delivery of a draft report in September 2008. The findings were further updated in February and March 2009 to reflect the recent economic downturn as well as the return of motor fuel prices to normal levels. The traffic and revenue forecasts included in this document reflect the most recent updates, as well as the benefit of the various detailed analyses conducted in the study between mid-2007 and winter 2009.

### PROJECT DESCRIPTION

Figures 1-1 and 1-2 depict the project location and its relationship to the surrounding transportation system. The proposed Triangle Expressway is defined for this study as follows:<sup>(2)</sup>

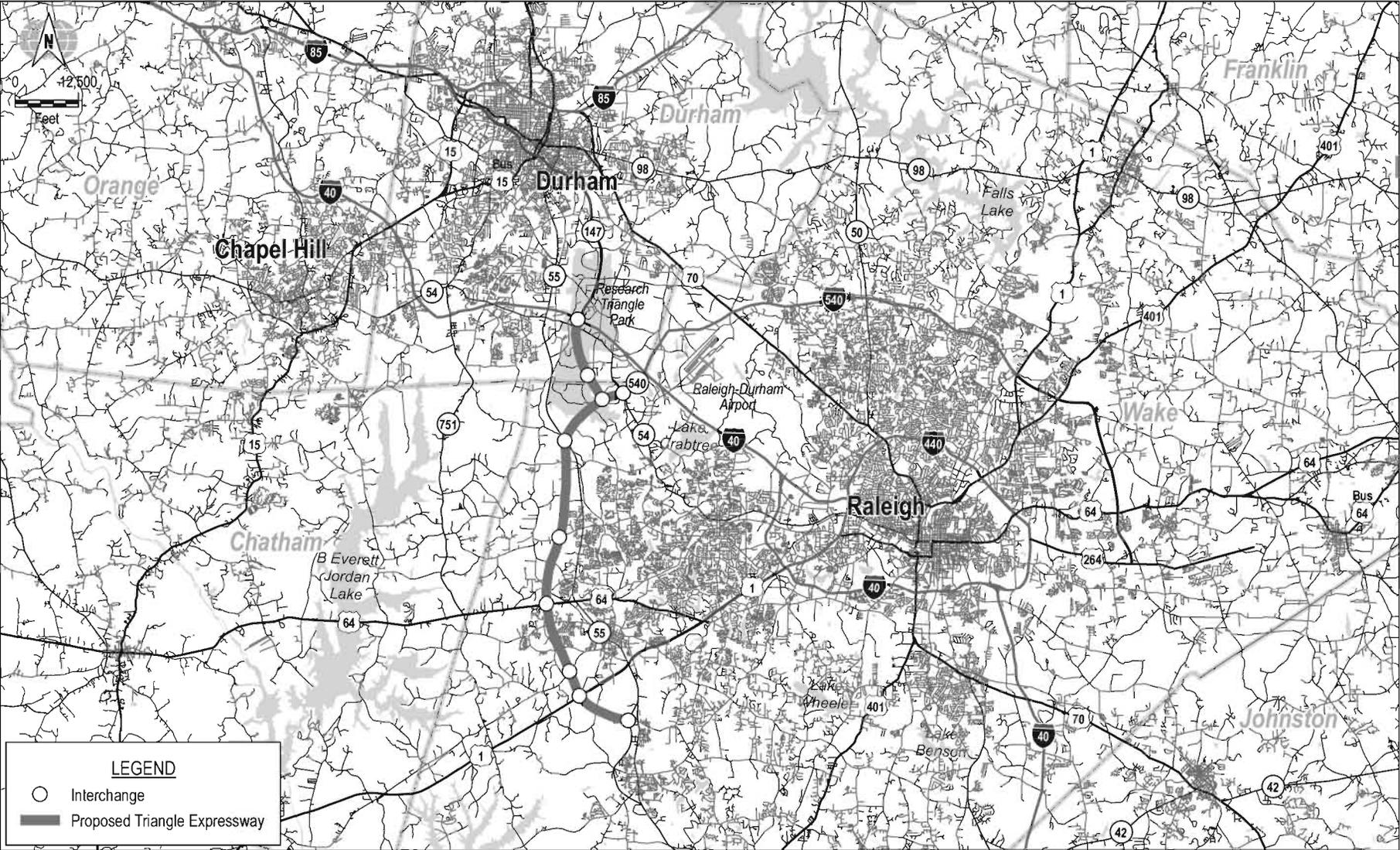
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<sup>(1)</sup> Proposed Triangle Parkway Preliminary Traffic and Revenue Study, Wilbur Smith Associates for the North Carolina Turnpike Authority, March 30, 2006.  
Proposed Western and Southern Wake Parkways Preliminary Traffic and Revenue Study, Wilbur Smith Associates for the North Carolina Turnpike Authority, June 16, 2006.

<sup>(2)</sup> The three designations discussed herein are based on the earlier studies and are included for continuity and clarity. The working name for the entire project is “Triangle Expressway.”

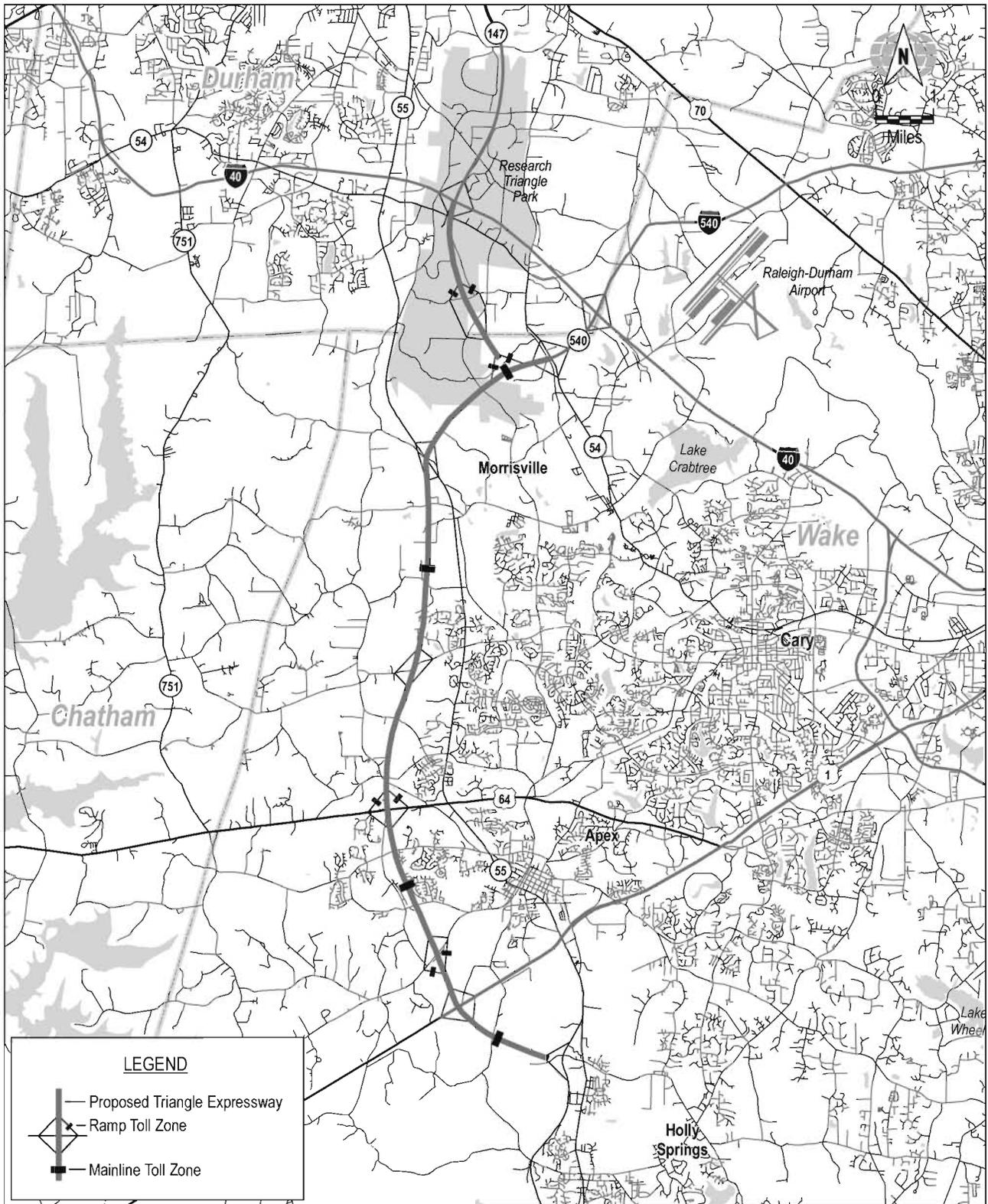
Proposed Triangle Expressway  
Comprehensive Traffic and Revenue Study

NC 103278 / 3-13-09 / Regional Location Map.mxd



# Proposed Triangle Expressway Comprehensive Traffic and Revenue Study

NC 103278 / 3-13-09 / Project Location and Toll System Configuration.mxd



## PROJECT LOCATION AND TOLL SYSTEM CONFIGURATION

FIGURE 1-2

- Triangle Parkway – NC 147/I-40 Interchange in Research Triangle Park to an interchange with NC 540 (3.4 miles);
- NC 540 - NC 54/NC 540 Interchange to NC 55 near Morrisville (2.8 miles); and
- Western Wake Freeway - NC 55 near Morrisville to NC 55 Bypass at Holly Springs (12.6 miles).

The proposed Triangle Expressway would extend for approximately 18 miles from the interchange of NC 540 and NC 54 south of Research Triangle Park at the northern end of the project to NC 55 Bypass near Holly Springs at the southern end of the project, and would include an approximate 3-mile connecting segment from NC 540 to NC 147 through the Research Triangle Park. The section of NC 540 between NC 54 and NC 55 is in operation now as a free facility, but will be re-designated as part of the Triangle Expressway when the Triangle Parkway is opened to traffic in 2012.

The Triangle Expressway would extend the planned and partially complete Wake Outer Loop around the greater Raleigh area. I-540, the northern portion of the Outer Loop terminates at I-40 and continues as state-designated NC 540 to NC 55 near Morrisville. NC 540 between NC 54 and NC 55 will become part of the Triangle Expressway in 2012. With the Triangle Expressway in place, drivers would have a high-grade facility from I-40 to NC 55 Bypass near Holly Springs, which would reduce congestion on the heavily-utilized parallel NC 55. It would also improve access into the Research Triangle Park and other area employment centers.

The Triangle Expressway would follow a generally north-south orientation parallel to NC 55. It would have 10 interchanges. This would provide significantly improved access to a rapidly developing area within the Triangle region, which, as noted below, is projected to have substantial increases in both population and employment over the next 25 years. NC 55 is currently being widened to a minimum of four lanes, with left-turn lane provisions. This will be the primary competing route to the Triangle Expressway. The improvement to NC 55 and other facilities was taken into consideration in this study. Other competing routes include Davis Drive, a major arterial facility located east of NC 55, and NC 751 to the west.

#### **PROJECT CONFIGURATION AND TOLL COLLECTION CONCEPT**

The project configuration is shown in Figure 1-2. Intermediate interchanges would be constructed at Davis Drive/Hopson Road, the junction of Triangle Parkway with NC 540 between NC 54 and NC 55, NC 55, Green Level Road, US 64, Old US 1 and US 1. The southern terminus of

this project would be at the NC 55 Bypass at Holly Springs. The northern termini would be at NC 147/I-40 and NC 54/NC 540.

An all-electronic, open road tolling (ORT) system is planned for the Triangle Expressway based upon analysis conducted for this study. The system will be structured as a barrier system with no free movements. Cash payments of tolls will not be available. Motorists not equipped for electronic toll collection (ETC) will be permitted to use the road under a video tolling system. ETC rates will be discounted from the base video rates.

Since all toll collection will be by either ETC or video at highway speeds, the Triangle Expressway will not have conventional toll plazas. Instead it will have locations, called “tolling zones,” with appropriate equipment to read transponders or to capture license plate information by digital video.

Figure 1-2 shows the nominal location of four mainline tolling zones:

- Between US 1 and NC 55 Bypass;
- Between US 64 and Old US 1;
- Between NC 55 and Green Level Road; and
- Within the interchange of the Triangle Parkway and NC 540.

Tolling zones would also be established on certain interchange ramps to ensure no toll-free travel for users of the Triangle Expressway. Under this tolling concept, motorists using the TriEx from “end to end” would pass through four tolling zones without having to stop to pay tolls.

#### **PROJECT PHASING**

The proposed Triangle Expressway is expected to open for service in two phases:

- January 1, 2012: NC 147 to NC 55 Near Morrisville and NC 540 between NC 54 and NC 55 (Triangle Parkway and NC 540); and
- January 1, 2013: NC 55 near Morrisville to NC 55 Bypass at Holly Springs (Western Wake Freeway).

#### **SCOPE OF WORK**

This study was a follow-on to the preliminary studies described earlier. Previously collected data was reviewed and updated as necessary. Inventories of the corridor operating conditions including traffic counts and speed-delay studies on competing and complementary routes within the traffic impact study area plus other relevant routes outside the study area

were conducted. Information on the planned transportation improvement program was reviewed to determine its prospective impact on the traffic and revenue potential of the Triangle Expressway.

Previous reports and study materials related to the proposed Triangle Expressway were also reviewed. This information included previous traffic analysis and transportation modeling analysis prepared by the two Metropolitan Planning Organizations (MPOs) in the area, the Capital Area MPO (CAMPO) and the Durham-Chapel Hill-Carrboro MPO (DCHC).

Supplemental traffic counts were conducted in the project corridor. This information facilitated both the calibration of the travel demand model used in the analysis and provided a “base case” count condition for use in the traffic impact analysis as described below.

#### **ORIGIN-DESTINATION SURVEY**

An origin-destination (OD) survey was conducted in the project area to identify current travel patterns and trip characteristics. A mail-back survey procedure was followed in which motorists were given survey cards while stopped at traffic signals and encouraged to return them by pre-paid mail. The information obtained in this survey was used to supplement the Triangle Regional Model.

#### **STATED PREFERENCE SURVEY**

Surveys were also conducted to provide value-of-time data for use in the toll diversion models. Interactive, notepad-based interviews were held at various employment centers, shopping areas, and government offices. Interactive, internet-based surveys were also conducted with OD survey participants who responded to the internet link provided on the OD survey card.

#### **TRAFFIC MODEL REFINEMENT**

The Triangle Regional Model (TRM) used in the preliminary studies was also used for this Level 3 study. This traffic model covers all of Wake, Durham, and Orange Counties as well as adjacent portions of Chatham, Johnston, Harnett, Granville, and Franklin Counties.

A new model platform and revised socioeconomic data was under development during this study but was not adopted by the MPOs prior to the publication of this report. Consequently the older model was used with new socioeconomic forecasts as described below.

The socioeconomic data used in the original TRM trip generation process was replaced by more recent forecasts prepared by the MPO and adjusted by an independent economist. Accordingly, new trip tables were developed by applying the new socioeconomic data to the trip generation, trip distribution, and mode choice modules of the TRM.

The revised base-year model was calibrated in the immediate project area to achieve the best traffic volume assignments compared to observed traffic counts and observed speeds during speed-delay studies. The model also was updated to reflect committed highway improvements.

The toll collection concept used in the preliminary studies was revised to reflect the NCTA's decision to use ORT without toll plazas. As was the case for the earlier studies, considerable zone disaggregation was required along the TriEx. The trip tables were disaggregated on a proportionate basis using the updated trip generation and distribution process. Future-year trip tables were also disaggregated to reflect the new disaggregated zone system.

Information was also obtained regarding regional and corridor income characteristics to aid in the development of estimated values-of-time for potential users of the candidate toll facility. Additional information from the stated preference survey was used to establish values-of-time by trip purpose and income level. This is a critical model parameter used to assess motorists' willingness to pay tolls and to estimate motorists' sensitivity to toll rates for the facility. Vehicle operating cost parameters were also established specific to the study corridor.

#### **INDEPENDENT CORRIDOR GROWTH ANALYSIS**

Economic growth is particularly important for a start-up toll facility such as the proposed Triangle Expressway. Given the strong employment-related growth in the Research Triangle region and population and employment growth in the project study area, analysis and validation of the projected economic activity is particularly important.

Since the completion of the preliminary studies, the MPOs began a reassessment of the Triangle Region's socioeconomic forecasts for use in the new transportation model that was under development during the Level 3 study. The new MPO forecasts as of June 2007, while not adopted by the MPOs during this study, were used by the independent economist in its review of study area growth.<sup>(3)</sup> The independent economist adjusted the

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<sup>(3)</sup> Kenan Institute for Private Enterprise of the University of North Carolina at Chapel Hill.

MPO's new forecasts as described in its report. These forecasts by the independent economist were then used in the transportation model to create new trip tables for the toll diversion analysis.

#### **TRAFFIC AND REVENUE ANALYSIS**

The refined models were used to run a series of traffic assignments, both with and without the proposed Triangle Expressway. In each case, traffic assignments were run at AM peak, PM peak and off-peak conditions. A review was made of the reasonableness of the travel demand estimates, particularly under a toll condition, using various evaluation techniques such as select link, corridor share, and capture rate.

Toll sensitivity curves were developed for 2012 traffic volumes and 2030 volumes to determine optimum toll rates. These optimum rates were then used to conduct traffic assignments for other years.

Based on the results of the traffic modeling analysis, annual estimates of traffic and revenue from the proposed Triangle Expressway were developed for the base-case condition from opening year 2012 through 2030. The forecasts beyond 2030 were based on a computational extrapolation of modeling results from 2030.

Revenue estimates in the early years of the projection period were adjusted to reflect ramp-up, a pattern of gradual build-up in demand for new toll facilities. This reflects the fact that the full demand along a facility is not typically realized when it opens but gradually phases in over a period of two to four years.

Finally, estimates of revenue leakage were prepared to reflect potential losses of revenue due to system operational factors, unreadable license plates, unidentified vehicle owners, and account collection factors.

#### **EFFECTS OF RECESSION**

Most of the analysis for this report was completed by August 2008 before the effects of the current recession were apparent. However, the traffic and revenue forecasts were adjusted during February and March 2009 to reflect the recession. The procedures used for this adjustment are described in Chapter 6. Revenue forecasts in this report reflect an estimate of the impact of the current economic downturn.

#### **SENSITIVITY TESTS**

A series of sensitivity tests were also performed to provide additional information on the sensitivity of the forecasts to changes in key parameters

such as higher and lower economic growth, different percentages of ETC usage, different values of time, different vehicle operating costs, longer ramp-up periods, the inclusion of additional toll facilities on the Southern Wake Freeway, increased use of transit in the study area, and the introduction of a hypothetical commuter rail service in the study area.

## **REPORT STRUCTURE**

The remainder of this report consists of six chapters.

- Chapter 2 presents the traffic conditions in the project study area.
- Chapter 3 contains a summary of the stated preference surveys.
- Chapter 4 describes the socioeconomic characteristics of the study area using the independent economist's socioeconomic forecast.
- Chapter 5 describes the analysis that led to the decision to adopt all electronic, open road tolling concept as the preferred toll collection method.
- Chapter 6 describes the development of the traffic forecast model, assumed roadway and transit improvements, toll configuration, toll sensitivity, recommended toll rates, traffic and gross revenue forecasts, and revenue leakage.
- Chapter 7 contains the results of a series of sensitivity tests on key model parameters.

# CHAPTER 2

## EXISTING TRAFFIC CONDITIONS

A major part of the effort involved in this phase of the study included the collection of existing data in order to:

- Understand existing travel behavior as a context for the evolution of future travel behavior after the proposed toll road and other area facilities planned for construction over the forecast period are built; and
- Calibrate the base year of the forecasting models to current/baseline observed traffic conditions to assure that the forecasting tools are adequately replicating current conditions in the study area prior to forecasting future traffic volumes.

To achieve these objectives, the latest travel data on traffic speeds, traffic volumes, and vehicle type in the study area were compiled. In addition, extensive route reconnaissance and a review of available traffic statistics on highways within the study area was conducted.

This current empirical documentation of the traffic network in the study area was augmented by available traffic trend data from North Carolina Department of Transportation (NCDOT). Available information on programmed highway improvements scheduled in the study area was incorporated into the analysis also.

This chapter describes the collection of data used to characterize the operational performance of existing facilities in the Triangle Expressway study area.

### EXISTING HIGHWAY SYSTEM

The proposed Triangle Expressway would facilitate traffic movement in a north-south direction between I-40 and I-540 and NC 55 southwest of Raleigh. It would pass through or near major employment centers, including

the Research Triangle Park, the dominant location for employment in the area. Table 2-1 summarizes the major features of the study area for the Triangle Expressway, which are described below.

- I-40 is the major east-west route in the Raleigh-Durham area. It extends from Wilmington on the coast across the State of North Carolina to the Tennessee state line and provides access to major cities along its length, including Asheville, Hickory, Winston Salem, Greensboro, Raleigh and Wilmington. In the area of the proposed project, I-40 is a limited access six to eight lane freeway with interchanges at I-540, Page Road, Miami Boulevard, Davis Drive, Durham Freeway (NC 147), and NC 55. The speed limit on I-40 is 65 mph.
- I-540 is part of a facility that eventually will provide an outer loop around Raleigh. Currently, I-540 extends from US 64 east of Raleigh to I-40 west of Raleigh. The eastern and southern sections of the I-540 Outer Loop, which will extend from US 64 Bypass east of Raleigh to NC 55 at Holly Springs, currently are not funded for right of way or construction. The speed limit on I-540 is 55 mph.
- NC 540 is a short section of the planned outer loop around Raleigh. NC 540 extends from I-40 between Raleigh and RTP to NC 55 near Morrisville. It is a six-lane median divided freeway with full control of access and interchanges at NC 54 and NC 55. The proposed Triangle Expressway will have its northern terminus at NC 54. The speed limit on NC 540 is 55 mph.
- US 1 is a major highway that runs north to south through Wake County. It is primarily a four-lane, median-divided expressway facility with 65 mph speed limits and multiple interchanges. US 1 is being widened at the time of this study.
- Old US 1 runs parallel to US 1. It is a two-lane roadway with numerous unsignalized intersections.
- US 64 is primarily an east-west route with interchanges at US 1 and NC 55. US 64 is a four-lane, median-divided highway that connects Raleigh, Apex and Cary to points west. Speed limits on US 64 are 45 and 55 mph.
- NC 54 extends east-west from NC 55, parallel to I-40, before turning south to become Miami Boulevard and Chapel Hill Road. It has between two and five lanes and a posted speed limit of 45 mph.



**Table 2-1  
Key Attributes of Major Routes Within the Study Area**

<b>Route</b>	<b>Location in Study Area</b>	<b>Direction in Study Area</b>	<b>Lanes Per Direction</b>	<b>Controlled Access</b>	<b>Traffic Signals</b>	<b>Posted Speed Limit</b>
Davis Drive	North of I-40 to US 64	North - South	1-3	No	Yes	45-55
Green Level Road	NC 55 to NC 751	East - West	1	No	No	45
I-40	Raleigh to Chapel Hill/Durham	East - West	3-4	Yes	No	65
I-540	Proposed Outer Ring Road around Raleigh	East - West	3-4	Yes	No	65
Miami Boulevard	Durham to Research Triangle Park	North - South	2-3	No	Yes	45
Morrisville Carpenter Road	Chapel Hill Road to NC 55	East - West	1	No	No	45
NC 54	Miami Boulevard/Chapel Hill Road to Chapel Hill	East-West	1-3	No	Yes	45
NC 147 (Durham Freeway)	Durham to Research Triangle Park	North - South	2	Yes	No	55-65
NC 55	Durham to US 1/Holly Springs	North - South	2-3	No	Yes	45
Old US 1	Parallel to US 1	North - South	1	No	No	45-55
Page Road/Hopson Road	US 70 to Research Triangle Park	East-West	1-3	No	Yes	45
US 1	Raleigh to Apex/Sanford	North - South	2	Yes	No	65
US 64	Apex/Pittsboro to Raleigh	East - West	2	Yes	No	45-55
NC 540	I-40 to NC 55	East-West	2*	Yes	No	55

\* Constructed to 3 lanes per direction but only 2 lanes per direction are currently operational.

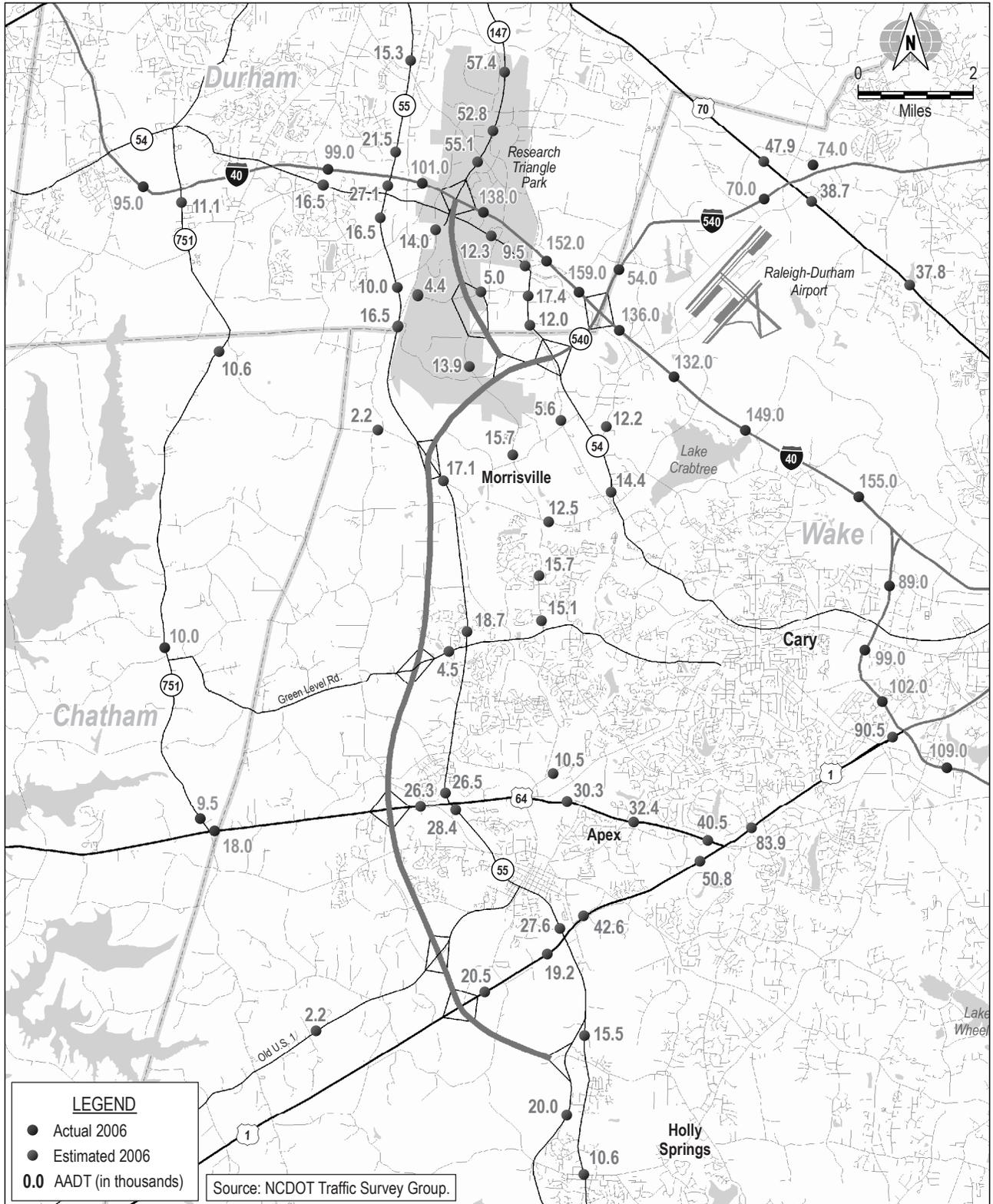
- NC 55 extends north-south along the western side of the study area with an interchange at I-40. NC 55, which would parallel the proposed Triangle Expressway, has between two and five lanes with signalized and unsignalized intersections throughout its length. The majority of NC 55 has a 45 mph speed limit.
- NC 147 (Durham Freeway) provides north-south access from Durham to the Research Triangle Park (RTP). This four-lane facility presently terminates at I-40. The proposed Triangle Expressway would extend south from the NC 147/I-40 Interchange. Speed limits vary from 55 to 65 mph.
- Davis Drive serves the Research Triangle Park from north of I-40 to US 64 south of the Park. It has between two and five lanes with speed limits from 45 to 55 mph.
- Green Level Road is an east-west local road with multiple unsignalized intersections. It is a two-lane roadway with a 45 mph speed limit.
- Hopson Road and Page Road provide east-west access through the study area from an interchange with I-40 east of RTP to Alston Avenue west of RTP. Hopson Road is two lanes, while Page Road has between three and five lanes. The posted speed limit is 45 mph on both roadways.
- Miami Boulevard provides north-south access in the study area with an interchange at I-40. It is five lanes with multiple signalized intersections. The posted speed limit is 45 mph.
- Morrisville Carpenter Road is an east-west local road. It is two to four lanes with a 45 mph speed limit.

#### **TRAFFIC TRENDS AND VARIATIONS**

The NCDOT Traffic Survey Group conducts traffic counts for selected roadways statewide. Mainline and ramp traffic volumes are collected annually for interstate and limited access highways and used to develop estimates of Average Annual Daily Traffic (AADT). Traffic counts on arterial roadways are usually collected biennially. Existing traffic data from NCDOT were reviewed to aid in the traffic model calibration process. For locations where 2006 data was not available, historical data was used to estimate 2006 traffic volumes. Figure 2-1 provides a summary of available 2006 traffic counts conducted by NCDOT, as well as selected estimates of 2006 traffic volumes. All volumes are shown in thousands of vehicles.

# Proposed Triangle Expressway Comprehensive Traffic and Revenue Study

NC 103278 / 3-13-09 / AADT at Selected Locations-2006.mxd



**AVERAGE ANNUAL DAILY TRAFFIC  
AT SELECTED LOCATIONS, 2006**



FIGURE 2-1

The dominant road within the study area is I-40 with daily volumes up to 159,000 vehicles per day. Other major east-west routes that would connect to the Triangle Expressway include NC 540, US 1, US 64, NC 54, and Green Level Road. The major north-south route parallel to the proposed Triangle Expressway is NC 55 with volumes between 10,600 and 28,400 vehicles per day. Other major north-south routes that could compete with the proposed Triangle Expressway include Davis Drive and NC 751.

Traffic information supplied by NCDOT was supplemented by new traffic counts within the Triangle Expressway study area and other key locations during November and December 2006. The major purpose of this supplemental work was to obtain current traffic volumes as an aid in recalibrating the regional transportation demand model in the area of the proposed Triangle Expressway. Seven-day counts by day, hour, and vehicle class at 15 locations were obtained as shown in Figure 2-2. The average annual daily traffic volumes resulting from this data collection effort, which were calculated using North Carolina's published axle and seasonal correction factors, are summarized in Table 2-2.

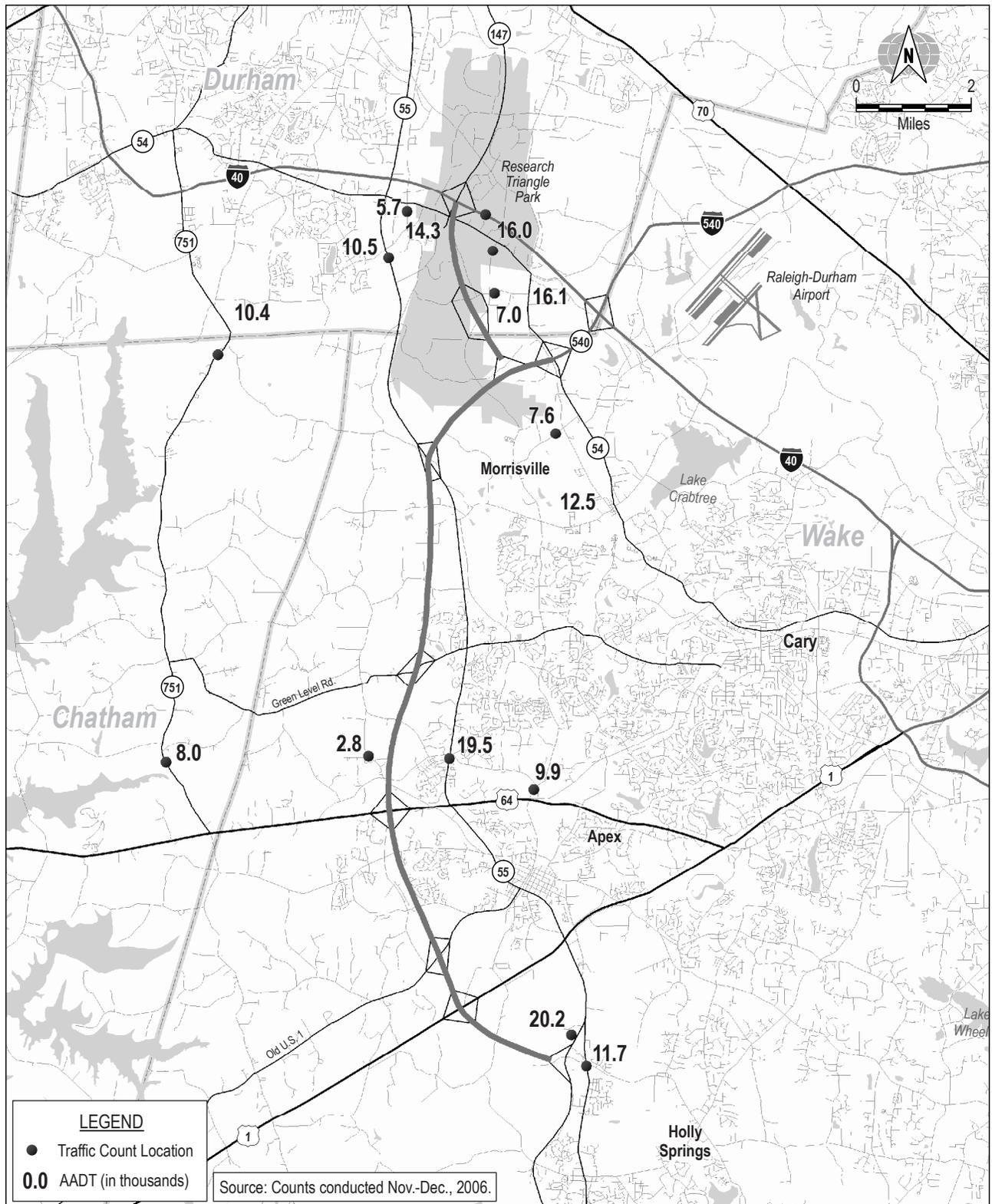
**Table 2-2  
Average Annual Daily Traffic Volumes  
at Supplemental Traffic Count Locations**

Location	Average Annual Daily Traffic (AADT)		
	Northbound / Eastbound	Southbound / Westbound	Total
NC 55 Business south of Sunset Lake Road	5,957	5,779	11,736
NC 55 Bypass south of NC 55 Business	9,623	10,615	20,238
NC 55 West Williams Street south of Old Jenks Road	9,826	9,646	19,472
NC 55 south of Sedwick Drive	5,112	5,404	10,516
NC 147 west of TW Alexander Drive <sup>(1)</sup>	7,738	6,516	14,254
NC 751 south of Fayetteville Road	5,023	5,337	10,360
NC 751 south of Luther Road	4,030	3,989	8,019
Davis Drive south of NC 54 <sup>(1)</sup>	8,356	7,620	15,976
Davis Drive south of Old Jenks Road	3,951	5,943	9,894
Green Level Church Road north of Secluded Acres Road	1,465	1,366	2,831
Hopson Road east of Davis Drive	3,351	3,610	6,961
McCrimmon Parkway west of Church Street	3,732	3,916	7,648
Morrisville-Carpenter Road west of Church Street	5,719	6,762	12,481
South Alston Avenue south of NC 54	2,665	2,986	5,651
South Miami Boulevard south of NC 54 <sup>(1)</sup>	8,287	7,856	16,143

<sup>(1)</sup> Based on less than seven days of data  
Source: 7-Day Supplemental Counts in November-December 2006.

# Proposed Triangle Expressway Comprehensive Traffic and Revenue Study

NC 103278 / 3-13-09 / AADT at Selected WSA Locations-2006.mxd



## AVERAGE ANNUAL DAILY TRAFFIC AT SUPPLEMENTAL TRAFFIC COUNT LOCATIONS, 2006

FIGURE 2-2

### **ANNUAL TRAFFIC TRENDS AND VARIATIONS**

Based on available NCDOT traffic information for the years 2001 and 2005, total traffic within the study area increased a total of 6 percent between 2001 and 2005, with an average annual change of 1.5 percent. Figure 2-3 shows the location of traffic counts conducted on selected roadways, which are further summarized in Table 2-3. The highest percentages of growth occurred on I-540 and on various arterial roadways in Morrisville. This may be due to the opening of I-540 to the east between I-40 and US 1 in 1997. Additional increases in traffic can be seen on roadways near Apex and on NC 751, which would be parallel to the proposed Triangle Expressway. The largest decreases in traffic occurred on NC 55 in Holly Springs, due to the construction of the NC 55 Bypass, which would serve as the southern terminus of the proposed Triangle Expressway. Smaller decreases in traffic also occurred within the Research Triangle Park, which may be due to the diversion of traffic from local roadways to I-540.

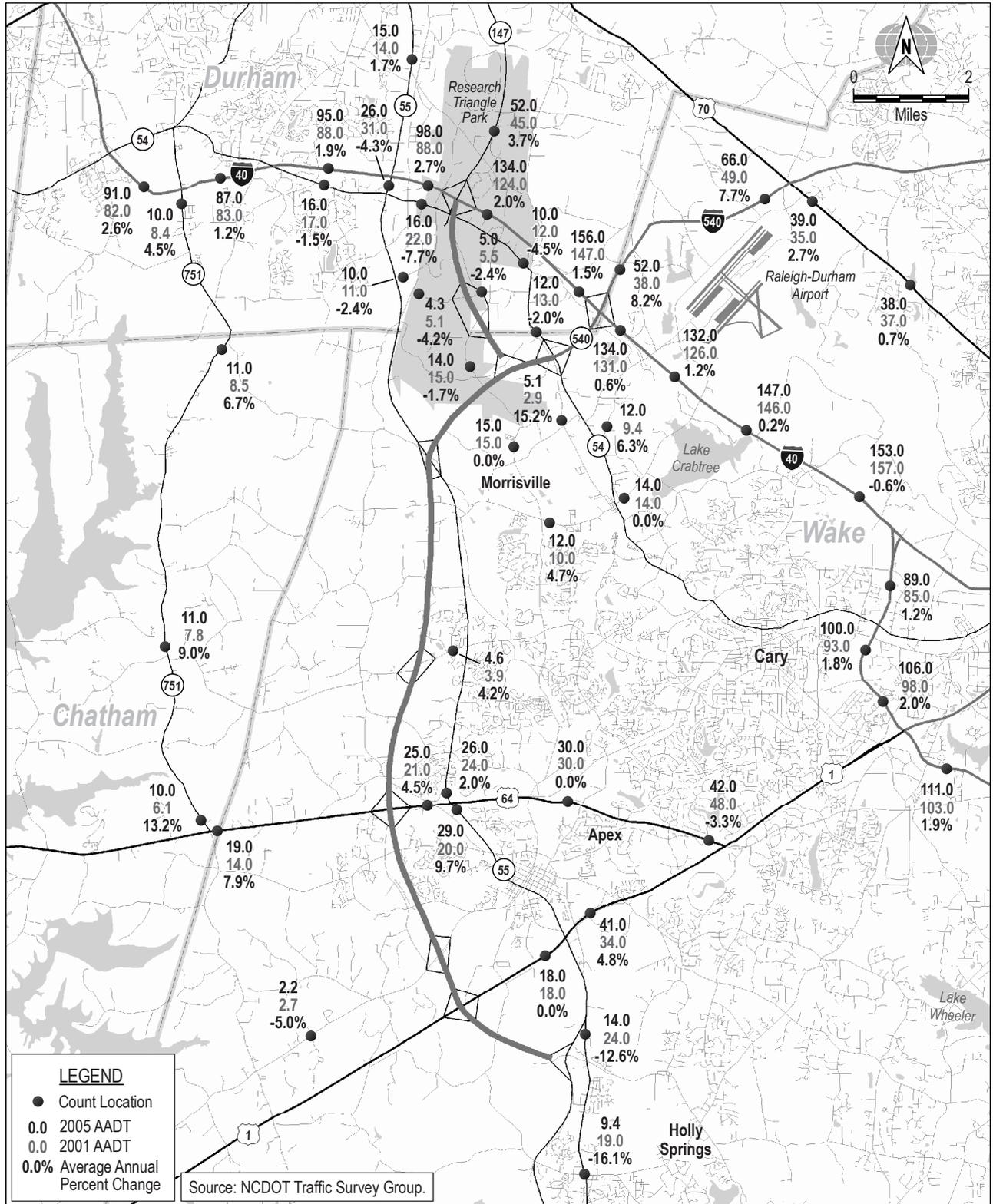
Since traffic data for interstates and limited access highways are provided annually, further analysis was conducted regarding these roadways. Figure 2-4 summarizes the interstate traffic counts collected on I-40 in the study area between 2000 and 2006. I-40 is a major east-west roadway that would interchange with the proposed Triangle Expressway. Traffic on I-40 between NC 751 and the I-440/ Wade Avenue increased an average of 2.2 percent per year between 2000 and 2006. Traffic and traffic growth on I-40 were greatest overall between NC 147 and I-540. Traffic information is provided in Table 2-4 for all interstates in the study area between 2000 and 2006. Overall, traffic on interstates within the study area increased by 3 percent between 2000 and 2005, with an additional increase of 1.6 percent between 2005 and 2006.

### **MONTHLY TRAFFIC VARIATIONS**

Seasonal adjustment factors obtained from the NCDOT Traffic Survey Group are shown in Table 2-5. These seasonal adjustment factors reflect the monthly traffic variations that occur on roadways in the study area. As shown in the table, the average May, June, July and August traffic volumes on secondary roads, such as NC 55, NC 54, and Davis Drive are 8 percent above the monthly average traffic volume. By contrast, average January traffic volume is 8 percent below the monthly average. Urban interstates generally have volumes above the monthly average, with the peak month being September with 10 percent above the monthly average. The seasonality on rural interstates is more pronounced, ranging from 12 percent below the monthly average in February to 9 percent above the monthly average in August.

# Proposed Triangle Expressway Comprehensive Traffic and Revenue Study

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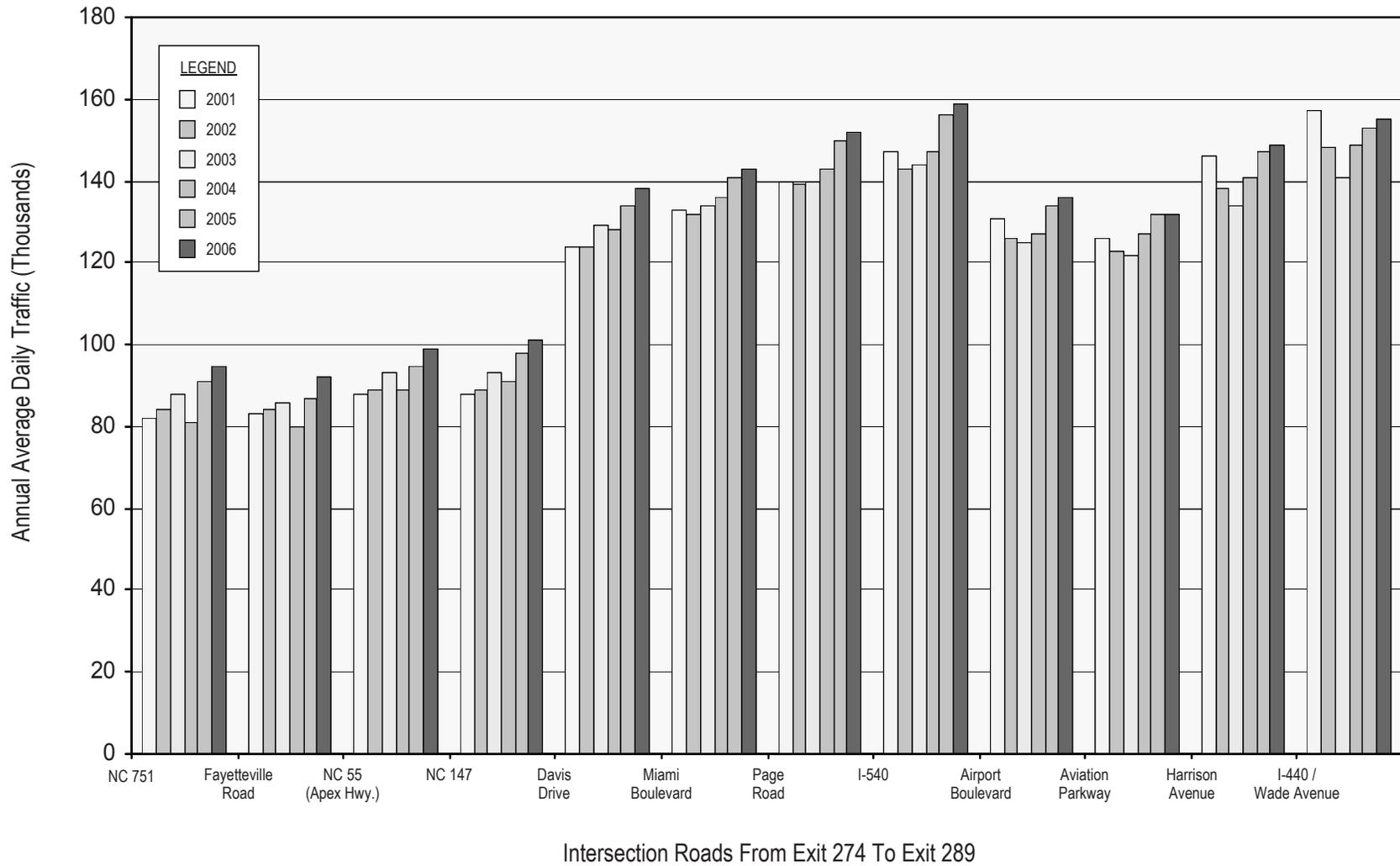


**Table 2-3  
Historic Arterial Roadway Traffic Counts  
2001 - 2005**

Route Name	Traffic Count Location	Average Annual Daily Traffic (000s)			Average Annual Growth 2001 - 2005
		2001	2003	2005	
Airport Boulevard	East of NC 54	9.4	11.0	12.0	6.3%
Church Street	North of McCrimmon Parkway	2.9	3.7	5.1	15.2%
Davis Drive	North of Kitt Creek Road	15.0	15.0	14.0	-1.7%
Davis Drive	North of McCrimmon Parkway	15.0	17.0	15.0	0.0%
Hopson Road	West of Davis Drive	5.5	4.9	5.0	-2.4%
Hopson Road	East of South Alston Avenue	5.1	3.9	4.3	-4.2%
Morrisville Carpenter Road	East of Davis Drive	10.0	11.0	12.0	4.7%
NC 147	Between T W Alexander Drive and East Cornwallis Road	45.0	53.0	52.0	3.7%
NC 54	North of Aviation Parkway	14.0	15.0	14.0	0.0%
NC 54 (South Miami Boulevard)	South of Church Street	13.0	11.0	12.0	-2.0%
NC 54	West of NC 54 / South Miami / Creekstone	12.0	11.0	10.0	-4.5%
NC 54	East of South Alston Avenue	22.0	19.0	16.0	-7.7%
NC 54	East of Barbee Road	17.0	17.0	16.0	-1.5%
NC 55	South of Holly Springs Road	19.0	7.0	9.4	-16.1%
NC 55 (East Williams Street)	Between NC 55 Bypass and Sunset Lake Road	24.0	11.0	14.0	-12.6%
NC 55	South of US 64	20.0	24.0	29.0	9.7%
NC 55	North of US 64	24.0	25.0	26.0	2.0%
NC 55 (Apex Highway)	North of NC 54	31.0	31.0	26.0	-4.3%
NC 55	North of Cornwallis Road	14.0	15.0	15.0	1.7%
NC 751	North of US 64	6.1	8.9	10.0	13.2%
NC 751	North of Lewter Shop / Hollands Chapel	7.8	9.7	11.0	9.0%
NC 751	South of Okelly Chapel Road	8.5	8.8	11.0	6.7%
NC 751	South of I-40	8.4	10.0	10.0	4.5%
Old US 1	East of Bosco Road	2.7	2.1	2.2	-5.0%
T W Alexander Drive	East of NC 55 (Apex Highway)	11.0	10.0	10.0	-2.4%
US 1	West of NC 55 (East Williams Street)	18.0	16.0	18.0	0.0%
US 1	Between Ten Ten Road and NC 55 (East Williams Street)	34.0	35.0	41.0	4.8%
US 64	West of US 1	48.0	45.0	42.0	-3.3%
US 64	Between Laura Duncan Road and Salem Street	30.0	31.0	30.0	0.0%
US 64	Between NC 55 and Kelly Road	21.0	24.0	25.0	4.5%
US 64	East of NC 751	14.0	17.0	19.0	7.9%
US 70 (Glenwood Avenue)	Between Ebenezer Church Road and Pinecrest Road	37.0	36.0	38.0	0.7%
US 70 (Glenwood Avenue)	South of I-540	35.0	33.0	39.0	2.7%

Source: NCDOT, Information, Mapping, and Graphics Unit.





**Table 2-4  
Historic Interstate Highway Traffic Counts  
2000 - 2006**

Route Name	Traffic Count Location	Average Annual Daily Traffic (000s)							Average Annual Growth 2000 - 2006
		2000	2001	2002	2003	2004	2005	2006	
I-40 / I-440	Between Gorman Street and US 1	94	103	101	103	109	111	109	2.5%
I-40	Between US 1 and Cary Towne Boulevard	85	98	96	96	105	106	102	3.1%
I-40	Between Cary Towne Boulevard and NC 54	80	93	91	92	98	100	99	3.6%
I-40	Between NC 54 and Wade Avenue/I-40	72	85	82	83	87	89	89	3.6%
I-40	Between I-40/Wade Avenue and Harrison Avenue	144	157	148	141	149	153	155	1.2%
I-40	Between Harrison Avenue and Aviation Parkway	135	146	138	134	141	147	149	1.7%
I-40	Between Aviation Parkway and Airport Boulevard	118	126	123	122	127	132	132	1.9%
I-40	Between Airport Boulevard and I-540	124	131	126	125	127	134	136	1.6%
I-40	Between I-540 and Page Road	140	147	143	144	147	156	159	2.1%
I-40	Between Page Road and South Miami Boulevard	133	140	139	140	143	150	152	2.3%
I-40	Between South Miami Boulevard and Davis Drive	126	133	132	134	136	141	143	2.1%
I-40	Between Davis Drive and NC 147	118	124	124	129	128	134	138	2.6%
I-40	Between NC 147 and NC 55 (Apex Highway)	83	88	89	93	91	98	101	3.3%
I-40	Between NC 55 (Apex Highway) and Fayetteville Road	83	88	89	93	89	95	99	3.0%
I-40	Between Fayetteville Road and NC 751	81	83	84	86	80	87	92	2.1%
I-40	Between NC 751 and NC 54	79	82	84	88	81	91	95	3.1%
I-540	Between I-40 and Aviation Parkway	28	38	35	47	45	52	54	11.6%
I-540	Between Lumley Road and US 70 (Glenwood Avenue)	36	49	48	58	57	66	70	11.7%

Source: NCDOT, Information, Mapping, and Graphics Unit.

**Table 2-5  
Seasonal Adjustment for Selected  
Automatic Traffic Recorder Groups<sup>(1)</sup>**

Month	Monthly Index <sup>(2)</sup>		
	Urban Interstate	Rural Interstate	Secondary Roads
January	97	85	92
February	103	88	97
March	105	97	99
April	109	102	104
May	108	104	108
June	106	108	108
July	105	108	108
August	110	109	108
September	103	106	105
October	106	109	106
November	104	105	105
December	99	103	106

<sup>(1)</sup> An Automatic Traffic Recorder (ATR) Group is a set of roadways that have similar physical characteristics and surrounding development patterns.

<sup>(2)</sup> The ratio of Monthly Traffic Volumes to the Average Monthly Traffic Volumes.

Source: NCDOT Traffic Survey Group - ATR Based Seasonal Factors

#### **DAILY TRAFFIC VARIATIONS**

In the absence of any continuous counting stations within the study area, the data collected during the seven-day supplemental counts conducted in November-December 2006 was used to analyze daily traffic variations. Table 2-6 summarizes the daily variations in traffic volumes at the 12 count locations where a full week of data was available. The average weekday traffic volume for all locations is 9 percent above the average daily traffic volume, while the average weekend traffic volume is 23 percent below the average. This suggests the heavy commuter pattern present within the study area. Additionally, the three routes with variations between weekdays and weekends of 50 percent or more are located along local roadways that provide access to the Triangle Research Park, Hopson

**Table 2-6  
Daily Traffic Variations at Supplemental Traffic Count Locations**

Location	Daily Index <sup>(1)</sup>							Average	Average	Average
	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Weekday	Weekend	Day
NC 55 Business south of Sunset Lake Road	76	108	101	104	102	111	97	105	87	100
NC 55 Bypass south of NC 55 Business	69	108	105	107	107	114	91	108	80	100
NC 55 West Williams Street south of Old Jenks Road	80	105	102	104	104	109	97	105	89	100
NC 55 south of Sedwick Drive	61	107	111	111	114	114	83	111	72	100
NC 751 south of Fayetteville Road	63	106	111	109	117	111	83	111	73	100
NC 751 south of Luther Road	62	113	107	109	112	115	82	111	72	100
Davis Drive south of Old Jenks Road	75	107	110	99	112	111	86	108	81	100
Green Level Church Road north of Secluded Acres Road	67	118	111	109	107	109	79	111	73	100
Hopson Road east of Davis Drive	19	127	128	136	135	128	27	131	23	100
McCrimmon Parkway west of Church Street	56	108	108	113	121	122	71	114	64	100
Morrisville-Carpenter Road west of Church Street	87	101	94	104	104	109	102	102	95	100
South Alston Avenue south of NC 54	41	115	116	116	118	118	76	117	59	100
<b>Average</b>	<b>68</b>	<b>108</b>	<b>107</b>	<b>108</b>	<b>111</b>	<b>113</b>	<b>86</b>	<b>109</b>	<b>77</b>	<b>100</b>

<sup>(1)</sup> Ratio of individual day's traffic to average daily traffic for the week.  
Source: 7-Day Supplemental Counts in November-December 2006.

Road, McCrimmon Parkway and Alston Avenue. For most locations, the peak day is either Thursday or Friday. The average variation in daily traffic volumes is further illustrated in Figure 2-5.

#### **HOURLY TRAFFIC VARIATIONS**

Table 2-7 summarizes hourly traffic volumes at all 15 supplemental count locations. The average hourly traffic volumes at three locations on NC 55 are summarized in Figure 2-6. Distinct AM and PM peaks are present, as well as a smaller midday peak at the northern end of NC 55 near Research Triangle Park, which suggests the heavy influence of commuters. This midday peak is reduced at the southern end near Holly Springs. The locations that exhibit higher traffic volumes during the AM period are Davis Drive south of NC 54 and Hopson Road east of Davis Drive. These two roadways provide access to the Research Triangle Park.

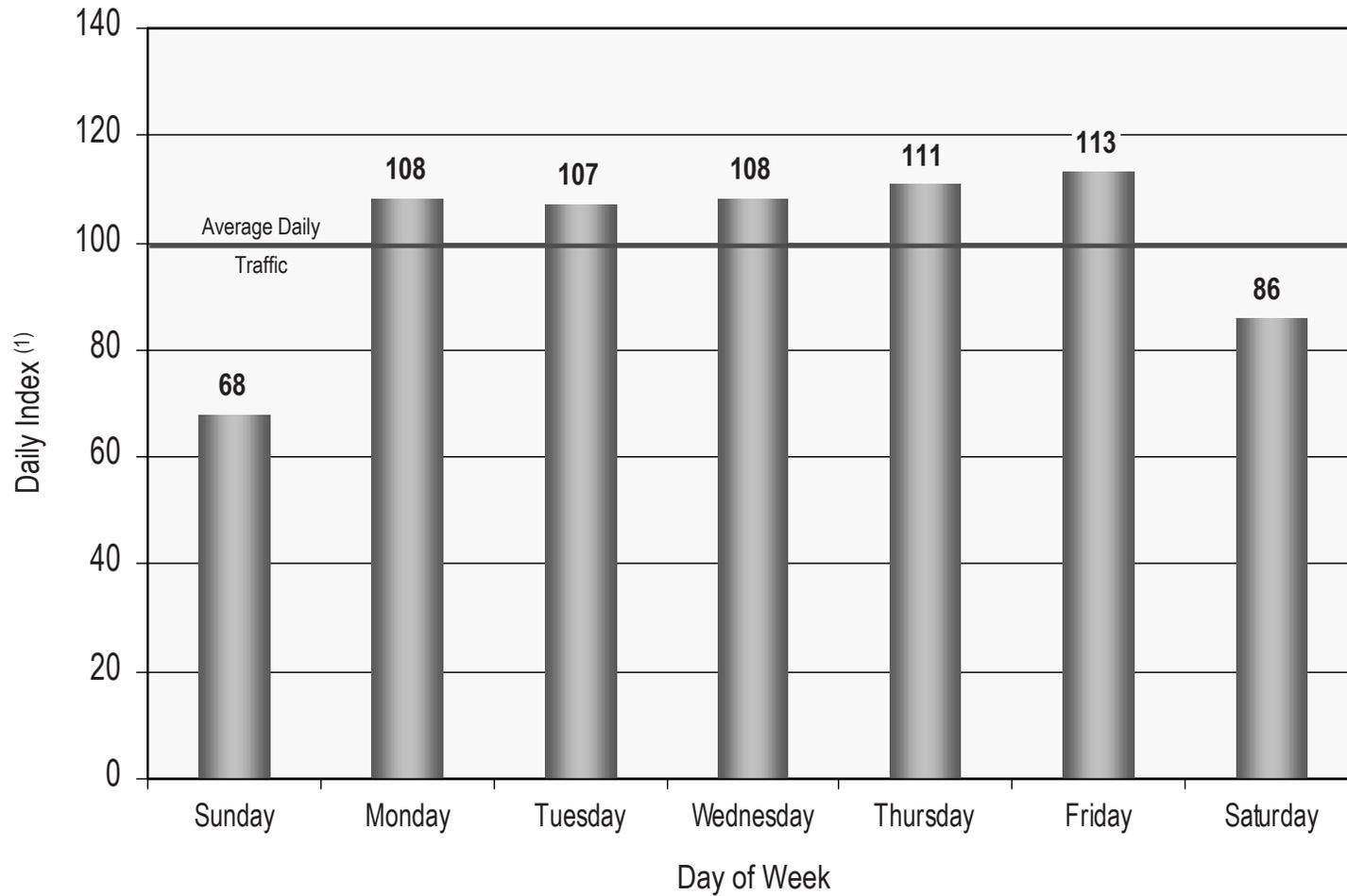
Table 2-8 examines the peak period share of average daily traffic at the 15 supplemental count locations. The AM peak period is defined as 6:00-10:00 a.m., and the PM peak period is defined as 3:00-7:00 p.m. There is also a Midday peak period from 10:00 a.m. to 3:00 p.m. and an Off-peak period from 7:00 p.m. to 6:00 a.m. From the table it is clear that the PM peak represents a significant share of daily traffic. For the supplemental count locations, an average of 30.1 percent of daily traffic occurs during the PM peak period. The AM peak period represents an average of 21.7 percent of daily traffic. This means that the majority of daily traffic occurs during the peak periods further suggesting the influence of commuters within the study area.

#### **VEHICLE CLASSIFICATION**

Vehicle classification affects many modeling variables, such as value of time and vehicle operating costs. Additionally, it has an influence on revenue generation. Table 2-9 presents the vehicle classification data gathered from the 15 supplemental traffic count locations. Passenger vehicles predominate in this heavy commuter area, with an average of 90.9 percent for all locations. Heavy trucks, which are considered to be tractor trailers, constitute an average of 3.3 percent of all vehicles, while light and medium trucks make up 5.8 percent. The highest percentages of truck traffic were observed on NC 55, Miami Boulevard and Davis Drive, which all provide north-south access through the Research Triangle Park.

#### **TRAVEL SPEEDS AND DELAYS**

Weekday travel speeds within the project study area were measured on July 25 and 26, 2007. Data collection was performed during the AM peak period and PM peak period on multiple roads in each direction, including the following.

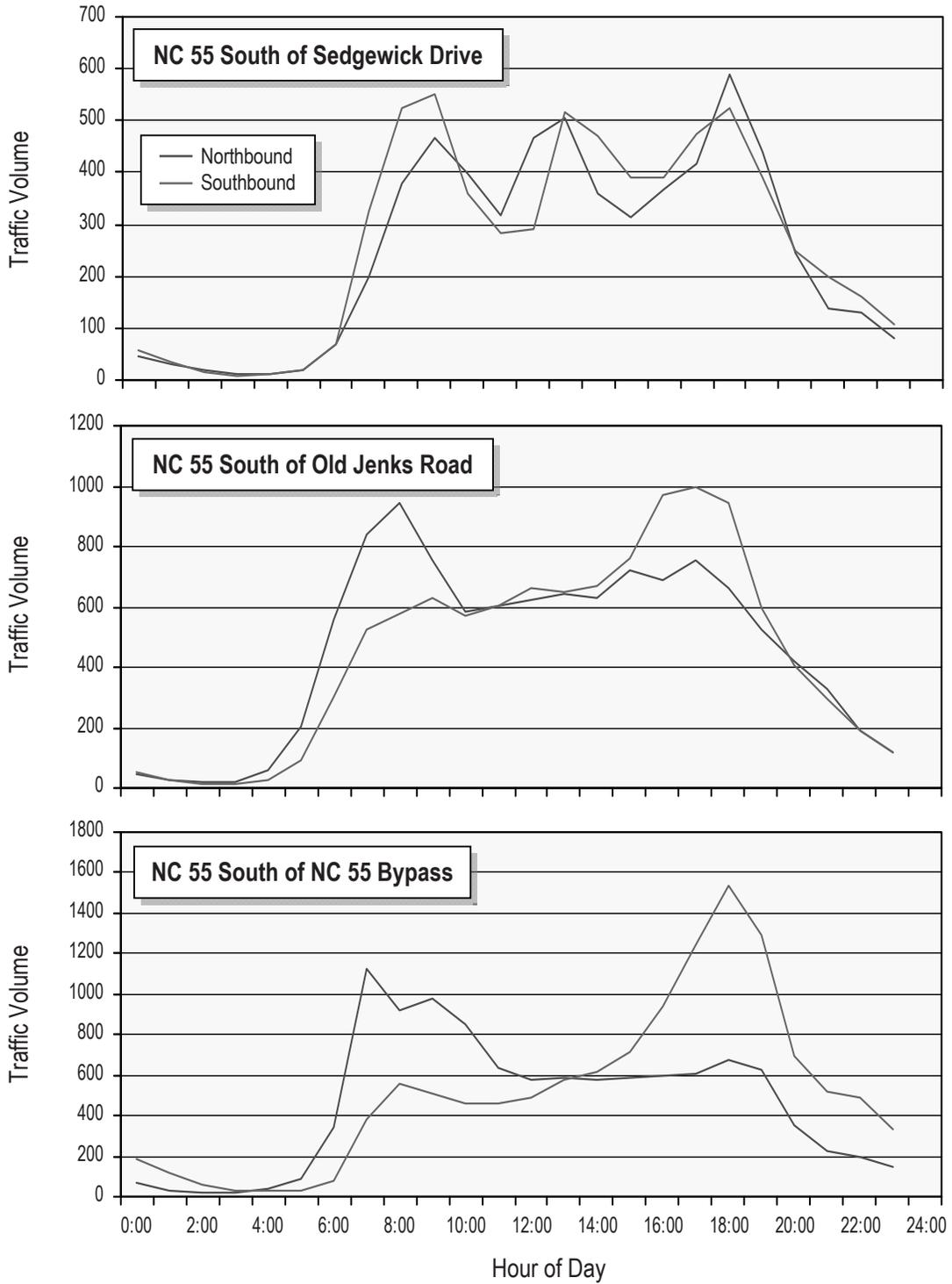


(1) Daily Index = Ratio of individual day's traffic to average daily traffic for week.

**Table 2-7**  
**Hourly Traffic Variations at Supplemental Traffic Count Locations**

Beginning Hour	Percent of Total Day (7-day Counts)															Average
	NC 55 Business south of Sunset Lake	NC 55 Bypass south of NC 55 Business	NC 55 West Williams Street south of Old Jenks Road	NC 55 south of Sedwick Drive	NC 147 west of TW Alexander Drive <sup>(1)</sup>	NC 751 south of Fayetteville Road	NC 751 south of Luther Road	Davis Drive south of NC 54 <sup>(1)</sup>	Davis Drive south of Old Jenks Road	Green Level Church Road south of Secluded Acres Road	Hopson Road east of Davis Drive	McCrimmon Parkway west of Church Street	Morrisville-Carpenter Road west of Church Street	South Alston Avenue south of NC 54	South Miami Boulevard south of NC 54 <sup>(1)</sup>	
0:00	1.4%	1.5%	0.7%	1.2%	0.8%	0.7%	0.7%	0.7%	0.4%	0.5%	0.7%	0.7%	1.7%	1.2%	0.7%	0.9%
1:00	0.7%	0.9%	0.4%	0.7%	0.5%	0.4%	0.4%	0.4%	0.3%	0.2%	0.4%	0.3%	0.9%	0.6%	0.4%	0.5%
2:00	0.5%	0.5%	0.2%	0.4%	0.2%	0.2%	0.2%	0.2%	0.2%	0.1%	0.3%	0.2%	0.4%	0.3%	0.2%	0.3%
3:00	0.4%	0.3%	0.2%	0.3%	0.2%	0.1%	0.1%	0.2%	0.2%	0.1%	0.2%	0.2%	0.2%	0.3%	0.2%	0.2%
4:00	0.5%	0.3%	0.4%	0.2%	0.1%	0.1%	0.1%	0.1%	0.5%	0.1%	0.2%	0.4%	0.2%	0.2%	0.3%	0.3%
5:00	0.5%	0.5%	1.2%	0.3%	0.2%	0.3%	0.3%	0.2%	2.0%	0.0%	0.2%	1.0%	0.5%	0.2%	1.2%	0.6%
6:00	1.2%	1.6%	3.2%	1.0%	1.3%	1.0%	1.1%	0.9%	4.3%	0.2%	1.3%	3.4%	1.2%	0.8%	4.3%	2.0%
7:00	4.1%	5.4%	5.3%	3.8%	4.4%	4.7%	5.0%	4.1%	6.5%	2.6%	3.8%	6.3%	3.3%	2.2%	7.6%	4.9%
8:00	6.3%	5.5%	6.2%	6.2%	9.7%	8.7%	11.0%	9.7%	6.5%	8.4%	8.7%	6.5%	4.8%	7.0%	8.8%	7.4%
9:00	5.9%	5.8%	6.1%	7.4%	10.6%	7.9%	7.9%	11.7%	6.3%	9.6%	10.2%	5.7%	5.0%	7.7%	6.2%	7.4%
10:00	5.5%	5.6%	5.6%	6.0%	6.4%	5.3%	5.0%	7.7%	5.5%	5.7%	7.6%	4.9%	5.6%	4.9%	4.4%	5.7%
11:00	4.9%	5.1%	6.0%	5.2%	3.6%	4.7%	4.6%	4.3%	5.6%	4.4%	4.3%	5.6%	6.1%	4.0%	7.0%	5.2%
12:00	5.0%	5.0%	6.4%	6.2%	4.1%	4.9%	4.5%	4.9%	5.8%	5.1%	6.8%	7.4%	6.3%	5.3%	8.5%	5.8%
13:00	5.9%	5.6%	6.5%	8.1%	4.4%	5.3%	5.0%	6.1%	5.8%	6.0%	9.2%	6.7%	6.5%	7.5%	7.3%	6.3%
14:00	5.6%	5.7%	6.5%	6.9%	4.3%	5.3%	5.2%	5.4%	6.7%	5.7%	8.9%	6.1%	6.5%	7.2%	5.2%	5.9%
15:00	6.0%	6.0%	7.2%	6.0%	4.5%	5.9%	5.5%	4.8%	7.4%	5.6%	5.4%	6.8%	6.9%	5.8%	5.6%	6.0%
16:00	6.9%	6.8%	7.8%	6.4%	6.3%	7.1%	6.8%	5.8%	7.7%	6.9%	5.8%	8.4%	6.8%	7.9%	7.2%	6.9%
17:00	7.6%	7.8%	8.0%	7.2%	10.6%	10.0%	9.6%	8.7%	7.4%	8.2%	7.7%	8.9%	7.3%	7.8%	9.2%	8.4%
18:00	8.5%	9.0%	7.3%	8.7%	13.2%	12.0%	11.7%	9.0%	6.9%	12.7%	6.2%	6.7%	6.8%	10.5%	6.0%	8.7%
19:00	7.7%	7.8%	5.2%	6.6%	6.9%	6.3%	6.4%	6.9%	5.2%	8.2%	5.7%	4.8%	6.4%	6.7%	3.3%	6.2%
20:00	5.3%	4.6%	3.8%	4.1%	3.2%	3.4%	3.2%	3.5%	3.5%	4.0%	2.9%	3.4%	5.8%	4.4%	2.2%	3.8%
21:00	3.9%	3.4%	3.0%	3.0%	2.0%	2.4%	2.4%	2.2%	2.6%	2.5%	1.7%	2.6%	4.4%	3.3%	1.8%	2.8%
22:00	3.3%	3.1%	1.9%	2.5%	1.7%	1.9%	1.9%	1.3%	1.8%	2.1%	1.1%	1.7%	3.7%	2.5%	1.3%	2.2%
23:00	2.3%	2.2%	1.2%	1.8%	1.0%	1.3%	1.3%	0.9%	1.0%	1.0%	0.9%	1.3%	2.6%	1.7%	1.0%	1.5%
Total Day	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

<sup>(1)</sup> Figures based on less than seven days of data  
Source: 7-Day Supplemental Counts in November-December 2006.



Source: 7-Day Supplemental Traffic Counts in November-December, 2006



**Table 2-8  
Traffic Variations by Time Period at Selected Locations**

Location	Percent of Average Daily Traffic				
	AM Peak 6 - 10 AM	Midday 10 AM- 3 PM	PM Peak 3 - 7 PM	Off-Peak 7 PM - 6 AM	Total Day
NC 55 Business south of Sunset Lake Road	17.5%	26.9%	29.0%	26.5%	100%
NC 55 Bypass south of NC 55 Business	18.3%	27.0%	29.6%	25.1%	100%
NC 55 West Williams Street south of Old Jenks Road	20.8%	31.0%	30.3%	18.2%	100%
NC 55 south of Sedwick Drive	18.4%	32.4%	28.3%	21.1%	100%
NC 147 west of TW Alexander Drive <sup>(1)</sup>	26.0%	22.8%	34.6%	16.8%	100%
NC 751 south of Fayetteville Road	22.3%	25.5%	35.0%	17.1%	100%
NC 751 south of Luther Road	25.0%	24.3%	33.6%	17.0%	100%
Davis Drive south of NC 54 <sup>(1)</sup>	26.4%	28.4%	28.3%	16.6%	100%
Davis Drive south of Old Jenks Road	23.6%	29.4%	29.4%	17.7%	100%
Green Level Church Road north of Secluded Acres Road	20.8%	26.9%	33.4%	18.8%	100%
Hopson Road east of Davis Drive	24.0%	36.8%	25.1%	14.3%	100%
McCrimmon Parkway west of Church Street	21.9%	30.7%	30.8%	16.6%	100%
Morrisville-Carpenter Road west of Church Street	14.3%	31.0%	27.8%	26.8%	100%
South Alston Avenue south of NC 54	17.7%	28.9%	32.0%	21.4%	100%
South Miami Boulevard south of NC 54 <sup>(1)</sup>	26.9%	32.4%	28.0%	12.6%	100%
<b>Average</b>	<b>21.7%</b>	<b>28.9%</b>	<b>30.1%</b>	<b>19.3%</b>	<b>100%</b>

<sup>(1)</sup> Figures based on less than seven days of data  
Source: 7-Day Supplemental Counts in November-December 2006.

**Table 2-9  
Vehicle Classifications at Supplemental Traffic Count Locations**

<b>Location</b>	<b>Passenger Vehicles</b>	<b>Light &amp; Medium Trucks</b>	<b>Heavy Trucks</b>	<b>Total Trucks</b>
NC 55 Business south of Sunset Lake Road	95.7%	3.6%	0.7%	4.3%
NC 55 Bypass south of NC 55 Business	90.8%	6.2%	3.1%	9.3%
NC 55 West Williams Street south of Old Jenks Road	88.7%	4.4%	6.9%	11.3%
NC 55 south of Sedwick Drive	90.2%	8.3%	1.5%	9.8%
NC 147 west of TW Alexander Drive <sup>(1)</sup>	95.4%	3.4%	1.2%	4.6%
NC 751 south of Fayetteville Road	90.9%	7.3%	1.8%	9.1%
NC 751 south of Luther Road	92.3%	5.5%	2.2%	7.7%
Davis Drive south of NC 54 <sup>(1)</sup>	87.8%	10.0%	2.1%	12.1%
Davis Drive south of Old Jenks Road	87.4%	5.7%	6.9%	12.6%
Green Level Church Road north of Secluded Acres Road	90.6%	8.4%	1.0%	9.4%
Hopson Road east of Davis Drive	95.7%	3.5%	0.9%	4.4%
McCrimmon Parkway west of Church Street	92.8%	3.5%	3.7%	7.2%
Morrisville-Carpenter Road west of Church Street	91.2%	7.4%	1.4%	8.8%
South Alston Avenue south of NC 54	94.8%	4.6%	0.6%	5.2%
South Miami Boulevard south of NC 54 <sup>(1)</sup>	87.1%	4.7%	8.2%	12.9%
<b>Average</b>	<b>90.9%</b>	<b>5.8%</b>	<b>3.3%</b>	<b>9.1%</b>

<sup>(1)</sup> Figures based on less than seven days of data  
Source: 7-Day Supplemental Counts in November-December 2006.

The results of this data collection are summarized in Table 2-10.

Northbound – Southbound Routes:

- NC 55
- NC 147
- NC 751
- Davis Drive

Eastbound – Westbound Routes:

- I-40
- I-440/US 64/US 1/I-40
- NC 54 / Chapel Hill Road

Observed travel speeds collected during typical AM peak period speed and delay studies in the northbound and westbound direction are shown in Figure 2-7. Southbound and eastbound data are shown in Figure 2-8. The figures show reduced speeds on Davis Drive within the Research Triangle Park, and on NC 54 eastbound and westbound approaching the Research Triangle Park. Additionally, there appears to be reduced speeds on NC 55 northbound, south of US 64. Figures 2-7 and 2-8 also show that I-40, NC 147 and NC 751 appear to be generally at free-flow speeds. These observations are borne out by the average observed travel speeds presented in Table 2-10. However, AM peak travel westbound from the Raleigh area to Research Triangle Park is frequently subjected to significant delays that were not observed during these speed and delay studies.

Travel speed data was collected on the same roadways during the PM peak period. Figure 2-9 presents the observed travel speeds collected during the PM peak period in the southbound and eastbound direction; Figure 2-10 presents the northbound and westbound data. Congestion is clearly visible on I-40 eastbound in the PM peak period from Aviation Parkway to just south of NC 54, while I-40 westbound appears to be at free-flow speeds. Additionally, there is some congestion in both directions on NC 54 from McCrimmon Parkway into the Town of Cary. NC 55 also shows some reduced speeds in the southbound direction from just north of Okelley Chapel Road to High House Road. The speeds observed on these roadways would suggest that the source of congestion within the study corridor is due to commuters travelling to and from the Research Triangle Park. Figures 2-9 and 2-10 also show that NC 147, NC 751, and NC 55 northbound appear to be generally at free-flow speeds. These observations are borne out by the average travel speeds presented in Table 2-10.

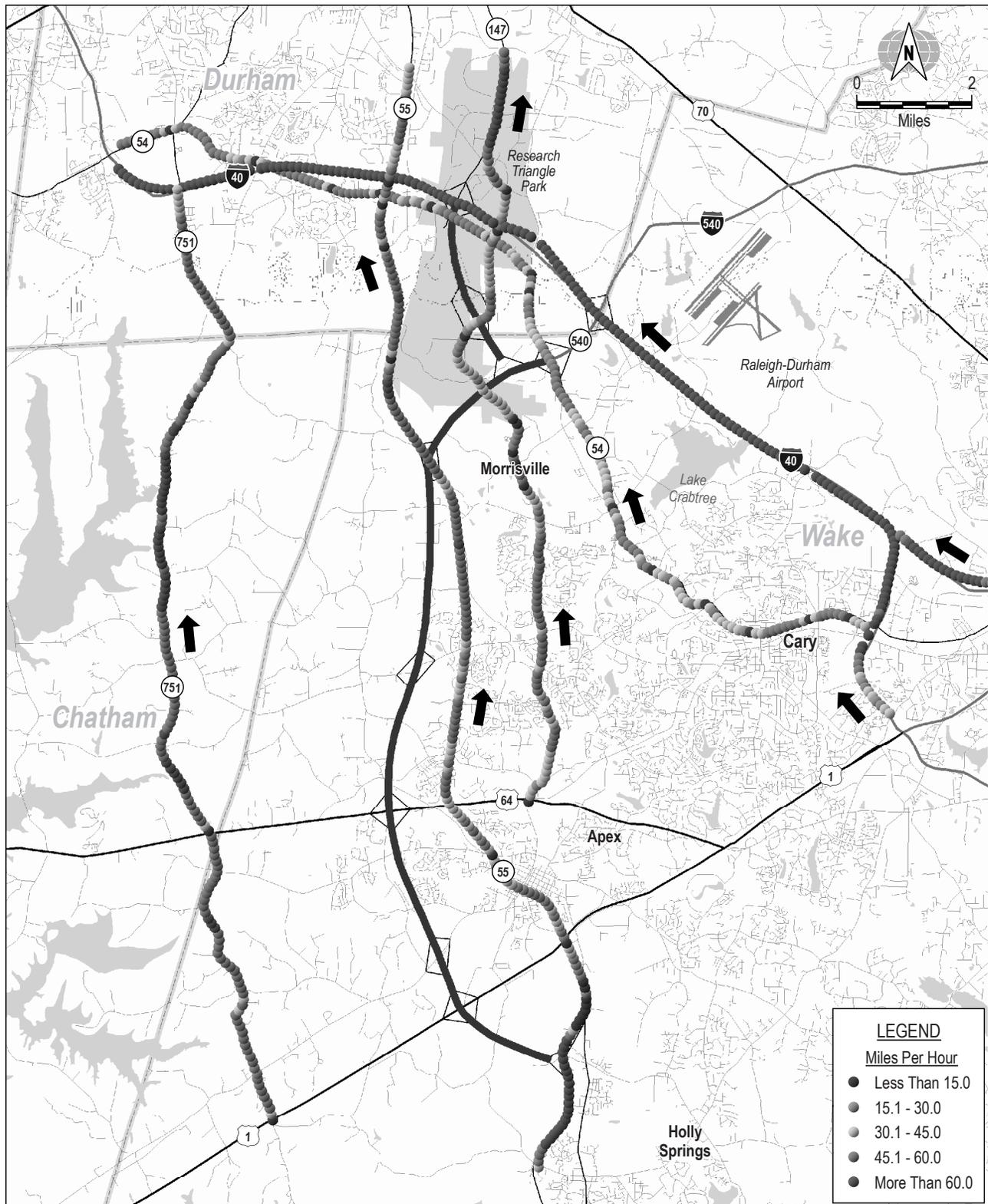
**Table 2-10  
Speed and Delay Studies on Selected Roads**

Segment Start	Segment End	Distance (miles)	Observed Travel Speeds (MPH)			
			Northbound		Southbound	
			AM	PM	AM	PM
<b>NC 55</b>						
East Cornwallis Road	I-40	1.9	42.7	49.2	35.0	27.8
I-40	T W Alexander Drive	1.9	32.2	34.3	30.8	37.8
T W Alexander Drive	Morrisville Carpenter Road	4.5	46.7	47.0	55.8	32.1
Morrisville Carpenter Road	High House Road	2.3	42.1	43.4	42.6	37.1
High House Road	US 64	2.8	40.9	40.7	39.3	38.0
US 64	US 1	3.1	25.4	25.0	30.8	16.2
US 1	New Hill Road	4.3	34.8	45.1	56.8	51.9
	<b>Total Distance/ Average Speed</b>	<b>20.7</b>	<b>36.5</b>	<b>39.1</b>	<b>41.7</b>	<b>31.0</b>
<b>NC 147</b>						
Ellis Road	I-40	2.9	41.8	47.1	65.3	55.9
<b>NC 751</b>						
I-40	Fayetteville Road	2.2	36.7	36.1	47.2	38.6
Fayetteville Road	US 64	10.0	51.4	52.0	51.2	46.8
US 64	US 1	5.4	40.8	47.3	45.3	43.3
	<b>Total Distance/ Average Speed</b>	<b>17.6</b>	<b>45.5</b>	<b>47.9</b>	<b>48.8</b>	<b>44.6</b>
<b>Davis Drive</b>						
East Cornwallis Road	NC 54	0.9	18.6	25.4	20.2	26.5
NC 54	Morrisville Carpenter Road	5.8	27.9	42.9	47.1	32.9
Morrisville Carpenter Road	High House Road	2.0	44.4	37.5	35.9	45.6
High House Road	US 64	3.0	38.2	41.1	39.5	31.8
	<b>Total Distance/ Average Speed</b>	<b>11.7</b>	<b>30.8</b>	<b>39.3</b>	<b>39.0</b>	<b>33.6</b>
<b>I-40</b>						
NC 54	NC 147	6.2	67.4	67.2	68.3	68.2
NC 147	I-540	2.7	69.3	53.0	69.5	70.3
I-540	Aviation Parkway	1.0	71.7	45.1	70.2	69.9
Aviation Parkway	I-440/US 64/US 1/I-40	6.7	68.6	27.8	69.6	71.3
I-440/US 64/US 1/I-40	US 1	2.7	68.2	44.5	42.6	67.0
	<b>Total Distance/ Average Speed</b>	<b>19.3</b>	<b>68.4</b>	<b>41.3</b>	<b>63.7</b>	<b>69.5</b>
<b>I-440/US 64/US 1/I-40</b>						
Exit 289	US1	3.0	56.9	59.2	62.5	66.0
<b>NC 54 / Chapel Hill Road</b>						
I-40 (Exit 273)	NC 55	5.2	34.8	27.9	31.7	33.0
NC 55	Hopson Road	3.3	27.1	37.6	19.2	22.3
Hopson Road	Aviation Parkway	4.1	40.2	23.8	33.7	34.7
Aviation Parkway	I-40	5.6	31.0	21.0	29.3	28.1
	<b>Total Distance/ Average Speed</b>	<b>18.2</b>	<b>32.8</b>	<b>25.5</b>	<b>28.0</b>	<b>29.2</b>

Source: Speed and Delay Studies, July 25 - 26, 2007

# Proposed Triangle Expressway Comprehensive Traffic and Revenue Study

NC 103278 / 3-13-09 / AM Travel Speeds - NB & WB.mxd



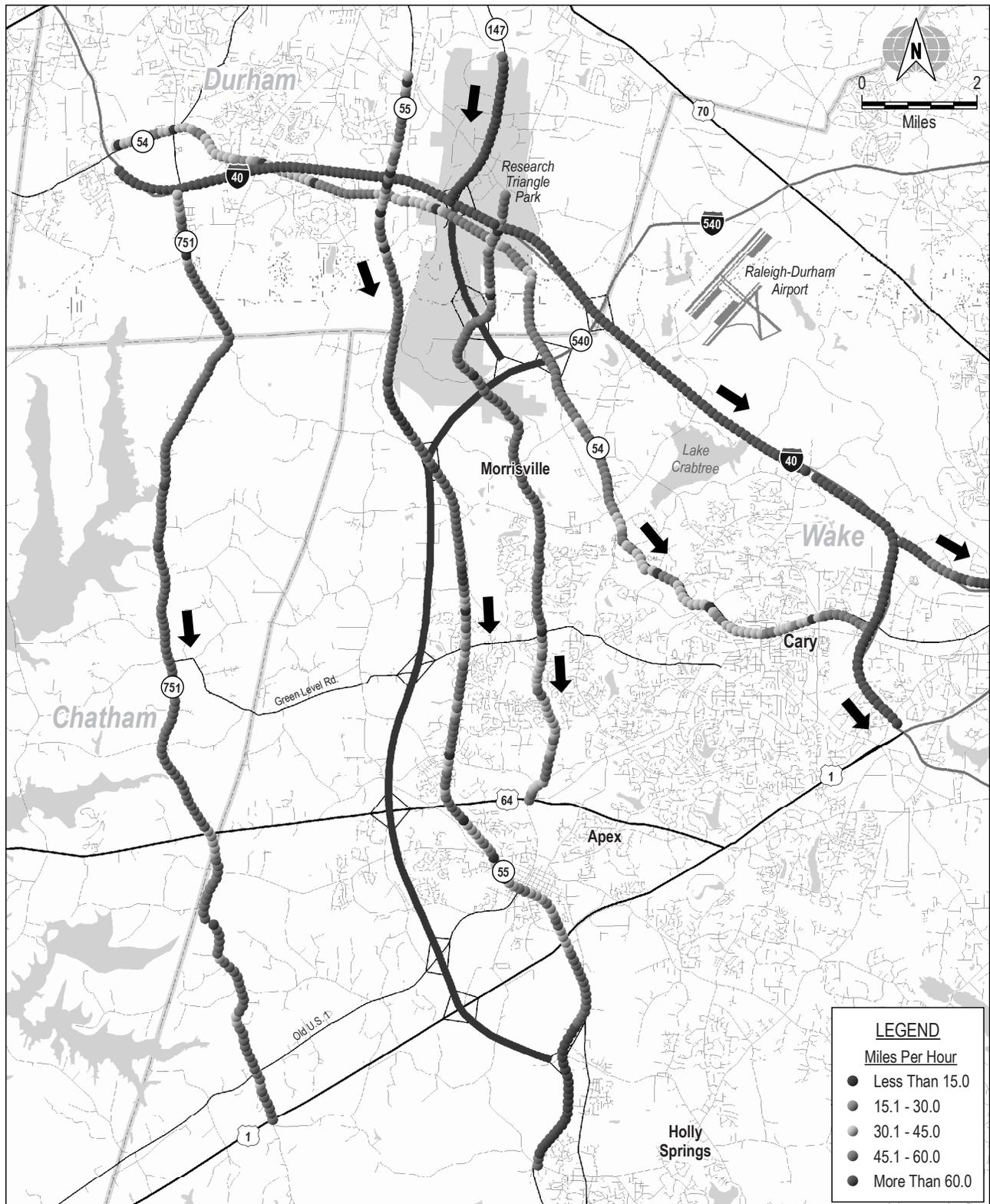
**OBSERVED AM PEAK PERIOD TRAVEL SPEEDS,  
NORTHBOUND AND WESTBOUND (NOV.-DEC., 2006)**



FIGURE 2-7

# Proposed Triangle Expressway Comprehensive Traffic and Revenue Study

NC 103278 / 3-13-09 / AM Travel Speeds - SB & EB.mxd

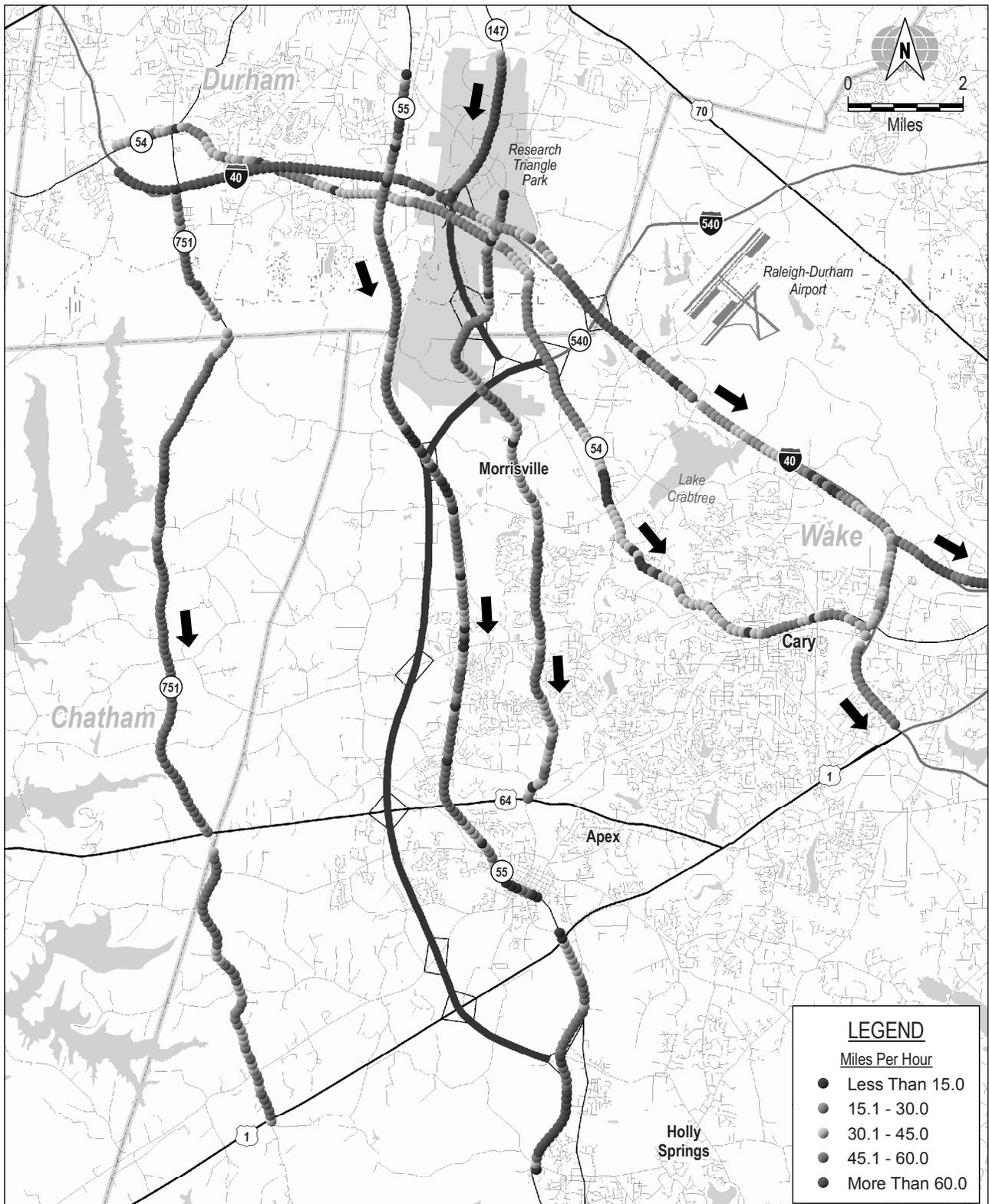


**OBSERVED AM PEAK PERIOD TRAVEL SPEEDS,  
SOUTHBOUND AND EASTBOUND (NOV.-DEC., 2006)**

FIGURE 2-8

# Proposed Triangle Expressway Comprehensive Traffic and Revenue Study

NC 103278 / 3-13-09 / PM Travel Speeds - SB & EB.mxd

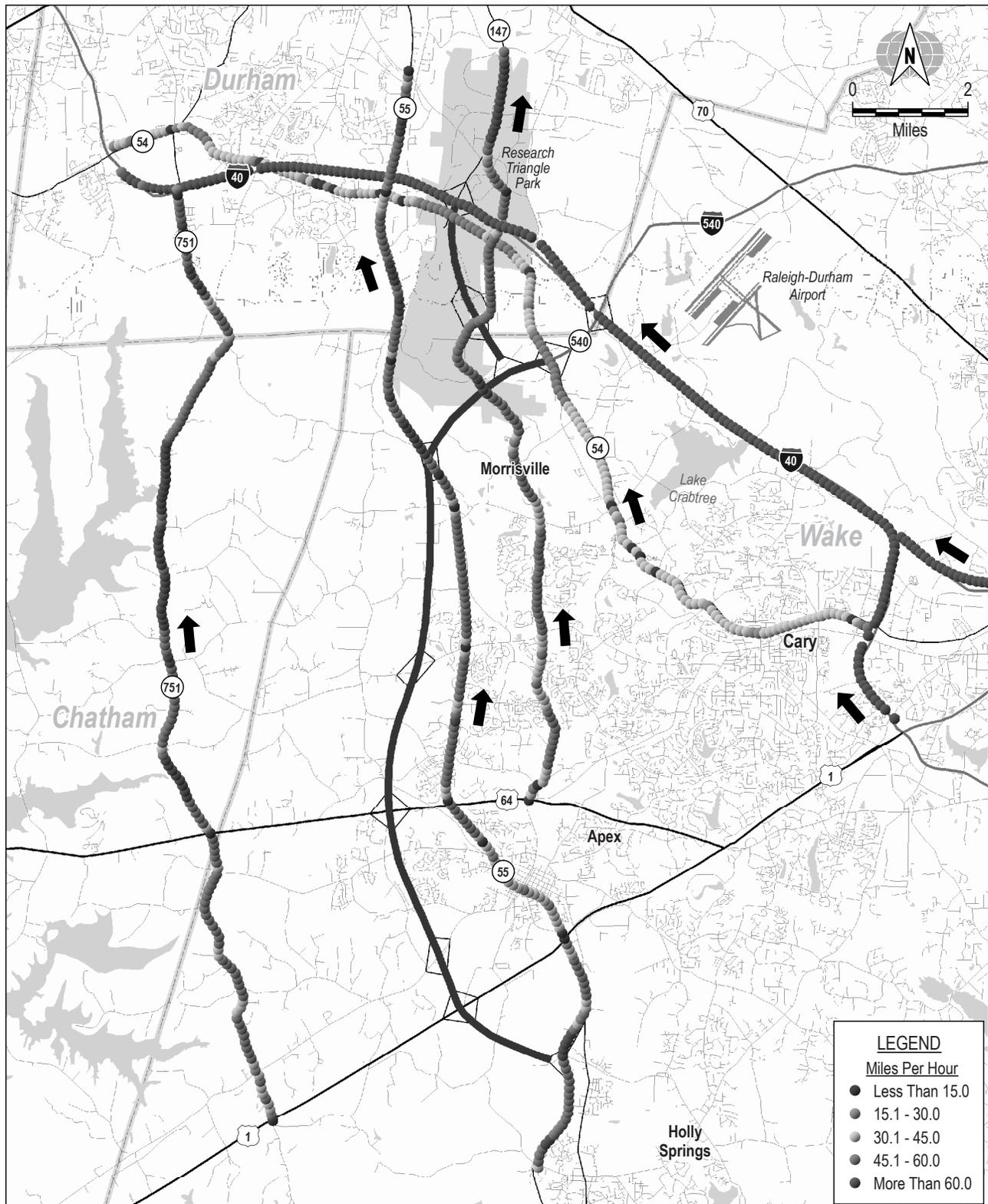


**OBSERVED PM PEAK PERIOD TRAVEL SPEEDS,  
SOUTHBOUND AND EASTBOUND (NOV.-DEC., 2006)**

FIGURE 2-9

# Proposed Triangle Expressway Comprehensive Traffic and Revenue Study

NC 103278 / 3-13-09 / PM Travel Speeds - NB & WB.mxd



**OBSERVED PM PEAK PERIOD TRAVEL SPEEDS,  
NORTHBOUND AND WESTBOUND (NOV.-DEC., 2006)**



FIGURE 2-10

## **EXISTING TRANSIT SERVICES IN THE STUDY AREA**

### **TRANSIT AGENCIES**

Several major transit agencies operate within the Triangle region. Many of these agencies are operated by local governments. Capital Area Transit (CAT) is operated by the City of Raleigh. Chapel Hill Transit (CHT) is operated by the City of Chapel Hill. The City of Cary offers fixed route service through Cary Transit (C-Tran). The Durham Area Transit Authority (DATA) is operated by the City of Durham.

More rural areas are served by county-wide agencies that provide demand-response services. Orange County Public Transportation (OPT) operates within Orange County. It recently began operating one fixed-route bus service in cooperation with the Triangle Transit Authority. The Chatham Transportation Network (CTN) operates within Chatham County.

The Wolfline is a bus service operated by North Carolina State University (NCSU) for the NC State Community. Wolfline buses are open to the public and operate every day that classes are in session serving all three campuses, two park and ride lots, and official NCSU housing. No university ID, pass or fare is required to ride.

The Triangle Transit Authority (TTA) is the only regional transit agency within the study area. It operates bus lines, vanpooling, and other ride-sharing services within Wake, Durham and Orange Counties.

Table 2-11 contains data on the transit agencies within the study area, as provided by the National Transit Database. Of the six agencies included in the database, TTA is the largest with a service area of 1,525 square miles and a fleet of 146 vehicles. Despite this, CHT and NCSU carry more bus passengers per hour than the other agencies. This may be due to the fact that CHT and NCSU are free services. TTA provides the longest average bus trips, at 8.58 miles, presumably due to its large service area and express bus service. TTA is also the only agency to provide vanpooling statistics.

### **TRANSIT SERVICES**

Figure 2-11 displays the routes of study area transit providers in 2005. TTA provides express and local bus service, and ridesharing programs throughout the Triangle Region. The Town of Cary is served by TTA and C-Tran. In the City of Chapel Hill, the University of North Carolina and downtown business district form a major regional employment center, which is served by CHT and TTA. Likewise, downtown Durham and

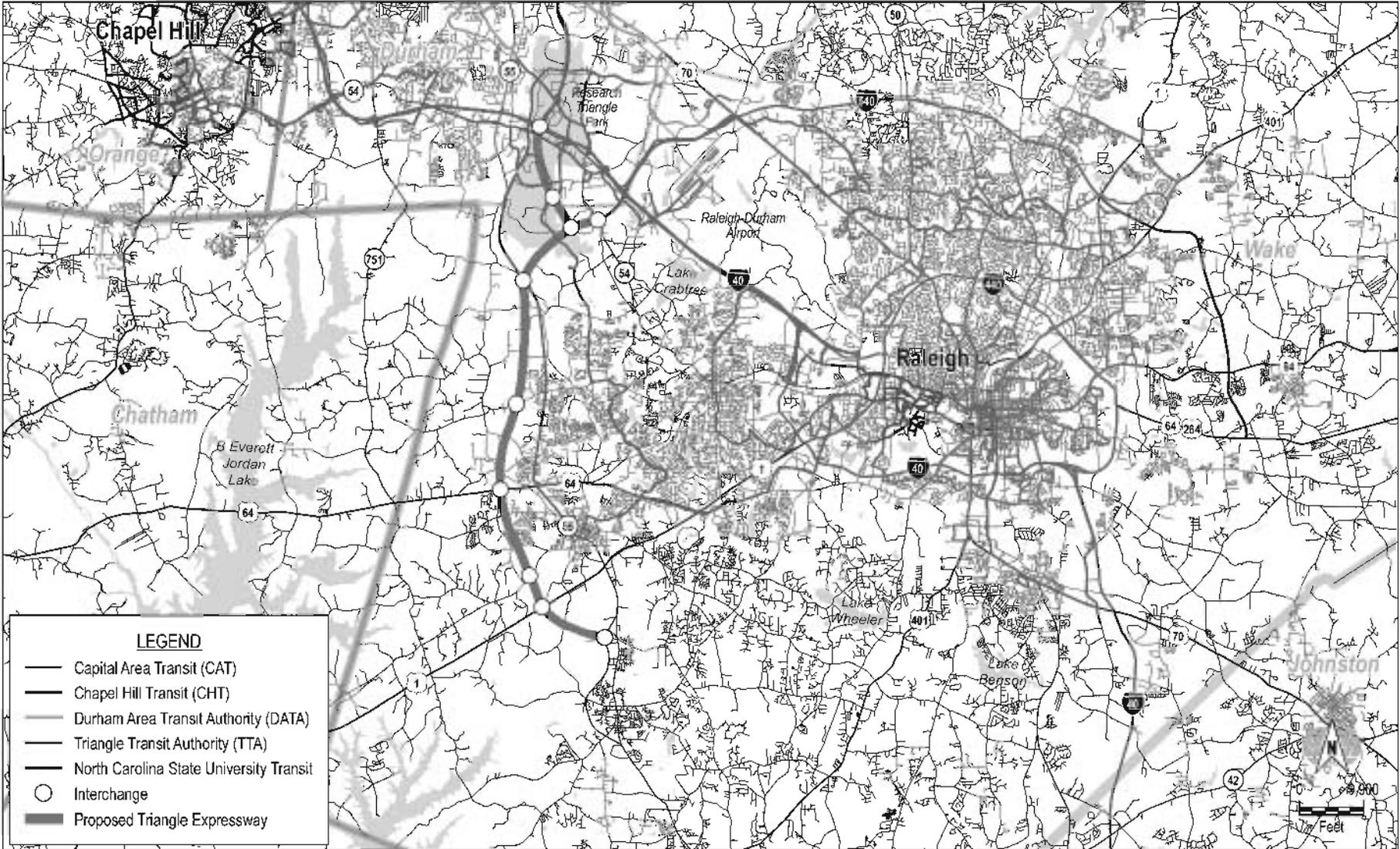
**Table 2-11  
Statistics for Transit Agencies in the Triangle Region  
2005**

<b>Statistics</b>	<b>CAT</b>	<b>C-Tran</b>	<b>CHT</b>	<b>DATA</b>	<b>NCSU</b>	<b>TTA</b>
Service Area (sq. mi.)	125	50	25	93	9	1525
Service Area Population <sup>(1)</sup>	311,053	107,973	52,440	179,000	40,000	1,002,876
<b>Overall Service</b>						
Fleet Size	86	18	97	91	25	146
Annual Passenger Miles	14,139,346	367,245	14,979,244	18,572,131	2,323,170	17,730,060
Annual Unlinked Trips	3,702,432	52,682	5,783,800	4,519,449	1,767,209	1,052,052
Passenger Miles Per Unlinked Trip	3.82	6.97	2.59	4.11	1.31	16.85
<b>Bus</b>						
Fleet Size	68		83	49	25	67
Annual Passenger Miles	13,387,657		14,620,347	18,043,241	2,323,170	6,204,180
Annual Unlinked Trips	3,546,761		5,711,073	4,443,568	1,767,209	723,184
Passenger Miles Per Unlinked Trip	3.77		2.56	4.06	1.31	8.58
<b>Demand Response</b>						
Fleet Size	18	18	14	42		5
Annual Passenger Miles	751,689	367,245	358,897	528,890		127,164
Annual Unlinked Trips	155,671	52,682	72,727	75,881		8,072
Passenger Miles Per Unlinked Trip	4.83	6.97	4.93	6.97		15.75
<b>Vanpool</b>						
Fleet Size						74
Annual Passenger Miles						11,398,716
Annual Unlinked Trips						320,796
Passenger Miles Per Unlinked Trip						35.53

<sup>(1)</sup> Urbanized Area (UZA) Statistics - 2000 Census  
Source: 2005 National Transit Database (NTD)

Proposed Triangle Expressway  
 Comprehensive Traffic and Revenue Study

NC 102845 / 3-13-09 / Transit Routes 2005.mxd



Duke University, including the academic centers and the hospital, which are located within the City, are major centers for employment. DATA, TTA and Duke University all provide transit services to this area. In the City of Raleigh, CAT and TTA serve the downtown area. North Carolina State University's Wolfline serves the three NCSU campuses, two park and ride lots, and official housing.

Several routes are of particular significance in that they operate within the Triangle Expressway study area. These transit routes only operate Monday through Friday. Moreover, some of them only operate during the AM and PM peak periods. TTA Routes 105, 107, 201 and 205 are express routes; the others are local.

Table 2-12 provides a list of selected transit routes with comparable roadway traffic. The transit ridership in the Triangle Expressway corridor is extremely small in comparison to the vehicular traffic. For example, TTA Route 311, which operates on NC 55 parallel to the proposed Triangle Expressway, carried 100 passengers per day in 2005. Vehicular traffic on NC 55 was between 19,000 and 38,000 vehicles per day.

In the study area, standard fares vary from free to \$2.50 per ride. Triangle Transit is the most expensive service, with differing fares for local and express service. Several agencies also offer monthly passes, which are generally less expensive per ride and encourage commuting. Regional passes are also available, which provide unlimited rides on and transfers between all DATA routes, CAT routes, and TTA local routes. A regional pass costs \$4.00 for 1 day and \$64.00 for 30 days. Table 2-13 provides the 2007 fixed-route fare structure for the transit agencies in the study area.

#### **VANPOOL SERVICES**

The Triangle Transit Authority (TTA) offers vanpool service in Wake, Durham, and Orange Counties. A vanpool is made up of 10 commuters or more who live and work near each other and who share approximately the same work hours. TTA pays for gas and insurance, and arranges, oversees, and pays for all van maintenance. In addition, TTA provides potential users with a list of current vanpool routes and schedules; workers can join a current route by finding one that operates near home and work, or start a new one. Table 2-14 lists some of the current TTA vanpool routes in the Triangle Expressway study area. Riders pay a monthly fare based on average daily round-trip mileage and the number of riders. Table 2-15 provides an overview of the TTA vanpooling fare structure.

**Table 2-12  
Ridership on Selected Transit Routes and Comparable Roadway Traffic Volumes  
2005**

<b>Service Provider</b>	<b>Route Number</b>	<b>Origin</b>	<b>Destination</b>	<b>Major Roadways</b>	<b>Daily Ridership (Person Trips)</b>	<b>Lowest AADT in Corrdior (Vehicles)</b>	<b>Highest AADT in Corrdior (Vehicles)</b>
DATA	12	Durham	RTP	NC54 / NC55	21	13,000	26,000
TTA	105	Raleigh	RTP	I-40	226	132,000	153,000
TTA	107	Raleigh	RTP	I-40	190	132,000	156,000
TTA	201	New Hope	RTP	I-540 / US70	75	38,000	74,000
TTA	202	Brookhaven	RTP	I-540	19	52,000	74,000
TTA	301	Raleigh	RTP	I-40 / NC54	255	10,000	153,000
TTA	302	Raleigh	RTP	Davis Drive	139	13,000	15,000
TTA	311	Apex	RTP	US64 / NC55	100	19,000	38,000
TTA	402	Durham	RTP	NC147	342	52,000	54,000
TTA	403	Durham	RTP	NC147	353	52,000	54,000
TTA	412	Chapel Hill	RTP	NC54 / NC147	359	13,000	55,000
TTA	413	Durham	RTP	NC147	362	52,000	54,000

Source: Triangle Transit Authority, Durham Area Transit Authority

**Table 2-13  
Fixed Route Fare Structure  
2007**

<b>Agency</b>	<b>One-Way Adult Cash Fare<sup>(1)</sup></b>	<b>Senior/Disabled Persons Cash Fare<sup>(1)</sup></b>	<b>Monthly Pass<sup>(2)</sup></b>
Capital Area Transit	\$1.00	\$0.50	\$36.00
Cary Transit	\$1.00	\$0.50	\$30.00
Chapel Hill Transit	FREE	FREE	N/A
Duke Transit	FREE	FREE	N/A
Durham Area Trans. Authority	\$1.00	FREE	\$36.00
NCSU Transit	FREE	FREE	N/A
Triangle Transit Authority Local Route	\$2.00	\$1.00	\$80.00
Triangle Transit Authority Express Route	\$2.50	\$1.25	\$80.00

(1) Transfer between an agency's routes is free

(2) The Triangle Transit Authority Monthly Pass is accepted on express and local routes

Note: Orange County Public Transportation has the same fare structure as the Triangle Transit Authority

Source: Fare Information is published online by the various transit agencies.

**Table 2-14  
Triangle Transit Authority Vanpool Routes and Schedules in Study Area**

<b>ID#</b>	<b>Origin</b>	<b>Destination</b>	<b>Work Hours</b>
1863	Chapel Hill	SAS (Cary)	8:45am - 5:00pm
1867	Garner	Research Tri. Park	7:30am - 4:30pm
1868	Apex	Wyeth Vaccines (Stanford)	8:00am - 4:30pm
1871	Apex	UNC-Chapel Hill	
1883	Cary	UNC-Chapel Hill	8:00am - 4:30pm
1900	Chapel Hill/Carrboro	Research Triandgle (EPA)	8:00am - 5:00pm
1901	Chapel Hill	Research Triandgle (EPA)	8:00am - 5:00pm
1915	Garner	Wyeth Vaccines (Stanford)	7:30am - 4:30pm
1927	Cary	Wyeth Vaccines (Stanford)	8:00am - 4:30pm
1935	Stanford	Research Tri. Park/Durham	7:00am - 4:00pm
1936	North Raleigh	Durham VA Medical Center	8:00am - 4:30pm

Source: Triangle Transit Authority

**Table 2-15  
Triangle Transit Authority Vanpool Fares  
2006**

<u>Daily Round Trips (Miles)</u>	<u>Monthly Lease</u>	<u>Rider Fare 14 Riders</u>	<u>Rider Fare 12 Riders</u>	<u>Rider Fare 10 Riders</u>
20	\$554.20	\$39.59	\$46.18	\$55.42
25	602.50	43.04	50.21	60.25
30	650.80	46.49	54.23	65.08
35	699.10	49.94	58.26	69.91
40	747.40	53.39	62.28	74.74
45	795.70	56.84	66.31	79.57
50	844.00	60.29	70.33	84.00
65	988.90	70.64	82.41	98.89
70	1037.20	74.09	86.43	103.72
75	1085.50	77.54	90.46	108.55
80	1133.80	80.99	94.48	113.38
85	1182.10	84.44	98.51	118.21
90	1230.40	87.89	102.53	123.04
95	1278.70	91.34	106.56	127.87
100	1237.00	94.79	110.58	132.70
110	1423.60	101.69	118.63	142.36
120	1520.20	108.59	126.68	152.02
130	1616.80	115.49	134.73	161.68
140	1713.40	122.39	142.78	171.34
150	1810.00	129.29	150.83	181.00

Source: Triangle Transit Authority

## JOURNEY TO WORK

The study area for the Triangle Expressway incorporates portions of Chatham, Durham, Orange and Wake Counties. The majority of commuters living in those counties chose to drive alone to work. Orange County, where Chapel Hill Transit (CHT) is a free service, has the largest percentage of workers using public transportation to commute to work (4.2 percent), as well as the largest percentages of people bicycling (1.8 percent) and walking (7.0 percent) to work. Durham County has the largest percentage of people choosing to carpool to work (15.9 percent). Wake County, as the most populous of the four counties, has the most commuters using public transportation (4,153) and carpooling (37,823). The means of travel to work in Chatham, Durham, Orange and Wake Counties, as reported by the 2000 Census, is provided Table 2-16. For the four-

**Table 2-16**  
**Transportation to Work Mode**  
**2000**

Mode	Chatham County		Durham County		Orange County		Wake County		Four County Area	
	Workers Age 16+	% of Total Workers								
Drove Alone	18,966	76.9%	84,063	74.8%	42,668	70.1%	274,674	81.1%	420,371	78.3%
Carpooled	3,902	15.8%	17,927	15.9%	7,149	11.7%	37,823	11.2%	66,801	12.5%
Public Transportation	54	0.2%	3,384	3.0%	2,566	4.2%	4,153	1.2%	10,157	1.9%
Motorcycle	16	0.1%	115	0.1%	108	0.2%	306	0.1%	545	0.1%
Bicycle	47	0.2%	396	0.4%	1,124	1.8%	643	0.2%	2,210	0.4%
Walked	357	1.4%	2,959	2.6%	4,263	7.0%	5,847	1.7%	13,426	2.5%
Other Means	207	0.8%	539	0.5%	295	0.5%	2,419	0.7%	3,460	0.6%
Worked at Home	1,108	4.5%	3,050	2.7%	2,687	4.4%	12,737	3.8%	19,582	3.6%
<b>Total</b>	<b>24,657</b>	<b>100%</b>	<b>112,433</b>	<b>100%</b>	<b>60,860</b>	<b>100%</b>	<b>338,602</b>	<b>100%</b>	<b>536,552</b>	<b>100%</b>

Source: 2000 Census Data

county area, approximately 91 percent of workers either drove alone or carpooled to work. Less than 2 percent used public transportation.

Commuter travel time is influenced by several factors, such as the location of major employment centers, county size, and population. Table 2-17 provides 2000 travel time data for Chatham, Durham, Orange and Wake counties. Durham County has the lowest average travel time (23 minutes), while Chatham County has the highest average travel time (29 minutes). Of the four counties, Orange County has the highest percentage of commuters traveling less than 15 minutes to work (30.9 percent).

Table 2-18 shows vehicle occupancy data for Chatham, Durham, Orange and Wake Counties collected during the 2000 Census. Chatham and Durham Counties had the highest average vehicle occupancy (1.27 and 1.28 persons, respectively). Conversely, Wake County had the largest percentage of motorists choosing to drive alone to work (321,497).

## **TRAVEL PATTERN SURVEYS**

As part of this study effort, travel pattern surveys were conducted between November and early December 2006 at 13 locations in the vicinity of the proposed Triangle Expressway. The travel patterns observed from the survey served as integral inputs into the travel demand model for the Triangle Expressway traffic and toll revenue forecast. The key findings of the travel pattern surveys are summarized below.

### **METHODOLOGY AND PROCEDURES**

Thirteen survey locations were selected for the travel pattern survey in order to provide an adequate representation of study area traffic. The survey team coordinated with county and local jurisdictions to ensure that safety concerns were taken into consideration. Figure 2-12 depicts the locations of the 13 survey stations. As shown in the figure, all surveys were conducted in a single direction of travel at signalized intersections in accordance with an operation and safety plan developed for each location.<sup>(1)</sup> The survey was conducted in such a manner as to minimize impact on traffic flow and maximize safety to motorists and survey personnel.

The survey questionnaire was distributed in the form of a postage-paid business-reply card. Figure 2-13 shows the mail-back, handout survey questionnaire. The survey contained nine questions that queried motorists about their trip origin and destination; residence status; trip purpose; trip

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<sup>(1)</sup> During later survey processing, observed one-way trips were “reversed” in order to provide estimates of daily travel patterns in each direction.

**Table 2-17  
Travel Time to Work  
2000**

Trip Length	Chatham County		Durham County		Orange County		Wake County		Four County Area	
	Commuters	% of Total	Commuters	% of Total	Commuters	% of Total	Commuters	% of Total	Commuters	% of Total
Less than 5 minutes	713	3.0%	2,301	2.1%	1,484	2.6%	7,151	2.2%	11,649	3.6%
5 to 9 minutes	2,283	9.7%	10,330	9.4%	6,283	10.8%	27,154	8.3%	46,050	14.1%
10 to 14 minutes	2,613	11.1%	18,979	17.4%	10,212	17.6%	42,047	12.9%	73,851	22.7%
15 to 19 minutes	3,048	12.9%	25,376	23.2%	9,991	17.2%	52,957	16.3%	91,372	28.0%
20 to 24 minutes	3,283	13.9%	19,238	17.6%	9,724	16.7%	57,773	17.7%	90,018	27.6%
25 to 29 minutes	1,449	6.2%	6,435	5.9%	4,102	7.1%	24,749	7.6%	36,735	11.3%
30 to 34 minutes	3,654	15.5%	14,373	13.1%	8,163	14.0%	54,366	16.7%	80,556	24.7%
35 to 39 minutes	1,055	4.5%	2,069	1.9%	1,651	2.8%	10,921	3.4%	15,696	4.8%
40 to 44 minutes	1,133	4.8%	2,136	2.0%	1,690	2.9%	11,403	3.5%	16,362	5.0%
45 to 59 minutes	2,687	11.4%	4,739	4.3%	3,027	5.2%	21,899	6.7%	32,352	9.9%
60 to 89 minutes	1,169	5.0%	2,145	2.0%	1,190	2.0%	9,990	3.1%	14,494	4.4%
90 or more minutes	462	2.0%	1,262	1.2%	656	1.1%	5,455	1.7%	7,835	2.4%
Total	23,549	100%	109,383	100%	58,173	100%	325,865	100%	516,970	159%
Average Travel Time	29		23		24		26		25	

Source: 2000 Census Data

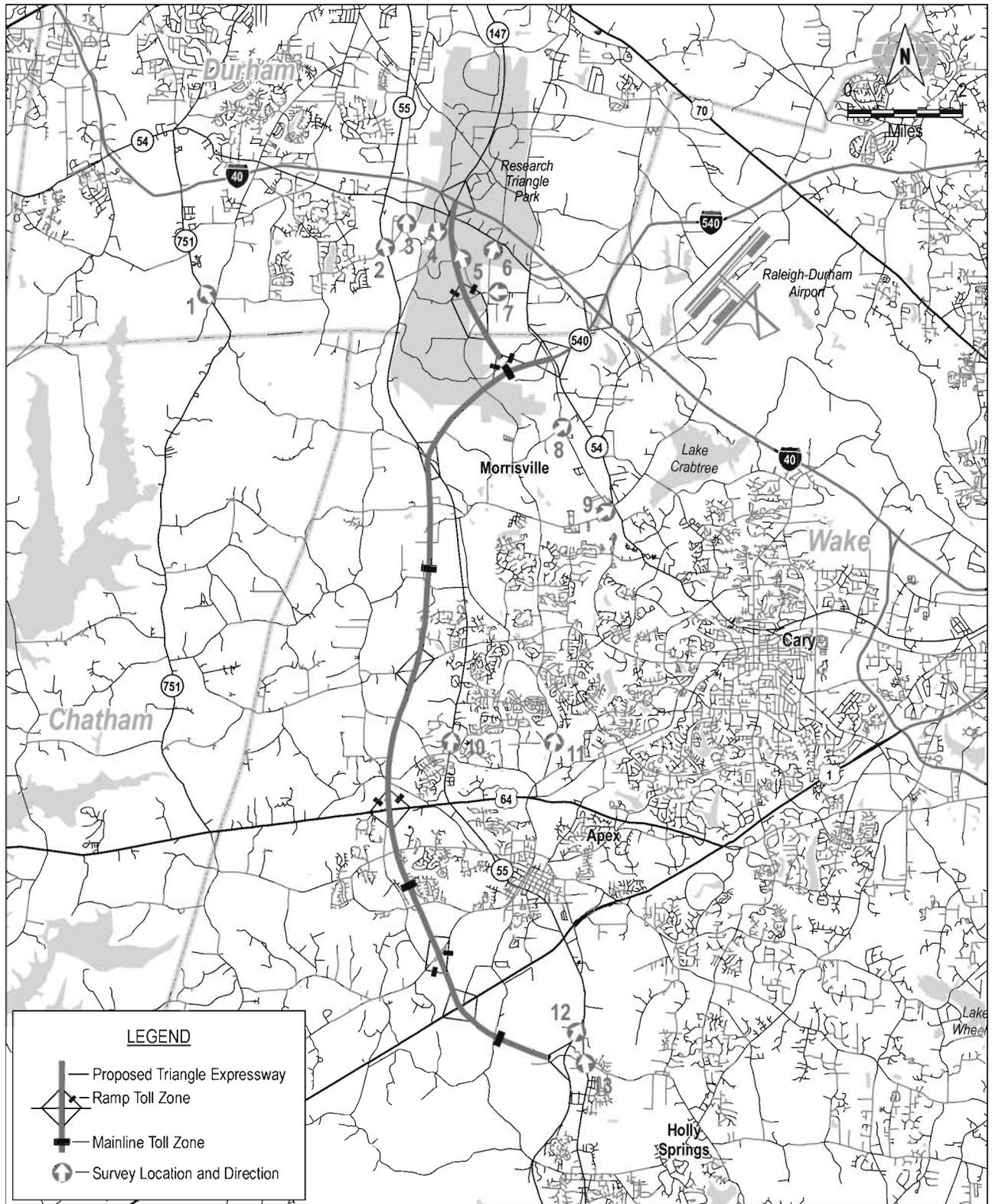
**Table 2-18  
Commuter Vehicle Occupancy  
2000**

Trip Length	Chatham County		Durham County		Orange County		Wake County		Four County Area	
	Motorists	% of Total Motorists	Motorists	% of Total Motorists	Motorists	% of Total Motorists	Motorists	% of Total Motorists	Motorists	% of Total Motorists
Drove alone	18,966	82.9%	84,063	82.4%	42,668	85.6%	274,674	87.9%	420,371	86.3%
2-person carpool	2,641	11.5%	12,117	11.9%	5,267	10.6%	27,874	8.9%	47,899	9.8%
3-person carpool	784	3.4%	3,218	3.2%	1,100	2.2%	5,863	1.9%	10,965	2.3%
4-person carpool	269	1.2%	1,525	1.5%	459	0.9%	2,204	0.7%	4,457	0.9%
5- or 6-person carpool	131	0.6%	749	0.7%	224	0.4%	1,483	0.5%	2,587	0.5%
7-or-more-person carpool	77	0.3%	318	0.3%	99	0.2%	399	0.1%	893	0.2%
<b>Total</b>	<b>22,868</b>	<b>100%</b>	<b>101,990</b>	<b>100%</b>	<b>49,817</b>	<b>100%</b>	<b>312,497</b>	<b>100%</b>	<b>487,172</b>	<b>100%</b>
Average Vehicle Occupancy	1.27		1.28		1.21		1.18		1.21	

Source: 2000 Census Data

# Proposed Triangle Expressway Comprehensive Traffic and Revenue Study

NC 103278 / 3-13-09 / Travel Pattern Survey Locations.mxd



## Proposed Triangle Expressway Comprehensive Traffic and Revenue Study

<b>6</b>	Dear Motorist: The North Carolina Turnpike Authority (NCTA) is undertaking an important transportation initiative to improve mobility in the Triangle Region. NCTA is requesting your assistance and is asking for information about the <b>one-way</b> trip that you made today when you received this questionnaire. Please complete the questionnaire and drop it into the mail at your earliest convenience. Postage is pre-paid. All information is confidential and will not be used for any purpose other than for this study. Thank you for your participation. This information is critical as NCTA plans future highway improvements in the area.																																																																												
<b>7</b>	A. Where did you <b>start</b> your trip today? (In this direction) Please be as specific as possible. If you do not know the street address, please identify the nearest intersection, shopping area, subdivision, etc.																																																																												
<b>8</b>	_____ Street Address, nearest intersection or location  _____ City or town State Zip Code (if known)																																																																												
<b>9</b>	B. Where did you <b>end</b> this trip today? (In this direction) Please be as specific as possible. If you do not know the street address, please identify the nearest intersection, shopping area, subdivision, etc.																																																																												
<b>10</b>	<b>The answer should not be the same as your answer for Question A. Please do not describe a round trip such as home to work and then home. Please describe the trip only in the direction you were going when you received this card.</b>																																																																												
<b>11</b>	_____ Street Address, nearest intersection or location  _____ City or town State Zip Code (if known)																																																																												
<b>12</b>	C. Did you or will you use any of the following roads during this specific one-way trip? (Circle all that apply) 1. I-40    2. I-540    3. NC 55    4. NC 54    5. NC 751    6. Did not use any of these roads																																																																												
<b>13</b>	D. Please indicate the main purpose of your one-way trip. (Circle one) 1. To or from work    3. School    5. Recreation    7. Other personal business 2. Company business    4. Shopping    6. Social event and/or visit																																																																												
<b>14</b>	E. How many times per week do you make this one-way trip? (Circle one) Less than 1    1    2    3    4    5    6 or more																																																																												
<b>15</b>	F. How many people, including yourself and any children, were in your vehicle? (Circle one) 1    2    3    4    5    6 or more																																																																												
<b>16</b>	G. Please identify the type of vehicle you were driving. (Circle one) 1. Two-axle, Four-tire Passenger Car, SUV or Pickup Truck    2. 2-axle, 6 tire Truck    3. 3-axle Truck    4. Four-axle Truck    5. Truck with Five or More Axles    6. Motorcycle																																																																												
<b>17</b>	H. What is the zip code of your primary residence? _____																																																																												
<b>18</b>	I. <b>OPTIONAL</b> - If you would like to participate in an internet-based survey of transportation options, please provide your e-mail address. (This information will be used only for the internet survey and will not be used for any other purpose.) E-mail address _____																																																																												
<b>19</b>	<table border="1" style="width: 100%; border-collapse: collapse; margin: 0 auto;"> <tr> <td style="width: 5%;"></td><td style="width: 5%;"></td> </tr> <tr> <td style="width: 5%;"></td><td style="width: 5%;">DAY</td><td style="width: 5%;">DIR</td><td style="width: 5%;">HR</td><td style="width: 5%;"></td><td style="width: 5%;"></td> </tr> <tr> <td style="width: 5%;"></td><td style="width: 5%;"></td> </tr> <tr> <td style="width: 5%;"></td><td style="width: 5%;"></td> </tr> </table>																					DAY	DIR	HR																																																					
	DAY	DIR	HR																																																																										

frequency; and vehicle occupancy. An optional question was included asking if motorists wished to participate in an internet-based survey of transportation options.

Of the 21,276 surveys distributed, a total of 2,501 valid surveys were returned or 11.8 percent of the total. Table 2-19 indicates the dates on which the surveys were conducted, the number of surveys distributed and the return rate for each location. Upon receipt, the completed questionnaires were filtered for validity and entered into a Geographic Information Systems (GIS) database. This database was a valuable tool in constructing the Triangle Expressway travel demand model, ensuring that appropriate trip tables reflected current usage patterns of the highway system in the study area.

#### **SURVEY TRIP CHARACTERISTICS**

The travel pattern survey results illustrated several trends in trip characteristics in the Raleigh-Durham area. Motorists were asked to identify the roads they used on their one-way trip. Of the surveys returned, 2,501 respondents provided usable information regarding road choice. Road choice usage was broken down by peak and off-peak periods. Although travel was greatly reduced in the off-peak hours, the percentage of road usage remained almost identical. For example, 28 percent of motorists used NC 55 during peak hours as compared to 27 percent using the same road during off-peak hours. Other major roads listed on the survey include I-40, I-540, NC 54 and NC 751. This analysis helped identify competing routes to the proposed toll road, from which traffic could be diverted to the proposed Triangle Expressway (especially during peak periods when these roads could be less attractive because of congestion).

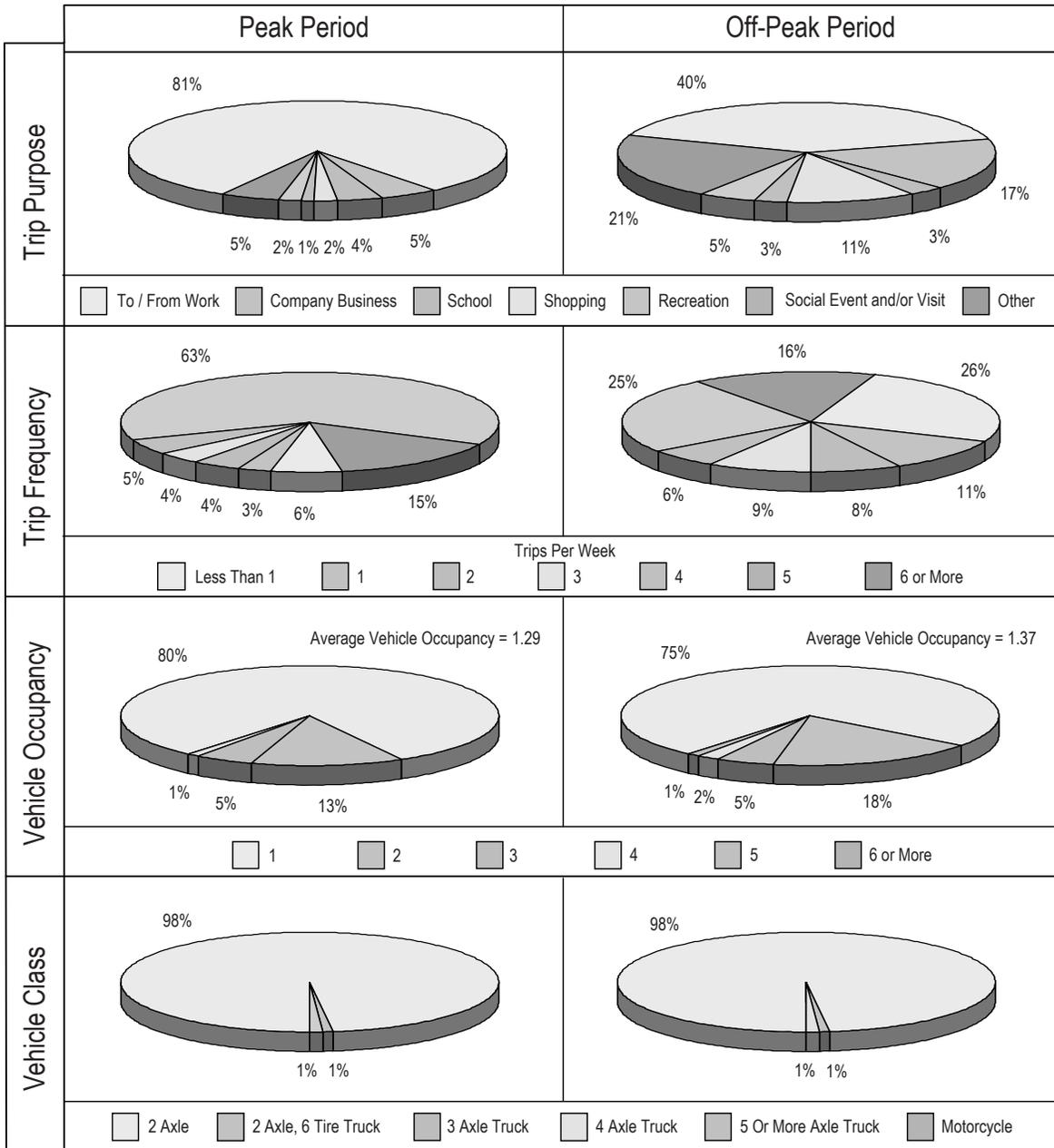
Questions regarding trip purpose were also included in the travel pattern survey. As shown in Figure 2-14, the overwhelming majority of surveyed motorists (81 percent) traveling in the study area during peak periods were commuters traveling “to and from work.” When combined with the “company business” category, work related trips accounted for 86 percent of total trips. During off-peak periods as indicated in Figure 2-14, work related trips were reduced to 57 percent, with shopping and other trip purposes comprising the bulk of off-peak travel.

Figure 2-14 also provides information collected from the survey regarding trip frequency. During the peak period, 78 percent of survey respondents indicated that they make similar trips a minimum of 5 times per week. This roughly corresponds to the percentage of “To and From Work” trips described by the Trip Purpose pie chart, suggesting that a large percentage



Table 2-19  
Motorist Survey Sample Size

Survey Station	Date	Location	Direction	Number of Surveys Distributed	Number of Valid Surveys Returned	Passing Traffic	Percent of Passing Traffic Surveyed	Percent of Valid Surveys Returned
1	11/29/2006	NC 751 Hope Valley Road South of Fayetteville	Northbound	665	126	4,847	13.7	18.9
2	11/29/2006	NC 55 South of Sedwick Drive	Northbound	1,370	97	4,189	32.7	7.1
3	11/29/2006	South Alston Avenue South of NC 54	Northbound	1,040	100	2,231	46.6	9.6
4	11/29/2006	NC 147 West of TW Alexander Drive	Southbound	1,799	372	6,072	29.6	20.7
5	11/30/2006	Davis Drive South of NC 54	Northbound	2,029	225	6,482	31.3	11.1
6	11/30/2006	South Miami Boulevard South of NC 54	Northbound	2,827	237	7,428	38.1	8.4
7	11/30/2006	Hopson Road South of NC 54	Westbound	1,072	155	4,750	22.6	14.5
8	12/5/2006	McCrimmon Parkway West of Church Street	Eastbound	1,561	176	3,269	47.8	11.3
9	12/5/2006	Morrisville Carpenter Road West of Railroad Lin	Eastbound	3,340	435	4,029	82.9	13.0
10	12/6/2006	NC 55 West Williams Street South of Old Jenks	Northbound	1,508	94	8,498	17.7	6.2
11	12/6/2006	Davis Road South of Old Jenks Road	Northbound	360	65	3,055	11.8	18.1
12	12/7/2006	Bypass NC 55 South of NC 55 Junction	Northbound	3,379	376	8,212	41.1	11.1
13	12/7/2006	NC 55 Main Street South of Sunset Lake Road	Northbound	326	43	4,952	6.6	13.2
<b>Total</b>				<b>21,276</b>	<b>2,501</b>	<b>68,014</b>	<b>31.3</b>	<b>11.8</b>



Note: Charts represent sum of all survey locations.

of trips are made by weekly commuters. During off-peak periods, trip frequencies of 4 or less times per week were predominant, accounting for 60 percent of the trips made within the study area.

Vehicle occupancy rates for the various types of users in the project study area are also displayed in Figure 2-14. As shown, 80 percent of peak hour surveyed respondents and 75 percent of off-peak hour respondents indicated that trips were made by single occupancy vehicles (SOV). Only 13 to 18 percent of respondents traveled with one passenger. Overall, the survey indicates average vehicle occupancy of between 1.3 to 1.4 persons per vehicle.

The overwhelming majority of survey respondents, (98 percent) stated that they were traveling in passenger cars.

#### **TRIP ORIGINS AND DESTINATIONS**

A majority of survey respondents, over 90 percent, indicated that they began their trip in Apex, Cary, Holly Springs, Morrisville, Durham, Fuquay-Varina and Raleigh. The most prevalent destination cities included Durham, Cary, Chapel Hill, Research Triangle Park (RTP) and Apex. The relatively low percent of destination trips attributable to the Research Triangle Park (RTP) is because several destinations in the RTP have Durham addresses as defined by the United States Postal Service. Table 2-20 shows the percent distribution of trips by origin city and by destination city. The origin towns and cities help to identify the market area of the proposed Triangle Expressway.

Detailed origin-destination analysis for some frequent origins and destinations was conducted using “factored” trips data. The survey database containing valid trips was “factored up” to traffic counts conducted at the same time as the surveys. This “factoring” process is a method by which each survey record is associated with a multiplying factor representing the number of trips for that particular origin-destination movement at average weekday levels.

Table 2-21 shows the number of “factored” trips in the peak and off-peak periods for some of the common traffic movements identified from the surveys. Only origin-destination pairs that had over 1,000 trips per day are depicted in the table. The most popular trips surveyed were from Apex, Holly Springs, Cary, Morrisville and Durham, to destinations such as Durham, RTP and Cary. The two most prevalent origin-destination pairs, Apex-Durham and Holly Springs-Durham, accounted for more than 25 percent of all the trips shown in the table.

**Table 2-20  
Trips by Origin and Destination City**

<u>Origin City</u>	<u>Total Trips</u>	<u>Percent</u>
Apex	15,053	18.9%
Holly Springs	12,750	16.0%
Cary	12,672	15.9%
Morrisville	11,349	14.2%
Durham	10,724	13.4%
Fuquay-Varina	5,999	7.5%
Raleigh	4,489	5.6%
Research Triangle Park	4,881	6.1%
Sanford	671	0.8%
Chapel Hill	638	0.8%
Pittsboro	536	0.7%
<b>TOTAL</b>	<b>79,762</b>	<b>100.0%</b>

<u>Destination City</u>	<u>Total Trips</u>	<u>Percent</u>
Durham	39,497	48.2%
Cary	8,448	10.3%
Chapel Hill	7,720	9.4%
Research Triangle Park	6,760	8.2%
Apex	5,356	6.5%
Hillsborough	3,304	4.0%
Mebane	3,124	3.8%
Raleigh	2,184	2.7%
Morrisville	2,380	2.9%
Roxboro	1,325	1.6%
Burlington	831	1.0%
Cedar Grove	556	0.7%
Butner	527	0.6%
<b>TOTAL</b>	<b>82,013</b>	<b>100.0%</b>

Source: Factored trips from travel pattern survey  
in November and December 2006.



**Table 2-21  
Trips for Common Origin-Destination Pairs**

Origin City or Town	Destination City or Town	Trips			Percent Share of Trips		
		Peak	Off-Peak	Total	Peak	Off-Peak	Total
Apex	Cary	491	699	1,190	7.4	12.5	9.7
	Chapel Hill	922	705	1,628	13.9	12.6	13.3
	Durham	4,793	3,392	8,185	72.1	60.5	66.8
	RTP	441	807	1,248	6.6	14.4	10.2
	<b>Total</b>	<b>6,647</b>	<b>5,604</b>	<b>12,251</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
Cary	Cary	551	755	1,306	11.1	16.1	13.5
	Chapel Hill	753	1,176	1,928	15.2	25.0	20.0
	Durham	3,095	1,959	5,054	62.4	41.7	52.3
	RTP	560	811	1,371	11.3	17.2	14.2
	<b>Total</b>	<b>4,700</b>	<b>4,700</b>	<b>9,659</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
Durham	Cary	604	553	1,157	15.9	14.9	15.4
	Durham	2,539	2,364	4,903	66.6	63.6	65.2
	RTP	668	797	1,465	17.5	21.5	19.5
	<b>Total</b>	<b>3,811</b>	<b>3,714</b>	<b>7,525</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
Fuquay-Varina	Durham	1,219	1,371	2,590	100.0	100.0	100.0
Holly Springs	Cary	689	324	1,013	12.1	8.5	10.7
	Chapel Hill	763	264	1,027	13.4	7.0	10.8
	Durham	3,679	2,724	6,403	64.5	71.9	67.4
	RTP	571	480	1,051	10.0	12.7	11.1
	<b>Total</b>	<b>5,702</b>	<b>3,792</b>	<b>9,494</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
Morrisville	Cary	622	700	1,322	14.4	16.6	15.4
	Chapel Hill	582	588	1,171	13.4	13.9	13.7
	Durham	3,128	2,935	6,064	72.2	69.5	70.9
	<b>Total</b>	<b>4,332</b>	<b>4,224</b>	<b>8,556</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
Raleigh	Durham	1,129	1,133	2,262	100.0	100.0	100.0
RTP	Durham	1,079	1,043	2,122	100.0	100.0	100.0

Table 2-21 also shows that peak traffic was higher than off-peak traffic even though the peak periods account for only eight hours of the day. All trips heading to Durham clearly show a higher percentage of trips in the peak periods than in the off-peak. Peak and off-peak travel patterns differ for trips originating from Apex, Cary and Holly Springs and having destinations in Cary, Durham and Chapel Hill. The higher share of off-peak traffic for trips heading to the RTP from Apex, Cary, Durham and Holly Springs may be due to the fact that many locations in the RTP have mailing addresses in Durham and Morrisville. All of this data suggests a strong commuting pattern within the study area.

#### **ROAD CHOICE**

Figure 2-15 graphically shows the popular route choices for common origin-destination pairs. NC 55 emerges as a major roadway within the study area, favored by 55 percent of motorists making trips from Apex to Durham. NC 55 is also used by motorists traveling to Durham from Cary and Holly Springs. Another significant route in the study area is NC 54, which is used by motorists traveling from Cary to Durham and the majority of motorists traveling from Morrisville to Durham. Additionally, a majority of surveyed motorists, 43 percent, traveling from Raleigh to Durham indicated that they use a combination of I-40 and I-540. As Figure 2-15 indicates, other origin-destination pairs favor NC 54 and NC 55 for east-west movements and NC 55, I-40 or a combination of I-40 and NC 55 for north-south movements.

#### **TRIP PURPOSE**

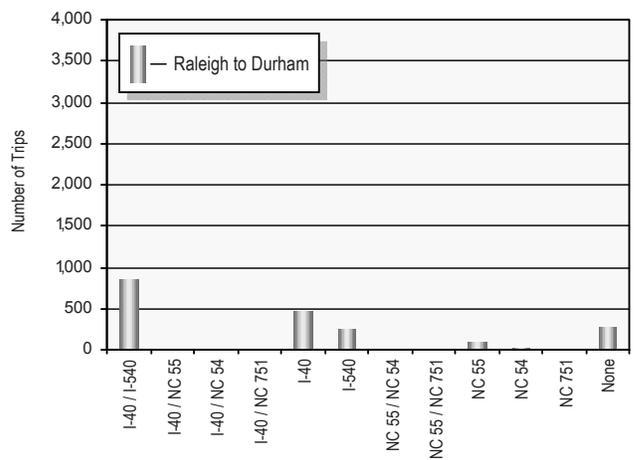
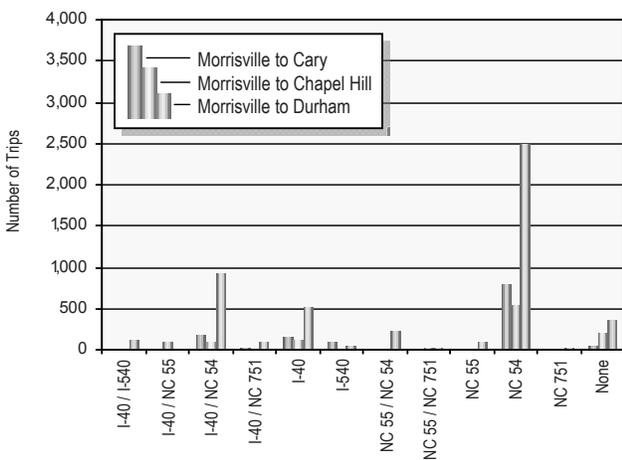
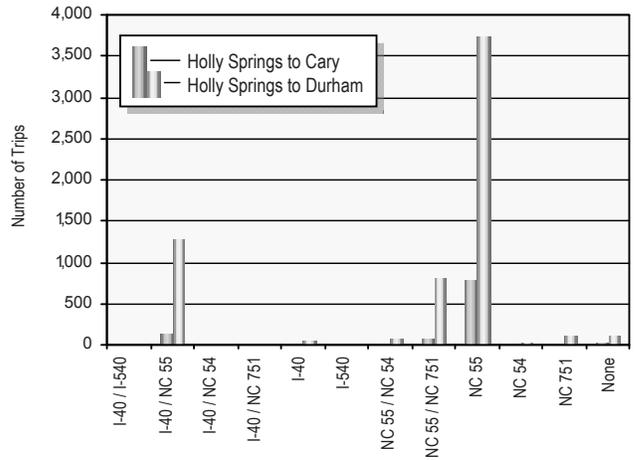
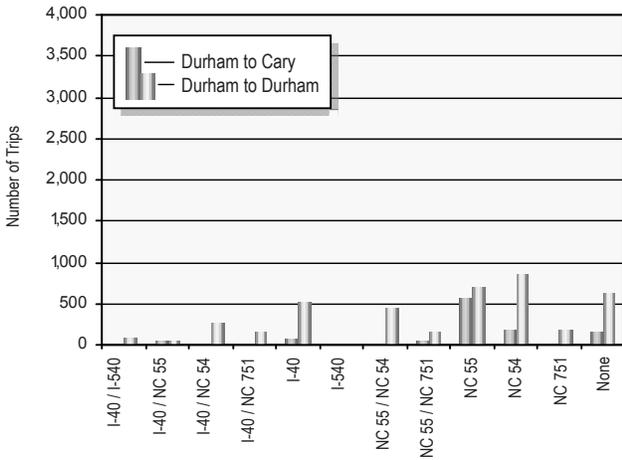
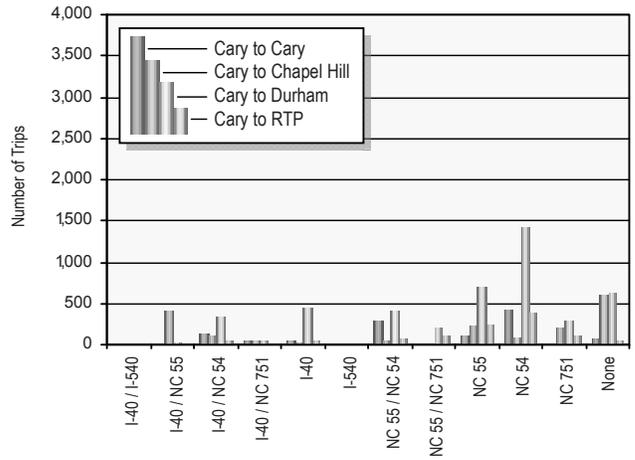
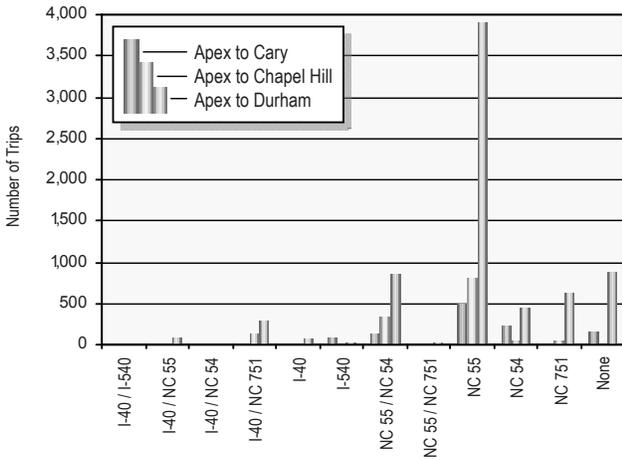
Figure 2-16 depicts the distribution of trips by trip purpose for common origin-destination pairs. The most common trip purpose for the frequent origin-destination pairs was to and from work. Combined with company business trips, work trips accounted for nearly two-thirds of all origin-destination trips.

Figure 2-16 also identifies a few other trip patterns. Twenty-eight (28) percent of trips between Apex and Chapel Hill are shopping trips. A significant number of trips, about 20 percent, are school trips (likely trips made by students to the University of North Carolina.) Similarly, the Cary-Chapel Hill and Holly Springs-Chapel Hill origin-destination pairs show a significant number of school trips, 17 and 12 percent, respectively, of all trips between the origin-destination pairs.

#### **TRIP FREQUENCY**

Figure 2-17 indicates the frequency between common origin and destination pairs. Of the 63,000 origin-destination trips between the most frequent origin and destination cities, 58 percent of trips were made five times or

## Proposed Triangle Expressway Comprehensive Traffic and Revenue Study

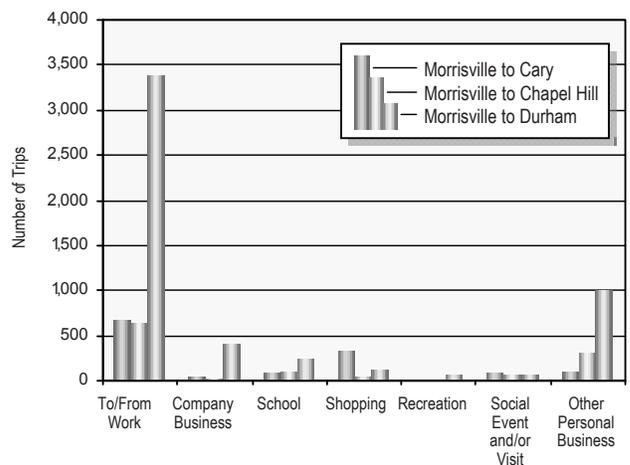
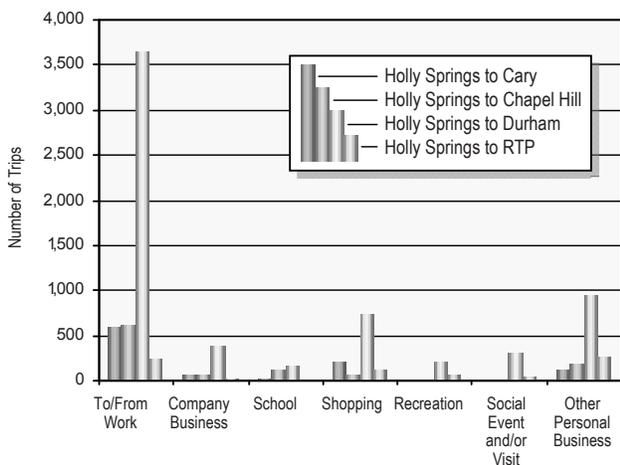
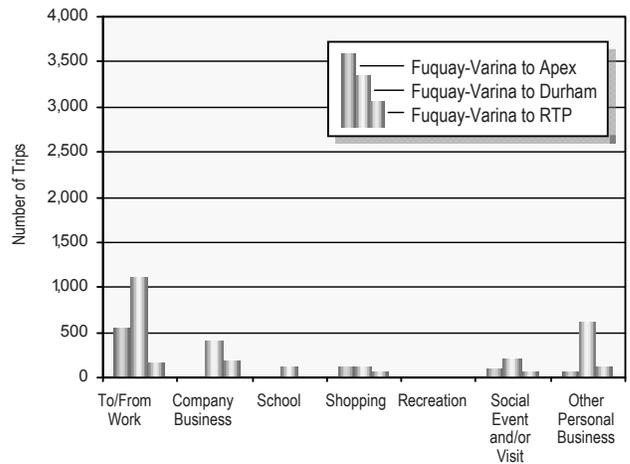
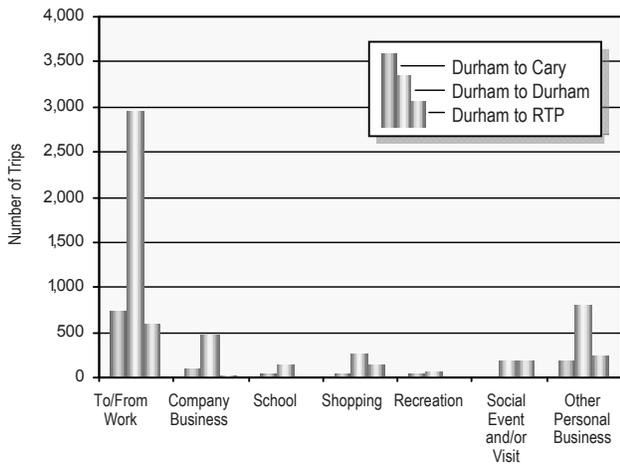
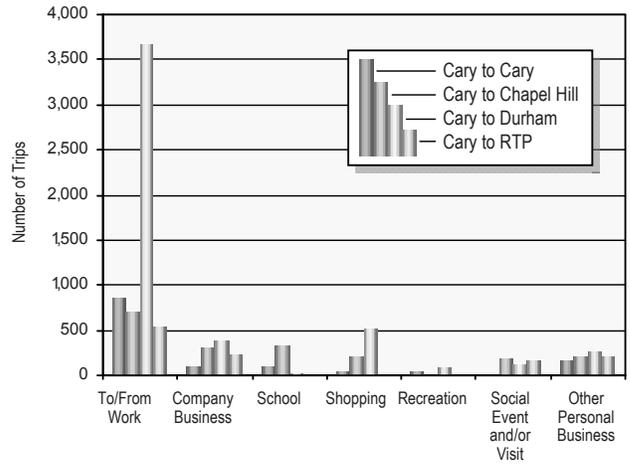
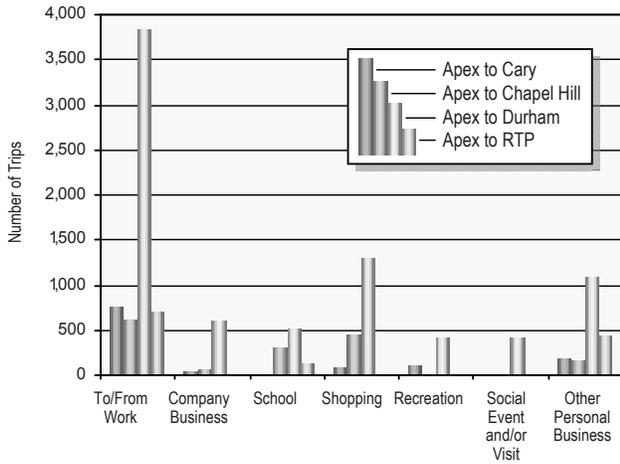


## ROAD CHOICE FOR COMMON ORIGIN-DESTINATION PAIRS

FIGURE 2-15

# Proposed Triangle Expressway Comprehensive Traffic and Revenue Study

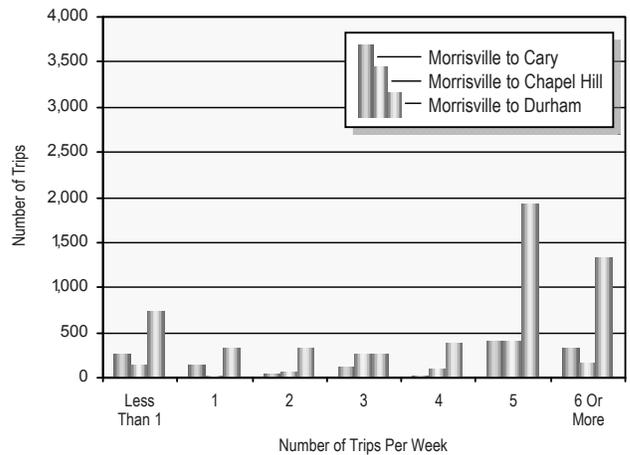
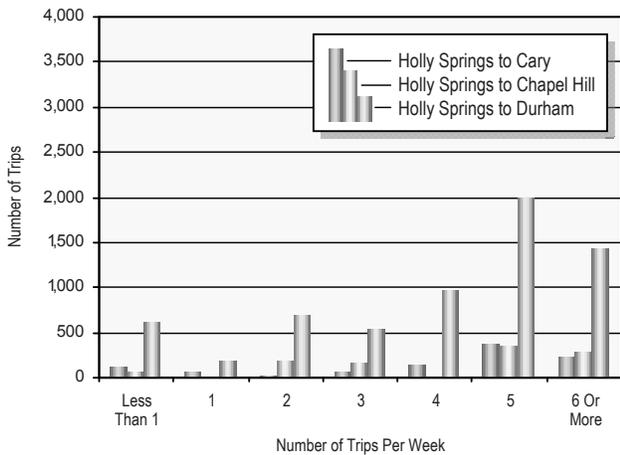
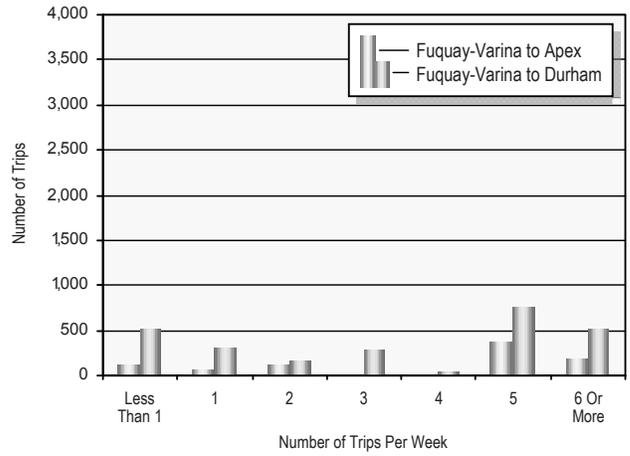
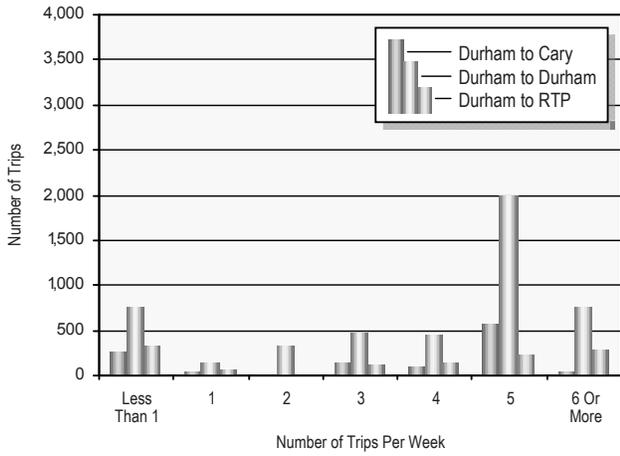
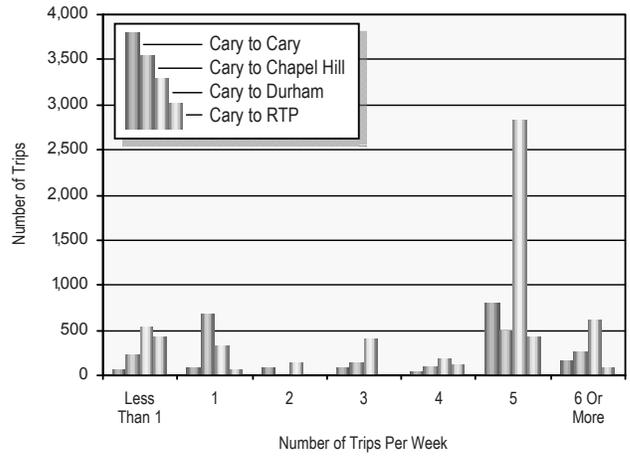
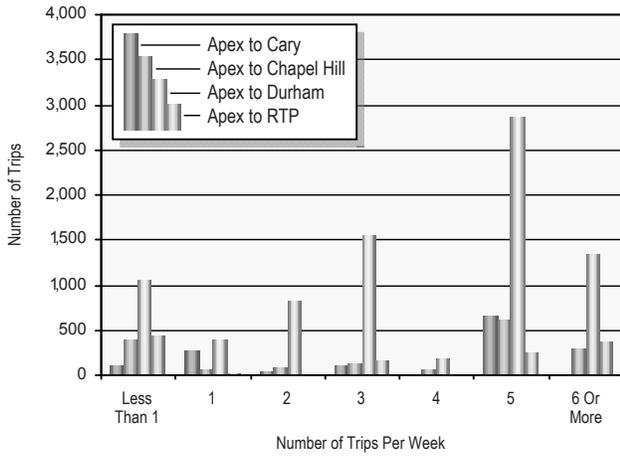
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## TRIP PURPOSE FOR COMMON ORIGIN-DESTINATION PAIRS

FIGURE 2-16

# Proposed Triangle Expressway Comprehensive Traffic and Revenue Study



more every week. Of these, 17 percent of surveyed motorists make the trip six or more times a week. This corresponds to the percentage of motorists who indicated that they were making the trip to or from work.

A more detailed analysis of the trip characteristics of common origin and destination pairs is provided in a technical memorandum that details the travel patterns for some common origin-destination pairs in the Raleigh-Durham area.

# CHAPTER 3

## STATED PREFERENCE SURVEYS

The Triangle Expressway Stated Preference Survey was conducted by Resource Systems Group (RSG) for Wilbur Smith Associates and the North Carolina Turnpike Authority (NCTA). The objective of the stated preference survey was to estimate reliable values of the toll sensitivity, or “values of time,” of travelers in the proposed Triangle Expressway study area. The survey was designed to provide sufficient detail to allow analyses of traveler responses to different toll structures and toll collection options; and to allow analysis of toll sensitivities by trip type sufficient to support route diversion modeling. The inputs and results of the stated preference survey are documented in a technical memorandum.

### APPROACH

The stated preference survey instrument was programmed using customized software developed by RSG for field intercept administration using laptop computers and for online administration through RSG’s Survey-Cafe.com website. Respondents for this survey were recruited from several sources, including email invitation to those travel pattern survey respondents expressing interest in participating in follow-up surveys, workers with jobs in the study area, local shopping centers and motor vehicle departments.

The customized computer-based survey software adapts to the trip characteristics of each respondent, making the survey realistic for them. By performing calculations behind the scenes, it allowed for the presentation of complex ideas in a simple manner. Electronic validation of each question eliminated item non-response and prevented the entry of invalid inputs. Responses were stored directly into a database after every question, reducing data entry costs and eliminating transcription error.

## SURVEY QUESTIONNAIRE

The survey questionnaire briefly introduced the purpose of the survey and then asked questions grouped into four sections: trip description, stated preference section with questions about travel time and toll cost, stated preference follow-up questions, and demographic questions.

### TRIP DESCRIPTION

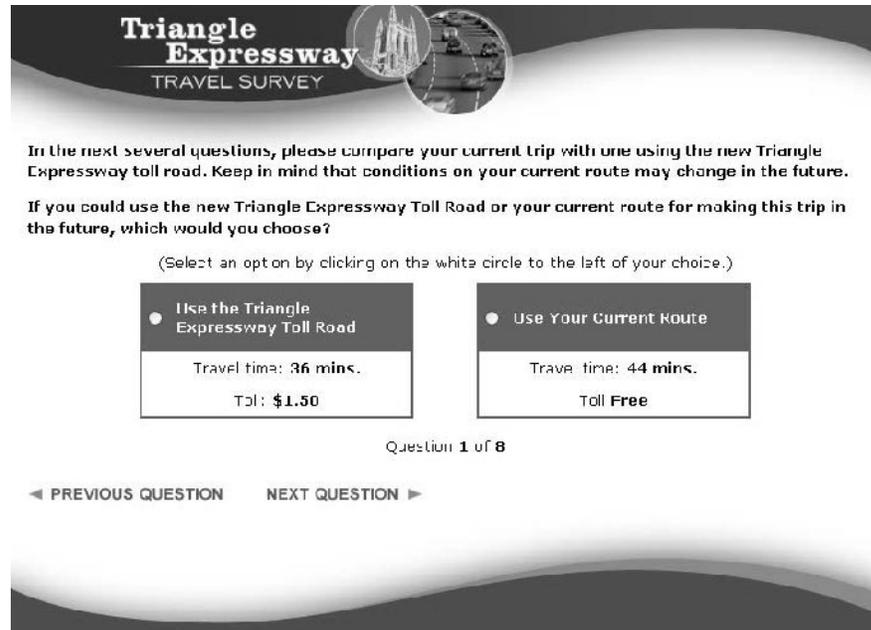
Respondents were screened to ensure that they had made trips recently within the Triangle Expressway study area. Each was asked to provide details of their trip, including day of the week, the purpose of their trip, the time period in which their trip began, the roads they used during their trip, and where their trip began and ended. These data were used to validate the Triangle Expressway as a possible alternative for the respondent's reported trip and as inputs to build the alternatives described in the stated preference scenarios.

After entering origin and destination information, respondents were asked for additional details about their trips, including, trip duration, amount of travel delay experienced, vehicle occupancy and how many times a week they make the particular trip (trip frequency).

### STATED PREFERENCE SECTION

Before beginning the stated preference exercises, respondents were presented with more specific information about the proposed Triangle Expressway. Respondents were also given a description of the toll collection methods that likely would be used on the new facility.

***Definition of Alternatives*** - The stated preference section consisted of eight hypothetical scenarios, with each scenario presenting two alternatives for traveling between the respondent's trip origin and destination. The first alternative presented the respondent's reported travel time using a toll-free rate. The second alternative presented the estimated travel time and toll cost based on the calculated use of Triangle Expressway for the identical trip. Figure 3-1 shows an example stated preference experiment.



**Figure 3-1**

**Definition of Attributes and Levels** - Travel times for the respondent’s current route, as well as travel times and toll costs for the Triangle Expressway alternative, were presented at different values or “levels” in eight scenarios for each respondent. The combination of times and costs presented in each scenario were selected using a fractional factorial orthogonal experimental design, a commonly used experimental design method. The experimental design consisted of 32 scenarios, and each respondent saw 8 of the 32 scenarios in a randomized order.

To ensure that the Triangle Expressway scenarios were believable to the respondent, the values for travel times and toll costs were based on characteristics of the respondent’s own trip: the respondent’s likely route for their trip using the Triangle Expressway was estimated based on the stated origin and destination for their trip. Calculations of the most likely entrance and exit ramps determined the respondent’s hypothetical access times to, egress times from, and total distance along the Expressway. Times spent on the Expressway and toll costs were varied by travel speed and toll cost per mile, respectively, to provide values meeting the experimental design criteria. By varying the travel times and tolls shown in each scenario, the respondent was presented with different time costs and saving amounts for each scenario, allowing the demonstration of travel preferences across a range of values of time.

### **STATED PREFERENCE FOLLOW-UP**

Directly following the stated preference section, respondents who did not select the Triangle Expressway alternative in any of the eight stated preference scenarios were asked to indicate their primary reason for not choosing the toll road. Respondents who chose the Triangle Expressway option at least once were asked their likelihood of acquiring an electronic toll collection (ETC) device as well as their familiarity with these devices. Those respondents who were not “very likely” to acquire an ETC device were asked if a reduced toll would increase their likelihood of ETC use. Respondents who still were not interested in ETC devices were asked why they were unlikely to open an ETC account.

The final follow-up section of the survey asked about their opinions of the project and their primary reason for support or opposition. Finally, respondents were asked a few attitudinal questions regarding tolling in general.

### **DEMOGRAPHICS**

The final section of the survey contained a series of questions to collect data such as county of residence, household size, number of children, number of household vehicles, gender, age, employment status, and income. This information was used to determine differences in responses among traveler market segments, such as trips to and from Research Triangle Park, non-work trips, and airport trips.

## **SURVEY RESULTS**

### **SAMPLE OVERVIEW**

Stated preference data from 4,597 respondents were used to estimate the choice models presented in the following section of this report. Approximately 13 percent of these responses were recruited at intercept sites; 10 percent were recruited from the origin-destination survey email list; and 77 percent were recruited via business recruiting efforts. The intercept surveys were conducted at North Carolina Department of Motor Vehicles offices, area shopping centers, and other public locations:

- North Carolina Department of Motor Vehicles – west Raleigh, east Durham;
- Cary Towne Center Mall - Cary;
- Streets at Southpoint Mall – Durham;
- Raleigh-Durham Airport – Morrisville; and
- Cary West Regional Library – Cary.

While the majority of the sample came from one sample source, there are sufficient data from each sample source to provide unbiased results for a range of traveler market segments.

#### **RESPONDENT CHARACTERISTICS**

The sample was comprised of 34 percent women and 66 percent men. The median age was between 35 and 44 years of age. Most respondents (80 percent) were residents of Wake County, with 11 percent from Durham County and the remainder from other counties such as Orange and Chatham. The median household size was three people, and median vehicle ownership was two vehicles per household.

Ninety (90) percent of respondents were employed full time, and five (5) percent were employed part-time or were self-employed. Of those three groups, 82 percent were employed in the RTP. The majority of those working in the RTP (80 percent) were employed in professional or technical positions. The job types of non-RTP employees were more diverse, with 47 percent in professional or technical jobs, 16 percent in executive or managerial jobs, 11 percent in manufacturing jobs, and the remaining 26 percent doing other types of work.

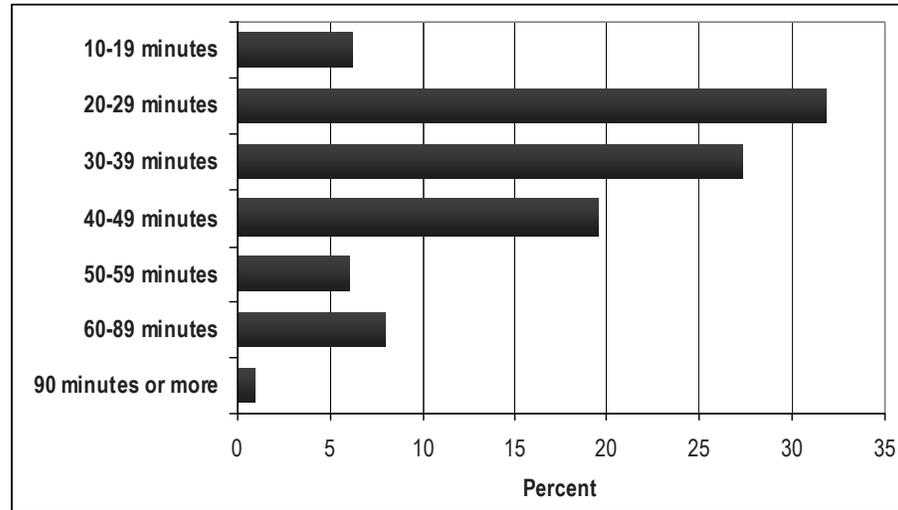
The sample's median annual household income was in the \$100,000–\$149,999 per year bracket. It was clear that the median income of those employed within the RTP was higher than those employed elsewhere. The income of the respondents who were employed outside the RTP more closely resembled the median income reported in the census. To address this, variations in income by zone were applied within the tolling analysis.

#### **TRIP CHARACTERISTICS**

The multi-method sampling approach used for the survey allowed respondents who made a diverse range of trips to be recruited. Of those respondents who were recruited at intercept sites, 27 percent described work commute trips and the remainder described social or recreational trips, shopping trips and other personal business trips. Surveys completed by employees of businesses in the study area and travel pattern survey respondents largely described work related travel; in both these groups, less than a quarter of respondents described a non-work trip.

Over three quarters (86 percent) of respondents indicated that their trip began at home. Most respondents described trips that used I-40 (60 percent of respondents), Davis Drive (40 percent of respondents), and/or NC-55 (40 percent of respondents).

The median travel time in the sample was between 30 and 39 minutes. Over 90 percent of trips were less than an hour in duration (see Figure 3-2).



**Figure 3-2 - Current Total Travel Time**

Around two-thirds of the trips took place during the peak periods. About two-thirds of peak period travelers and one-third of off-peak travelers experienced some delay. A slightly higher proportion of PM peak travelers than AM peak travelers experienced delays of 10 minutes or more.

**ETC FAMILIARITY**

Although there are no toll roads in North Carolina, 82 percent of respondents said that they were familiar with electronic toll collection (ETC). A significant number of respondents (16 percent) currently own or have owned an ETC device in another state; for most respondents that device was an E-ZPass transponder.

**MODEL ESTIMATION**

Data from the stated preference alternatives were expanded into a dataset that contained eight observations for each of the 4,597 usable surveys, yielding a total of 36,776 observations that were used to complete model estimation. The statistical estimation and specification testing was completed using a conventional maximum likelihood procedure that estimated

a single set of coefficients for a multinomial logit model. These coefficients were used to estimate the value of travel time savings for travelers in the proposed Triangle Expressway study area. The value-of-time estimates were input into the travel demand model to estimate traffic and revenue for the proposed Triangle Expressway.

#### **MODEL COEFFICIENTS BY MARKET SEGMENT**

Model coefficients were estimated for the nine different market segments listed below:

- Peak Work Trips to/from RTP;
- Peak Work Trips Outside RTP;
- Peak Non-work Trips;
- Off-peak Work Trips;
- Off-peak Non-work Trips;
- Business-related Trips;
- Airport Pick-up/Drop-off Trips;
- Airport Business-related Trips; and
- Airport Non-Business related Trips.

The final model structures are provided in the full report from RSG included in a technical memorandum. For most of the market segments, value-of-time was determined to be sensitive to income and total trip distance. That is, people with higher incomes tended to have higher values of time and those with longer travel distances also tended to value their time more.

The value-of-time for the different market segments based on a household income of \$70,000 (the median for the region) and a trip length of 20 miles is shown in Table 3-1. It should be noted that these values were chosen to be representative but the actual values used were localized for each traffic analysis zone in the model.

**Table 3-1  
Estimated Value of Time**

<b>Market Segment</b>	<b>Value-of-time (\$ per hour) <sup>(1)</sup></b>
Peak Work to/from RTP	\$16.51
Peak Work Outside RTP	13.24
Peak Non-Work	14.51
Off-peak Work	13.03
Off-peak Non-work	9.85
Business-related	12.97
Airport Pick-up/Drop-off	11.99
Airport Business	20.97
Airport Non-Business	16.20

<sup>(1)</sup> Estimated at \$70,000 per year household income and 20 miles total trip length.

## **APPLICATION TO MODEL FOR TRAFFIC AND REVENUE FORECAST**

A weighted average value-of-time was calculated for each traffic analysis zone within the travel demand model used for the traffic and revenue analysis for this project. The estimated value-of-time for each zone was weighted based on the trip purpose distribution for trips originating within the zone, the household income for the zone, and the average length of trips from the zone that would potentially use the Triangle Expressway. This matrix was used as input to the traffic assignments for the project under a variety of tolling conditions.

# CHAPTER 4

## STUDY AREA GROWTH REVIEW

Economic growth is an important factor in evaluating the viability of any start-up toll facility such as the proposed Triangle Expressway. Given the strong nature of past and current employment-related growth in the Triangle Region, anticipated economic activity is particularly important.

This study will be used in support of project financing; therefore, it was important to conduct an independent analysis of the expected economic growth of the region. This “Study Area Growth Review” provides independently-developed socioeconomic forecasts of all parameters that were used in the regional travel demand model to predict future travel in the region rather than relying on the parameters developed by the two metropolitan planning organizations (MPOs) as was the case for the preliminary level traffic and revenue studies.

The independent economist for this study was the Kenan Institute of Private Enterprise of the Kenan-Flagler Business School at the University of North Carolina at Chapel Hill. The Kenan team of economists had no affiliation with the forecasts developed by the MPOs or any affiliation with local governments or developers in the area. Thus Kenan could provide an unbiased review of regional economic growth and the independently-derived data sets that were needed for the travel demand models to forecast future traffic at the Transportation Analysis Zone (TAZ) level.

### METHODOLOGY

The details of the Kenan study are contained in a technical memorandum.

This chapter contains a brief overview of the Kenan approach.<sup>(1)</sup>

Kenan reviewed the original (2002) socioeconomic forecasts that were used in the preliminary traffic and revenue studies for the Triangle Expressway and a newer (2007) set of draft forecasts developed by the MPOs as part of the new regional travel demand model (TDM). This new TDM was in development during this study, therefore the newer draft socioeconomic forecasts were not officially adopted by the MPOs before the beginning of the transportation modeling and toll diversion analysis. Through discussions with the MPOs, it was determined that the draft socioeconomic forecasts of June 2007 were expected to be close to the final forecasts, which would be officially adopted later in the year. Slightly modified forecasts and projections were adopted by the Capitol Area MPO (CAMPO) in August 2007 and by the Durham-Chapel Hill-Carrboro MPO (DCHC) in September 2007. The differences between the draft forecasts and the official forecasts are small.

Kenan employed two methods in preparing the regional socioeconomic forecast that were used for this traffic and revenue study. The results of these two methods were then reconciled to create the individual forecasts at the TAZ level for use in the transportation demand model.

The first method was a top-down approach that began with overall forecast for the region using economic model-driven parameters to allocate population and employment throughout the region. Trend analysis was performed to determine the reasonableness of economic growth rates in relation to the new MPO draft forecasts, other forecasting organizations, and individual experts.

The second method was a bottom-up approach that reviewed the new draft forecasts coordinated by the two MPOs on behalf of the member jurisdictions. The MPO process involves local envisioning and inter-municipality discussions subject to broad constraints. The MPOs' forecasts are based on current planning assumptions in each member's jurisdiction. Kenan evaluated the basic assumptions upon which the MPOs jurisdictions forecast socioeconomic parameters and conducted interviews with local planners, developers, and others to assess the contingencies that affect the projections.

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<sup>(1)</sup> The independent economic analysis was conducted by Kenan during 2007 at a time before the current recession and surge in fuel prices had started. As discussed elsewhere in this report, the current recession is expected to affect future traffic and revenue on the Triangle Expressway. This chapter contains both the original Kenan analysis and a review of more recent economic trends which have led to a revision of the traffic and revenue forecasts as described in detail in Chapter 6.

Finally, Kenan reconciled the top-down and bottom-up methods by relying on the top-down method for regional and county-wide control totals and the bottom-up method, informed by historical precedent, for distribution to the TAZ level in the model.

## **COMPARISON WITH PREVIOUS FORECASTS**

The Kenan socioeconomic forecasts form the basis for the toll traffic and revenue forecasts presented in this report. The preliminary traffic and revenue studies used the MPOs' 2002 socioeconomic forecasts. As discussed previously, the MPOs prepared new socioeconomic forecasts in 2007 as part of the development of a new regional travel demand model. These three forecasts differ; and it was important to compare them, to identify major changes, and to point to the potential effect on the toll traffic and revenue forecasts.

Direct comparison at the regional level was difficult because the MPOs' 2007 draft forecasts cover a larger geographic area than the 2002 forecasts. The older travel demand model, which was used for both the preliminary and comprehensive traffic and revenue studies, covers the smaller geographic area. However, comparisons can be made for the Triangle Expressway study area by converting the data that uses the new TAZ system boundaries to the older TAZ boundaries and then concentrating only on the study area as illustrated in a later figure in this chapter.

Tables 4-1 and 4-2 contain comparisons of the population and employment forecasts, respectively, in the Triangle Expressway study area. All three forecasts are shown for the study area: the 2002 forecasts used in the preliminary studies, the 2007 draft forecasts prepared by the MPOs, and the forecasts prepared by Kenan, the independent economist. Figures 4-1 and 4-2 depict the three forecasts graphically.

### **POPULATION IN THE TRIANGLE EXPRESSWAY STUDY AREA**

The three population forecasts for the study area vary considerably, particularly in the later years of the forecast. In each case the independent economist population forecasts are lower than the MPOs' forecasts. The MPOs' 2007 draft population forecasts for the study area in 2010 are 3.5 percent higher than the MPOs' 2002 forecasts; whereas, the Kenan forecasts are slightly lower. By 2020, the MPOs' 2007 draft population forecasts are lower than the 2002 forecasts by 2.4 percent; and the Kenan forecasts are 11 percent lower, which represents a lower growth expectation by Kenan than by the MPOs. The Kenan population forecasts for 2030 are

**Table 4-1  
Comparison of Population Projections  
Triangle Expressway Study Area**

Year	2002 MPO Population <sup>(1)</sup>	2007 MPO <sup>(2)</sup>		Independent Economist <sup>(3)</sup>	
		Population	Change from Preliminary Study	Population	Change from Preliminary Study
2010	213,862	221,443	3.5%	213,510	-0.2%
2020	327,723	319,826	-2.4%	291,656	-11.0%
2030	435,140	386,276	-11.2%	364,849	-16.2%

<sup>(1)</sup> Proposed Western and Southern Wake Freeways Preliminary Traffic and Revenue Study, June 16, 2006 using MPO socioeconomic forecasts contained in the Regional Transportation Demand Model adopted at the time of the study.

<sup>(2)</sup> Draft forecasts prepared by Capital Area MPO and Durham-Chapel Hill-Carrboro MPO through June 2007 for new Regional Transportation Demand Model.

<sup>(3)</sup> Forecasts prepared by Kenan Institute of Private Enterprise based on review of 2007 MPO forecasts.

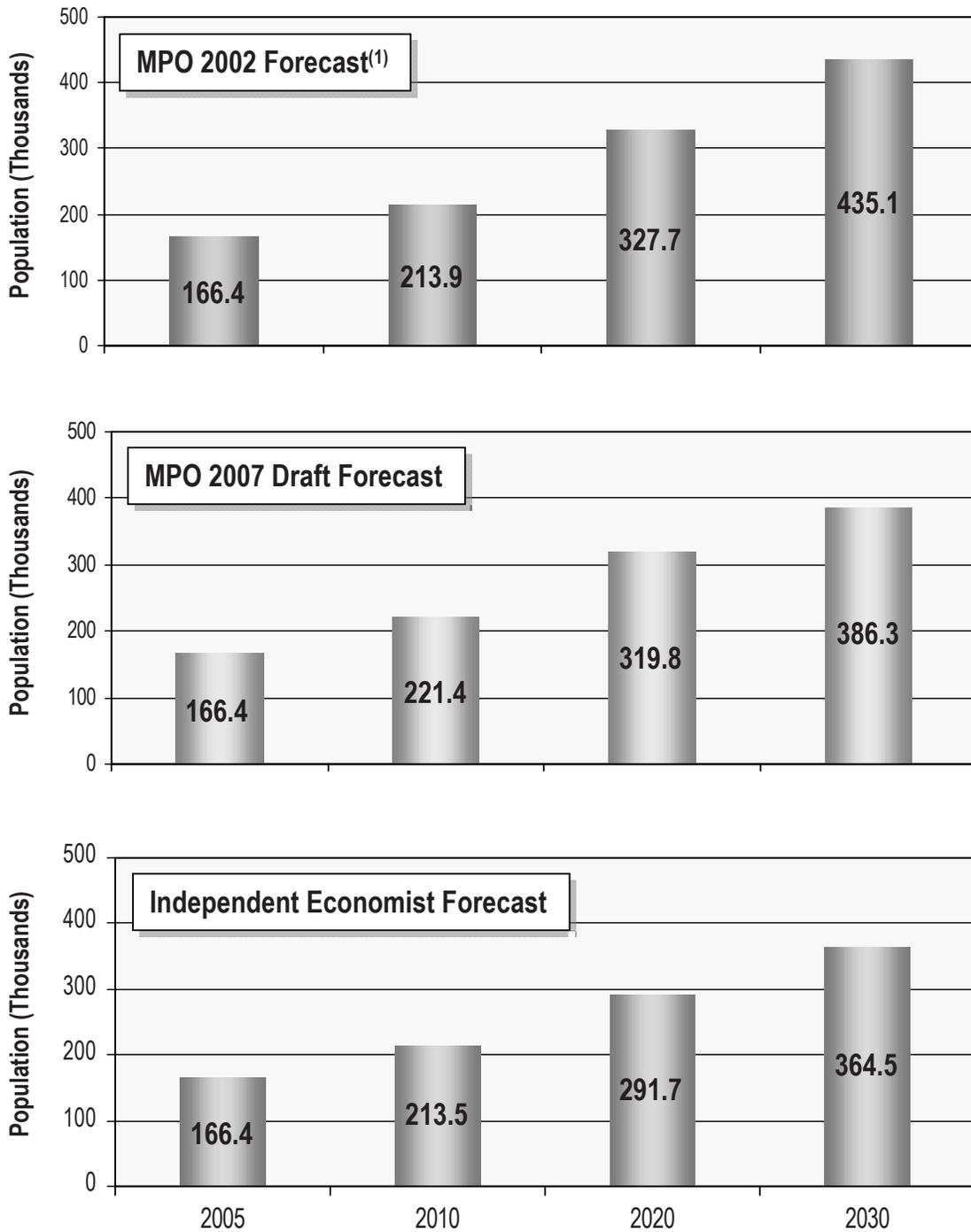
**Table 4-2  
Comparison of Employment Projections  
Triangle Expressway Study Area**

Year	2002 MPO Employment <sup>(1)</sup>	2007 MPO <sup>(2)</sup>		Independent Economist <sup>(3)</sup>	
		Employment	Change from Preliminary Study	Employment	Change from Preliminary Study
2010	153,685	141,248	-8.1%	140,589	-8.5%
2020	246,350	195,195	-20.8%	184,596	-25.1%
2030	341,549	242,231	-29.1%	222,669	-34.8%

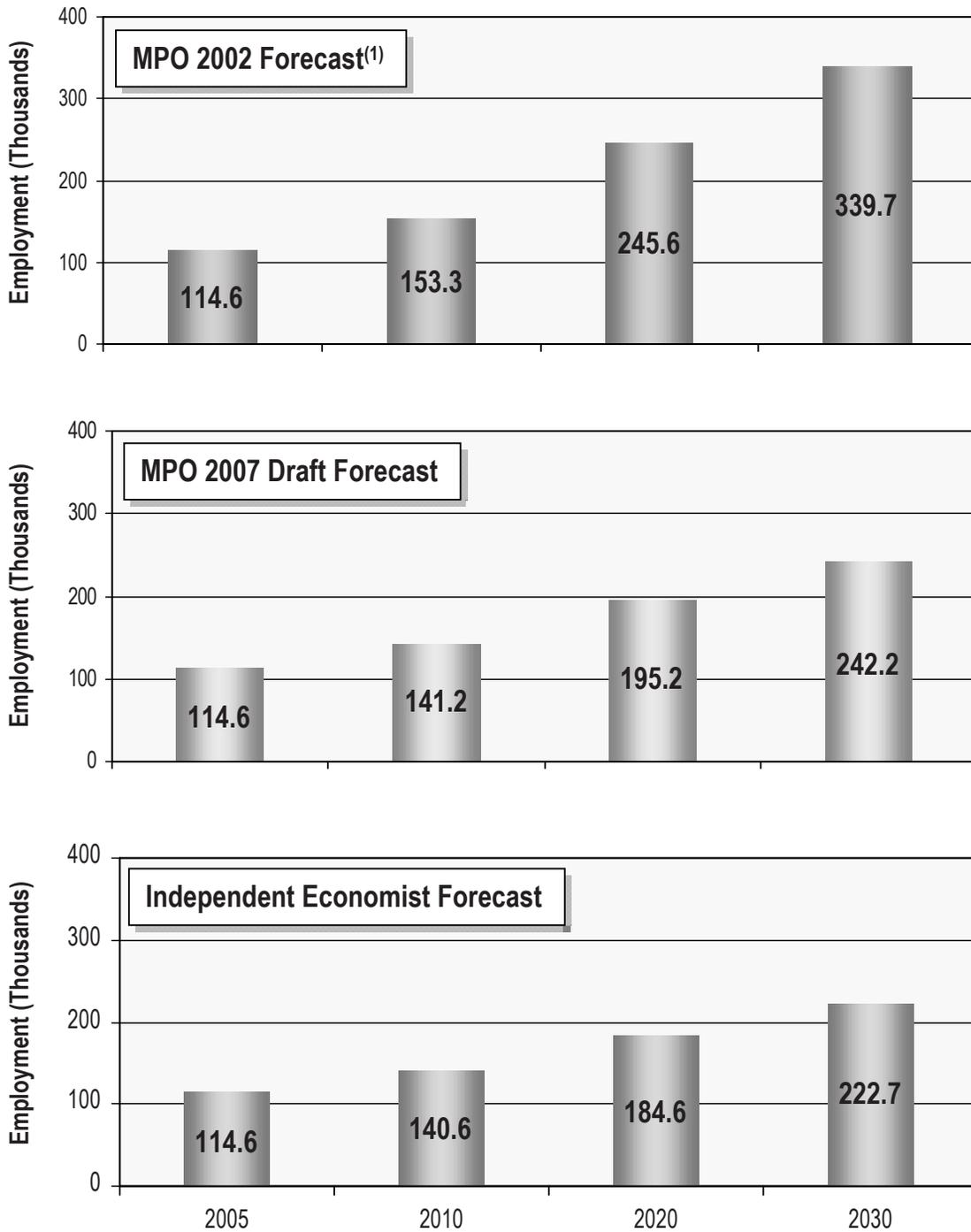
<sup>(1)</sup> Proposed Western and Southern Wake Freeways Preliminary Traffic and Revenue Study, June 16, 2006 using MPO socioeconomic forecasts contained in the Regional Transportation Demand Model adopted at the time of the study.

<sup>(2)</sup> Draft forecasts prepared by Capital Area MPO and Durham-Chapel Hill-Carrboro MPO through June 2007 for new Regional Transportation Demand Model.

<sup>(3)</sup> Forecasts prepared by Kenan Institute of Private Enterprise based on review of 2007 MPO forecasts.



(1) Used in Preliminary Study



(1) Used in Preliminary Study

also significantly lower than the MPOs' 2002 and 2007 draft forecasts. The 2007 MPO draft population forecast for 2030 is nearly 49,000 residents less (-11 percent) than the MPOs' 2002 forecasts, and the Kenan forecast is 70,000 residents less (-16 percent).

However, while the population growth estimates for the study area were reduced, the changes in traffic zones proximate to the proposed Expressway were positive in some cases. Hence, the net impact of the changes in population forecasts on the traffic estimates for the Expressway was not as significant.

#### **EMPLOYMENT IN THE TRIANGLE EXPRESSWAY STUDY AREA**

Table 4-2 shows the comparisons for employment in the study area. The MPOs' 2007 draft forecasts and Kenan forecasts are much lower than the forecast prepared by the MPOs' in 2002. By 2030, the MPOs' 2007 draft employment forecast is 29 percent lower, and the Kenan forecast is 35 percent lower than the 2002 forecasts. The difference between the Kenan forecast and the 2002 forecast, which was used in the preliminary traffic and revenue study, is nearly 119,000 jobs. These differences are due to lower expectations of growth in the study area; as employment is now expected to grow more rapidly in other areas of the Triangle Region.

Like population, adjustments in employment estimates in the immediate vicinity of the proposed Expressway were less negative than for the study area, and in some cases were positive. Most negative adjustments were made in the outlying sections of the study area.

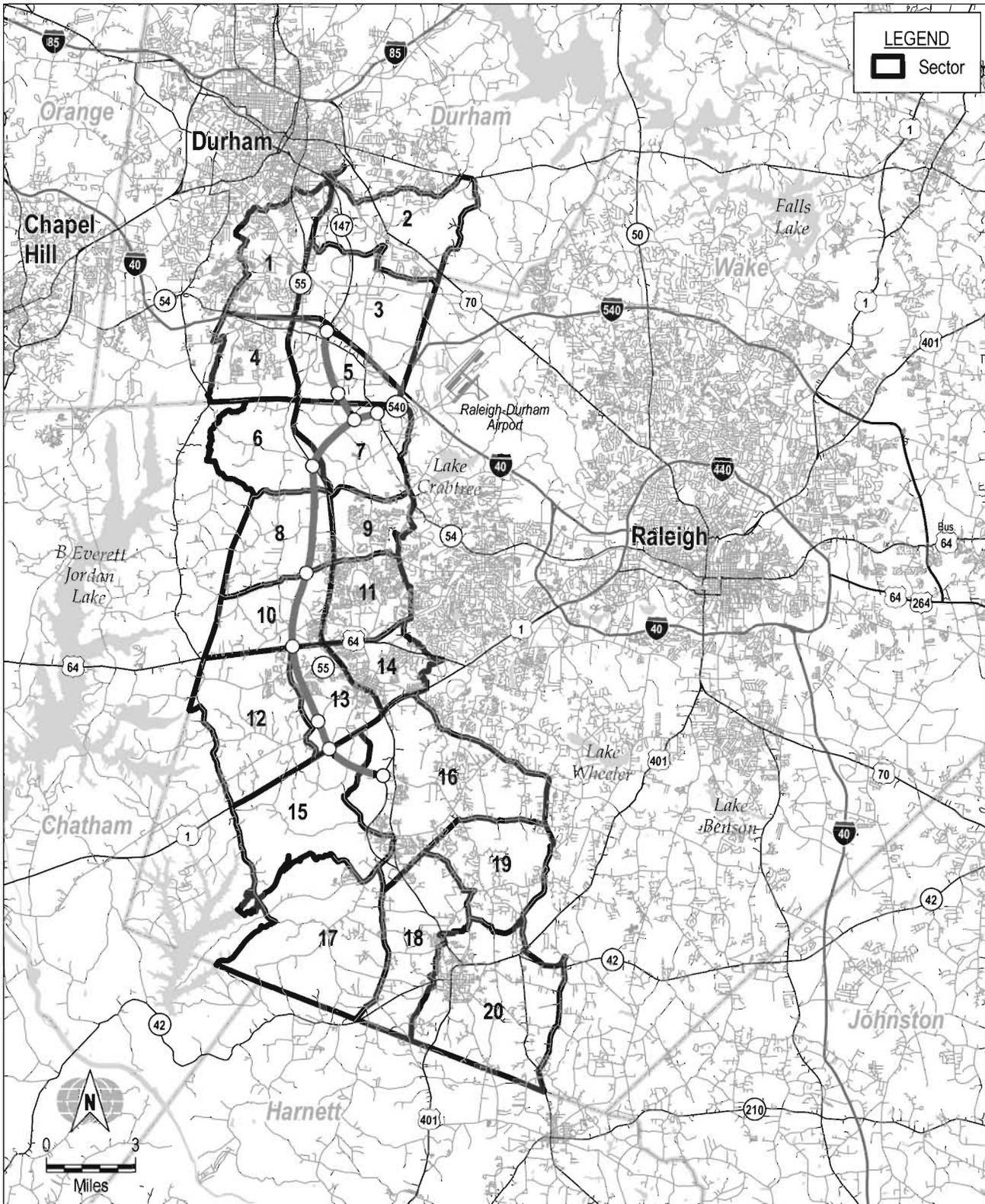
#### **GROWTH PROJECTIONS**

These updated forecasts in the Triangle Expressway study area were analyzed further in order to identify specifically where the changes in growth are expected. Figure 4-3 depicts the 20 geographic sectors within the Triangle Expressway study area. The Triangle Expressway is also shown to orient the sectors to the proposed toll road.

The population and employment within the vicinities of the Western and Southern Wake Freeways are expected to grow extensively over the next three decades based on the forecasts made by the MPOs and the independent economist.

# Proposed Triangle Expressway Comprehensive Traffic and Revenue Study

NC 103278 / 3-13-09 / Study Area Sector Map.mxd



### **POPULATION FORECASTS**

Table 4-3 summarizes population growth within the Triangle Expressway study area using the Kenan forecasts and the TAZ structure in the older travel demand model and compares the study area growth to growth for the rest of the Triangle Region.

In 2005, the Triangle Region had approximately 1.2 million residents with nearly 166,000 people (13.5 percent) residing within the Triangle Expressway study area. By 2030, the regional population is forecast to grow to about 2.1 million people, and the study area's population will grow to more than 365,000 people. By that time the study area's share of the population is expected to be 17.8 percent of the regional population, which means that the study area population is growing faster than the regional population. In fact, the average annual growth rate for the study area is expected to be 3.2 percent annually over the 2005-2030 period, whereas the entire region is expected to grow at only 2 percent annually.

The table also shows the study area sectors where the greatest population growth is expected to occur. Three sectors are expected to have population growth rates exceeding 6 percent per year. Figure 4-4 highlights the growth by percentage in the study area. At the southern end of the study area, nearly all of the sectors are expected to grow at rates exceeding 3 percent with some sectors exceeding 5 percent. The western side of the study area exhibits the highest growth rates with all geographic sectors exceeding 4 percent. These rates, although somewhat lower than the MPOs' 2002 forecasts, nevertheless represent significant growth of population within the study area.

### **EMPLOYMENT FORECASTS**

As shown in Table 4-4 and Figure 4-5, employment in the Triangle Expressway study area represented 19 percent of regional employment in 2005 and is expected to increase to 22 percent by 2030. This growth from 115,000 employees in 2005 to nearly 223,000 employees in 2030 represents a 2.7 percent average annual growth rate. The regional growth rate of 2.1 percent per annum is forecast to increase employment from 603,000 persons in 2005 to more than 1 million in 2030.

Figure 4-5 illustrates the projected employment growth between 2005 and 2030 for each sector of the study area. While significant employment growth is exhibited throughout the study area, the western and southern

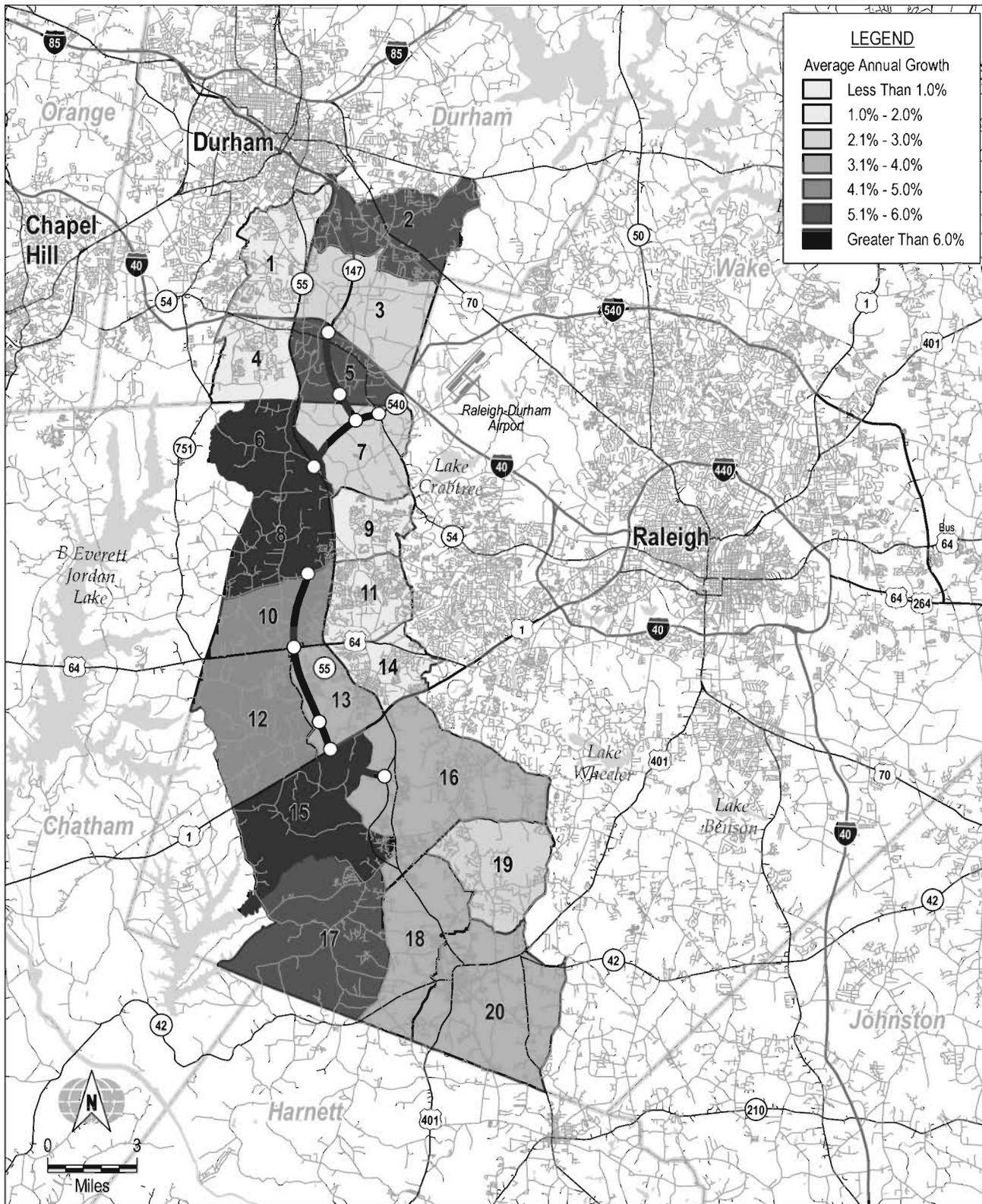
**Table 4-3  
Study Area Population Projections  
Proposed Triangle Expressway**

Study Area Sector	2005	Average Annual Growth	2010	Average Annual Growth	2020	Average Annual Growth	2030	Average Annual Growth	Total Growth
								2005-2030	2005-2030
1	19,745	1.4%	21,161	1.3%	24,050	1.0%	26,611	1.2%	34.8%
2	6,210	10.0%	9,984	5.1%	16,372	2.7%	21,370	5.1%	244.2%
3	4,678	6.0%	6,252	3.4%	8,772	1.9%	10,610	3.3%	126.8%
4	9,896	1.7%	10,750	1.3%	12,282	0.8%	13,244	1.2%	33.8%
5	1,485	2.3%	1,667	9.1%	3,977	4.4%	6,130	5.8%	312.8%
6	504	68.1%	6,753	9.5%	16,726	3.8%	24,390	16.8%	4742.1%
7	7,003	10.5%	11,538	1.1%	12,840	0.7%	13,726	2.7%	96.0%
8	4,078	23.9%	11,927	2.7%	15,494	1.9%	18,760	6.3%	360.1%
9	11,950	0.5%	12,270	-0.8%	11,368	0.3%	11,684	-0.1%	-2.2%
10	3,085	10.1%	5,000	2.9%	6,668	2.4%	8,447	4.1%	173.8%
11	21,246	1.6%	23,012	0.2%	23,500	1.0%	26,080	0.8%	22.8%
12	5,390	3.8%	6,494	5.7%	11,276	4.5%	17,573	4.8%	226.0%
13	9,267	0.4%	9,434	5.1%	15,572	2.8%	20,534	3.2%	121.6%
14	10,820	1.3%	11,515	1.0%	12,693	1.7%	15,024	1.3%	38.9%
15	1,869	11.4%	3,205	11.5%	9,562	3.9%	14,023	8.4%	650.1%
16	19,509	5.2%	25,104	3.3%	34,752	2.4%	43,983	3.3%	125.4%
17	3,777	9.3%	5,884	5.5%	10,049	3.1%	13,582	5.3%	259.6%
18	5,827	3.7%	6,992	4.8%	11,144	3.0%	14,942	3.8%	156.4%
19	7,934	3.7%	9,514	1.7%	11,240	1.8%	13,411	2.1%	69.0%
20	12,142	4.4%	15,053	4.5%	23,318	2.8%	30,724	3.8%	153.0%
<b>Total Study Area</b>									
Area Population	166,416	5.1%	213,510	3.2%	291,656	2.3%	364,849	3.2%	119.2%
<b>Percent of Triangle Region</b>									
Region	13.5%		15.2%		16.9%		17.8%		
<b>Triangle Region</b>									
Population	1,235,663	2.6%	1,403,428	2.1%	1,722,332	1.8%	2,050,416	2.0%	65.9%
<b>Population Change</b>									
Study Area Sector	2005-2010		2010-2020		2020-2030		2010-2030		
1		1,416		2,888		2,561		6,866	
2		3,774		6,388		4,998		15,161	
3		1,574		2,520		1,837		5,932	
4		854		1,531		962		3,347	
5		182		2,310		2,153		4,645	
6		6,249		9,973		7,664		23,887	
7		4,535		1,302		887		6,723	
8		7,849		3,567		3,266		14,683	
9		320		-902		315		-266	
10		1,915		1,668		1,779		5,362	
11		1,766		488		2,580		4,834	
12		1,103		4,783		6,297		12,183	
13		166		6,138		4,962		11,267	
14		696		1,178		2,331		4,205	
15		1,336		6,356		4,462		12,154	
16		5,595		9,647		9,232		24,474	
17		2,107		4,165		3,533		9,805	
18		1,165		4,153		3,797		9,115	
19		1,580		1,727		2,171		5,477	
20		2,911		8,265		7,406		18,581	
<b>Total Study Area</b>									
Population Change		47,095		78,146		73,193		198,433	
<b>Triangle Region</b>									
Population Change		167,765		318,903		328,084		814,753	

Source: Kenan Institute of Private Enterprise, Summarized by Traffic Analysis Zone

# Proposed Triangle Expressway Comprehensive Traffic and Revenue Study

NC 103278 / 3-13-09 / Study Area Population Growth 2005-2030.mxd



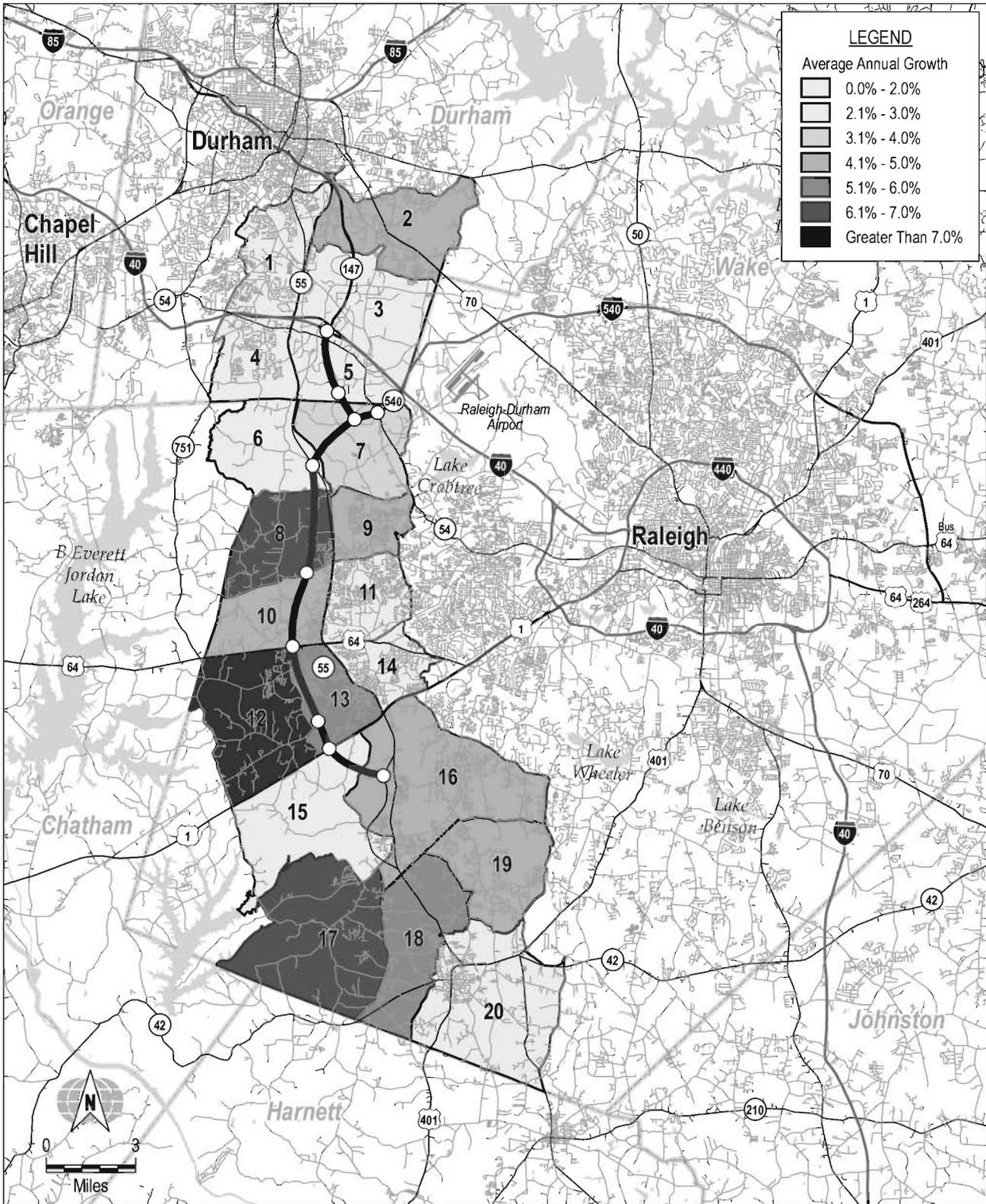
**Table 4-4  
Study Area Employment Projections  
Proposed Triangle Expressway**

Study Area Sector	2005	Average Annual Growth	2010	Average Annual Growth	2020	Average Annual Growth	2030	Average Annual Growth	Total Growth
								2005-2030	2005-2030
1	5,886	2.6%	6,699	2.1%	8,254	1.4%	9,485	1.9%	61.1%
2	3,044	2.6%	3,464	2.1%	4,269	7.0%	8,397	4.1%	175.9%
3	29,466	2.3%	33,006	1.9%	39,749	0.3%	41,072	1.3%	39.4%
4	2,876	1.5%	3,094	1.3%	3,506	2.2%	4,373	1.7%	52.1%
5	20,436	3.0%	23,661	2.3%	29,840	0.4%	30,965	1.7%	51.5%
6	6,890	3.5%	8,178	1.9%	9,852	1.9%	11,906	2.2%	72.8%
7	11,997	5.7%	15,845	3.3%	21,876	2.6%	28,197	3.5%	135.0%
8	583	13.1%	1,077	6.2%	1,974	3.6%	2,818	6.5%	383.4%
9	1,699	9.0%	2,608	4.8%	4,181	3.2%	5,712	5.0%	236.3%
10	939	7.3%	1,338	4.1%	2,001	2.9%	2,667	4.3%	183.8%
11	2,284	2.9%	2,637	1.5%	3,046	1.7%	3,589	1.8%	57.1%
12	485	20.6%	1,235	7.9%	2,647	4.1%	3,946	8.7%	713.7%
13	2,363	9.6%	3,743	5.1%	6,149	3.3%	8,476	5.2%	258.8%
14	6,508	2.9%	7,509	1.4%	8,656	1.6%	10,184	1.8%	56.5%
15	5,392	4.7%	6,771	2.7%	8,796	2.3%	11,023	2.9%	104.4%
16	5,978	9.0%	9,188	4.8%	14,727	3.2%	20,129	5.0%	236.7%
17	691	12.8%	1,261	6.2%	2,291	3.6%	3,265	6.4%	372.5%
18	1,446	9.4%	2,271	5.0%	3,705	3.2%	5,094	5.2%	252.2%
19	1,204	7.2%	1,708	4.1%	2,545	2.9%	3,388	4.2%	181.5%
20	4,387	3.8%	5,296	2.1%	6,531	2.0%	7,981	2.4%	81.9%
<b>Total Study Area Employment</b>									
	114,553	4.2%	140,589	2.8%	184,596	1.9%	222,669	2.7%	94.4%
<b>Percent of Triangle Region</b>									
	19.0%		20.1%		22.1%		22.2%		
<b>Triangle Region Employment</b>									
	602,563	3.0%	699,675	1.8%	836,563	1.8%	1,001,494	2.1%	66.2%
<b>Employment Change</b>									
Study Area Sector	2005-2010		2010-2020		2020-2030		2010-2030		
1		813		1,556		1,231		3,599	
2		420		805		4,128		5,353	
3		3,540		6,743		1,323		11,606	
4		218		413		867		1,497	
5		3,225		6,179		1,125		10,529	
6		1,288		1,674		2,054		5,016	
7		3,848		6,031		6,321		16,199	
8		494		897		844		2,235	
9		909		1,573		1,532		4,014	
10		399		663		666		1,727	
11		354		409		543		1,305	
12		750		1,412		1,299		3,461	
13		1,381		2,406		2,327		6,114	
14		1,001		1,146		1,529		3,676	
15		1,380		2,025		2,227		5,632	
16		3,209		5,539		5,403		14,151	
17		570		1,030		974		2,574	
18		825		1,435		1,389		3,648	
19		504		838		843		2,185	
20		910		1,235		1,450		3,595	
<b>Total Study Area Employment Change</b>									
		26,035		44,007		38,072		108,115	
<b>Triangle Region Employment Change</b>									
		97,112		136,888		164,932		398,931	

Source: Kenan Institute of Private Enterprise, Summarized by Traffic Analysis Zone

# Proposed Triangle Expressway Comprehensive Traffic and Revenue Study

NC 103278 / 3-13-09 / Study Area Employment Growth 2005-2030.mxd



**STUDY AREA EMPLOYMENT GROWTH  
2005-2030**

sectors are expected to have the highest growth. These areas generally have growth rates that exceed 4 percent per year. The more mature sectors in the northern part of the study area such as the sectors around the highly developed northern portion of RTP have lower expected growth rates. The less developed southern sectors and areas southwest of RTP are expected to grow significantly.

#### **NUMBER OF HOUSEHOLDS**

The growth in the number of households in the study area is relative to the expected population growth. Table 4-5 summarizes the households as contained in the Kenan forecasts. In 2005, the number of households in the study area was estimated at over 62,000, which is a 13 percent share of the regional number of households. By 2030 the study area is forecast to increase in households to over 144,000, which would be 17 percent of the region's households. This growth rate of 3.4 percent annually between 2005 and 2030 is significantly higher than the 2.2 percent annual growth rate anticipated for the region. The highest growth rate in the number of households is expected to occur in the southern and western sectors of the study area.

#### **HOUSEHOLD INCOME**

Median household incomes by location are summarized in Table 4-6. All values shown are in 2002 dollars. In 2005, the median household income in the region was estimated at \$57,667. The Triangle Expressway study area had a 17 percent higher median household income (\$67,586) than the region. By 2030, the forecast median household income in the study area is estimated to be 6.5 percent higher than the regional median.

The relatively high household income correlates with the study area's high incidence of residents with college degrees. According to 2000 census data, 44 percent of the study area's population age 25 and older has achieved an education level of Bachelor's Degree or higher compared to the national average of around 24 percent. This important statistic is likely related to the higher skill and knowledge level required by much of the employment in the region, especially that which is affiliated with Research Triangle Park.

**Table 4-5  
Study Area Households Projections  
Proposed Triangle Expressway**

Study Area Sector	Average Annual Growth		Average Annual Growth		Average Annual Growth		Average Annual Growth	Total Growth	
	2005	2010	2020	2030	2005-2030	2005-2030			
1	7,982	1.7%	8,693	1.4%	10,026	1.1%	11,160	1.3%	39.8%
2	2,384	10.2%	3,874	5.2%	6,446	2.8%	8,475	5.2%	255.5%
3	1,855	6.1%	2,495	3.5%	3,532	2.0%	4,293	3.4%	131.4%
4	3,964	2.0%	4,374	1.5%	5,074	0.8%	5,516	1.3%	39.2%
5	566	2.7%	647	9.2%	1,561	4.5%	2,422	6.0%	328.2%
6	202	66.6%	2,588	9.8%	6,581	4.0%	9,722	16.8%	4714.0%
7	2,702	11.0%	4,543	1.3%	5,184	0.8%	5,616	3.0%	107.9%
8	1,542	24.5%	4,610	2.9%	6,150	2.1%	7,550	6.6%	389.8%
9	4,642	0.9%	4,867	-0.5%	4,625	0.4%	4,817	0.1%	3.8%
10	1,167	10.6%	1,931	3.2%	2,643	2.5%	3,395	4.4%	191.0%
11	7,158	2.0%	7,905	0.5%	8,314	1.2%	9,383	1.1%	31.1%
12	2,036	4.2%	2,504	5.9%	4,456	4.7%	7,035	5.1%	245.5%
13	3,465	0.8%	3,603	5.3%	6,022	2.9%	8,027	3.4%	131.6%
14	3,954	1.6%	4,291	1.2%	4,840	1.8%	5,798	1.5%	46.6%
15	681	11.7%	1,184	11.8%	3,610	4.0%	5,363	8.6%	687.7%
16	7,063	5.6%	9,292	3.6%	13,183	2.5%	16,906	3.6%	139.4%
17	1,376	9.8%	2,192	5.8%	3,842	3.2%	5,264	5.5%	282.5%
18	2,171	4.1%	2,659	5.0%	4,351	3.1%	5,920	4.1%	172.7%
19	2,934	4.1%	3,585	2.0%	4,352	1.9%	5,270	2.4%	79.6%
20	4,671	4.8%	5,903	4.7%	9,369	2.9%	12,512	4.0%	167.9%
<b>Total Study Area Number of Households</b>									
	62,513	5.5%	81,740	3.4%	114,161	2.4%	144,444	3.4%	131.1%
<b>Percent of Triangle Region</b>									
	12.8%		14.5%		16.2%		17.1%		
<b>Triangle Region Number of Households</b>									
	488,982	2.9%	564,177	2.2%	702,823	1.8%	843,133	2.2%	72.4%
<b>Number of Households Change</b>									
Study Area Sector	2005-2010		2010-2020		2020-2030		2010-2030		
1		711		1,333		1,134		3,178	
2		1,490		2,573		2,028		6,091	
3		640		1,037		761		2,438	
4		411		700		442		1,552	
5		81		913		862		1,857	
6		2,386		3,992		3,142		9,520	
7		1,841		641		432		2,914	
8		3,069		1,539		1,400		6,008	
9		225		-242		192		175	
10		764		712		752		2,228	
11		747		410		1,068		2,225	
12		468		1,952		2,580		4,999	
13		138		2,419		2,005		4,562	
14		337		550		958		1,844	
15		503		2,426		1,754		4,682	
16		2,229		3,891		3,723		9,843	
17		815		1,650		1,423		3,888	
18		488		1,692		1,569		3,749	
19		652		767		917		2,336	
20		1,232		3,466		3,143		7,841	
<b>Total Study Area Number of Households Change</b>									
		19,227		32,421		30,284		81,931	
<b>Triangle Region Number of Households Change</b>									
		75,194		138,646		140,311		354,151	

Source: Kenan Institute of Private Enterprise, Summarized by Traffic Analysis Zone

**Table 4-6  
Study Area Median Household Income  
Proposed Triangle Expressway  
2002 Dollars**

<b>Study Area Sector</b>	<b>2005</b>	<b>2010</b>	<b>2020</b>	<b>2030</b>
1	\$49,609	\$49,626	\$49,511	\$49,287
2	51,855	51,068	50,944	51,280
3	60,349	60,654	59,827	58,288
4	70,543	71,354	72,305	72,431
5	56,502	64,746	56,614	52,078
6	64,761	55,984	53,263	53,134
7	54,425	49,204	49,704	51,474
8	69,549	63,933	59,698	56,818
9	89,962	88,288	87,726	87,394
10	85,456	86,404	83,632	80,135
11	87,073	86,850	85,210	83,640
12	63,701	64,197	60,113	56,811
13	66,530	67,043	61,423	60,924
14	78,485	76,093	73,618	71,519
15	65,334	59,584	56,775	54,833
16	64,762	61,816	59,302	57,676
17	61,565	54,617	53,514	52,889
18	58,137	57,152	55,055	54,818
19	89,120	80,093	77,016	75,343
20	49,015	48,518	49,802	50,597
<b>Total Study Area</b>				
Median Income	\$67,583	\$64,837	\$61,576	\$60,082
<b>Percent of</b>				
Triangle Region	117.2%	113.0%	108.7%	106.5%
<b>Triangle Region</b>				
Median Income	\$57,667	\$57,372	\$56,640	\$56,402

Source: Kenan Institute of Private Enterprise, Summarized by Traffic Analysis Zone

## **RESEARCH TRIANGLE PARK**

The Research Triangle Park (RTP) is a major economic driver in the region. The RTP reports that its corporate occupants employ approximately 44,000 staff and contractors. This employment is expected to grow to 85,000 as the Park builds out its remaining space over the next 20 years. Employees of Park companies are expected to be potential customers of the proposed toll road.

The RTP occupies approximately 7,000 acres with around two thirds of the Park lying south of I-40. The southern portion of RTP is less developed than the northern portion and will accommodate the extensive growth that is anticipated as the Park develops its remaining 1,100 acres. The proposed Triangle Expressway would provide a limited access roadway into the southern portion of the RTP.

## **ADJUSTMENTS TO TRIANGLE REGIONAL MODEL (TRM)**

As discussed earlier, socioeconomic forecasts prepared by the Kenan Institute independent economist were used in the trip generation process for this study. That is, the transportation network representation, trip distribution procedure, and mode choice procedure used in the MPOs' older regional travel demand model (TDM) were used to develop toll traffic forecast for this study; but the socioeconomic data used in the generation, distribution, and mode choice procedures to estimate future traffic are from the forecasts prepared by the independent economist.

Finally, the review of the structure and size of the traffic analysis zones (TAZs) contained in the MPOs' older regional TDM revealed that certain zones along the Expressway study area were not adequate to provide reliable estimates of traffic through proposed tolling locations. In effect, certain TAZs were deemed too large geographically to reflect traffic at the level of detail necessary for the traffic and revenue analysis.

Accordingly, certain TAZs in the northern sectors of the study area near RTP were disaggregated into multiple zones, as were select TAZs in the northern sectors of the Western Wake Freeway. These new zones were coded into the network.

## RECENT IMPACTS OF THE RECESSION

Since the completion of the original economic analysis in late 2007, the country has experienced a significant economic downturn that has now been designated as a recession. While it is impossible to predict the depth or length of this recession, it is nevertheless important to review more recent impacts of the recession in the Triangle Region and the potential effect on traffic and revenue.

Several key economic indicators are reviewed in this section in order to provide guidance as to whether or not the local recession impact is significantly different than statewide or national trends. Later in Chapter 6 is a description of the adjustments made to the base forecasts to account for the recession on the Triangle Expressway traffic and revenue forecasts.

### HOUSING AND HOUSE PRICES

The change in the number of houses sold in the region and the state began shifting during 2007. Before 2007, the year on year trend was upwards; since that time the trend is negative. Table 4-7 provides details of sales of existing homes for the state and the Triangle MLS Region <sup>(2)</sup> according to Multiple Listing Service information. A key indicator is the percent change in sales for each month in comparison to the same month the previous year. For example the December 2008 sales in the Triangle MLS Region were 47 percent lower than the December 2007 sales. Statewide the percent reduction was nearly 38 percent in December 2008. Overall sales in 2008 were nearly 33 percent lower than 2007 for the region in comparison to a 26 percent reduction statewide. Figure 4-6 illustrates this trend since 2006. Since mid-2007, the regional year on year sales have been negative.

Housing price changes have lagged by a few months compared to the housing sales as summarized in Table 4-7 and illustrated in Figure 4-7. Prices in the Raleigh MLS Region have fluctuated from positive to negative during the third quarter of 2007. In some months of 2008, regional housing prices have been higher than comparable months in 2007. However, average prices from November 2008 have been less than the previous year's prices. On a statewide basis, average housing prices have been less than the comparable month since December 2006. Overall housing prices, while down in recent months in the region, have not be as bad as

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<sup>(2)</sup> The Triangle Multiple Listing Service Region includes all or portions of several counties including Wake, Durham, Orange, Alamance, Caswell, Chatham, Franklin, Granville, Halifax, Harnett, Johnston, Lee, Nash, Person, Vance and Warren.

Table 4-7  
Multiple Listing Service Existing Home Sales  
North Carolina and Triangle Region

Home Sales										Home Sales									
Month	Triangle Multiple Listing Service Region								879	All North Carolina Multiple Listing Service Regions								4,044	
	2005	Percent Change	2006	Percent Change	2007	Percent Change	2008	Percent Change		2009	2005	Percent Change	2006	Percent Change	2007	Percent Change	2008		Percent Change
January	2,000	3.2%	2,063	5.8%	2,183	-28.9%	1,553	-43.4%	879	8,500	0.8%	8,565	-2.1%	8,385	-23.6%	6,408	-36.9%	4,044	
February	1,836	34.4%	2,467	-9.7%	2,227	-16.0%	1,871			7,981	19.6%	9,543	-5.6%	9,004	-17.6%	7,421			
March	2,515	19.7%	3,011	1.6%	3,059	-27.5%	2,217			9,984	23.4%	12,317	-6.8%	11,475	-25.5%	8,549			
April	2,714	3.8%	2,818	5.8%	2,982	-24.2%	2,260			11,327	2.5%	11,606	-3.7%	11,179	-24.0%	8,501			
May	3,127	8.3%	3,388	7.9%	3,655	-31.1%	2,517			12,778	4.9%	13,404	-6.5%	12,536	-22.3%	9,735			
June	3,686	6.8%	3,935	1.7%	4,002	-36.8%	2,531			14,044	7.9%	15,157	-11.8%	13,368	-26.4%	9,836			
July	3,883	0.3%	3,895	-10.9%	3,471	-30.2%	2,422			13,977	-1.3%	13,795	-9.4%	12,494	-23.5%	9,552			
August	3,640	1.3%	3,688	-8.3%	3,382	-39.3%	2,053			13,538	2.4%	13,861	-10.2%	12,441	-31.5%	8,527			
September	2,966	4.5%	3,098	-24.2%	2,347	-26.0%	1,736			12,194	-2.2%	11,920	-22.8%	9,203	-19.4%	7,417			
October	3,025	-2.4%	2,953	-14.4%	2,528	-44.7%	1,397			11,499	-1.1%	11,368	-20.5%	9,037	-29.3%	6,389			
November	2,590	-1.3%	2,556	-16.4%	2,138	-44.5%	1,186			10,543	-3.6%	10,160	-18.4%	8,288	-40.2%	4,959			
December	2,923	-13.2%	2,537	-19.0%	2,055	-47.0%	1,089			10,631	-5.6%	10,039	-18.6%	8,176	-37.6%	5,100			
Total	34,905	4.3%	36,409	-6.5%	34,029	-32.9%	22,832		879	136,996	3.5%	141,735	-11.4%	125,586	-26.4%	92,394		4,044	

Average Sales Price										Average Sales Price									
Month	Triangle Multiple Listing Service Region								\$224,831	All North Carolina Multiple Listing Service Regions								\$192,587	
	2005	Percent Change	2006	Percent Change	2007	Percent Change	2008	Percent Change		2009	2005	Percent Change	2006	Percent Change	2007	Percent Change	2008		Percent Change
January	\$200,000	7.9%	\$215,713	4.3%	\$225,056	3.6%	\$233,236	-3.6%	\$224,831	\$200,000	3.5%	\$206,905	3.1%	\$213,258	-0.3%	\$212,543	-9.4%	\$192,587	
February	198,240	-1.3%	195,579	21.1%	236,910	3.1%	244,363			192,963	0.1%	193,064	10.8%	213,879	-3.2%	206,964			
March	209,647	5.1%	220,258	6.1%	233,763	0.6%	235,175			209,421	-1.5%	206,177	6.0%	218,449	-3.3%	211,186			
April	208,877	8.3%	226,248	2.3%	231,549	-1.5%	228,183			202,459	4.5%	211,668	3.9%	219,850	-3.4%	212,396			
May	213,600	6.2%	226,786	5.7%	239,635	2.6%	245,788			209,962	3.0%	216,273	4.8%	226,697	-3.6%	218,647			
June	223,519	8.1%	241,727	0.4%	242,594	5.3%	255,382			217,454	4.5%	227,171	2.4%	232,565	-2.8%	226,032			
July	210,267	10.5%	232,367	6.6%	247,760	-2.6%	241,437			213,136	3.7%	221,059	4.3%	230,604	-4.4%	220,535			
August	218,322	5.8%	230,959	7.2%	247,582	0.2%	248,079			217,552	0.8%	219,224	4.7%	229,432	-3.4%	221,571			
September	222,075	3.4%	229,687	5.7%	242,885	0.0%	242,854			209,751	1.0%	211,877	7.8%	228,483	-7.1%	212,276			
October	219,690	3.4%	227,185	5.6%	239,820	3.7%	248,693			215,769	-1.2%	213,179	2.4%	218,362	-2.2%	213,621			
November	224,045	1.9%	228,241	6.2%	242,316	-6.5%	226,528			214,718	0.4%	215,539	3.3%	222,681	-10.7%	198,908			
December	223,212	6.0%	236,499	0.5%	237,628	-0.3%	236,888			212,282	3.2%	218,999	-0.6%	217,727	-7.6%	201,255			
Annual Average	\$215,358	5.5%	\$227,155	5.5%	\$239,537	0.8%	\$241,382		\$224,831	\$210,550	1.8%	\$214,332	4.3%	\$223,484	-4.1%	\$214,393		\$192,587	

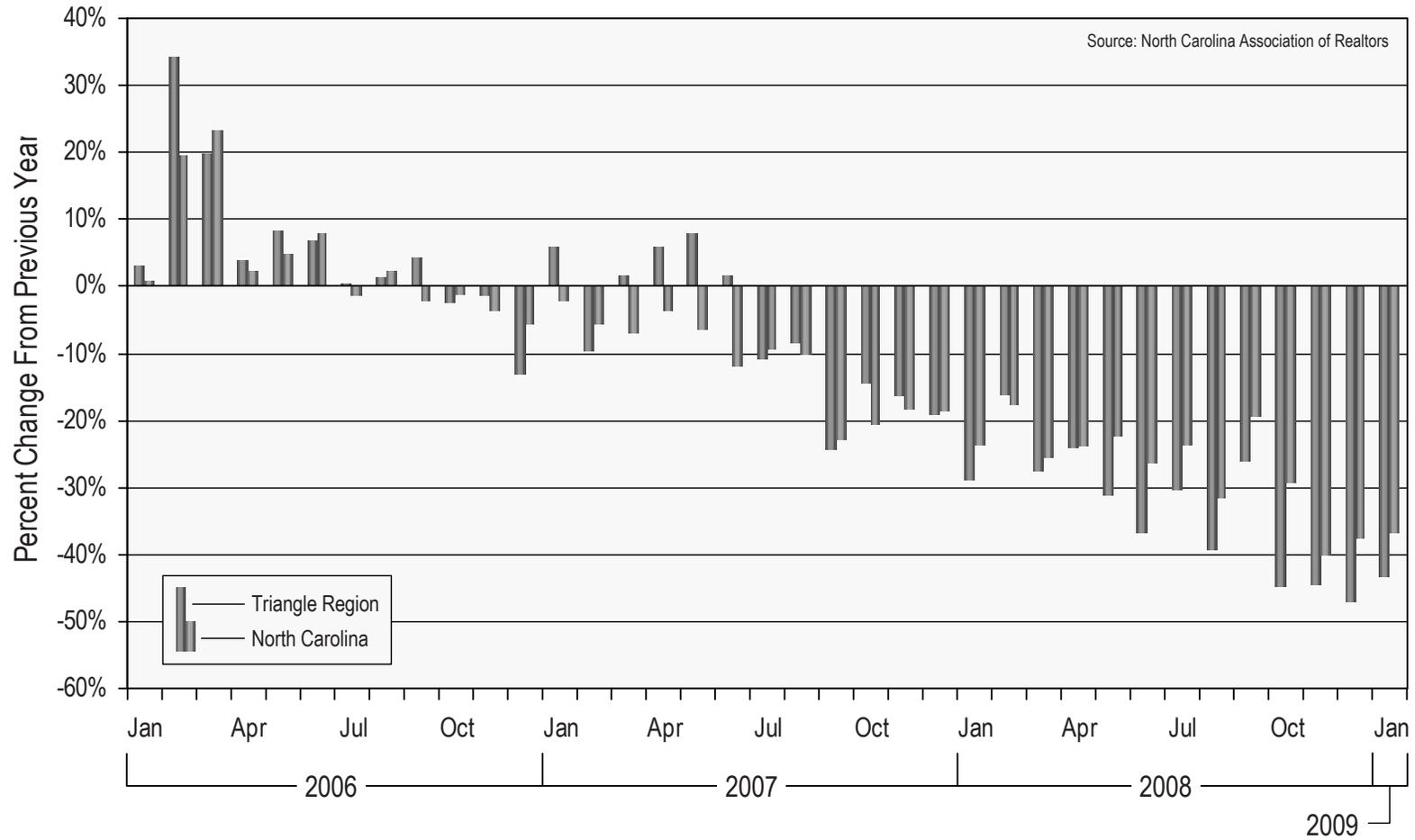
Note: Data not available for January, 2005. Estimated values shown.  
Triangle Multiple Listing Service Region includes all or portions of the following counties:  
Wake, Durham, Orange, Alamance, Caswell, Chatham, Franklin, Granville, Halifax,  
Harnett, Johnston, Lee, Nash, Person, Vance, and Warren.

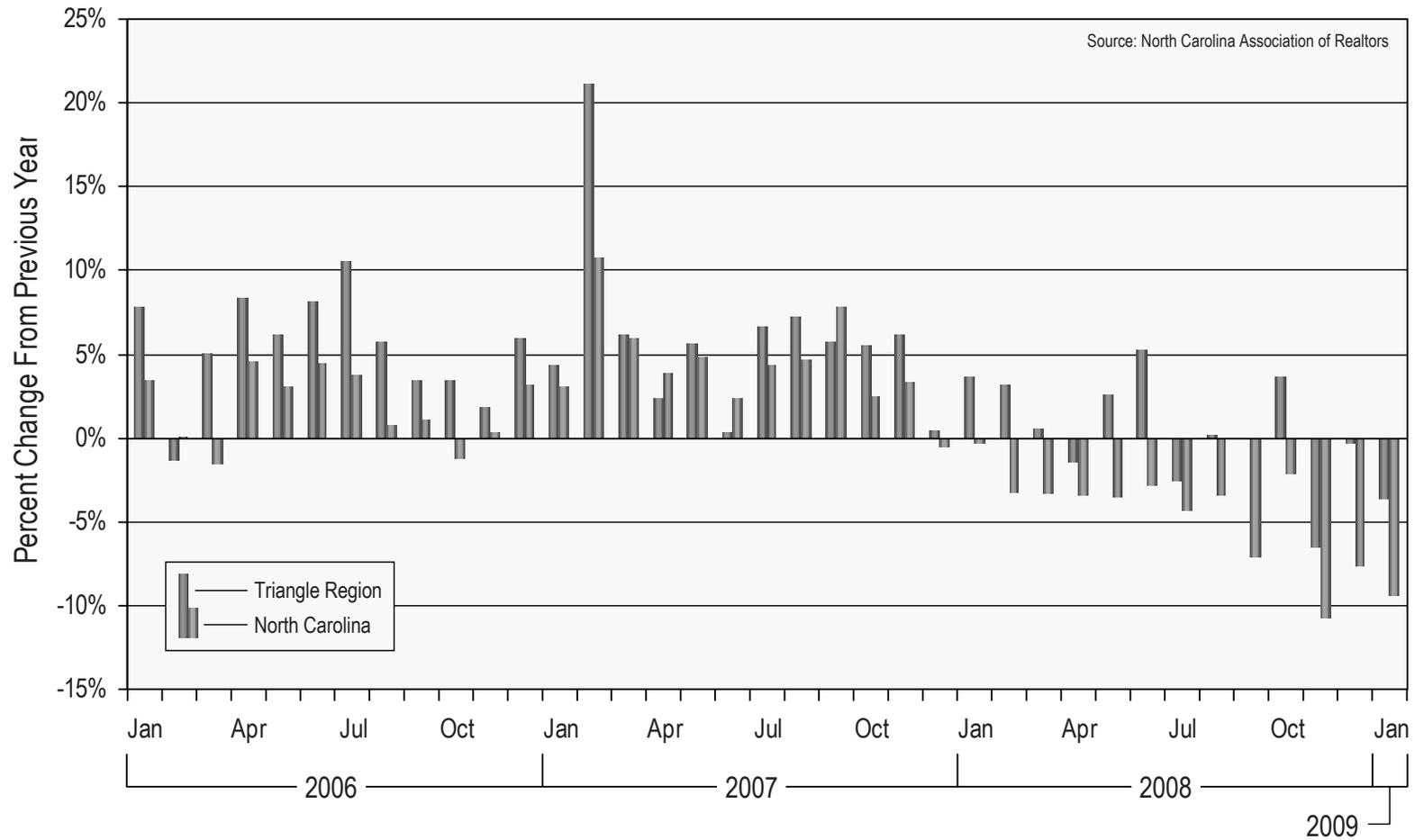
Source: NC Association of Realtors



**NORTH CAROLINA**  
**Turnpike Authority**

*Proposed Triangle Expressway  
Comprehensive Traffic and Revenue Study*





for the state as a whole, and much less of a drop than many other parts of the U.S., which suggests some of the economic strength of the region.

#### **RECENT EMPLOYMENT TRENDS**

Table 4-8 summarizes local and state employment information since 2005. Unemployment, a key indicator of the economy's strength, was generally below 4 percent in the Raleigh/Durham/Cary areas between late 2005 and January 2008. This unemployment rate was significantly lower than both the statewide rates and the national rates during the same period. However, beginning in January 2008, unemployment rates have been climbing. In this region, the December 2008 unemployment rate reached 6.3 percent which is over two percentage points lower than the statewide rate of 8.5 percent.

Nationally the unemployment rates in recent months have been lower than North Carolina's as illustrated in Figure 4-8. While all of the recent employment data indicates one measure of this recessionary economy, the Raleigh/Durham/Cary region is at least somewhat better than the state and nation. Figure 4-9 provides comparisons of the December 2008 unemployment on a county basis. Both Wake and Durham Counties are near the regional average in unemployment rates, but Harnett and Johnston Counties are significantly worse. Orange County has a significantly better unemployment rate than the rest of the region and is near the statewide rate.

The Raleigh-Durham area was one of the few regions in the country which actually experienced a slight increase in total employment during 2008. Positive growth in jobs were shown in each month through July 2008, with negative trends beginning well into the second half of the year. In total, about 1,200 jobs were added in the Raleigh-Durham area, during a year which saw a reduction of about three million jobs nationwide.

Employment in the total state, on the other hand, was negative during 2008, with a loss of about 0.9 percent statewide. Much of the job loss occurred in rural areas and in the greater Charlotte region, hit particularly hard due to the concentration of banking interests in that region. The relatively strong employment growth pattern exhibited in the Raleigh-Durham area, as compared with the rest of the state and the nation, underscores the continued benefit of a well educated, high tech employment base.

#### **AIRPORT ACTIVITY**

Activity at the Raleigh-Durham International Airport is summarized in Table 4-9 and Figure 4-10. Total passengers have declined by 3.1 percent in 2008, and air cargo has declined by 7.7 percent. Passenger activity has

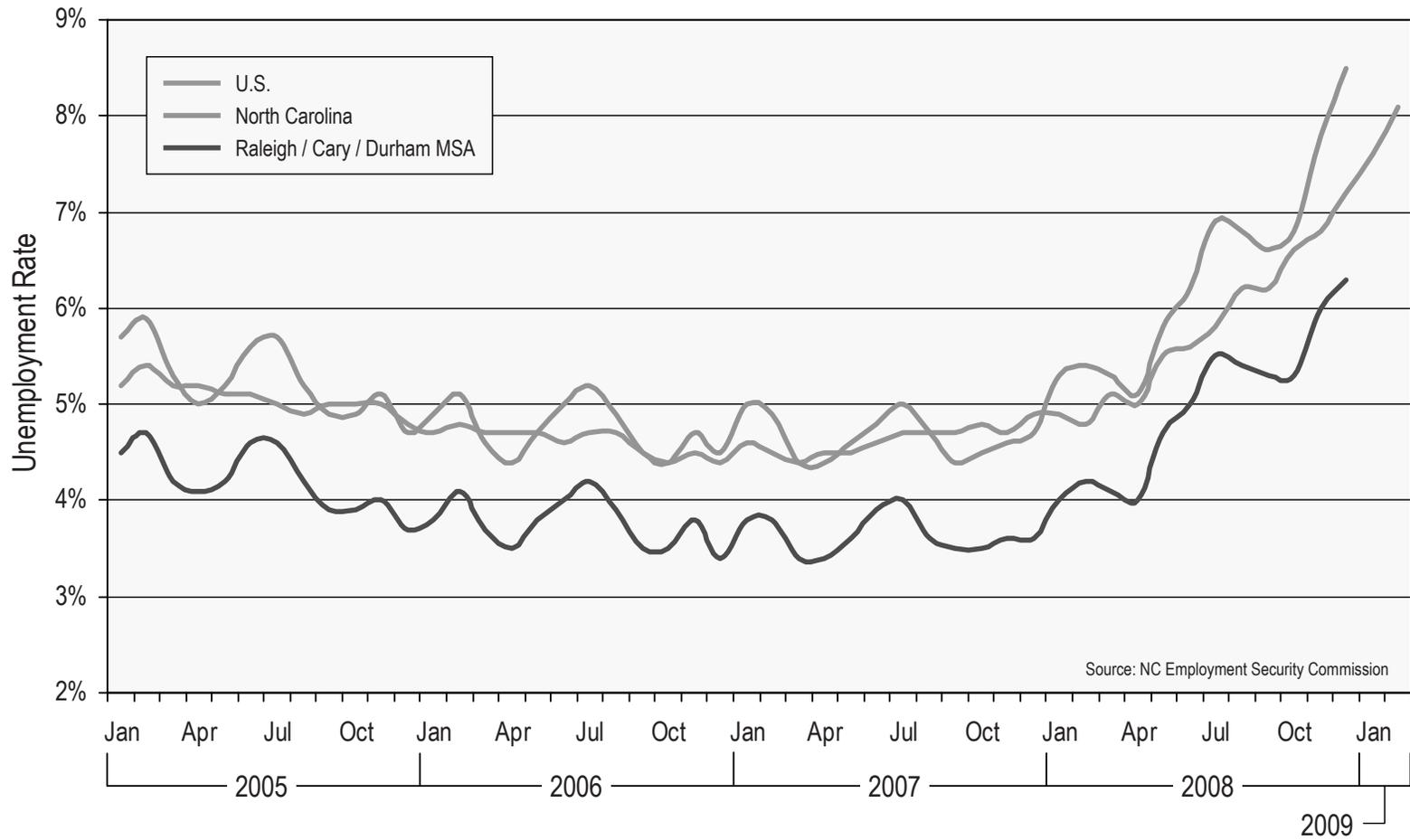
**Table 4-8**  
**Regional Employment Trends**  
**Raleigh-Cary and Durham MSAs and North Carolina**

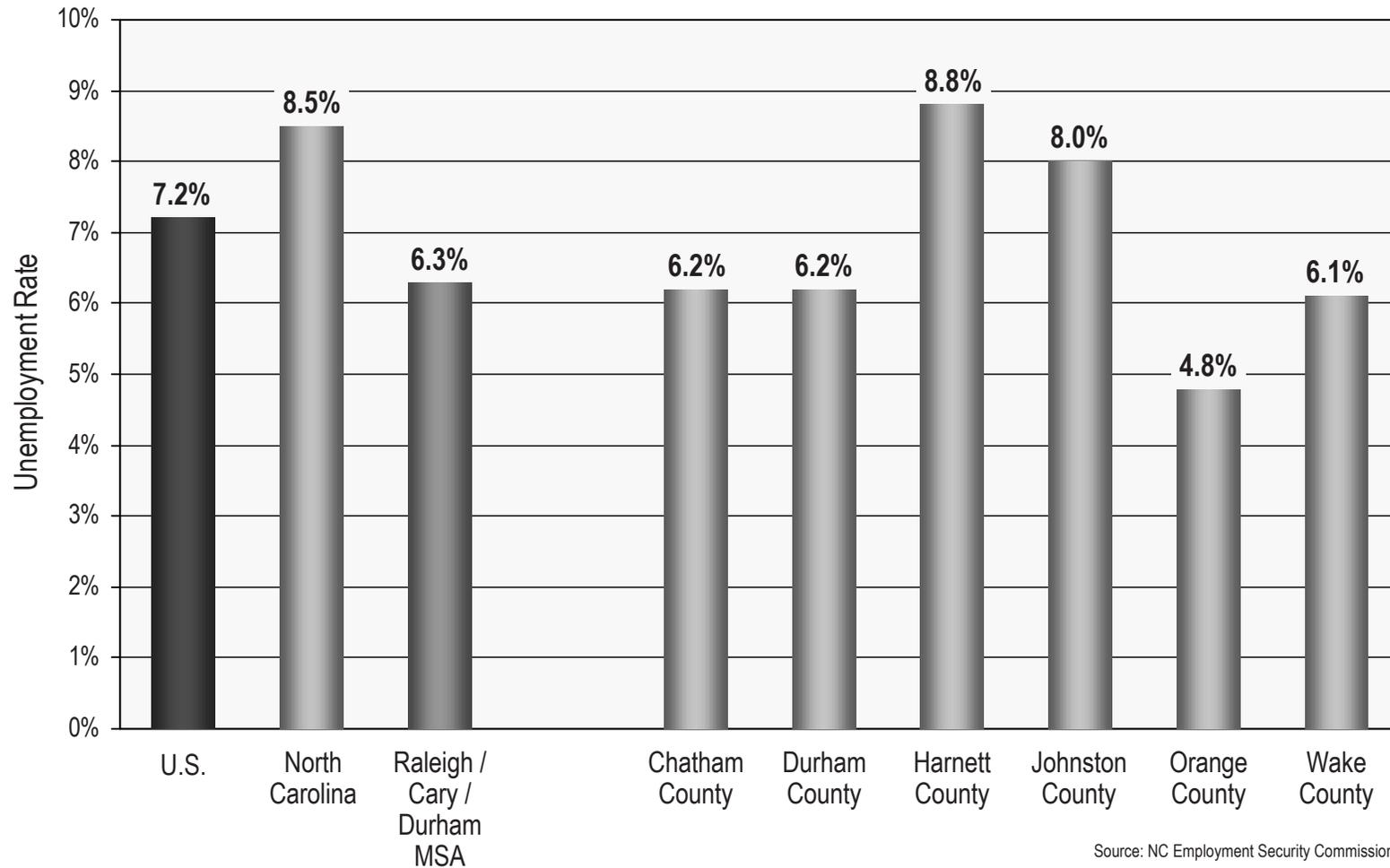
<b>Employment</b>													
<b>Month</b>	<b>Raleigh-Cary MSA and Durham MSA</b>						<b>North Carolina</b>						
	<b>2005</b>	<b>Percent Change</b>	<b>2006</b>	<b>Percent Change</b>	<b>2007</b>	<b>Percent Change</b>	<b>2005</b>	<b>Percent Change</b>	<b>2006</b>	<b>Percent Change</b>	<b>2007</b>	<b>Percent Change</b>	<b>2008</b>
January	696,238	4.9%	730,054	2.7%	750,053	1.8%	4,025,048	2.9%	4,139,840	2.8%	4,257,028	0.4%	4,272,980
February	697,487	5.0%	732,360	3.0%	754,684	1.3%	4,033,119	2.8%	4,147,639	2.9%	4,268,075	-0.3%	4,255,847
March	703,683	4.8%	737,454	3.1%	760,003	0.8%	4,066,814	2.8%	4,180,561	2.9%	4,302,311	-0.5%	4,280,356
April	706,729	5.3%	743,980	1.8%	757,123	1.7%	4,096,268	3.1%	4,222,665	1.6%	4,291,769	0.2%	4,302,076
May	711,682	5.2%	748,487	1.6%	760,616	0.9%	4,108,371	3.2%	4,238,768	1.7%	4,312,805	-0.4%	4,297,274
June	715,651	5.5%	754,956	1.8%	768,656	0.2%	4,113,481	3.5%	4,258,467	1.8%	4,336,243	-0.5%	4,316,413
July	729,790	4.8%	765,058	1.5%	776,266	0.9%	4,144,723	3.4%	4,283,903	1.2%	4,333,862	0.3%	4,344,800
August	727,040	5.1%	763,782	1.0%	771,281	-0.6%	4,148,343	3.2%	4,281,196	0.8%	4,314,578	-0.8%	4,280,113
September	729,089	4.6%	762,336	1.4%	772,877	-1.1%	4,154,692	3.0%	4,279,476	1.2%	4,330,984	-1.4%	4,271,774
October	729,445	5.4%	768,720	0.4%	771,490	0.0%	4,174,674	3.4%	4,316,625	0.3%	4,329,258	-1.0%	4,285,788
November	731,485	5.5%	771,775	0.0%	771,846	-1.7%	4,160,163	3.8%	4,319,220	0.3%	4,330,248	-2.9%	4,205,375
December	732,854	5.3%	771,955	-0.5%	768,449	-2.5%	4,153,023	3.9%	4,313,522	-0.4%	4,296,326	-3.4%	4,148,975
Average	717,598	5.1%	754,243	1.5%	765,279	0.2%	4,114,893	3.2%	4,248,490	1.4%	4,308,624	-0.9%	4,271,814

<b>Unemployment Rate</b>									
<b>Month</b>	<b>Raleigh-Cary MSA and Durham MSA</b>				<b>North Carolina</b>				
	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	
January	4.5%	3.8%	3.8%	4.0%	5.7%	4.9%	5.0%	5.3%	
February	4.7%	4.1%	3.8%	4.2%	5.9%	5.1%	4.9%	5.4%	
March	4.2%	3.7%	3.4%	4.1%	5.3%	4.6%	4.4%	5.3%	
April	4.1%	3.5%	3.4%	4.0%	5.0%	4.4%	4.4%	5.1%	
May	4.2%	3.8%	3.6%	4.7%	5.2%	4.7%	4.6%	5.8%	
June	4.6%	4.0%	3.9%	5.0%	5.6%	5.0%	4.8%	6.2%	
July	4.6%	4.2%	4.0%	5.5%	5.7%	5.2%	5.0%	6.9%	
August	4.2%	3.9%	3.6%	5.4%	5.2%	4.9%	4.7%	6.8%	
September	3.9%	3.5%	3.5%	5.3%	4.9%	4.5%	4.4%	6.6%	
October	3.9%	3.5%	3.5%	5.3%	4.9%	4.4%	4.5%	6.8%	
November	4.0%	3.8%	3.6%	6.0%	5.1%	4.7%	4.6%	7.8%	
December	3.7%	3.4%	3.6%	6.3%	4.7%	4.5%	4.7%	8.5%	
Annual Average	4.2%	3.8%	3.7%	5.0%	5.3%	4.7%	4.7%	6.4%	

Source: NC Employment Security Commission

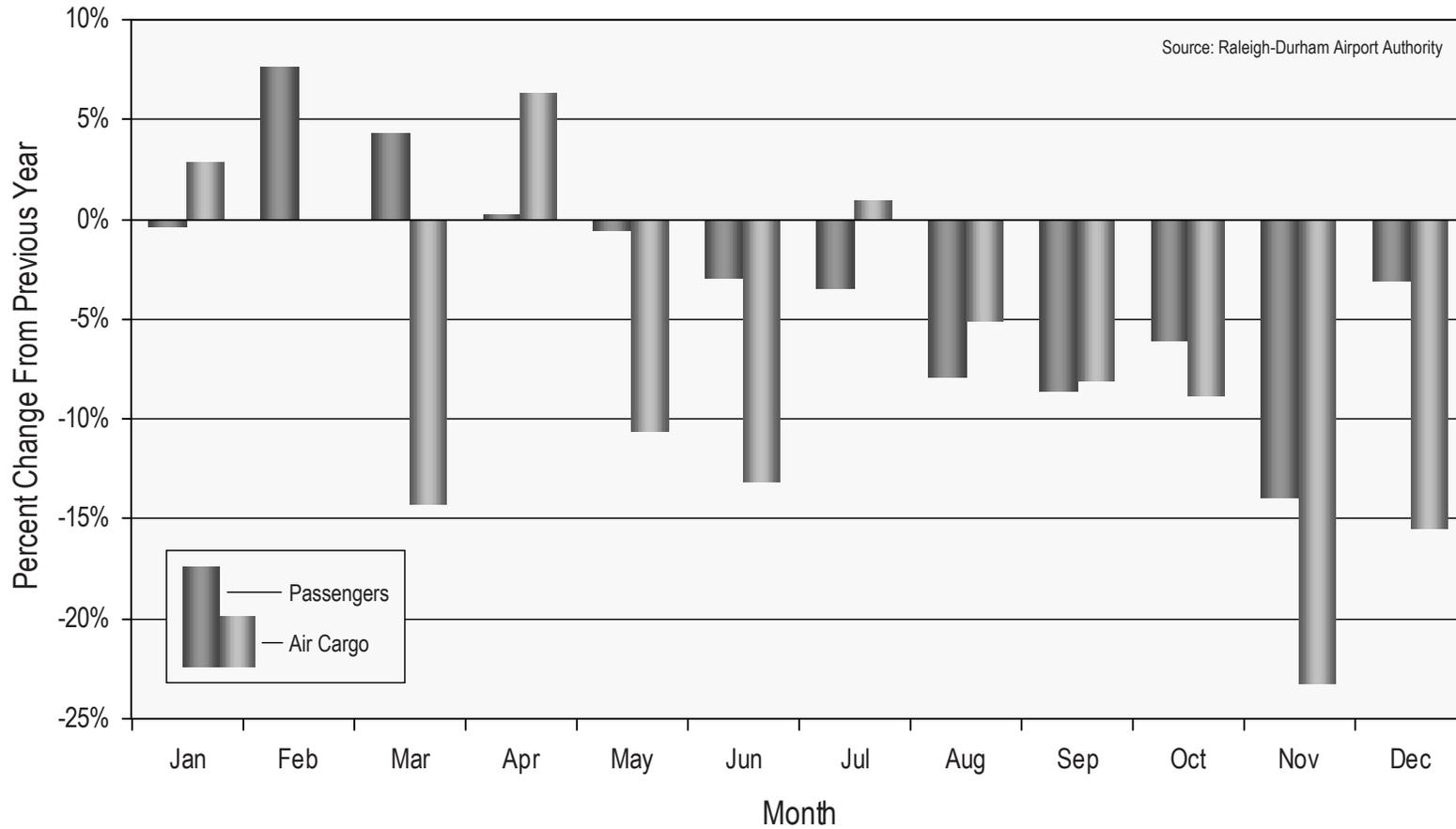




**Table 4-9  
Passenger and Air Cargo Activity at Raleigh-Durham International Airport**

Month	Passengers			Air Cargo (tons)		
	2007	Percent Change	2008	2007	Percent Change	2008
January	705,541	-0.4%	702,546	9,642	2.8%	9,912
February	656,933	7.7%	707,349	9,235	-0.1%	9,228
March	822,932	4.4%	858,732	10,735	-14.3%	9,204
April	842,051	0.3%	844,278	9,025	6.3%	9,598
May	891,087	-0.6%	886,089	10,866	-10.6%	9,711
June	939,086	-2.9%	911,857	10,266	-13.1%	8,920
July	944,075	-3.4%	911,534	9,277	0.9%	9,365
August	938,428	-7.9%	864,717	10,127	-5.1%	9,611
September	773,304	-8.6%	707,142	9,618	-8.0%	8,845
October	874,384	-6.1%	821,358	10,420	-8.9%	9,496
November	845,647	-13.9%	727,930	10,189	-23.3%	7,819
December	797,207	-3.1%	772,394	9,702	-15.5%	8,200
<b>Total</b>	<b>10,030,675</b>	<b>-3.1%</b>	<b>9,715,926</b>	<b>119,101</b>	<b>-7.7%</b>	<b>109,908</b>

Source: Raleigh-Durham Airport Authority



been flat or negative in comparison to the same month in the previous year since April 2008. In November 2008 passengers were nearly 14 percent lower than November 2007. December 2008 saw improvement to 3.1 percent lower than then previous December. Air cargo has also decreased significantly in 2008 with November and December being 23 and 15 percent lower than the comparable months the year before.

#### **VEHICLE-MILES OF TRAVEL**

Table 4-10 and Figure 4-11 summarize the impact of the recession and higher fuel prices on local, statewide and national travel. In 2006, all North Carolina roads combined exhibited very high growth rates in comparison to the same months in the 2005. Generally the growth rates compared to the 2005 months were over 5 percent. Urban arterial roads in the state had lower growth rates of less than 2 percent over 2005 or even negative in some months. However in late 2006 through late 2007, the annual growth rates began to decline or even turn flat or negative. Late in 2007, vehicle miles of travel in the state and nation turned dramatically downward with peak declines in the spring and summer of 2008 when fuel prices were at their highest. Now, fuel prices have declined significantly since the peak in the summer of 2008, but vehicle mile of travel are still negative on a year on year basis. That is, the negative effects on travel caused in large part by high fuel prices appear to be replaced now by negative effects of the recession. In December 2008, travel increased compared to early months but was still less than the December 2007 travel.

#### **RECESSIONARY IMPACTS**

At the time of this report, March 2009, the length, depth, and long term impacts of the recession are unknown. However, economic indicators provide some information that can be used to adjust the traffic and revenue forecasts to address the current economic reality.

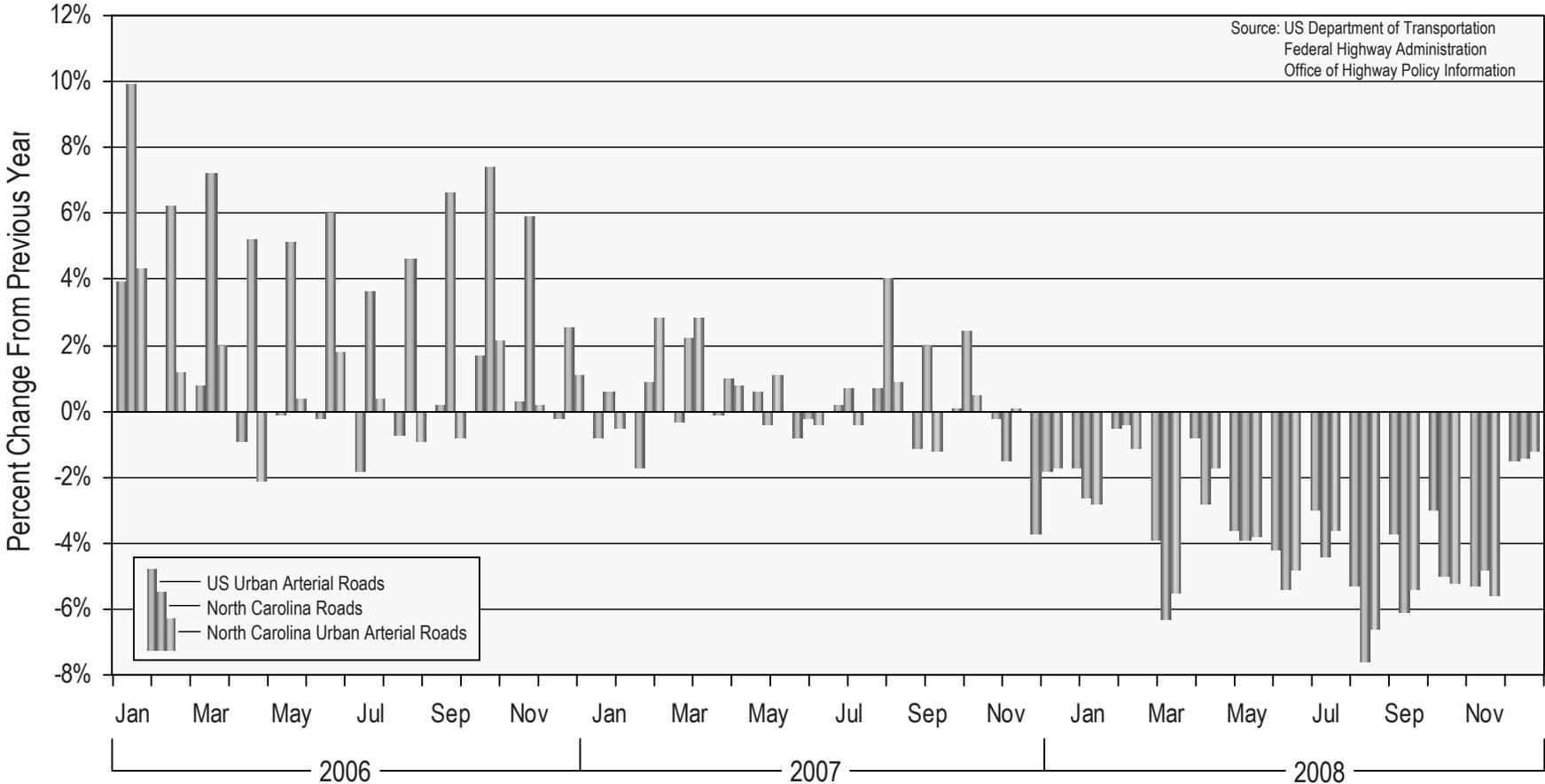
As will be discussed subsequently in Chapter 6, for purposes of developing an updated revenue outlook for the proposed Triangle Expressway, it was assumed that the current economic downturn would bottom out at some point during the second half of 2009. It is further anticipated that economic recovery will begin by the first quarter of 2010. The net effect of the economic downturn is assumed to be represented by a three-year lag in housing and employment growth for the corridor and the overall region. That is, updated estimates of travel demand for the year 2012 were assumed to be represented by previously developed regional travel demand estimates for the year 2009.

A gradual recovery was assumed to take place over several years, reaching prior socioeconomic growth forecast levels by 2030.

**Table 4-10  
Vehicle Miles of Travel Trends  
Percent Change From Previous Year**

Month	2006			2007			2008		
	US Urban Arterial Roads	North Carolina All Roads	North Carolina Urban Arterial Roads	US Urban Arterial Roads	North Carolina All Roads	North Carolina Urban Arterial Roads	US Urban Arterial Roads	North Carolina All Roads	North Carolina Urban Arterial Roads
January	3.9%	9.9%	4.3%	-0.8%	0.6%	-0.5%	-1.7%	-2.6%	-2.8%
February	0.0%	6.2%	1.2%	-1.7%	0.9%	2.8%	-0.5%	-0.4%	-1.1%
March	0.8%	7.2%	2.0%	-0.3%	2.2%	2.8%	-3.9%	-6.3%	-5.5%
April	-0.9%	5.2%	-2.1%	-0.1%	1.0%	0.8%	-0.8%	-2.8%	-1.7%
May	-0.1%	5.1%	0.4%	0.6%	-0.4%	1.1%	-3.6%	-3.9%	-3.8%
June	-0.2%	6.0%	1.8%	-0.8%	-0.2%	-0.4%	-4.2%	-5.4%	-4.8%
July	-1.8%	3.6%	0.4%	0.2%	0.7%	-0.4%	-3.0%	-4.4%	-3.6%
August	-0.7%	4.6%	-0.9%	0.7%	4.0%	0.9%	-5.3%	-7.6%	-6.6%
September	0.2%	6.6%	-0.8%	-1.1%	2.0%	-1.2%	-3.7%	-6.1%	-5.4%
October	1.7%	7.4%	2.1%	0.1%	2.4%	0.5%	-3.0%	-5.0%	-5.2%
November	0.3%	5.9%	0.2%	-0.2%	-1.5%	0.1%	-5.3%	-4.8%	-5.6%
December	-0.2%	2.5%	1.1%	-3.7%	-1.8%	-1.7%	-1.5%	-1.4%	-1.2%

Source: Traffic Volume Trends, US Department of Transportation, Federal Highway Administration, Office of Highway Policy Information, Updated Monthly.



**VEHICLE MILES OF TRAVEL  
 PERCENT CHANGE FROM PREVIOUS YEAR**

FIGURE 4-11

# CHAPTER 5

## TOLL COLLECTION AND VEHICLE CLASSIFICATION

The preliminary studies considered a tolling system that would provide both ETC and cash toll collection on the assumption that providing both options would attract more customers. Estimates of net operating revenue were made on the assumption that 75 percent of the transactions would be by ETC and that 25 percent would be by cash. No discounts were assumed for either ETC or cash toll collection.

However, the toll industry is moving rapidly toward cashless open road tolling (ORT) systems, particularly for newer facilities. In the current study, the concept of a cashless system was examined in detail using a series of assumptions based on the preliminary work. The North Carolina Turnpike Authority subsequently decided to implement an all-electronic, open road tolling system instead of the ETC/cash system assumed for the preliminary studies.

### OPEN ROAD TOLLING ANALYSIS

An open road tolling analysis was conducted to provide guidance on continuing with a cash option or converting to a cashless system in which all toll collection would be by ETC or by video identification. Since the assumptions in the earlier study were developed for an ETC/cash system, a new set of assumptions was developed to estimate the proportion of traffic that would use the system if cash payment was no longer an option.

The customer base was divided into several components for this analysis:

- **Open Road Tolling Customers** – These are ETC or video tolling customers.

- **Cash Customers** – These customers would pay cash if that option is available. However, if the cash option is not available, this group would be divided into:
  - Those who would switch to ETC or video tolling, and
  - Those who would choose not to use the toll road.

Assumptions were made regarding the percentage of ETC and video customers, the percentage of cash customers who would divert to the ETC or video if cash payment is not available, and the percentage of cash customers who would not be willing to purchase an ETC device or pay the higher tolls associated with video.

The analysis yielded estimates of annual transactions and toll revenue for a cashless system, which were compared to the estimates of annual transactions and toll revenue from the preliminary studies. Total transactions for the ORT system would be reduced by approximately 15 percent in the early years to approximately 5 percent in the later years in comparison to the ETC/cash system. However, the reduction in transactions would be offset by the higher charges for video tolling, which would result in slightly higher revenues for the ORT system than for the ETC/cash system.

Based on this analysis, the NCTA decided to implement the Triangle Expressway as an all-electronic, open road tolling facility with no cash collection.

## **VEHICLE CLASSIFICATION SYSTEM AND TOLL RATES**

The NCTA decided to use a simplified vehicle classification system as follows:

- **Class 1, Light Vehicles** – Included in this class are automobiles, pickup trucks, passenger and service vans, sports utility vehicles, and motor cycles.
- **Class 2, Medium Vehicles** – Included in this class are single unit trucks larger than pickup trucks including 2-axle, 6-tire vehicles; passenger buses; recreational vehicles and any Class 1 vehicle that is towing a trailer.
- **Class 3, Heavy Trucks** – Included in this class are all multi-unit vehicles with four or more axles and all oversize vehicles.

The toll rate for Class 1 vehicles is the rate on which the rates for other vehicle classes are based. The recommended premiums for Class 2 and Class 3 vehicles are based on a review of the premiums that are charged by other toll agencies for such vehicles. Table 5-1 contains a summary of the rates charged for passenger cars; for 3, 4, 5-axle single unit trucks; and for 6-axle multi unit trucks for 22 urban toll roads. The average rate is between two and three times the passenger vehicle rates. The rates for 5-axle trucks are 3.75 times the passenger car rate on average, and the average rate for 6-axle trucks are 4.50 times the average passenger care rate. Accordingly the following premiums were selected for the Class 2 and Class 3 vehicles:

- **Class 2, Medium (Single-unit) Vehicles** – Two times the Class 1 rate.
- **Class 3, Heavy (Multi-unit) Trucks** – Four times the Class 1 rate.

It is expected that the majority of the Triangle Expressway users would be electronic toll collection (ETC) customers. ETC customers would be identified via radio-frequency transponders attached to the windshield of their vehicles. ETC customers would be charged a lower toll rate than video customers because it is less expensive to match ETC accounts to the NCTA database.

Video toll customers would be identified using digital video capture of their vehicle license plates. Video toll customers would include users with registered video accounts and non-registered users of the toll road. Users that do not register for ETC or video toll accounts would be considered potential customers and provided an opportunity to pay before their transactions are classified as violations. Based on discussions with the NCTA and others, the following rate differentials are recommended for video toll collection and ETC:

- **Video Toll Collection Rates** – The toll rates established for Class 1, Class 2 and Class 3 video toll customers; and
- **Electronic Toll Collection Rates** – The toll rates for Class 1, Class 2 and Class 3 toll customers discounted by no more than 35 percent from the corresponding video rates.

The ETC and video toll rates for each vehicle class were determined through toll rate sensitivity tests as described in Chapter 6.

Table S-1  
Electronic Toll Collection Rates by Toll Agency and Number of Axles

Agency and Facility Name	Length (Miles)	Vehicle Type													
		Passenger Car		3-Axle Truck/Bus			4-Axle Truck			5-Axle Truck			6-Axle Truck		
		Toll	Cost/ Mile	Toll	Cost/ Mile	Percent of Passenger Toll/Mile	Toll	Cost/ Mile	Percent of Passenger Toll/Mile	Toll	Cost/ Mile	Percent of Passenger Toll/Mile	Toll	Cost/ Mile	Percent of Passenger Toll/Mile
Florida Turnpike Enterprise - Beachline (SR 528) (Orlando)	8.2	\$0.50	\$0.061	\$1.00	\$0.122	200%	\$1.50	\$0.183	300%	\$2.00	\$0.244	400%	\$2.50	\$0.305	500%
Florida Turnpike Enterprise - Sawgrass Expressway (Broward County)	20.8	\$1.50	\$0.072	\$3.00	\$0.144	200%	\$4.50	\$0.216	300%	\$6.00	\$0.288	400%	\$7.50	\$0.361	500%
Florida Turnpike Enterprise - Seminole Expressway (Orlando)	17.0	\$1.50	\$0.088	\$3.00	\$0.177	200%	\$4.50	\$0.265	300%	\$6.00	\$0.354	400%	\$7.50	\$0.442	500%
Florida Turnpike Enterprise - Veterans Expressway (Tampa)	16.0	\$1.25	\$0.078	\$2.50	\$0.156	200%	\$3.75	\$0.234	300%	\$5.00	\$0.313	400%	\$6.25	\$0.391	500%
Harris County Toll Road Authority - Hardy Toll Road	21.7	\$2.50	\$0.115	\$6.00	\$0.276	240%	\$8.00	\$0.369	320%	\$12.00	\$0.553	480%	\$15.00	\$0.691	600%
Harris County Toll Road Authority - Sam Houston Toll Road	67.0	\$9.75	\$0.146	\$22.75	\$0.340	233%	\$31.25	\$0.466	321%	\$39.00	\$0.582	400%	\$57.50	\$0.858	590%
Harris County Toll Road Authority - Westpark Tollway	11.0	\$2.50	\$0.227	\$6.00	\$0.545	240%	\$8.00	\$0.727	320%	\$10.00	\$0.909	400%	\$13.00	\$1.182	520%
Miami-Dade Expressway Authority - Don Shula (South Dade) Expressway - SR 874	7.3	\$1.00	\$0.137	\$2.00	\$0.274	200%	\$3.00	\$0.411	300%	\$4.00	\$0.548	400%	\$5.00	\$0.685	500%
Miami-Dade Expressway Authority - East-West (Dolphin) Expressway - SR 836	11.0	\$1.00	\$0.091	\$2.00	\$0.182	200%	\$3.00	\$0.273	300%	\$4.00	\$0.364	400%	\$5.00	\$0.455	500%
Miami-Dade Expressway Authority - Gratigny Parkway - SR 924	5.4	\$1.00	\$0.185	\$2.00	\$0.370	200%	\$3.00	\$0.556	300%	\$4.00	\$0.741	400%	\$5.00	\$0.926	500%
Miami-Dade Expressway Authority - Miami Airport Expressway - SR 112	4.2	\$1.00	\$0.238	\$2.00	\$0.476	200%	\$3.00	\$0.714	300%	\$4.00	\$0.952	400%	\$6.00	\$1.429	600%
North Texas Tollway Authority - Dallas North Tollway (DNT)	21.0	\$1.80	\$0.086	\$2.85	\$0.136	158%	\$3.60	\$0.171	200%	\$4.35	\$0.207	242%	\$5.10	\$0.243	283%
North Texas Tollway Authority - President George Bush Turnpike (PGBT)	26.0	\$3.00	\$0.115	\$6.00	\$0.231	200%	\$9.00	\$0.346	300%	\$12.00	\$0.462	400%	\$15.00	\$0.577	500%
Orlando-Orange County Expressway Authority - Beachline Expressway (SR 528)	24.0	\$2.00	\$0.083	\$3.75	\$0.156	188%	\$4.75	\$0.198	238%	\$6.00	\$0.250	300%	\$6.00	\$0.250	300%
Orlando-Orange County Expressway Authority - Central Florida Greenway	38.0	\$3.25	\$0.086	\$6.00	\$0.158	185%	\$7.95	\$0.209	245%	\$9.75	\$0.257	300%	\$7.50	\$0.197	231%
Orlando-Orange County Expressway Authority - East-West Expressway	22.0	\$2.50	\$0.114	\$4.50	\$0.205	180%	\$5.25	\$0.239	210%	\$6.75	\$0.307	270%	\$6.75	\$0.307	270%
Osceola County, FL - Osceola Parkway	13.0	\$1.00	\$0.077	\$1.50	\$0.115	150%	\$2.00	\$0.154	200%	\$2.50	\$0.192	250%	\$2.50	\$0.192	250%
Tampa-Hillsborough Expressway - Lee Roy Selmon Crosstown Expressway	14.0	\$2.50	\$0.179	\$5.00	\$0.357	200%	\$7.50	\$0.536	300%	\$10.00	\$0.714	400%	\$12.50	\$0.893	500%
Transportation Corridor Agencies - Route 133	4.6	\$1.25	\$0.272	\$2.50	\$0.543	200%	\$2.50	\$0.543	200%	\$5.00	\$1.087	400%	\$5.00	\$1.087	400%
Transportation Corridor Agencies - Route 241 (1)	24.0	\$4.25	\$0.177	\$8.50	\$0.354	200%	\$8.50	\$0.354	200%	\$17.00	\$0.708	400%	\$17.00	\$0.708	400%
Transportation Corridor Agencies - Route 261 (1)	6.6	\$1.25	\$0.189	\$2.50	\$0.379	200%	\$2.50	\$0.379	200%	\$5.00	\$0.758	400%	\$5.00	\$0.758	400%
Transportation Corridor Agencies - San Joaquin, Route 73 (1)	15.0	\$4.25	\$0.283	\$8.50	\$0.567	200%	\$8.50	\$0.567	200%	\$17.00	\$1.133	400%	\$17.00	\$1.133	400%
Average			\$0.141		\$0.285	200%		\$0.369	250%		\$0.542	375%		\$0.640	450%

<sup>(1)</sup> Tolls for peak conditions shown.  
Source: Toll Agency Web Sites



## TOLL PAYMENT PROCESS AND ENFORCEMENT

Tolls will be set at the video rate, but the NCTA may discount that rate up to 35 percent for vehicles equipped with electronic transponders. Tolls are payable via ETC or video accounts, or at designated payment locations accepting cash and other acceptable forms of payment. The Triangle Expressway will have signage to notify users of the toll payment requirements, payment options (including directions to nearby payment locations accepting cash) and procedures to follow if users do not establish an account or make payment at designated payment locations within 15 days after using the roadway. In summary, unpaid tolls will be enforced generally as follows:

- **Bill for Unpaid Tolls** – If a toll is not paid within 15 days of use of the road, the NCTA will send a bill within 90 days of the first occurrence of an unpaid toll. The bill will contain an image of the vehicle license plate and will list all unpaid tolls from the time of the first unpaid toll. It will explain how to make payment without the imposition of additional processing fees and penalties;
- **Payment Procedures and Processing Fees** – The recipient of a bill for unpaid tolls can pay the bill within 30 days with no additional fees and penalties. If the recipient does not pay within 30 days, the NCTA may re-bill the amount and may add up to a \$6 processing fee with a maximum of \$48 in processing fees allowed within a calendar year. The processing fee will be based on the additional cost of identifying the user who has not paid a toll. The NCTA will retain processing fee receipts;
- **Civil Penalties** – A recipient of one or more bills during the first or second six-month period in a calendar year and who has not paid the amounts due is subject to a civil penalty of \$25. Only one civil penalty will be imposed in the first or second six-month period. This penalty must be collected by the NCTA. Provided, the NCTA can retain only the actual costs of collecting the penalty not to exceed 20 percent of the amount collected. The remaining portion of the penalty, by law, will be deposited to the State’s Civil Penalty and Forfeiture Fund;
- **Registration Block** – The NCTA will notify the Commissioner of Motor Vehicles of registered vehicle owners who have not paid tolls, processing fees, or civil penalties. The Commissioner of Motor Vehicles will withhold the vehicle registration renewal of the vehicle until the overdue amounts are paid; and
- **Review and Disputes** – The NCTA will institute appropriate dispute resolution processes including administrative hearings and judicial review.

# CHAPTER 6

## TRAFFIC AND REVENUE ANALYSIS

Chapter 6 presents a summary of the traffic and revenue analysis conducted for the proposed Triangle Expressway. In addition to an overview of the travel demand modeling process, this chapter also presents information on the regional highway improvement program, basic assumptions upon which the traffic and revenue forecasts are based, a toll rate sensitivity analysis, and the traffic and revenue forecasts for the proposed toll road.

Traffic and revenue forecasts included in this Chapter reflect recent updates intended to recognize the impact of the current local and national economic downturn. Forecasts were originally developed during 2008, using the full methodology described below. Updated estimates, prepared in March 2009 involve the development of new traffic assignments, generally following the methodology described below, but assuming a “three-year lag” in economic development in the early years of the project life, in an attempt to reflect the impact of the current recession.

In addition to assuming a significant lag in development, the new forecasts also recognize a delay in the opening of each phase of the project, by approximately one year. As described in more detail below, the forecast now assumes the first partial phase of the project will be open in 2012 and the first year of the full project operation will be 2013. It is assumed that significant economic recovery will have occurred by the time the project opens and previously anticipated rates of economic growth will resume. However, for purposes of the most recent update, it is assumed that there would be a net three-year lag in economic growth activity in the project corridor, and throughout the Raleigh-Durham area.

The section below provides a description of the full methodology used in the traffic modeling and assignment process. This full process was undertaken in the development of original traffic and revenue findings. In the most recent update, new traffic assignments were performed for each of the modeling years, simply using earlier year regional travel demand estimates to replicate later years, to introduce the net effect of the assumed

three-year lag. For example, updated traffic assignments for the year 2012 were made using trip matrices based on socioeconomic data representative of the year 2009.

In future years, the assumed “lag” was reduced progressively, such that by 2030 economic development in the corridor was assumed to have reached previously anticipated levels.

## **ANALYTICAL METHODOLOGY**

This section describes the general procedures followed to prepare the forecasts of annual toll traffic and gross toll revenue. Figure 6-1 depicts the process schematically.

### **TRIANGLE REGIONAL TRANSPORTATION DEMAND MODEL**

The two Metropolitan Planning Organizations (MPOs) in the region maintain a regional travel demand model, referred to as the Triangle Regional Model (TRM) that was used for this traffic and revenue analysis.

The currently available TRM, which was last updated in November 2006, was used to forecast traffic for this comprehensive traffic and revenue analysis. The two MPOs have subsequently adopted a new TRM using different software and have updated the land use and socioeconomic data used in the trip generation process. However, the new model platform was not ready in time to use in this analysis.

The following steps were used in the modeling process:

### **MODEL SOFTWARE AND NETWORK**

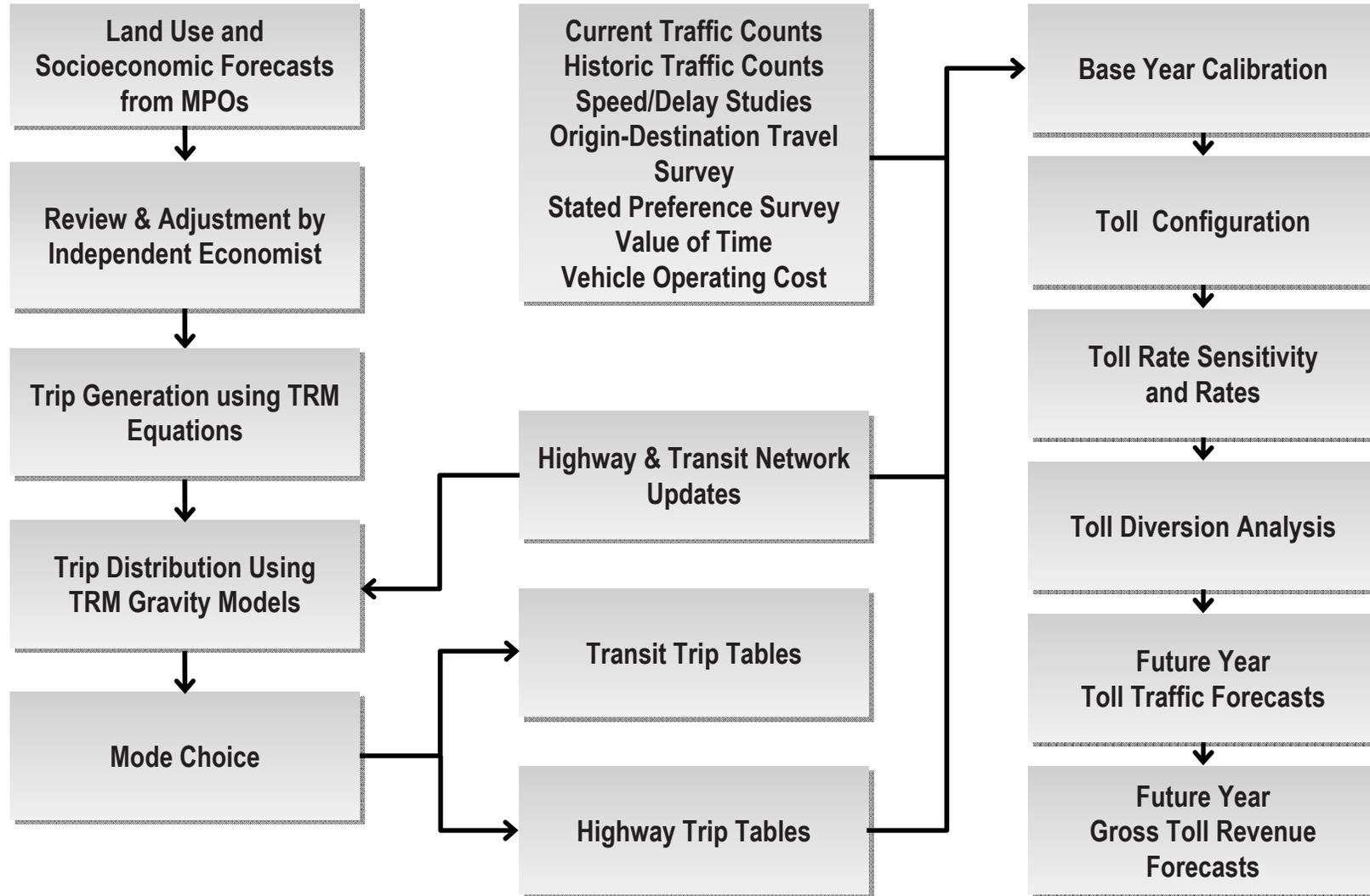
The same model framework and software that was used for the preliminary study was used for this study. Changes to the highway and transit networks to reflect plans adopted after completion of the preliminary study were incorporated.

### **LAND USE AND SOCIOECONOMIC DATA USED FOR THE TRIP GENERATION PROCESS**

Land use and socioeconomic data prepared by the MPOs in 2007 was reviewed by the independent economist. Adjustments to the socioeconomic data in the TRM were made by the economist for use in the trip generation process for this comprehensive study.

### **TRANSPORTATION ANALYSIS ZONES**

The new TRM will use different traffic analysis zones (TAZs) than the current TRM, which was used for this study. Consequently, extensive checking was performed to ensure that the updated socioeconomic data



prepared by the independent economist under the new TAZ structure was allocated properly to the TAZ structure used in current TRM. In addition some of the TAZs were disaggregated into smaller TAZs to allow for a better representation of the roadway system within the study area. Trip tables were disaggregated accordingly to fit this revised TAZ structure.

#### **FUTURE ROADWAY AND TRANSIT NETWORK REVIEW**

Highways and transit routes proposed for future improvement in the model were compared with proposed roadway and transit improvements in the Transportation Improvement Plans and Long Range Plans adopted by the two MPOs. In addition the commuter rail service planned for travel between Raleigh and Durham was removed from the network since funding for this project was withdrawn. Special attention was paid to proposed roadway and transit improvements in the Triangle Expressway study area. Detailed coding was added to represent the locations of proposed interchanges and tolling zones.

#### **TRIP GENERATION, DISTRIBUTION, AND MODE CHOICE**

Three standard steps – trip generation, distribution and mode choice – were followed in the modeling process because the socioeconomic data and some highway and transit facilities and services had changed since the preliminary study. In the earlier study, the highway vehicle trip tables prepared by the MPOs formed the basis for the forecasts. In the current study, new vehicle trip tables were prepared based on the updated networks and socioeconomic data.

#### **MODEL CALIBRATION**

The model was calibrated in the vicinity of the proposed Triangle Expressway by comparing model results with traffic volumes and travel speeds observed in the study area. Screenline analyses in the study area resulted in adjustments to travel speeds and trip tables for some movements in order to calibrate the model in the TriEx corridor.

#### **VEHICLE OPERATING COST**

Updates were made to the assumed operating costs of passenger vehicles and trucks using available data from AAA and other sources. Vehicle operating costs reflected an average gasoline price of \$3.00 per gallon inflated by 2.5 percent annually for future-year costs. Finally the vehicle operating cost per mile on the toll road was reduced by 15 percent in comparison to the cost on competing roads. This reduction reflects the relative fuel efficiency of a steady speed facility in comparison to the stop and go traffic on congested arterial facilities.

**VALUE OF TIME**

Estimates of the value of time were calculated using updated median income information at the TAZ level and results of the stated preference survey described earlier. Values of time differed by trip purpose and TAZ. The overall average value of time from passenger cars was \$0.225 per minute in peak periods and \$0.174 per minute in off-peaks.

**TRAFFIC DIVERSION ANALYSIS**

Following calibration of the model, a series of traffic assignments were generated for the future years of 2012, 2015, 2020, and 2030 under no build, toll free, and tolled conditions. Several toll rates were tested for the years 2012/2013 and 2030 in order to estimate the optimum toll rates. A toll diversion analysis was conducted using trips tables divided by time period, trip purpose, vehicle type, and toll payment class.

Toll traffic assignments were generated using a diversion assignment technique. This process involved comparing travel time and distance for trips on the Triangle Expressway with trips on the best toll-free alternative routes. The estimated traffic that would be expected to use the Expressway is a function of travel time and distance savings, the assumed monetary value of these savings, and the toll rate being tested in any given assignment. In general, as the total costs to use the proposed toll road increased, the traffic decreased.

The model also recognizes capacity constraints on roadways. Speeds for future-year forecasts were lowered to reflect increasing congestion on both the proposed toll facility and existing toll free roads.

**FISCAL YEAR CONVERSION**

The forecasts for this study were initially on a calendar-year basis because the TRM parameters were also on a calendar-year basis. These forecasts were later converted to a fiscal-year basis to conform to the NCTA's fiscal year which begins on July 1. The details of the conversion process are presented later in this chapter.

**BASIC ASSUMPTIONS**

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

1. The Triangle Parkway (NC 147 to NC 540) will open to traffic and NC 540 (NC 54 to NC 55) will convert to a toll section by January 1,

2012. The Western Wake Freeway (NC 55 near Morrisville to NC 55 Bypass near Holly Springs) will open to traffic by January 1, 2013;
2. The existing southern terminus of NC-147 at T.W. Alexander Drive will close upon the completion of the first section of the Triangle Expressway in January 2012;
  3. Improvements in the current Transportation Improvement Program, including the widening of some existing toll free routes and construction of HOV lanes on I-40, will be implemented by 2030;
  4. Tolls would be charged for three vehicle classes and two payment types and will be increased annually. The toll rates and tolling zone locations will be as shown later in this chapter;
  5. No new toll-free facilities or additional capacity will be constructed during the projection period, other than those in the current Transportation Improvement Plan;
  6. The system will operate in a cashless environment. Both electronic toll collection and video tolling will be used. However, provisions will be made for drivers to register their license plate by paying in cash at off-site locations;
  7. The percentage of ETC and video customers will be as described later in this chapter;
  8. Revenue leakage due to unreadable or uncollectible ETC or video transactions, or any transactions that cannot be processed and payment collected will occur. 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. Economic growth in the project study area and associated travel demand would occur as forecast by the independent economist. The current economic recession is assumed to “bottom out” by the end of 2009, with recovery beginning by the first quarter of 2010. For purposes of this analysis, a three-year lag in previously developed socio-economic forecasts is assumed to represent the net impact of the recession;

10. The traffic and revenue forecasts were then adjusted to estimate the impacts of the current recession;
11. Inflation will average 2.5 percent per year;
12. The Triangle Expressway will be well maintained, efficiently operated, effectively signed, and promoted to encourage maximum usage and to reach the assumed percentage goals for ETC and video usage;
13. Motor fuel will remain in adequate supply throughout the forecast period. Fuel prices are assumed to gradually increase back to levels approaching \$3.00 per gallon by 2011, and remain at that level, in real terms after adjustment for inflation, throughout the forecast period; and
14. 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 proposed Triangle Expressway.

## **FUTURE ROADWAY IMPROVEMENTS**

People's travel behavior and the number of vehicles that would use the proposed Triangle Expressway would be heavily influenced by the operating conditions on other area roadways in the study area. The process of transportation project development and funding makes it impossible to know with certainty which proposed transportation improvements will be implemented and when. However, it is important that reasonable assumptions are made regarding future improvements, since such improvements could have a considerable effect on the number of vehicles that would use the Expressway.

The TRM contains all future highway improvements listed in the two MPOs' fiscally constrained 2030 transportation improvement programs in effect at the time of the analysis. A list of the planned road improvements that could affect traffic volumes on the Triangle Expressway is provided in Table 6-1. The improvements that would have the most significant impact on the operation of the Expressway and the year that they are programmed in the TRM include:

- **Model Year 2012**
  - Widening of T.W. Alexander Drive, Davis Drive, and NC 55;

**Table 6-1  
Major Highway Improvements Contained in the Triangle Regional Model  
Proposed Triangle Expressway**

<b>Name and Location</b>	<b>Project Description</b>	<b>Model Year</b>
Garner Road	Walnut Creek Bridge to Martin Luther King Jr., 2-Lanes to 3-Lanes	2012
Edwards Mill Road Extension-Part II	Trinity Road to Chapel Hill Road, New 4-Lane	2012
Davis Drive	Morrisville - Carpenter Road to Farm Pond Road, 2-Lane to 4-Lane	2012
Davis Drive	Morrisville - Carpenter Road to Durham County line, 2-Lane to 4-Lane	2012
South Loop Road	Louis Stephan Drive to Davis Drive, New 4-Lane	2012
NC 54	Trinity Road to Maynard Road, 2-Lane to 4-Lane	2012
High House Road	Davis Drive to NC 55, 2 Lane to 4 Lane	2012
US 70 (Clayton) Bypass	I-40 (South) to US 70 Business, 4 New Lanes	2012
US 1-64	US 64 to Walnut Street, 4-Lanes to 6-Lanes	2012
Louis Stephens Drive Extension	Morrisville Parkway to High House Road, new 2-Lane	2012
Tryon Road	Keisler to Cary Parkway, 2-Lane to 4-Lane	2012
Tryon Road	Cary Parkway to Jones Franklin Road, 2-Lane to 4-Lane	2012
Tryon Road	Jones Franklin Road to Dillard Drive, 2-Lane to 4-Lane	2012
Tryon Road	Gorman Street to Lake Wheeler Road, 2-Lane to 4-Lane	2012
Tryon Road	Norfolk Southern Rail to Existing Tryon Road, 2-Lane to 4-Lane	2012
Tryon Road	New Tryon Road Alignment to South Wilmington Street	2012
County Line Road	North of O'Kelly Chapel to Yates Store Road	2012
NC 55	Carpenter Fire Station Road to Durham County line, 2-Lane to 4-Lane	2012
NC 55	Carpenter Fire Station Road to High House Road, 2-Lane to 4-Lane	2012
NC 55	High House Road to US 64, 2-Lane to 4-Lane	2012
NC 55	Holly Springs Bypass to Wake Chapel Road, 2-Lane to 4-Lane	2012
Airport Boulevard Extension	NC 54 to Davis Drive, New 4-Lane	2020
Timber Drive East	White Oak Road to New Rand Road, New 4-Lane	2020
Hillsborough Street Safety	Gorman Street to Woodburn Road, 4 Lane to 2-Lane	2020
Sunset Lake Road Connector	NC 55 to Optimist Farm Road, 2-Lane to 4-Lane	2020
Davis Drive	Farm Pond Road to US 64, 2-Lane to 4-Lane	2020
Trinity Road	Edwards Mill Road Extension to Trenton Road, 2-Lane to 4-Lane	2020
S.W. Maynard Road	W. Gatham Street to Kildare Farm Pond, 2-Lane to 4-Lane	2020
Old Apex Road	High House Road to Cary Parkway, 2-Lane to 4-Lane	2020
Morrisville Parkway	Davis Drive to NC 55, 2-Lane to 4-Lane	2020
Ten-Ten Road	Holly Springs Road to US 1, 2-Lane to 4-Lane	2020
Blue Ridge Road	Duraleigh Road to Glen Eden Drive, 2-Lane to 4-Lane	2020

(continued)

**Table 6-1 (cont'd.)  
Major Highway Improvements Contained in the Triangle Regional Model  
Proposed Triangle Expressway**

Name and Location	Project Description	Model Year
Holly Springs Road	Sunset Lake Road to Old Holly Springs Apex., 2-Lane to 4-Lane	2020
Center Street/1010	US 1 to Apex Peakway, 2-Lane to 4-Lane	2020
Lake Wheeler Road	I-40/I-440 to Tryon Road, 2-Lane to 4-Lane	2020
Tryon Road	Lake Wheeler Road to Norfolk Southern Rail, 2-Lane to 4-Lane	2020
Tryon Road Extension	Garner Road to Rock Quarry Road, New 4-Lane	2020
McCrimmon Parkway	Airport Boulevard to Aviation Parkway, New 4-Lane	2020
NC 55	Olive Chapel Road to US 64, 2-Lane to 4 Lane	2020
NC 55	Apex Peakway (South) to Olive Chapel Road, 2-Lane to 4-Lane	2020
Evans Road	NW Maynard Road to Dynasty Drive, 2-Lane to 4-Lane	2020
I-40 (South)	US 70 to East Parkway, 4-Lane to 6-Lane	2020
I-40 (South)	US 1/64 to Wade Avenue, 4-Lane to 6-Lane	2020
I-40 (South)	I-440 to US 70, 4-Lane to 8-Lane	2020
I-40(South)	US 70 to NC 42, 4-Lane to 8-Lane	2020
Smithfield Road	Carrington Drive to Forestville Road, 2-Lane to 4-Lane	2020
Cary Parkway Extension	Harrison Avenue to Trinity Road, New 2-Lane	2020
Jones Franklin Road	I-440 to Western Boulevard, 2-Lane to 4-Lane	2020
Johnson Pond Road	US 401 to North to Bells Lake Road, 2-Lane to 3-Lane	2030
Ten-Ten Road	Holly Springs Road to Bells Lake Road, 2-Lane to 4-Lane	2030
Kit Creek Road	NC 55 to Green Level to Durham, New 4-Lane	2030
Kit Creek Road	Davis Drive to NC 54, 2-Lane to 3-Lane	2030
Green Level Road to Durham	Green Level West to Jenks Road, 2-Lane to 4-Lane	2030
Green Level Road to Durham	Green Level West to Durham County Line, 2-Lane to 4-Lane	2030
Kelly Road	Jenks Road to Old US 1, 2-Lane to 4-Lane	2030
Olive Chapel Road	Kelly Road to NC 55, 2-Lane to 4-Lane	2030
Apex Peakway	NC 55 to NC 55, 4 New Lanes	2030
Reedy Creek Road	NE Maynard Road to Harrison Avenue, 2-Lane to 3-Lane	2030
New Hope Road	Old Pool Road to Rock Quarry Road, 2-Lane to 4-Lane	2030
NC 55	NC 42 to Harnett County, 2-Lanes to 4-Lanes	2030
Bells Lake Road	Ten-Ten Road to Johnson Pond Road, 2-Lane to 4-Lane	2030
Sunset Lake Road	Davis Drive to NC 55, 2-Lane to 4-Lane	2030
Sunset Lake Road	Hilltop-Needmore Road to Optimist Farm Road, 2-Lane to 4-Lane	2030
Creech/Jones Sausage Connector	Creech Road to Jones Sausage Road, 4 New Lanes	2030

(continued)

**Table 6-1 (cont'd.)  
Major Highway Improvements Contained in the Triangle Regional Model  
Proposed Triangle Expressway**

<b>Name and Location</b>	<b>Project Description</b>	<b>Model Year</b>
Rock Quarry Road	New Hope Road to Battle Bridge Road, 2-Lane to 4-Lane	2030
NC 54	NE Maynard Road to NW Maynard Road	2030
East Garner Road	Rock Quarry Road to Shotwell Road, 2-Lane to 4-Lane	2030
Bethlehem Road	Smithfield Road to Grasshopper Road, 2-Lane to 4-Lane	2030
Old Holly Springs Apex Road	Holly Springs Road to Jessi Drive, 2-Lane to 4-Lane	2030
Jessi Drive Part (NL)	Ten-Ten Road to Holly Springs Road, 2-Lane to 4-Lane	2030
Western Boulevard	Gorman Street to Avent Ferry Road, 4-Lane to 6-Lane	2030
Louis Stephens Drive Extension (Part NL)	Durham County Line to O'Kelly Chapel Road, 2-Lane to 4-Lane	2030
Dillard Drive	Jones Franklin Road to Walnut Street, 2-Lane to 4-Lane	2030
Dillard Drive	Tryon Road to Jones Franklin Road, 2-Lane to 4-Lane	2030
Eastern Parkway	US 401 to US 401, New 4-Lane	2030
Hilltop-Needmore Extension (Part NL)	NC 55 (Broad Street) to US 401 New 3-Lane	2030
Western Parkway (Fuquay Varina)	NC 55 to US 401, New 4-Lane	2030
Rock Quarry Road	Old Birch Road to New Hope Road, 2-Lane to 4-Lane	2030
Kildaire Farm Road	Ten-Ten Road to Kildaire Farm Connector, 2-Lane to 4-Lane	2030
Lake Pond Drive/Old Raleigh Road	Cary Parkway to Apex Peakway, 2-Lane to 4-Lane	2030
Penny Road	Ten-Ten Road to Holly Springs Road, 2-Lane to 4-Lane	2030
NC 55 (Main Street)	Holly Springs Road to Bobbitt Road, 2-Lane to 4-Lane	2030
Trinity Road Extension	NC 54 to Cary Town Boulevard, New 4-Lane	2030
New Rand Road	NC 50 to Old Garner Road, 2-Lane to 4-Lane	2030
I-40 HOV/HOT Project	Durham County Line to I-440/US 1-64	2030
I-40 HOV/HOT Project	I-440/US 1/64 to Johnson County	2030
Morrisville Carpenter Road	NC 54 to Davis Drive, 2-Lane to 4-Lane	2030
Morrisville Carpenter Road	Davis Drive to NC 55, 2-Lane to 4-Lane	2030
Holly Springs Road	Cary Parkway to Penny Road, 2-Lane to 6-Lane	2030
Holly Springs Road	Penny Road to Ten-Ten Road, 2-Lane to 6-Lane	2030
Holly Springs Road	Ten-Ten Road to Kildaire Farm Connector, 2-Lane to 6-Lane	2030
McCrimmon Parkway Extension	Townhall Drive to Louis Stevens Road, 2-Lane to 4-Lane	2030
McCrimmon Parkway Extension	Louis Stevens Rd. to NC 55, New 4-Lane	2030
McCrimmon Parkway Extension	NC 55 to Triangle Expressway, 2-Lane to 4-Lane	2030
McCrimmon Parkway Extension	Davis Drive to NC 55, 2-Lane to 4-Lane	2030
McCrimmon Parkway Extension	Green Level to Durham to Durham County line, New 2-Lane	2030
NC 54	Cary Parkway to McCrimmon Parkway, 2-Lane to 4-Lane	2030

Source: Capital Area Metropolitan Planning Organization, 2030 Long Range  
Transportation Plan, September, 15, 2004  
Durham-Chapel Hill-Carrboro Metropolitan Planning Organization, FY 2006-2012  
Metropolitan Transportation Improvement Program

- **Model Year 2020**
  - New roads – Airport Boulevard Extension, McCrimmon Parkway from Airport Boulevard to Aviation Parkway and from Davis Drive to NC 55, Extension of T.W. Alexander from US 70 to Leesville Road;
  - Widening of T.W. Alexander Drive, Davis Drive, McCrimmon Parkway, Morrisville Parkway, NC 54, US 401, I-40 (South), and Ten-Ten Road;
  
- **Model Year 2030**
  - I-40 – Widening and HOV/HOT Lanes;
  - Other new roads – Extensions of Kit Creek Road and McCrimmon Parkway; and Western Parkway (NC 55 to US 401); and
  - Widening of Morrisville Carpenter Road, NC 147, NC 54, and Ten-Ten Road.

Several of these highway improvements would compete directly with the proposed Triangle Expressway. For example, the widening of NC 55 parallel to the Expressway would affect toll road traffic by increasing free road capacity within the study area. Other new roads would complement the proposed toll road by providing better access to the toll road interchanges. Examples of complementary roads include the extension or widening of Kit Creek Road and Green Level Road.

## **FUTURE TRANSIT IMPROVEMENTS**

Transit service providers, headways, fares and service type data were reviewed for 2010, 2015, 2020, 2025, 2030, and 2035 according to the regional long range transportation plans and transportation improvement programs. Changes to the TRM transit network models were made as necessary to reflect new information.

A regional commuter rail system, proposed by the Triangle Transit Authority, (TTA) was removed from the TRM for this study. It was part of the transit network for the preliminary study. The 28-mile system was planned to connect Chapel Hill and Durham to the Research Triangle Park. However, in August 2006, the TTA decided not to proceed with federal funding for the project. CAMPO and DCHC appointed a Joint MPO Special Transit Advisory Commission (STAC) to draft a Regional Transit Vision Plan to examine goals and objectives for investments in regional transit and make recommendations for future transit projects. With funding for the regional commuter rail project uncertain and regional tran-

sit priorities being studied by the STAC, the rail project was not included in any of the transit networks for the current study.

- **Model Year 2010** - The 2010 network was reviewed using information provided by CAMPO and information contained in the DCHC LRTP and TIP. Overall, 21 new routes were added to the regional transit network, primarily to DATA and CHT. None are in the immediate area of the Triangle Expressway.
- **Model Year 2015** - The 2015 network was updated in a similar way to the 2010 network. The 2010 network was used as a base, assuming that no routes established in 2010 would be eliminated. Thirty-two new routes were added by 2015, with the majority being operated by DATA and therefore not expected to affect Triangle Expressway traffic forecasts.
- **Model Year 2020** - The 2020 transit network included both service changes and changes to existing routes. Fifteen routes were added to the 2020 transit network, with the majority of them being operated by CHT. Two new peak period routes extending from Lillington in Harnett County to the Research Triangle Park were added by TTA. Additionally, the headways of seven routes was reduced by 50 percent.
- **Model Years 2030 and 2035** - The 2030 and 2035 transit networks include 72 additional transit routes throughout the region plus changes to headways.

## **TOLL STRUCTURE**

As discussed in more detail in Chapter 5, the recommended toll structure was established for three vehicle classes. This study evaluates six combinations of vehicle class and toll rate in order to estimate the anticipated traffic and revenue for the Triangle Expressway.

### **VEHICLE CLASSES**

Three vehicle classes are recommended in order to simplify the toll structure for the public. The three vehicle classes are as follows;

- **Class 1, Light Vehicles** – Included in this class are automobiles, pickup trucks, passenger and service vans, sports utility vehicles, and motorcycles.

- **Class 2, Medium Vehicles** – Included in this class are single unit trucks larger than pickup trucks including 2-axle, 6-tire vehicles, passenger buses, recreational vehicles and any Class 1 vehicle that is towing a trailer. Class 2 toll rates are two times the Class 1 rates.
- **Class 3, Heavy Trucks** – Included in this class are all multi-unit vehicles with four or more axles and all oversize vehicles. Class 3 toll rates are four times the Class 1 rates.

#### **COLLECTION METHODS**

Toll rates for the Triangle Expressway would be established for two collection methods – electronic toll collection (ETC) and video toll collection.

***Electronic Toll Collection (ETC)*** – This toll rate is based on the use of an electronic transponder or tag, which identifies the vehicle as it passes through each tolling zone and debits the user’s account accordingly. ETC is the preferred methodology for toll collection on the Expressway. ETC is considered highly reliable and is the most convenient and economical method for collecting tolls. It is expected that ETC will be strongly promoted by the North Carolina Turnpike Authority. ETC will be offered at a discount of 35 percent below the video toll rate.

***Video Toll Collection (VTC)*** – This toll rate is based on the use of digital video technology to capture an image of the license plate as the vehicle passes through each tolling zone. The license plate image is compared to the NCTA video account database and the user’s account is debited accordingly. The collection and payment process for video toll customers is described in more detail in Chapter 5. The video toll rate for Class 1 vehicles will be the base toll rate for the Triangle Expressway.

Toll road users that do not register for an ETC or VTC account will be identified through license plate video imaging and vehicle registration information provided by the Department of Motor Vehicles or similar agencies in other states. Non-registered users will be considered potential customers and provided an opportunity to pay before their transactions are classified as violations. The Authority will not collect cash payments for tolls on the Triangle Expressway. However, cash payments will be accepted at a designated location in the vicinity of the toll facility where drivers may also open an ETC or VTC account prior to using the facility.

There will be no difference in the video toll rate for registered and non-registered vehicles.

### **TOLL COLLECTION PERCENTAGES BY COLLECTION METHOD**

Table 6-2 shows the model input assumptions of ETC users and video toll users for each modeling year. These “input percentages” are shown separately for Class 1 vehicles and Class 2 and 3 vehicles. The “input percentages” were used as a starting point in apportioning the total number of trips into theoretical market shares.

The lower section of Table 6-2 for each class of vehicle shows the “output percentages” of video users following a toll diversion analysis. Since video users would be subjected to higher toll rates than ETC users, the “output percentages” for video users decreased; hence, the output proportion of video users is lower than the input assumptions. Conversely, the proportion of actual users on the Triangle Expressway with ETC is expected to be higher than the nominal input assumptions.

### **TOLL RATE SENSITIVITY**

Figure 6-2 shows the 2012 Class 1 toll sensitivity curve for ETC and video toll collection assuming the entire toll road was in operation. This year was used to determine the optimum base case toll rate, which is the video toll rate for Class 1 vehicles. In practice, the southern half of the Expressway will now not be opened until 2013, but the rate optimization analysis was performed at 2012 levels for the full project for continuity purposes.

As shown in the figure, the base-case video toll rate for a Class 1 vehicle traveling from NC 55 Bypass near Holly Springs to NC 147 at RTP would be approximately \$0.222 per mile. The ETC rate for the same trip for a Class 1 vehicle would be \$0.145 per mile. Tolls for registered vehicles would be deducted from the owner’s account as the vehicle passes through each toll collection zone. Tolls collected in each zone would be based on the maximum length of travel.

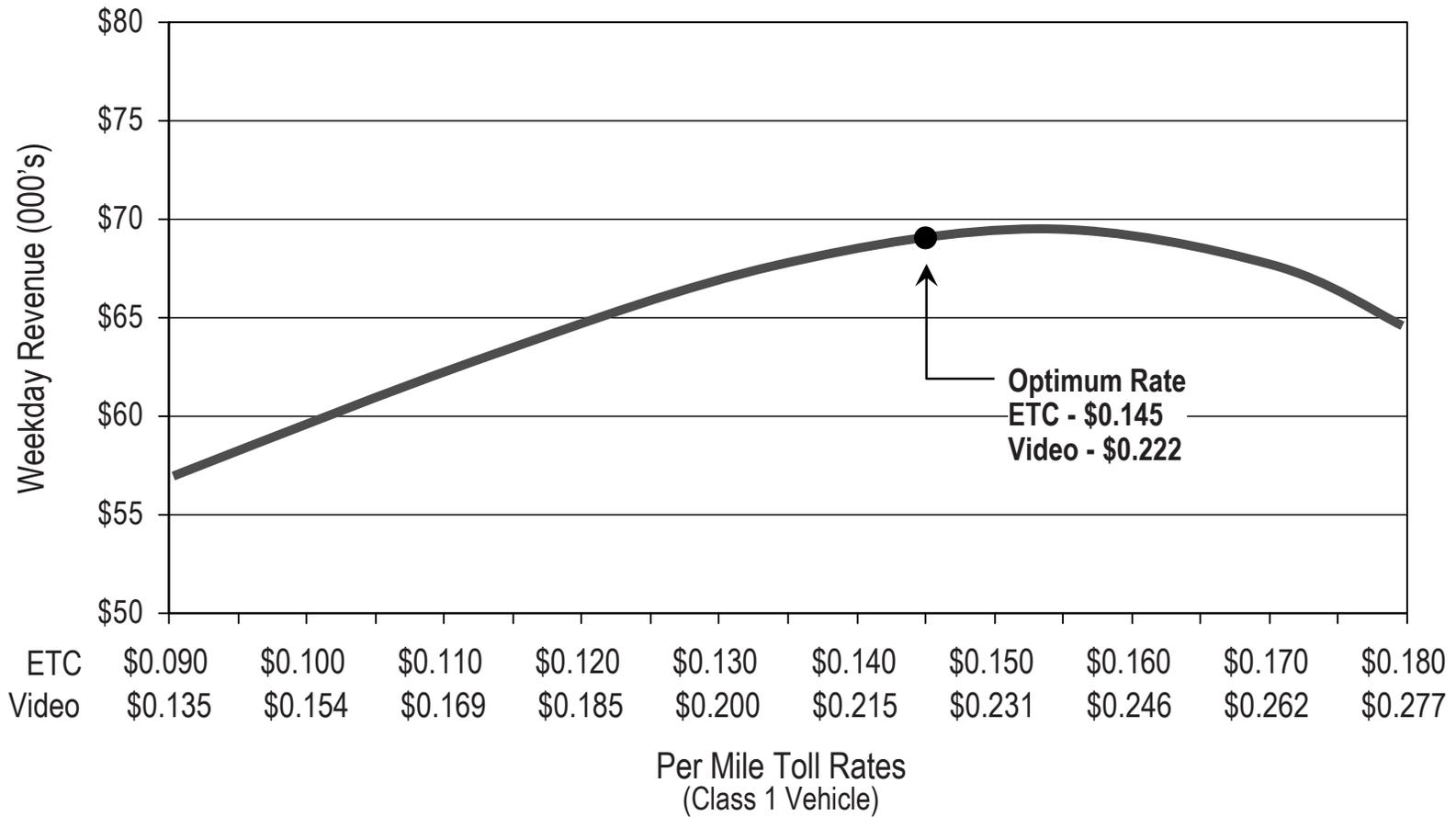
The base toll rate is set slightly below the rate which would maximize toll revenue in order to provide a limited “margin of safety” for setting future rates. Rates were assumed to increase annually as discussed later in this chapter. Table 6-3 compares the ETC toll rate for the Triangle Expressway in 2013 with toll rates for ETC at other comparable toll road facilities. At \$0.153 per mile, the Triangle Expressway ETC rate for Class 1 vehicles would be approximately in the mid-range of ETC rates for comparable urban toll roads. The current average is \$0.141 per mile.

**Table 6-2  
Toll Collection Percentages of Total Transactions  
Triangle Expressway**

Year	Model Input Assumptions Class 1			Model Input Assumptions Class 2 and 3		
	ETC	Video	Total	ETC	Video	Total
2012	65.0%	35.0%	100.0%	80.0%	20.0%	100.0%
2015	70.0%	30.0%	100.0%	85.0%	15.0%	100.0%
2020	77.0%	23.0%	100.0%	89.0%	11.0%	100.0%
2025	81.0%	19.0%	100.0%	89.0%	11.0%	100.0%
2030	84.0%	16.0%	100.0%	89.0%	11.0%	100.0%
2035	84.0%	16.0%	100.0%	89.0%	11.0%	100.0%

Year	Diversion Model Results Class 1			Diversion Model Results Class 2 and 3		
	ETC	Video	Total	ETC	Video	Total
2012	73.0%	27.0%	100.0%	90.9%	9.1%	100.0%
2015	77.1%	22.9%	100.0%	91.0%	9.0%	100.0%
2020	83.2%	16.8%	100.0%	94.2%	5.8%	100.0%
2025	88.3%	11.7%	100.0%	94.5%	5.5%	100.0%
2030	89.5%	10.5%	100.0%	94.5%	5.5%	100.0%
2035	90.3%	9.7%	100.0%	94.8%	5.2%	100.0%



**Table 6-3  
Comparison of Per-mile Electronic Toll Collection Rates  
for Selected Urban Toll Roads In Other States  
Class 1**

<b>Agency and Facility Name</b>	<b>Length (Miles)</b>	<b>ETC Toll</b>	<b>Cost/ Mile</b>
Transportation Corridor Agencies - San Joaquin Hills Tollway	15.0 <sup>(1)</sup>	\$4.25	\$0.283
Transportation Corridor Agencies - Foothill/Eastern Tollway	4.6	\$1.25	\$0.272
E-470 Tollway (Denver, CO)	46.1	\$11.00	\$0.239
Harris County Toll Road Authority - Westpark Tollway	11.0	\$2.50	\$0.227
Transportation Corridor Agencies - Route 261	6.6 <sup>(1)</sup>	\$1.25	\$0.189
Miami-Dade Expressway Authority - Gratigny Parkway - SR 924	5.4	\$1.00	\$0.185
Tampa-Hillsborough Expressway Authority - Lee Roy Selmon Crosstown Expressway	14.0	\$2.50	\$0.179
Transportation Corridor Agencies - Route 241	24.0 <sup>(1)</sup>	\$4.25	\$0.177
<b>North Carolina Turnpike Authority - Triangle Expressway <sup>(2)</sup></b>	<b>17.8 <sup>(2)</sup></b>	<b>\$2.72</b>	<b>\$0.153</b>
Harris County Toll Road Authority - Sam Houston Tollway	67.0	\$9.75	\$0.146
Miami-Dade Expressway Authority - Don Shula (South Dade) Expressway - SR 874	7.3	\$1.00	\$0.137
North Texas Tollway Authority - President George Bush Turnpike (PGBT)	26.0	\$3.00	\$0.115
Harris County Toll Road Authority - Hardy Toll Road	21.7	\$2.50	\$0.115
Orlando-Orange County Expressway Authority - East-West Expressway	22.0	\$2.50	\$0.114
North Texas Tollway Authority - Dallas North Tollway (DNT)	30.1	\$3.15	\$0.105
Miami-Dade Expressway Authority - East-West (Dolphin) Expressway - SR 836	11.0	\$1.00	\$0.091
Florida Turnpike Enterprise - Seminole Expressway (Orlando)	17.0	\$1.50	\$0.088
Orlando-Orange County Expressway Authority - Central Florida Greenway	38.0	\$3.25	\$0.086
Orlando-Orange County Expressway Authority - Beachline Expressway (SR 528)	24.0	\$2.00	\$0.083
Florida Turnpike Enterprise - Veterans Expressway (Tampa)	16.0	\$1.25	\$0.078
Osceola County, FL - Osceola Parkway	13.0	\$1.00	\$0.077
Florida Turnpike Enterprise - Sawgrass Expressway (Broward County)	20.8	\$1.50	\$0.072
Florida Turnpike Enterprise - Beachline (SR 528) (Orlando)	8.2	\$0.50	\$0.061
Average of other agencies			\$0.141

<sup>(1)</sup> Tolls for peak conditions.

<sup>(2)</sup> 2013 rates

Maximum distance from NC 147 at I-40 to NC 55 Bypass at Holly Springs.

Rate is for ETC, which is a 35 percent discount from the base video rate of \$4.15.

Source: Toll Agency Web Sites

## RECOMMENDED TOLL RATES BY LOCATION

Table 6-4 shows annual video toll and electronic toll rates for Class 1 vehicles for each tolling zone in the opening year and extending through 2035. Since the Triangle Expressway will operate as a cashless toll collection system, tolls can be increased relatively easily. In the preliminary study, tolls were assumed to increase every five years beginning in 2015. However, in the current study, small annual increases in toll rates are assumed, rather than large increases every five years.

A Class 2 vehicle would be charged a rate double the Class 1 vehicle rate; and a Class 3 vehicle would be charged four times the Class 1 vehicle rate. The ETC rates would be 35 percent less than the video rates.

Figure 6-3 graphically displays the base video toll rates in 2013, the first year of full operation, and 2030 at each tolling zone location for Class 1, Class 2 and Class 3 vehicles. The opening-year video toll for a full-length trip through four tolling zones on the Triangle Expressway would be \$4.15 for Class 1 vehicles, rising to \$7.31 by 2030.

Similarly, Figure 6-4 illustrates the ETC toll rates for Class 1 vehicles by location for 2013 and 2030. These rates reflect a 35 percent discount from the video toll rates. The 2013 ETC rate for a full-length trip would be \$2.72, rising to \$4.78 by 2030.

All rates are in future-year dollars; that is, there would be no further increase for inflation beyond the rates shown. The increase in tolls between the opening year and the later years of operation is slightly greater than the direct effect of inflation, reflecting the need for some level of “real increase” in rates based on the significant increase in traffic demand. The assumed average annual rate increases over time are:

- 2012 – 2015: 5.0 percent;
- 2015 – 2020: 3.5 percent;
- 2020 – 2030: 3.0 percent; and
- After 2030: 3.0 percent or less.

The four proposed mainline tolling zones are indicated in Figure 6-3:

- Between US 1 and NC 55 Bypass;
- Between US 64 and Old US 1;
- Between NC 55 and Green Level Road; and
- Within the interchange of the Triangle Parkway and NC 540.

**Table 6-4  
Recommended Annual Toll Rates by Tolling Zone  
Class 1 - ETC and Video**

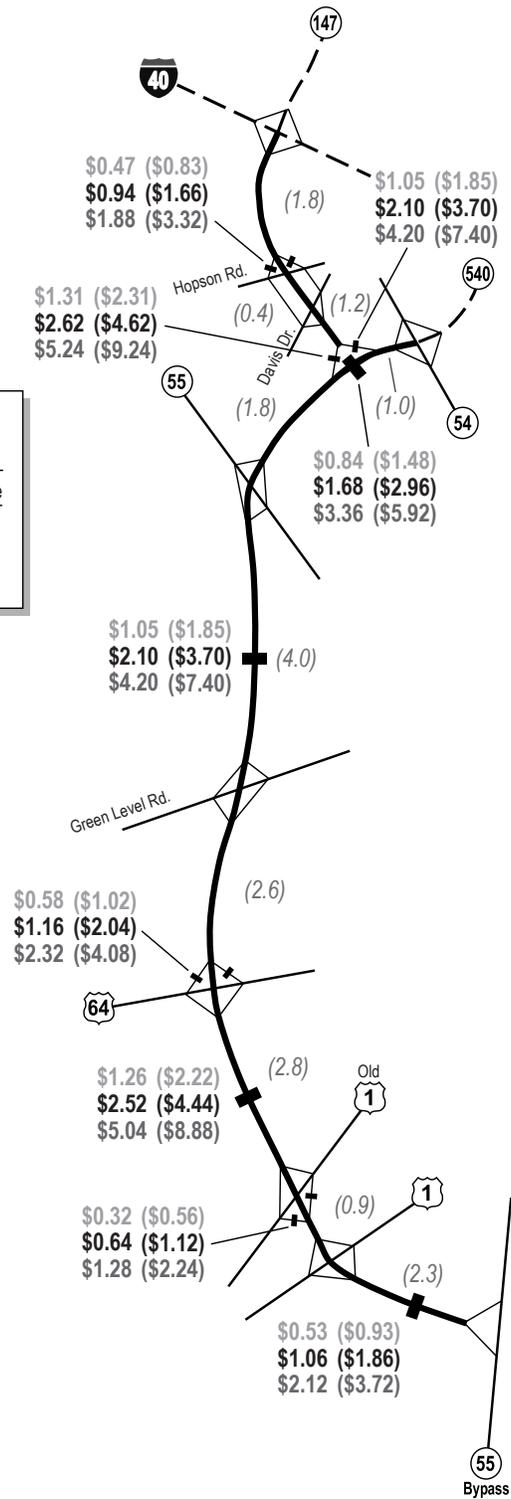
Year	Hopson Road/ Davis Drive Ramps		Triangle Parkway Ramp to NC 540/NC 54		Triangle Parkway Ramp to NC 540/NC 55		Mainline Zone 1: NC 540 Between Triangle Parkway Ramps		Mainline Zone 2: Between NC 55 & Green Level Road		US 64 Ramps		Mainline Zone 3: Between US 64 & Old US 1		Old US 1 Ramps		Mainline Zone 4: Between US 1 & NC 55 Bypass	
	ETC	Video	ETC	Video	ETC	Video	ETC	Video	ETC	Video	ETC	Video	ETC	Video	ETC	Video	ETC	Video
2012	\$0.30	\$0.45	\$0.65	\$1.00	\$0.82	\$1.25	\$0.52	\$0.80										
2013	0.31	0.47	0.69	1.05	0.86	1.31	0.55	0.84	0.69	1.05	0.38	0.58	0.82	1.26	0.21	0.32	0.35	0.53
2014	0.33	0.50	0.72	1.10	0.90	1.38	0.58	0.88	0.72	1.10	0.40	0.61	0.86	1.32	0.22	0.33	0.36	0.55
2015	0.34	0.52	0.76	1.16	0.95	1.45	0.61	0.93	0.76	1.16	0.42	0.64	0.91	1.39	0.23	0.35	0.34	0.58
2016	0.36	0.54	0.78	1.20	0.98	1.50	0.63	0.96	0.78	1.20	0.43	0.66	0.94	1.44	0.24	0.36	0.35	0.60
2017	0.37	0.56	0.81	1.24	1.01	1.55	0.65	1.00	0.81	1.24	0.45	0.69	0.97	1.49	0.25	0.37	0.36	0.62
2018	0.38	0.58	0.84	1.29	1.05	1.61	0.67	1.03	0.84	1.29	0.47	0.71	1.01	1.54	0.26	0.39	0.38	0.64
2019	0.39	0.60	0.87	1.33	1.08	1.66	0.70	1.07	0.87	1.33	0.48	0.73	1.04	1.60	0.26	0.40	0.39	0.67
2020	0.41	0.62	0.90	1.38	1.12	1.72	0.72	1.10	0.90	1.38	0.50	0.76	1.08	1.65	0.28	0.42	0.45	0.69
2021	0.42	0.64	0.93	1.42	1.16	1.77	0.74	1.13	0.93	1.42	0.51	0.78	1.11	1.70	0.28	0.43	0.47	0.71
2022	0.43	0.66	0.95	1.46	1.19	1.82	0.77	1.17	0.95	1.46	0.53	0.81	1.14	1.75	0.30	0.45	0.48	0.73
2023	0.45	0.68	0.99	1.51	1.23	1.88	0.78	1.20	0.99	1.51	0.54	0.83	1.17	1.80	0.30	0.46	0.49	0.75
2024	0.46	0.70	1.01	1.55	1.27	1.94	0.81	1.24	1.01	1.55	0.56	0.86	1.21	1.86	0.31	0.47	0.51	0.78
2025	0.47	0.72	1.04	1.60	1.30	1.99	0.84	1.28	1.04	1.60	0.58	0.88	1.25	1.91	0.32	0.49	0.52	0.80
2026	0.49	0.74	1.08	1.65	1.34	2.05	0.86	1.31	1.08	1.65	0.60	0.91	1.29	1.97	0.33	0.50	0.54	0.82
2027	0.50	0.76	1.11	1.70	1.38	2.12	0.88	1.35	1.11	1.70	0.61	0.93	1.32	2.03	0.34	0.52	0.56	0.85
2028	0.52	0.79	1.14	1.75	1.42	2.18	0.91	1.39	1.14	1.75	0.63	0.96	1.36	2.09	0.35	0.53	0.57	0.87
2029	0.53	0.81	1.17	1.80	1.46	2.24	0.94	1.44	1.17	1.80	0.65	0.99	1.40	2.15	0.36	0.55	0.59	0.90
2030	0.54	0.83	1.21	1.85	1.51	2.31	0.97	1.48	1.21	1.85	0.67	1.02	1.45	2.22	0.37	0.56	0.61	0.93
2031	0.56	0.85	1.25	1.91	1.55	2.38	0.99	1.52	1.25	1.91	0.69	1.05	1.49	2.29	0.38	0.58	0.63	0.96
2032	0.58	0.88	1.28	1.96	1.60	2.45	1.03	1.57	1.28	1.96	0.71	1.08	1.54	2.36	0.39	0.59	0.65	0.99
2033	0.60	0.91	1.32	2.02	1.64	2.52	1.06	1.62	1.32	2.02	0.73	1.11	1.58	2.43	0.40	0.61	0.67	1.02
2034	0.61	0.93	1.36	2.08	1.69	2.60	1.09	1.67	1.36	2.08	0.75	1.15	1.63	2.50	0.41	0.63	0.69	1.05
2035	0.63	0.96	1.40	2.14	1.75	2.68	1.12	1.72	1.40	2.14	0.77	1.18	1.68	2.57	0.43	0.65	0.71	1.08

**Note:**  
Class 2 tolls are two times the Class 1 video tolls.  
Class 3 tolls are four times the Class 1 video tolls.  
Electronic rates are 65 per cent of video rates.

# Proposed Triangle Expressway Comprehensive Traffic and Revenue Study



Vehicle Class	Via Triangle Parkway		Via NC 540	
	Toll	Toll Per Mile	Toll	Toll Per Mile
Class 1	\$4.15	\$0.233	\$3.68	\$0.239
Class 2	\$8.30	\$0.466	\$7.36	\$0.478
Class 3	\$16.60	\$0.932	\$14.72	\$0.956



**LEGEND**

- Proposed Triangle Expressway
- Ramp Toll Zone
- Mainline Toll Zone
- (0.0) — Distance Between Interchanges (Miles)

2013	2030	
\$0.00	(\$0.00)	- Class 1
\$0.00	(\$0.00)	- Class 2
\$0.00	(\$0.00)	- Class 3



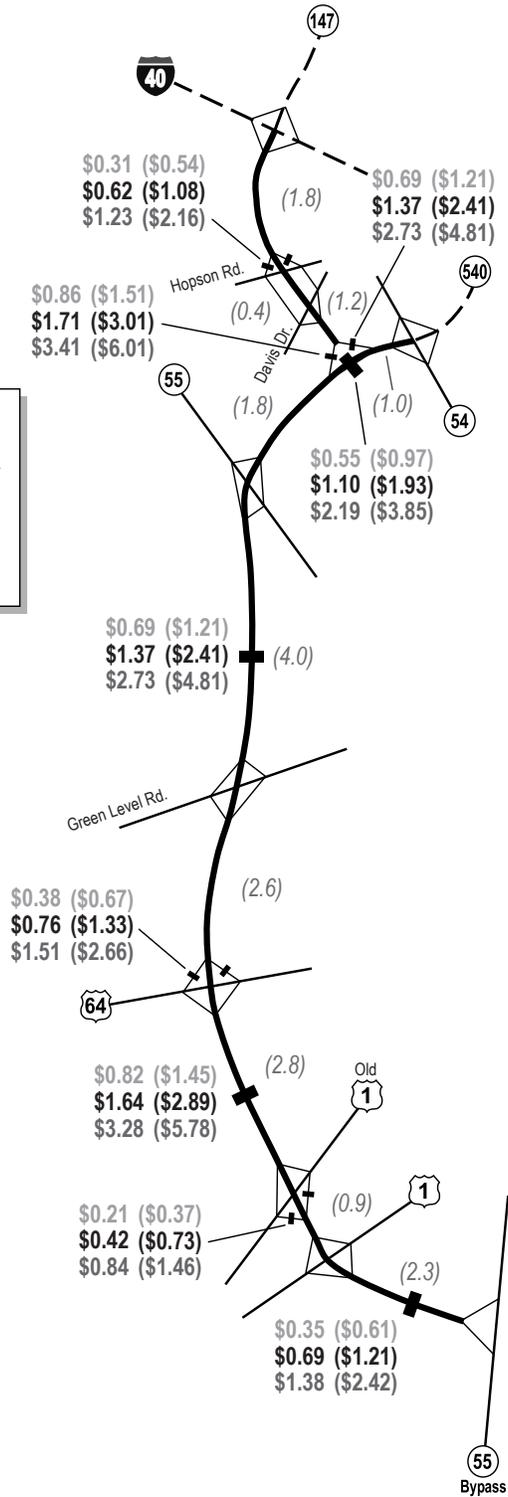
## COMPARISON OF VIDEO TOLL RATE ASSUMPTIONS

FIGURE 6-3

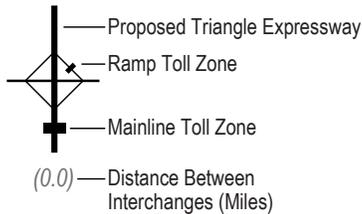
# Proposed Triangle Expressway Comprehensive Traffic and Revenue Study



Vehicle Class	Via Triangle Parkway		Via NC 540	
	Toll	Toll Per Mile	Toll	Toll Per Mile
Class 1	\$2.72	\$0.153	\$2.41	\$0.156
Class 2	\$5.41	\$0.304	\$4.80	\$0.312
Class 3	\$10.80	\$0.606	\$9.58	\$0.622



**LEGEND**



2013	2030	
\$0.00	(\$0.00)	- Class 1
\$0.00	(\$0.00)	- Class 2
\$0.00	(\$0.00)	- Class 3



## COMPARISON OF ETC TOLL RATE ASSUMPTIONS

FIGURE 6-4

Tolling zones would be established on ramps to and from the south at the Old US 1 interchange; and to and from the north at the Hopson Road/Davis Drive interchange and US 64. Tolling zones would be established on the ramps to and from the Triangle Parkway also. The interchanges at NC 55 Bypass near Holly Springs, NC 54 and I-40/NC 147 would not have tolling zones.

## **RECESSION IMPACT UPDATE**

The current recession will likely induce a “lag” in economic development in the project corridor and throughout the region. Accordingly adjustments were made to the base forecasting models to reflect an assumed three-year lag in economic development as a result of the recession over the first few years of operation with a full economic recovery assumed to occur by sometime between 2020 and 2030. The following adjustments to the base model were made:

- Model runs at 2012 levels were made using trip tables reflecting 2009 levels of economic development (nominal three-year lag);
- Model runs at 2015 levels were made using trip tables reflective of base 2013 economic forecast (nominal lag of two years);
- Model runs at 2020 levels were made using trip tables representative of base 2019 economic conditions (nominal one-year lag); and
- Model runs at 2030 levels were made using the base 2030 trip tables (assumed full recovery from recession).

Opening year traffic assignments were all conducted at 2012 levels, for purposes of continuity with the previous analysis. However, model runs at 2012 were made under two configurations; the partial project which is assumed to be open by January 1, 2012 and the full project which is actually assumed to be open by January 1, 2013. Opening year traffic and revenue forecasts for 2012 reflect only the partial project configuration. 2013 traffic estimates were developed by interpolating full project assignment results made at 2012 with those made at 2015, thereby reflecting one year of additional growth at 2013 levels.

In addition to the specific recession impact approach described above, the updated traffic and revenue model runs also assumed reduced motor fuel costs as compared with forecasts developed in the summer of 2008. Previously, fuel prices were assumed to be in the range of \$3.75 - \$4.00 per gallon; the new analysis reflected opening year fuel price levels closer to \$2.50, assumed to increase nominally to \$3.00 and remain generally constant, in real terms, thereafter.

In summary, the update completed in March 2009 reflected both the negative impact of an assumed three-year lag in economic development, offset in part by assumed reduced motor fuel costs. In addition to modifying vehicle cost estimates, the lower fuel cost also enabled WSA to restore the 3 percent reductions in the regionwide trip tables which had been introduced in mid-2008 to reflect the effect of higher gas prices.

## **ESTIMATED WEEKDAY TRAFFIC VOLUMES**

Estimates of weekday traffic volumes in 2013 are shown in Figure 6-5. The highest volume would occur between NC 55 and the junction of the Triangle Parkway and NC 540 where traffic is estimated at 22,800 vehicles per day in 2013. The lowest volume would occur between US 1 and NC 55 Bypass where 11,200 vehicles per day are expected. Traffic along the Triangle Parkway between NC 540 and NC 147 is estimated to range from 17,700 to 19,800 vehicles per day. The traffic volumes shown do not yet reflect downward “ramp-up” adjustments, which are incorporated later in the annual forecasts.

Figures 6-6 and 6-7 show estimated weekday traffic volumes in Year 2020 in Year 2030, respectively. Year 2030 is the most distant year actually modeled for purposes of the analysis. Traffic volumes in 2030 are estimated to reach 61,600 vehicles per day between Green Level Road and US 64. This is well within the available capacity of the planned six-lane toll road.

## **ESTIMATED ANNUAL TRAFFIC AND REVENUE**

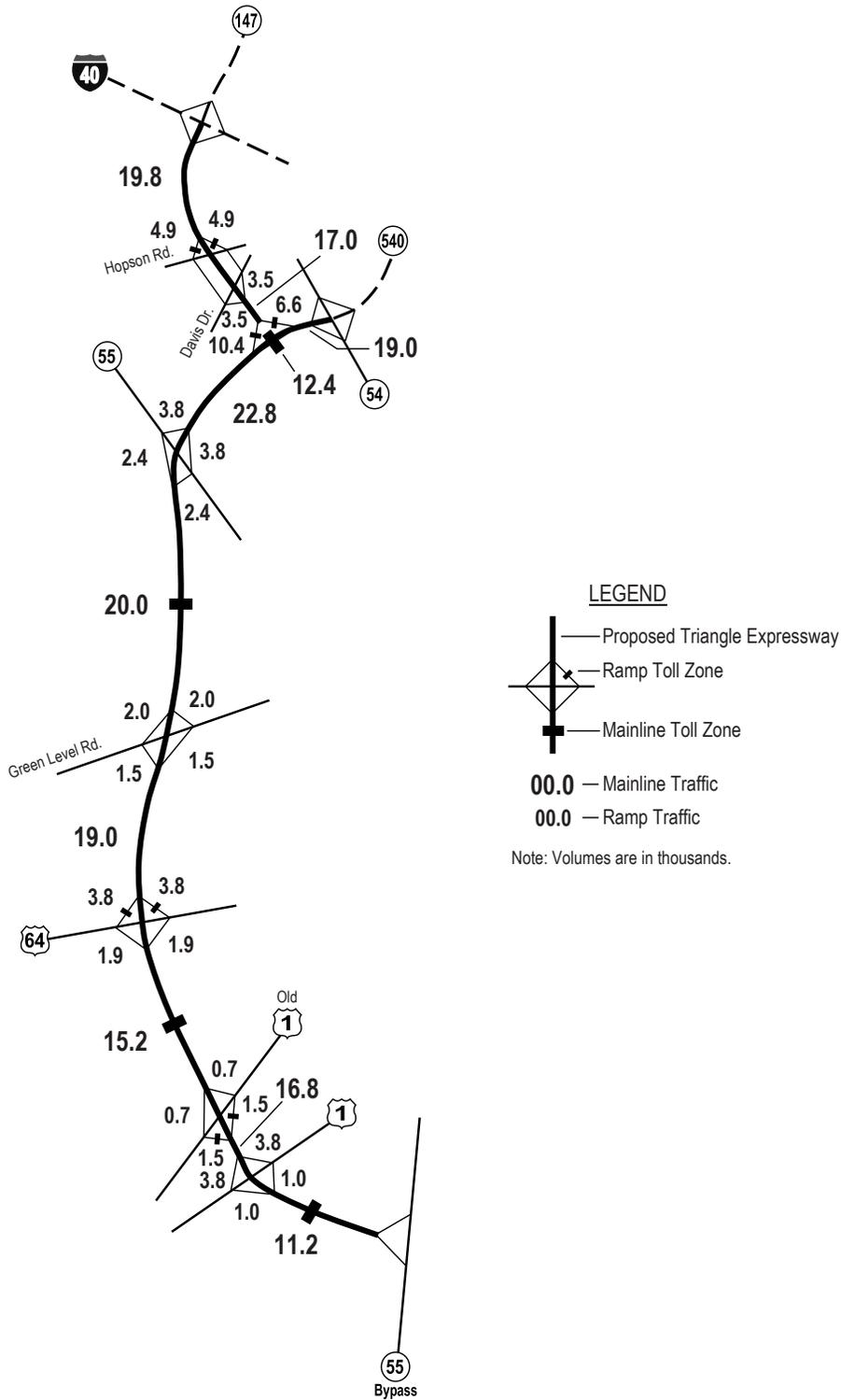
### **FY 2013 WEEKDAY TRANSACTIONS AND REVENUE**

Weekday traffic by vehicle class was calculated for each tolling zone and multiplied by the recommended ETC or video toll rate to develop estimates of weekday revenue. The weekday revenue estimates were then annualized and converted to fiscal years. Table 6-5 shows the toll transactions and gross revenue projections by vehicle class and toll rate for 2012 and 2013 and the conversion process to yield FY 2013 forecasts of transactions and gross toll revenue.

### **FISCAL YEAR CONVERSION**

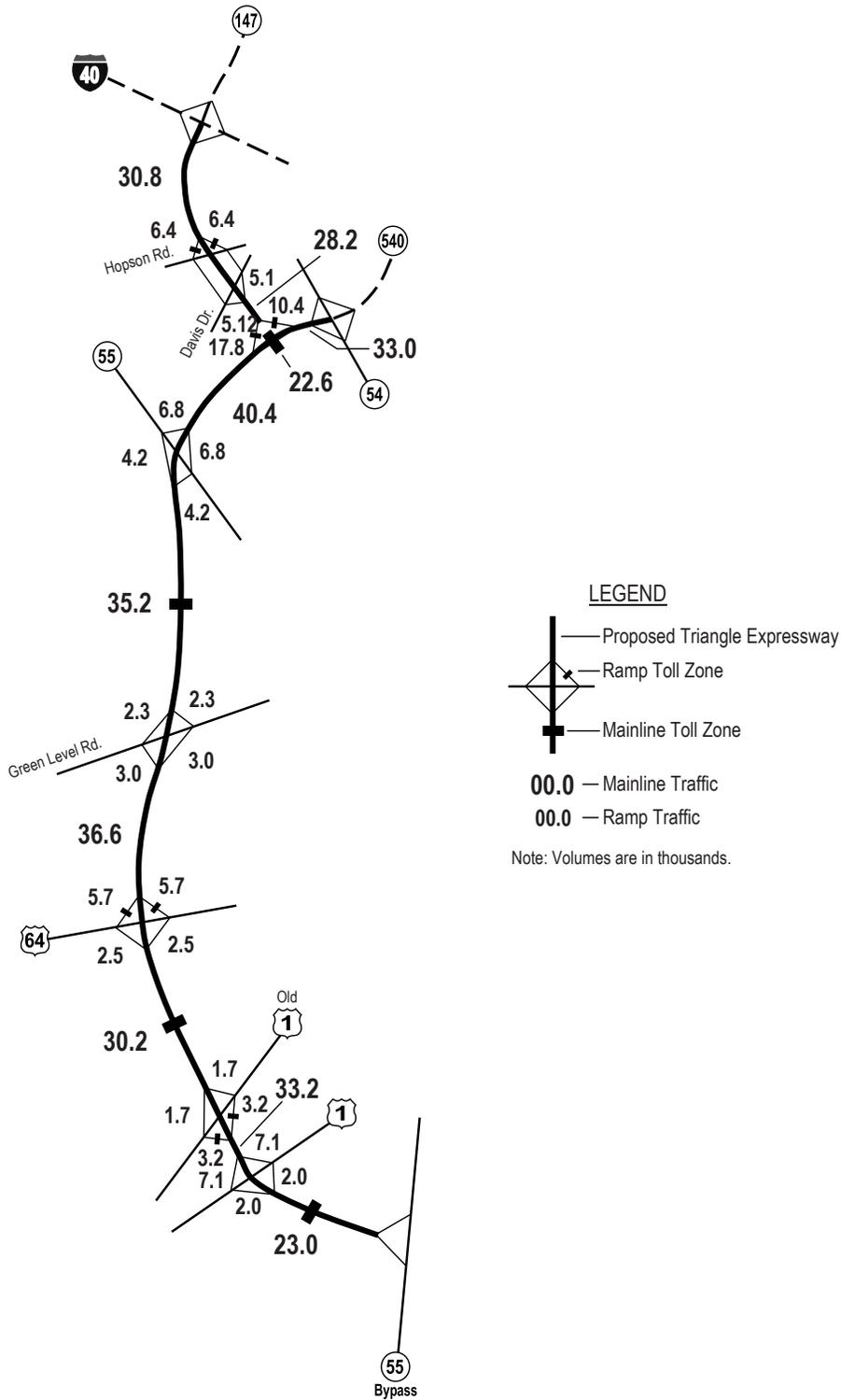
Transaction and revenue forecasts on a calendar-year basis were divided in half and allocated to the appropriate fiscal year, which is assumed to run from July 1 of one calendar year to June 30 of the following calendar year. Since the two sections of the Triangle Expressway will open in different calendar years, the transaction and revenue forecasts were estimated and

# Proposed Triangle Expressway Comprehensive Traffic and Revenue Study

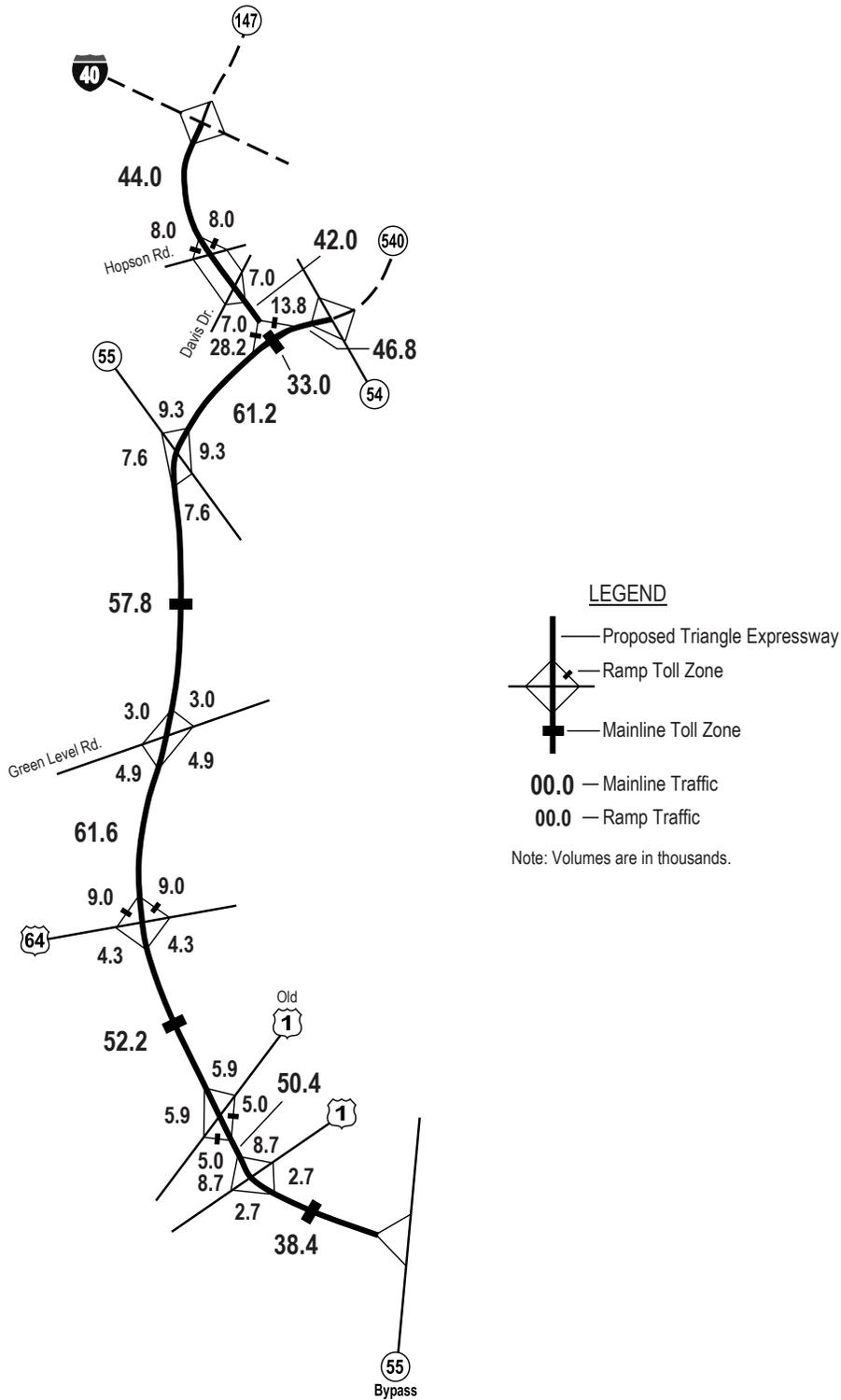


# Proposed Triangle Expressway Comprehensive Traffic and Revenue Study

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# Proposed Triangle Expressway Comprehensive Traffic and Revenue Study





allocated to fiscal years separately. This process, shown in detail in Table 6-5 for FY 2013, yields annual transaction forecasts of 15.1 million and \$10.5 million in gross toll revenue assuming no adjustments for ramp-up. This annualization is based on 319 equivalent weekdays per year and assumes lower weekend and holiday traffic. For annualization purposes, it was assumed that average weekend-day traffic would be 60 percent of average weekday traffic.

#### **ADJUSTMENTS FOR RAMP-UP**

The annualized transactions and revenues in 2012 were further adjusted to reflect “ramp-up.” Ramp-up is the phenomenon experienced on most new start-up toll facilities in which high levels of growth may be experienced over the first three years or so of operation as the motoring public gradually becomes aware of and begins using the new facility.

There are a number of reasons for the “ramp-up” phenomenon. For example, not all motorists who will use the facility are from the local area, therefore it may take several months before certain travelers are aware that the roadway is there, or where it goes. It will also take several months for the project to begin appearing on new maps and for motorists to become accustomed to using the facility. The duration and level of ramp-up adjustments can be directly affected by a well-conceived promotion and signing program.

For purposes of this study, a 36-month ramp-up period was assumed. The nominal traffic and revenue estimates prepared for the opening three years are adjusted downward on a six-month basis to reflect the time it will take to gradually build up demand. Since the Triangle Expressway is expected to open in two phases, the ramp-up factors were applied separately to each section every six months for the first three years of operation. Table 6-6 shows the ramp-up factors and the periods and locations to which they apply.

After applying these ramp-up factors, the Triangle Expressway is estimated to produce 10.2 million transactions and \$7.1 million in gross toll revenue in FY 2013 as shown in Table 6-5.

<b>Table 6-6 Ramp-up Factors</b>				
<b>Section Opening January 1, 2012</b>				
<b>Fiscal Year</b>	<b>Factor<sup>(1)</sup></b>			<b>Tolling Zones</b>
	<b>July - December</b>	<b>January - June</b>		
2012		0.550	}	Hopson Road/Davis Drive Ramps
2013	0.670	0.773		Triangle Parkway Ramp to NC 540/NC 54
2014	0.854	0.915		Triangle Parkway Ramp to NC 540/NC 55
2015+	0.975	1.000		Mainline 1: NC 540 Between Triangle Parkway Ramps
<b>Section Opening January 1, 2013</b>				
<b>Fiscal Year</b>	<b>Factor<sup>(1)</sup></b>			<b>Tolling Zones</b>
	<b>July - December</b>	<b>January - June</b>		
2013		0.550	}	Mainline 2: Between NC 55 & Green Level Road
2014	0.670	0.773		US 64 Ramps
2015	0.854	0.915		Mainline 3: Between US 64 & Old US 1
2016+	0.975	1.000		Old US 1 Ramps
				Mainline 4: Between US 1 & NC 55 Bypass

<sup>(1)</sup> Average 6-month factor applied to forecast of total traffic before ramp-up.

**FY 2020 AND FY 2030 TRANSACTIONS AND REVENUE**

Tables 6-7 and 6-8 show the anticipated transactions and gross toll revenue for FY 2020 and FY 2030, respectively, based on the weekly traffic estimates contained in Figures 6-5 and 6-6. In both of these cases, no ramp-up adjustments were made. The annualization factor of 319 days was also used in these future-year forecasts, based on the assumption that weekend day traffic is 60 percent of weekday traffic.

**ESTIMATED ANNUAL TOLL TRANSACTIONS AND REVENUE**

Estimated annual toll transactions by vehicle class and year are shown in Table 6-9 and in Figure 6-8. Annual transactions are expected to increase from about 25.5 million in FY 2014, the first full year of operation of the entire Expressway, to 84.3 million by FY 2030. Traffic estimates for FY 2012 through FY 2015 were adjusted downward to reflect the impact of successive three year ramp-up periods as discussed above and shown in Table 6-6.

**Table 6-7  
Toll Transactions and Gross Toll Revenue Estimates, Fiscal Year 2020  
Triangle Expressway**

Toll Zone	Class 1		Class 2		Class 3		Total
	ETC	Video	ETC	Video	ETC	Video	
<b>Weekday Transactions - Calendar Year 2019</b>							
Hopson Road/Davis Drive Ramps	9,617	2,249	235	16	131	9	12,257
Triangle Parkway Ramp to NC 540/NC 54	7,884	1,546	164	9	91	5	9,699
Triangle Parkway Ramp to NC 540/NC 55	13,367	2,403	493	27	275	15	16,580
Mainline Zone 1: NC 540 Between Triangle Parkway Ramps	16,172	3,608	567	42	316	23	20,728
Mainline Zone 2: Between NC 55 & Green Level Road	25,752	5,138	1,002	60	559	33	32,544
US 64 Ramps	8,579	1,681	272	14	152	8	10,706
Mainline Zone 3: Between US 64 & Old US 1	21,730	4,669	878	63	489	35	27,864
Old US 1 Ramps	4,632	1,122	69	6	39	3	5,871
Mainline Zone 4: Between US 1 & NC 55 Bypass	16,760	3,722	490	32	273	18	21,295
Weekday Total Transactions	124,493	26,138	4,170	269	2,325	149	157,544
<b>Toll</b>							
Hopson Road/Davis Drive Ramps	\$0.39	\$0.60	\$0.78	\$1.20	\$1.56	\$2.40	
Triangle Parkway Ramp to NC 540/NC 54	\$0.87	\$1.33	\$1.73	\$2.66	\$3.46	\$5.32	
Triangle Parkway Ramp to NC 540/NC 55	\$1.08	\$1.66	\$2.16	\$3.32	\$4.32	\$6.64	
Mainline Zone 1: NC 540 Between Triangle Parkway Ramps	\$0.70	\$1.07	\$1.40	\$2.14	\$2.79	\$4.28	
Mainline Zone 2: Between NC 55 & Green Level Road	\$0.87	\$1.33	\$1.73	\$2.66	\$3.46	\$5.32	
US 64 Ramps	\$0.48	\$0.73	\$0.95	\$1.46	\$1.90	\$2.92	
Mainline Zone 3: Between US 64 & Old US 1	\$1.04	\$1.60	\$2.08	\$3.20	\$4.16	\$6.40	
Old US 1 Ramps	\$0.26	\$0.40	\$0.52	\$0.80	\$1.04	\$1.60	
Mainline Zone 4: Between US 1 & NC 55 Bypass	\$0.39	\$0.67	\$0.88	\$1.34	\$1.75	\$2.68	
<b>Weekday Gross Toll Revenue - Calendar Year 2019</b>							
Hopson Road/Davis Drive Ramps	\$3,751	\$1,349	\$183	\$19	\$204	\$22	\$5,528
Triangle Parkway Ramp to NC 540/NC 54	6,859	2,056	284	24	315	27	9,565
Triangle Parkway Ramp to NC 540/NC 55	14,436	3,989	1,065	90	1,188	100	20,868
Mainline Zone 1: NC 540 Between Triangle Parkway Ramps	11,320	3,861	794	90	882	98	17,045
Mainline Zone 2: Between NC 55 & Green Level Road	22,404	6,834	1,733	160	1,934	176	33,241
US 64 Ramps	4,118	1,227	258	20	289	23	5,935
Mainline Zone 3: Between US 64 & Old US 1	22,599	7,470	1,826	202	2,034	224	34,355
Old US 1 Ramps	1,204	449	36	5	41	5	1,740
Mainline Zone 4: Between US 1 & NC 55 Bypass	6,536	2,494	431	43	478	48	10,030
Weekday Total Gross Toll Revenue	\$93,227	\$29,729	\$6,810	\$653	\$7,365	\$723	\$138,307

Toll Zone	Class 1		Class 2		Class 3		Total
	ETC	Video	ETC	Video	ETC	Video	
<b>Weekday Transactions - Calendar Year 2020</b>							
Hopson Road/Davis Drive Ramps	10,159	2,208	262	16	146	9	12,800
Triangle Parkway Ramp to NC 540/NC 54	8,543	1,554	185	10	103	5	10,400
Triangle Parkway Ramp to NC 540/NC 55	14,554	2,409	511	26	285	15	17,800
Mainline Zone 1: NC 540 Between Triangle Parkway Ramps	17,874	3,699	620	40	346	22	22,601
Mainline Zone 2: Between NC 55 & Green Level Road	28,250	5,213	1,059	56	590	31	35,199
US 64 Ramps	9,253	1,676	290	13	161	7	11,400
Mainline Zone 3: Between US 64 & Old US 1	23,928	4,748	918	60	512	34	30,200
Old US 1 Ramps	5,119	1,151	78	6	43	3	6,400
Mainline Zone 4: Between US 1 & NC 55 Bypass	18,375	3,775	516	29	288	16	22,999
Weekday Total Transactions	136,055	26,433	4,439	256	2,474	142	169,799
<b>Toll</b>							
Hopson Road/Davis Drive Ramps	\$0.41	\$0.62	\$0.81	\$1.24	\$1.62	\$2.48	
Triangle Parkway Ramp to NC 540/NC 54	\$0.90	\$1.38	\$1.80	\$2.76	\$3.59	\$5.52	
Triangle Parkway Ramp to NC 540/NC 55	\$1.12	\$1.72	\$2.24	\$3.44	\$4.48	\$6.88	
Mainline Zone 1: NC 540 Between Triangle Parkway Ramps	\$0.72	\$1.10	\$1.43	\$2.20	\$2.86	\$4.40	
Mainline Zone 2: Between NC 55 & Green Level Road	\$0.90	\$1.38	\$1.80	\$2.76	\$3.59	\$5.52	
US 64 Ramps	\$0.50	\$0.76	\$0.99	\$1.52	\$1.98	\$3.04	
Mainline Zone 3: Between US 64 & Old US 1	\$1.08	\$1.65	\$2.15	\$3.30	\$4.29	\$6.60	
Old US 1 Ramps	\$0.28	\$0.42	\$0.55	\$0.84	\$1.10	\$1.68	
Mainline Zone 4: Between US 1 & NC 55 Bypass	\$0.45	\$0.69	\$0.90	\$1.38	\$1.80	\$2.76	
<b>Weekday Gross Toll Revenue - Calendar Year 2020</b>							
Hopson Road/Davis Drive Ramps	\$4,165	\$1,369	\$212	\$20	\$237	\$22	\$6,025
Triangle Parkway Ramp to NC 540/NC 54	7,689	2,145	333	28	370	28	10,593
Triangle Parkway Ramp to NC 540/NC 55	16,300	4,143	1,145	89	1,277	103	23,057
Mainline Zone 1: NC 540 Between Triangle Parkway Ramps	12,869	4,069	887	88	990	97	19,000
Mainline Zone 2: Between NC 55 & Green Level Road	25,425	7,194	1,906	155	2,118	171	36,969
US 64 Ramps	4,627	1,274	287	20	319	21	6,548
Mainline Zone 3: Between US 64 & Old US 1	25,842	7,834	1,974	198	2,196	224	38,268
Old US 1 Ramps	1,433	483	43	5	47	5	2,016
Mainline Zone 4: Between US 1 & NC 55 Bypass	8,269	2,605	464	40	518	44	11,940
Weekday Total Gross Toll Revenue	\$106,619	\$31,116	\$7,251	\$643	\$8,072	\$715	\$154,416

Annualization Procedure (Rounded to Thousands)		
Annualization Factor: 319 days per year		
Period	Total Annual Transactions	Total Annual Gross Revenue
Calendar 2019	50,257,000	\$44,120,000
Calendar 2020	54,166,000	\$49,259,000
Conversion to Fiscal Year (Rounded to Thousands)		
Period	Transactions	Total Gross Revenue
Half of Calendar 2019	25,128,000	\$22,060,000
Half of Calendar 2020	27,083,000	\$24,630,000
<b>Total Fiscal Year 2020</b>	<b>\$52,212,000</b>	<b>\$46,690,000</b>

<sup>1)</sup> Excludes any allowance for uncollectible revenue

**Table 6-8  
Toll Transactions and Gross Toll Revenue Estimates, Fiscal Year 2030  
Triangle Expressway**

Toll Zone	Class 1		Class 2		Class 3		Total	Class 1		Class 2		Class 3		Total	
	ETC	Video	ETC	Video	ETC	Video		ETC	Video	ETC	Video	ETC	Video		
<b>Weekday Transactions - Calendar Year 2029</b>								<b>Weekday Transactions - Calendar Year 2030</b>							
Hopson Road/Davis Drive Ramps	13,220	1,928	389	29	217	16	15,799	13,412	1,925	396	29	221	16	15,999	
Triangle Parkway Ramp to NC 540/NC 54	12,671	1,496	247	13	138	7	14,572	12,023	1,393	234	12	130	7	13,799	
Triangle Parkway Ramp to NC 540/NC 55	24,202	2,428	627	31	350	17	27,655	24,724	2,438	634	32	354	18	28,200	
Mainline Zone 1: NC 540 Between Triangle Parkway Ramps	27,547	3,481	729	47	406	26	32,236	28,256	3,514	742	48	414	27	33,001	
Mainline Zone 2: Between NC 55 & Green Level Road	48,287	5,318	1,304	71	727	40	55,747	50,167	5,430	1,341	73	748	41	57,800	
US 64 Ramps	15,342	1,712	334	18	186	10	17,602	15,720	1,726	338	18	189	10	18,001	
Mainline Zone 3: Between US 64 & Old US 1	43,066	5,114	1,186	72	661	40	50,139	44,929	5,247	1,225	74	683	41	52,199	
Old US 1 Ramps	9,080	1,202	131	7	73	4	10,497	8,666	1,128	125	7	70	4	10,000	
Mainline Zone 4: Between US 1 & NC 55 Bypass	31,844	3,985	597	37	333	21	36,817	33,283	4,097	616	38	344	21	38,399	
Weekday Total Transactions	225,259	26,664	5,544	325	3,091	181	261,064	231,180	26,898	5,651	331	3,153	185	267,398	
<b>Toll</b>								<b>Toll</b>							
Hopson Road/Davis Drive Ramps	\$0.53	\$0.81	\$1.06	\$1.62	\$2.11	\$3.24		\$0.54	\$0.83	\$1.08	\$1.66	\$2.16	\$3.32		
Triangle Parkway Ramp to NC 540/NC 54	\$1.17	\$1.80	\$2.34	\$3.60	\$4.68	\$7.20		\$1.21	\$1.85	\$2.41	\$3.70	\$4.81	\$7.40		
Triangle Parkway Ramp to NC 540/NC 55	\$1.46	\$2.24	\$2.92	\$4.48	\$5.83	\$8.96		\$1.51	\$2.31	\$3.01	\$4.62	\$6.01	\$9.24		
Mainline Zone 1: NC 540 Between Triangle Parkway Ramps	\$0.94	\$1.44	\$1.88	\$2.88	\$3.75	\$5.76		\$0.97	\$1.48	\$1.93	\$2.96	\$3.85	\$5.92		
Mainline Zone 2: Between NC 55 & Green Level Road	\$1.17	\$1.80	\$2.34	\$3.60	\$4.68	\$7.20		\$1.21	\$1.85	\$2.41	\$3.70	\$4.81	\$7.40		
US 64 Ramps	\$0.65	\$0.99	\$1.29	\$1.98	\$2.58	\$3.96		\$0.67	\$1.02	\$1.33	\$2.04	\$2.66	\$4.08		
Mainline Zone 3: Between US 64 & Old US 1	\$1.40	\$2.15	\$2.80	\$4.30	\$5.59	\$8.60		\$1.45	\$2.22	\$2.89	\$4.44	\$5.78	\$8.88		
Old US 1 Ramps	\$0.36	\$0.55	\$0.72	\$1.10	\$1.43	\$2.20		\$0.37	\$0.56	\$0.73	\$1.12	\$1.46	\$2.24		
Mainline Zone 4: Between US 1 & NC 55 Bypass	\$0.59	\$0.90	\$1.17	\$1.80	\$2.34	\$3.60		\$0.61	\$0.93	\$1.21	\$1.86	\$2.42	\$3.72		
<b>Weekday Gross Toll Revenue - Calendar Year 2029</b>								<b>Weekday Gross Toll Revenue - Calendar Year 2030</b>							
Hopson Road/Davis Drive Ramps	\$7,007	\$1,562	\$412	\$47	\$458	\$52	\$9,538	\$7,242	\$1,598	\$428	\$48	\$477	\$53	\$9,846	
Triangle Parkway Ramp to NC 540/NC 54	14,825	2,693	578	47	646	50	18,839	14,548	2,577	564	44	625	52	18,410	
Triangle Parkway Ramp to NC 540/NC 55	35,335	5,439	1,831	139	2,041	152	44,937	37,333	5,632	1,908	148	2,128	166	47,315	
Mainline Zone 1: NC 540 Between Triangle Parkway Ramps	25,894	5,013	1,371	135	1,523	150	34,086	27,408	5,201	1,432	142	1,594	160	35,937	
Mainline Zone 2: Between NC 55 & Green Level Road	56,496	9,572	3,051	256	3,402	288	73,065	60,702	10,046	3,232	270	3,598	303	78,151	
US 64 Ramps	9,972	1,695	431	36	480	40	12,654	10,532	1,761	450	37	503	41	13,324	
Mainline Zone 3: Between US 64 & Old US 1	60,292	10,995	3,321	310	3,695	344	78,957	65,147	11,648	3,540	329	3,948	364	84,976	
Old US 1 Ramps	3,269	661	94	8	104	9	4,145	3,206	632	91	8	102	9	4,048	
Mainline Zone 4: Between US 1 & NC 55 Bypass	18,788	3,587	698	67	779	76	23,995	20,303	3,810	745	71	832	78	25,839	
Weekday Total Gross Toll Revenue	\$231,878	\$41,217	\$11,787	\$1,045	\$13,128	\$1,161	\$300,216	\$246,421	\$42,905	\$12,390	\$1,097	\$13,807	\$1,226	\$317,846	

Annualization Procedure (Rounded to Thousands)		
Annualization Factor: 319 days per year		
Period	Total Annual	Total Annual
Calendar 2029	83,279,000	\$95,769,000
Calendar 2030	85,300,000	\$101,393,000
Conversion to Fiscal Year (Rounded to Thousands)		
Period	Transactions	Gross Revenue
Half of Calendar 2029	41,640,000	\$47,885,000
Half of Calendar 2030	42,650,000	\$50,698,000
<b>Total Fiscal Year 2030</b>	<b>84,290,000</b>	<b>\$98,581,000</b>

<sup>11</sup> Excludes any allowance for uncollectible revenue





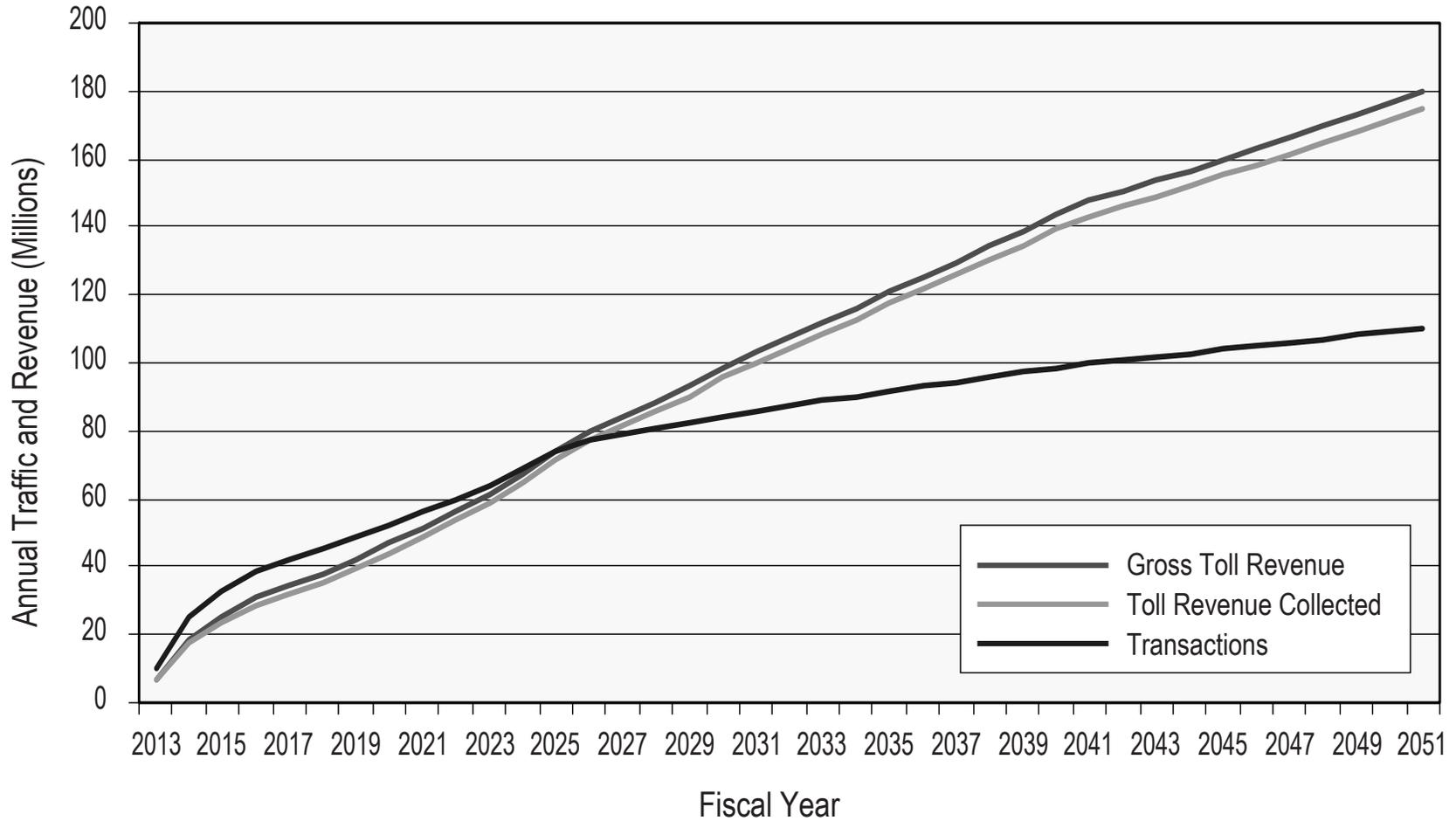
**Table 6-9  
Annual Toll Transactions (Fiscal Year)  
Triangle Expressway  
(Thousands)**

Fiscal Year	Class 1			Class 2			Class 3			Total Transactions	Percent ETC
	ETC	Video	Total Class 1	ETC	Video	Total Class 2	ETC	Video	Total Class 3		
2012 <sup>(1)</sup>	840	310	1,150	19	2	21	11	1	12	1,183	73.5%
2013 <sup>(2)</sup>	7,305	2,508	9,813	226	26	252	126	14	140	10,205	75.0%
2014	18,405	5,909	24,314	675	73	748	376	41	417	25,479	76.4%
2015	24,352	7,232	31,584	903	90	993	504	50	554	33,131	77.7%
2016	28,953	7,962	36,915	1,066	98	1,164	594	55	649	38,728	79.0%
2017	31,859	8,110	39,969	1,142	95	1,237	637	53	690	41,896	80.3%
2018	34,805	8,200	43,005	1,213	91	1,304	677	51	728	45,037	81.5%
2019	38,029	8,291	46,320	1,290	87	1,377	720	49	769	48,466	82.6%
2020	41,557	8,385	49,942	1,373	84	1,457	766	47	813	52,212	83.7%
2021	45,223	8,413	53,636	1,436	83	1,519	801	46	847	56,002	84.7%
2022	49,031	8,375	57,406	1,479	86	1,565	825	48	873	59,844	85.8%
2023	53,186	8,342	61,528	1,523	88	1,611	849	49	898	64,037	86.8%
2024	57,720	8,313	66,033	1,570	91	1,661	876	51	927	68,621	87.7%
2025	62,672	8,288	70,960	1,620	94	1,714	903	53	956	73,630	88.5%
2026	66,013	8,300	74,313	1,660	97	1,757	926	54	980	77,050	89.0%
2027	67,570	8,350	75,920	1,690	99	1,789	942	55	997	78,706	89.2%
2028	69,219	8,407	77,626	1,720	101	1,821	959	56	1,015	80,462	89.4%
2029	70,963	8,472	79,435	1,752	103	1,855	977	57	1,034	82,324	89.5%
2030	72,802	8,543	81,345	1,786	105	1,891	996	58	1,054	84,290	89.7%
2031	74,410	8,581	82,991	1,818	106	1,924	1,014	59	1,073	85,988	89.8%
2032	75,750	8,581	84,331	1,849	106	1,955	1,031	59	1,090	87,376	90.0%
2033	77,113	8,581	85,694	1,881	106	1,987	1,049	59	1,108	88,789	90.1%
2034	78,501	8,581	87,082	1,913	106	2,019	1,067	59	1,126	90,227	90.3%
2035	79,914	8,581	88,495	1,945	106	2,051	1,085	59	1,144	91,690	90.5%
2036	81,232	8,624	89,856	1,976	106	2,082	1,102	59	1,161	93,099	90.6%
2037	82,450	8,710	91,160	2,006	107	2,113	1,119	60	1,179	94,452	90.6%
2038	83,687	8,797	92,484	2,036	108	2,144	1,135	60	1,195	95,823	90.6%
2039	84,942	8,885	93,827	2,067	109	2,176	1,152	61	1,213	97,216	90.7%
2040	86,216	8,974	95,190	2,098	111	2,209	1,170	62	1,232	98,631	90.7%
2041	87,292	9,064	96,356	2,124	112	2,236	1,184	62	1,246	99,838	90.7%
2042	88,165	9,154	97,319	2,145	113	2,258	1,196	63	1,259	100,836	90.7%
2043	89,047	9,246	98,293	2,167	114	2,281	1,208	64	1,272	101,846	90.7%
2044	89,938	9,338	99,276	2,188	115	2,303	1,220	64	1,284	102,863	90.7%
2045	90,837	9,432	100,269	2,210	116	2,326	1,232	65	1,297	103,892	90.7%
2046	91,745	9,526	101,271	2,232	117	2,349	1,245	65	1,310	104,930	90.7%
2047	92,663	9,621	102,284	2,254	119	2,373	1,257	66	1,323	105,980	90.7%
2048	93,589	9,717	103,306	2,277	120	2,397	1,270	67	1,337	107,040	90.7%
2049	94,525	9,815	104,340	2,300	121	2,421	1,282	67	1,349	108,110	90.7%
2050	95,471	9,913	105,384	2,323	122	2,445	1,295	68	1,363	109,192	90.7%
2051	96,425	10,012	106,437	2,346	123	2,469	1,308	69	1,377	110,283	90.7%

<sup>(1)</sup> Triangle Parkway and NC 540 from NC 55 at Morrisville to NC 54 open January 1, 2012.

<sup>(2)</sup> Full project open January 1, 2013.

Note: Forecasts for FY 2012 - FY 2014 reflect an assumed ramp-up to full traffic volumes beginning in FY 2015 for Triangle Parkway and NC 540 at NC 55 to Morrisville to NC 54. Forecasts for FY 2013 - FY 2015 reflect an assumed ramp-up to full traffic volumes beginning in FY 2016 for Western Wake Freeway.



Electronic toll transactions are expected to be the largest proportion of users and are estimated to increase from about 73 percent in the opening year to nearly 90 percent by about FY 2030. Note that transaction estimates through FY 2030 are based on a detailed modeling analysis. Transactions between FY 2030 and FY 2051 were assumed to grow at the rates shown in Table 6-10.

**Table 6-10  
Annual Transaction Growth Rate Assumptions, 2020 - 2051  
Triangle Expressway  
(Thousands)**

Period	Class 1 Vehicles		Class 2 and 3 Vehicles	
	ETC	Video	ETC	Video
2030 - 2035	1.8%	0.0%	1.7%	0.0%
2035 - 2040	1.5%	1.0%	1.5%	1.0%
2040 - 2051	1.0%	1.0%	1.0%	1.0%

In developing the assumed extrapolated growth rates beyond FY 2030, the patterns of growth determined by the travel demand modeling over years prior to FY 2030 were considered. In general, overall transaction growth rates were assumed to moderate, dropping to an overall average growth rate of 1 percent per year subsequent to FY 2040. Prior to FY 2030, model results showed an annual decline in the number of video transactions, largely due to assumed continued increases in the penetration of electronic toll collection.

However, experience on other facilities suggests that ETC penetration typically reaches a maximum level in the range of 90 percent. Accordingly, WSA assumed declines in video transactions would “bottom out” between FY 2030 and FY 2035, with zero growth assumed in that category during that period. Subsequent to FY 2035, video transactions were assumed to grow at a nominal one percent per year through FY 2051, equivalent to the assumed growth rate of ETC vehicles after FY 2041. This resulted in the stabilization of the ETC share at approximately 90.7 percent of total transactions over the last 10 years of the forecast period.

Annual revenue estimates are provided in Table 6-11 and illustrated in Figure 6-8. Revenue estimates are presented for each vehicles class by toll rate. The total annual gross revenue is expected to increase from about \$18.8 million in FY 2014 to \$98.6 million by FY 2030. This reflects the impact of both traffic growth and periodic toll adjustments. Again, revenue estimates during the first four years of operation were adjusted to reflect a progressive ramp-up pattern. Assumed annual growth rates for gross toll revenue are shown in Table 6-12. ETC revenue growth rates were assumed to be 4.3 percent annually for Class 1 vehicles and 3.7 percent annually for Class 2 and 3 vehicles between FY 2030 and FY 2035. Video revenue was assumed to grow at the annual inflation rate of 2.5 percent during this same period.

Electronic tolls are expected to account for between 72 and 82 percent of total revenue after the ramp-up period. This is a lower percentage than the proportion of transactions, but reflects the fact that video users are assessed a significant premium toll charge.

#### **REVENUE COLLECTION AND LEAKAGE**

Revenue leakage can be a significant issue if the toll system design and agency's operational policies and procedures are not adequate to minimize the potential for leakage. During the initial years (early 1990s) of ETC in the industry, the issue of revenue leakage was greater than today due to the implementation of the then cutting edge technology that did not provide high performance accuracies. In recent years, ETC subsystems have become much more robust and video technology is now a proven technology.

The system being developed for the Triangle Expressway is an adaptation of two toll collection systems: ORT using ETC supplemented by automated video imaging that will serve both as the primary collection system and as the violation enforcement system.

The lane-level hardware required for implementing ORT and video enforcement/toll collection includes vehicle mounted transponders, overhead antennas, and roadside equipment such as readers, controllers, electrical circuit protection and distribution equipment, vehicle detection trigger devices, cameras, and supplemental lighting, as well as image processors and transmission equipment housed in an environmentally controlled roadside cabinet. Taken together with the necessary software and operational procedures, an ORT collection system can be quite complex resulting in lost revenue unless appropriate technology is used and procedures followed.

**Table 6-11**  
**Annual Gross Toll Revenue (Fiscal Year)**  
**Triangle Expressway**  
**(Thousands)**

Fiscal Year	Class 1			Class 2			Class 3			Total Gross Revenue <sup>(3)</sup>	Percent ETC
	ETC	Video	Total Class 1	ETC	Video	Total Class 2	ETC	Video	Total Class 3		
2012 <sup>(1)</sup>	\$445	\$246	\$691	\$22	\$4	\$26	\$25	\$5	\$30	\$747	65.9%
2013 <sup>(2)</sup>	4,216	2,152	6,368	282	48	330	313	53	366	7,064	68.1%
2014	11,226	5,402	16,628	878	141	1,019	977	157	1,134	18,781	69.7%
2015	15,547	6,958	22,505	1,237	185	1,422	1,377	206	1,583	25,510	71.2%
2016	19,179	7,994	27,173	1,518	209	1,727	1,692	233	1,925	30,825	72.6%
2017	21,823	8,435	30,258	1,677	209	1,886	1,868	234	2,102	34,246	74.1%
2018	24,751	8,841	33,592	1,840	208	2,048	2,049	232	2,281	37,921	75.5%
2019	28,037	9,266	37,303	2,017	207	2,224	2,247	231	2,478	42,005	76.9%
2020	31,876	9,704	41,580	2,211	206	2,417	2,463	230	2,693	46,690	78.3%
2021	36,027	10,045	46,072	2,380	212	2,592	2,651	236	2,887	51,551	79.6%
2022	40,223	10,295	50,518	2,520	224	2,744	2,807	249	3,056	56,318	80.9%
2023	44,912	10,561	55,473	2,671	237	2,908	2,975	264	3,239	61,620	82.0%
2024	50,228	10,843	61,071	2,835	251	3,086	3,157	280	3,437	67,594	83.2%
2025	56,171	11,130	67,301	3,008	266	3,274	3,350	297	3,647	74,222	84.2%
2026	61,089	11,483	72,572	3,173	280	3,453	3,532	313	3,845	79,870	84.9%
2027	64,548	11,930	76,478	3,330	294	3,624	3,708	328	4,036	84,138	85.1%
2028	68,097	12,401	80,498	3,495	309	3,804	3,894	345	4,239	88,541	85.3%
2029	71,969	12,892	84,861	3,671	325	3,996	4,089	362	4,451	93,308	85.4%
2030	76,289	13,417	89,706	3,857	341	4,198	4,296	381	4,677	98,581	85.7%
2031	80,299	13,858	94,157	4,026	354	4,380	4,485	395	4,880	103,417	85.9%
2032	83,752	14,204	97,956	4,175	363	4,538	4,651	405	5,056	107,550	86.1%
2033	87,353	14,559	101,912	4,330	372	4,702	4,823	415	5,238	111,852	86.3%
2034	91,110	14,923	106,033	4,490	382	4,872	5,002	426	5,428	116,333	86.5%
2035	95,027	15,296	110,323	4,656	391	5,047	5,187	436	5,623	120,993	86.7%
2036	98,725	15,717	114,442	4,824	402	5,226	5,373	448	5,821	125,489	86.8%
2037	102,181	16,189	118,370	4,993	414	5,407	5,561	462	6,023	129,800	86.9%
2038	105,757	16,675	122,432	5,167	426	5,593	5,756	476	6,232	134,257	86.9%
2039	109,459	17,175	126,634	5,348	439	5,787	5,958	490	6,448	138,869	87.0%
2040	113,290	17,690	130,980	5,535	452	5,987	6,166	505	6,671	143,638	87.0%
2041	116,390	18,131	134,521	5,687	464	6,151	6,335	517	6,852	147,524	87.0%
2042	118,718	18,494	137,212	5,801	473	6,274	6,462	528	6,990	150,476	87.0%
2043	121,093	18,864	139,957	5,917	482	6,399	6,591	538	7,129	153,485	87.0%
2044	123,514	19,241	142,755	6,035	492	6,527	6,723	549	7,272	156,554	87.0%
2045	125,985	19,626	145,611	6,156	502	6,658	6,857	560	7,417	159,686	87.0%
2046	128,504	20,018	148,522	6,279	512	6,791	6,994	571	7,565	162,878	87.0%
2047	131,075	20,418	151,493	6,404	522	6,926	7,134	582	7,716	166,135	87.0%
2048	133,696	20,827	154,523	6,532	533	7,065	7,277	594	7,871	169,459	87.0%
2049	136,370	21,243	157,613	6,663	543	7,206	7,422	606	8,028	172,847	87.0%
2050	139,097	21,668	160,765	6,796	554	7,350	7,571	618	8,189	176,304	87.0%
2051	141,879	22,102	163,981	6,932	565	7,497	7,722	630	8,352	179,830	87.0%

<sup>(1)</sup> Triangle Parkway and NC 540 from NC 55 at Morrisville to NC 54 open January 1, 2012.

<sup>(2)</sup> Full project open January 1, 2013.

<sup>(3)</sup> EXCLUDES ANY ALLOWANCE FOR UNCOLLECTIBLE REVENUE.

Note: Forecasts for FY 2012 - FY 2015 reflect an assumed ramp-up to full traffic volumes beginning in the second half of FY 2015 for Triangle Parkway and NC 540 at NC 55 to Morrisville to NC 54. Forecasts for FY 2013 - FY 2016 reflect an assumed ramp-up to full traffic volumes beginning in the second half of FY 2016 for Western Wake Freeway.

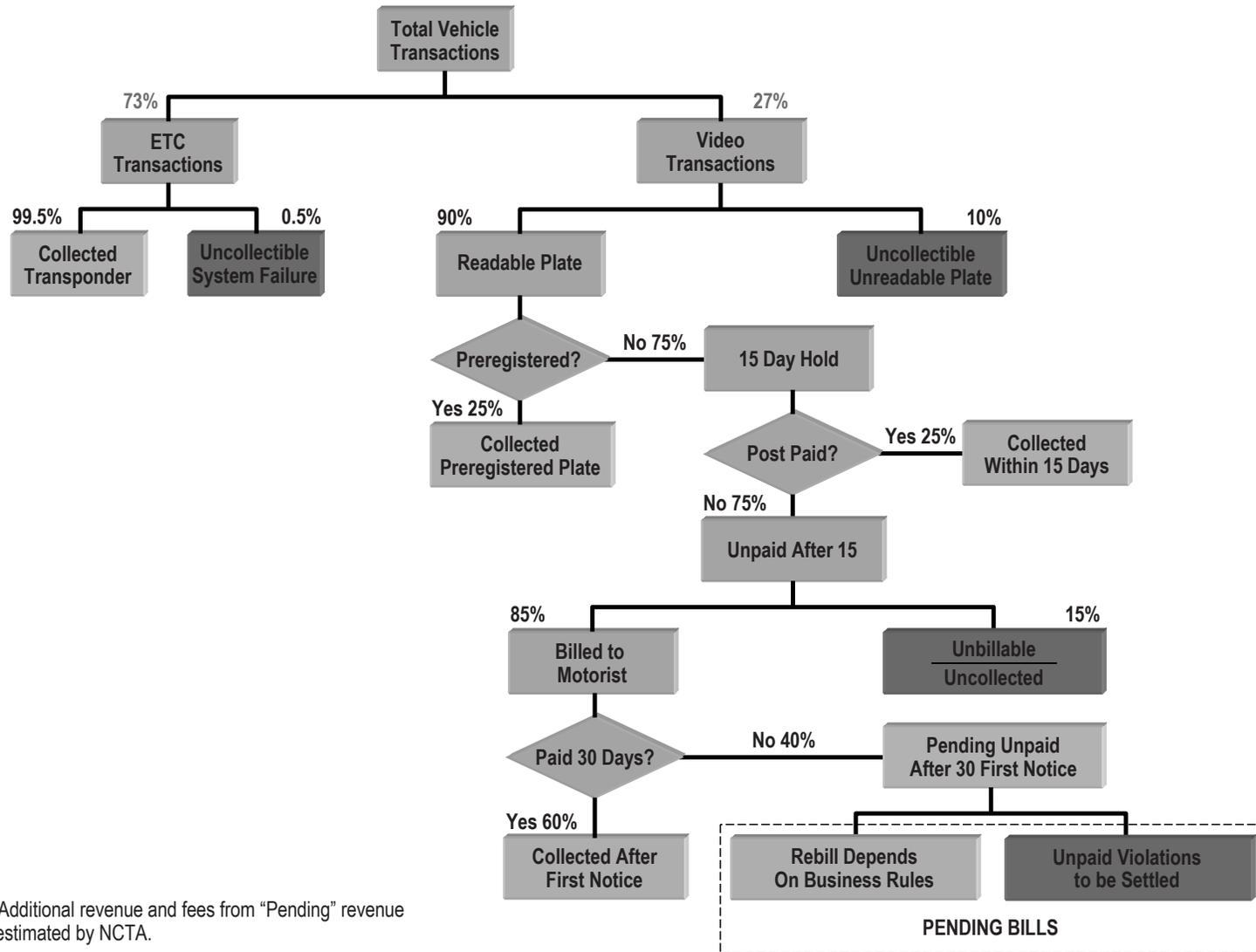
**Table 6-12  
Annual Revenue Growth Rate Assumptions, 2020 - 2051  
Triangle Expressway  
(Thousands)**

Period	Class 1 Vehicles		Class 2 and 3 Vehicles	
	ETC	Video	ETC	Video
2030 - 2035	4.3%	2.5%	3.7%	2.5%
2035 - 2040	3.5%	3.0%	3.5%	3.0%
2040 - 2051	2.0%	2.0%	2.0%	2.0%

Figure 6-9 illustrates the toll collection process and revenue collection flow which will be used on the Triangle Expressway. As noted previously, no option will be provided for direct payment in cash at the time of passage through an electronic toll zone. However, opportunities for payment in cash will be provided in the vicinity of the toll road.

In addition to showing the flow of potential transactions, Figure 6-9 also shows assumed collection rates, and percentages of uncollectable revenue at each point in the process.

Each vehicle which passes through an electronic toll zone will fall into one of two categories, either equipped with an electronic toll transponder or not. The share of traffic distribution between ETC and video transactions, by vehicle class, was a direct output in each year of the modeling process, and the differential tolls in effect at each location. In the example shown in Figure 6-9, reflecting 2012 conditions, the model estimated approximately 73 percent of vehicles would be equipped with ETC transponders and 27 percent would not. Of the ETC transactions, 99.5 percent were expected to be valid transactions, resulting in collected revenue. This collection rate appears high when compared to typical ETC express lane operations on other toll facilities today. However, on those facilities, any vehicles in ETC express toll lanes not equipped with transponders are considered violators. In the NCTA system, vehicles without transponders would fall into the “video transaction” category and be processed as shown on the right side of the chart. Hence, the 0.5 percent uncollectable rate for ETC transactions would only relate to unusual system failure conditions.



Note: Additional revenue and fees from "Pending" revenue estimated by NCTA.

Video transactions are estimated to represent approximately 27 percent of total transactions in 2012. Potential for uncollectable transactions are shown in the red boxes at several locations along the video transaction process.

Ten percent of video transactions are assumed to have unreadable license plates; such as plates which are obscured by trailer hitches or inclement weather conditions. Of the 90 percent of video transactions with readable plates, 25 percent are assumed to be pre-registered vehicles with video toll accounts. The remaining 75 percent of readable plates would be placed in a “hold” for 15 days, during which time motorists would have the opportunity to pay in person at a customer service center or via telephone, internet and other means prior to being sent a bill. The analysis assumes 25 percent of non-registered vehicles will choose this option. The remaining 75 percent are assumed to remain unpaid after 15 days.

All video transactions that remain unpaid 15 days after the transaction occurs would be invoiced. At this point, the leakage analysis assumes that 15 percent of these transactions would be “unbillable” due to inaccurate DMV information, out-of-state users with only a single transaction, or other similar circumstances. The remaining 85 percent are assumed billable. Invoices would be mailed to these vehicle owners. Based on North Carolina General Statute, those who pay the invoice within 30 days would pay only the video toll charge. The analysis assumes 60 percent of the invoices would be paid within the 30-day limit. The remaining 40 percent, representing about 5 percent of total toll revenue, would fall into a “pending” category. A portion of these would be unpaid violations based on NCTA business rules. Others will be “rebilled” one or more times. NCTA would add a \$6.00 processing fee to each bill that is resent following the initial 30-day period.

It is emphasized that a portion of the “pending” revenue, plus additional revenue from processing fees, will ultimately be collected. Estimates of the pending revenue that would be collectible were provided to WSA by NCTA. Assumptions regarding rebilling and collections of pending revenue are provided in a brief technical memorandum by NCTA included as an appendix to this report.

Over time, collectability assumptions were modified slightly to reflect anticipated improvements in technology and billing practices. Table 6-13 shows revenue collection assumptions for each class of vehicle, for each of the various decision points shown in Figure 6-9. In addition, WSA performed a sensitivity test (see Chapter 7) to evaluate the impact on collected revenue of using more conservative assumptions regarding leakage.

**Table 6-13  
Revenue Collection Assumptions  
Triangle Expressway**

Assumption	Class 1 Vehicles				
	Percent by Year				
	2012	2015	2020	2025	2030
ETC Collectible	99.5%	99.5%	99.5%	99.5%	99.5%
ETC Uncollectible	0.5%	0.5%	0.5%	0.5%	0.5%
Total ETC Transactions	100.0%	100.0%	100.0%	100.0%	100.0%
Readable Plates	90%	92%	93%	94%	95%
Unreadable Plates	10%	8%	7%	6%	5%
Total Plates Imaged	100%	100%	100%	100%	100%
Preregistered Video	25%	27%	30%	35%	40%
Unregistered Video	75%	73%	70%	65%	60%
Total Readable Plates	100%	100%	100%	100%	100%
Postpaid Collectible Before 15 Days	25%	25%	25%	25%	25%
Postpaid Unpaid After 15 Days	75%	75%	75%	75%	75%
Total Unregistered Vehicle	100%	100%	100%	100%	100%
Billable After 15 Days	85%	85%	85%	85%	85%
Unbillable After 15 Days	15%	15%	15%	15%	15%
Total Unpaid After 15 Days	100%	100%	100%	100%	100%
Collectible After 30 Days	60%	60%	60%	60%	60%
Unpaid After 30 Days	40%	40%	40%	40%	40%
Total Billable After 30 Days	100%	100%	100%	100%	100%
Assumption	Class 2 and 3 Vehicles				
	Percent by Year				
	2012	2015	2020	2025	2030
ETC Collectible	99.5%	99.5%	99.5%	99.5%	99.5%
ETC Uncollectible	0.5%	0.5%	0.5%	0.5%	0.5%
Total ETC Transactions	100.0%	100.0%	100.0%	100.0%	100.0%
Readable Plates	90%	92%	93%	94%	95%
Unreadable Plates	10%	8%	7%	6%	5%
Total Plates Imaged	100%	100%	100%	100%	100%
Preregistered Video	25%	27%	30%	35%	40%
Unregistered Video	75%	73%	70%	65%	60%
Total Readable Plates	100%	100%	100%	100%	100%
Postpaid Collectible Before 15 Days	25%	25%	25%	25%	25%
Postpaid Unpaid After 15 Days	75%	75%	75%	75%	75%
Total Unregistered Vehicle	100%	100%	100%	100%	100%
Unbillable After 15 Days	15%	15%	15%	15%	15%
Total Unpaid After 15 Days	100%	100%	100%	100%	100%
Collectible After 30 Days	60%	60%	60%	60%	60%
Unpaid After 30 Days	40%	40%	40%	40%	40%
Total Billable After 30 Days	100%	100%	100%	100%	100%

It is important to recognize that while there will be a portion of the video transactions which ultimately may go uncollected, over time video transactions represent a smaller and smaller part of total transactions; hence, the overall leakage as a percent of total revenue will continue to decline.

***ETC Collection*** –The accuracy of ETC and video equipment is key to the success of an open road toll collection system. The ETC equipment accuracy is quoted by vendors at between 99.95 and 99.99 percent. For this analysis, the ETC accuracy was assumed to be 99.5 percent. The largest number of toll customers is expected to use ETC technology. If the ETC system fails to capture an ETC transaction, the video system will be available for backup processing.

***Video Collection*** - Video capture rates are quoted by vendors in the 96 to 98 percent range for non-obscured plates. These rates are not achieved in practice and are dependent for example, on proper lane and tolling zone configurations. Within the video system, both an automatic and a manual process can be implemented in order to accurately identify vehicles and process transactions. For this analysis, the video accuracy rates were assumed to be 90 percent in the early years after opening and improving to 95 percent by 2030.

***Pending Video Collection*** – As noted above, the toll collection amount from road users that do not pay after the first invoice would be considered as “pending” (40 percent of those that receive a second invoice). These invoices would include administrative fees and civil penalties as described in Chapter 5. Collection from this group is dependent upon the business rules implemented by the NCTA. For example, the NCTA may determine the number of second and subsequent invoices that would be issued based upon the likelihood of payment and the cost of collection. Collection assumptions were made by the NCTA based on draft business rules. The collection amounts included both the toll and the administrative fees and civil penalties. The appendix contains the NCTA assumptions and estimates for the pending revenue category.

***Estimated Collected Revenue*** –Table 6-14 summarizes the total revenue collected annually, the revenue collected under 30 days, the revenue collected over 30 days as estimated by the NCTA, and the administrative fee and civil penalty revenue as estimated by the NCTA. The percent of uncollected toll revenue ranges from 9.9 percent in the opening year to 2.9 percent in the later years. When the fee and penalty revenue is included, the total revenue collected is only slightly lower than the gross toll revenue. Figure 6-8 presented earlier also illustrates the toll revenue collected in comparison to the gross toll revenue.

**Table 6-14**  
**Annual Toll Transactions and Revenue Forecasts (Fiscal Year)**  
**Triangle Expressway**  
**(Thousands)**

Fiscal Year	Total Gross Transactions	Gross Toll Revenue	Collected Toll Revenue		Total Collected Toll Revenue	Administrative Fees and Civil Penalty Revenue <sup>(3)</sup>	Total Net Revenue	Percent Uncollected Toll Revenue	Percent Uncollected Revenue of Total Revenue
			Revenue Under 30 Days	Collected Toll Revenue Over 30 Days <sup>(3)</sup>					
2012 <sup>(1)</sup>	1,184	\$747	\$655	\$18	\$673	\$7	\$680	9.9%	9.0%
2013 <sup>(2)</sup>	10,205	7,063	6,256	265	6,521	95	6,616	7.7%	6.3%
2014	25,478	18,782	16,765	638	17,403	215	17,618	7.3%	6.2%
2015	33,131	25,509	22,979	548	23,527	177	23,704	7.8%	7.1%
2016	38,727	30,825	27,971	646	28,617	201	28,818	7.2%	6.5%
2017	41,895	34,246	31,263	671	31,934	204	32,138	6.8%	6.2%
2018	45,036	37,921	34,826	690	35,516	203	35,719	6.3%	5.8%
2019	48,465	42,006	38,792	710	39,502	203	39,705	6.0%	5.5%
2020	52,211	46,690	43,355	734	44,089	204	44,293	5.6%	5.1%
2021	56,002	51,551	48,127	765	48,892	183	49,075	5.2%	4.8%
2022	59,843	56,318	52,840	780	53,620	183	53,803	4.8%	4.5%
2023	64,038	61,620	58,082	795	58,877	182	59,059	4.5%	4.2%
2024	68,621	67,593	63,991	815	64,806	182	64,988	4.1%	3.9%
2025	73,631	74,221	70,553	834	71,387	183	71,570	3.8%	3.6%
2026	77,050	79,870	76,125	857	76,982	182	77,164	3.6%	3.4%
2027	78,705	84,139	80,304	885	81,189	183	81,372	3.5%	3.3%
2028	80,462	88,541	84,612	910	85,522	182	85,704	3.4%	3.2%
2029	82,324	93,308	89,285	939	90,224	183	90,407	3.3%	3.1%
2030	84,291	98,582	94,456	971	95,427	183	95,610	3.2%	3.0%
2031	85,988	103,418	99,184	997	100,181	173	100,354	3.1%	3.0%
2032	87,376	107,551	103,203	1,013	104,216	172	104,388	3.1%	2.9%
2033	88,788	111,853	107,389	1,053	108,442	175	108,617	3.0%	2.9%
2034	90,226	116,332	111,748	1,083	112,831	175	113,006	3.0%	2.9%
2035	91,690	120,994	116,286	1,112	117,398	176	117,574	3.0%	2.8%
2036	93,099	125,490	120,647	1,141	121,788	177	121,965	3.0%	2.8%
2037	94,452	129,799	124,809	1,177	125,986	179	126,165	2.9%	2.8%
2038	95,824	134,257	129,112	1,212	130,324	181	130,505	2.9%	2.8%
2039	97,217	138,868	133,566	1,249	134,815	183	134,998	2.9%	2.8%
2040	98,630	143,638	138,175	1,290	139,465	185	139,650	2.9%	2.8%
2041	99,838	147,524	141,921	1,322	143,243	187	143,430	2.9%	2.8%
2042	100,837	150,474	144,762	1,348	146,110	189	146,299	2.9%	2.8%
2043	101,845	153,484	147,656	1,376	149,032	191	149,223	2.9%	2.8%
2044	102,863	156,554	150,609	1,403	152,012	193	152,205	2.9%	2.8%
2045	103,892	159,685	153,623	1,431	155,054	195	155,249	2.9%	2.8%
2046	104,931	162,878	156,694	1,459	158,153	196	158,349	2.9%	2.8%
2047	105,980	166,136	159,827	1,489	161,316	198	161,514	2.9%	2.8%
2048	107,040	169,459	163,025	1,518	164,543	200	164,743	2.9%	2.8%
2049	108,110	172,848	166,285	1,549	167,834	202	168,036	2.9%	2.8%
2050	109,192	176,305	169,611	1,581	171,192	205	171,397	2.9%	2.8%
2051	110,283	179,831	173,004	1,611	174,615	206	174,821	2.9%	2.8%

<sup>(1)</sup> Triangle Parkway and NC 540 from NC 55 at Morrisville to NC 54 open January 1, 2012.

<sup>(2)</sup> Full project open January 1, 2013.

<sup>(3)</sup> Applies to transactions for which a second bill is sent. Estimated by NCTA based on business rules.

Note: Forecasts for FY 2012 - FY 2015 reflect an assumed ramp-up to full traffic volumes beginning in the second half of FY 2015 for Triangle Parkway and NC 540 at NC 55 to Morrisville to NC 54.

Forecasts for FY 2013 - FY 2016 reflect an assumed ramp-up to full traffic volumes beginning in the second half of FY 2016 for Western Wake Freeway.

## DISCLAIMER

Current accepted professional practices and procedures were used in the development of these 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 the forecasters. In formulating its forecasts, WSA has reasonably relied upon the accuracy and completeness of information provided (both written and oral) by North Carolina Turnpike Authority and other local and state agencies. WSA also has relied upon the reasonable assurances of some independent parties and are not aware of any facts that would make such information misleading.

WSA 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. WSA gives no opinion as to the value or merit to partial information extracted from this report.

All estimates and projections reported herein are based on WSA' experience and judgment and on a review of information obtained from multiple state and local agencies, including North Carolina Turnpike Authority, 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 estimates or projections expressed in this report, such that WSA does not specifically guarantee or warrant any estimate or projections contained within this report.

While WSA 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, WSA 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.

# CHAPTER 7

## SENSITIVITY TESTS

A series of tests were conducted to provide a measure of the sensitivity of annual transactions and revenue to changes in key study assumptions. <sup>(1)</sup> The sensitivity tests were conducted for FY 2014, FY 2020, and FY 2030 with the exception of a commuter rail test and a toll road extension test, which were conducted for FY 2020 and FY 2030 only. The results of the sensitivity tests are presented in Table 7-1 and illustrated in Figure 7-1. The sensitivity tests included the following assumptions:

- **MPO Socioeconomic Forecasts** – The updated socioeconomic forecasts from CAMPO and DCHC form the basis for future travel demand instead of the forecasts from the independent economist;
- **Revised Long Term Economic Growth** – The base trip table rate of growth increases and decreases plus or minus 30 percent from the baseline growth rate;
- **Value of Time (VOT)** – 20 percent increases and decreases in base VOT's;
- **Electronic Toll Collection (ETC) Participation** – Higher and lower participation rates of ETC have a correspondingly lower and higher rate of video tolling;
- **Higher Motor Fuel Prices** – 5 percent reduction in regional travel demand;
- **Longer Ramp-up Period** – Traffic levels will gradually build up to full demand over a five-year “ramp up” period instead of the three-year period used for the base case;
- **Express Bus Service on Triangle Expressway** – Express buses on the parallel NC 55 are routed via the Triangle Expressway non-stop between NC 55 Bypass at Holly Springs and NC 55 near Morrisville;

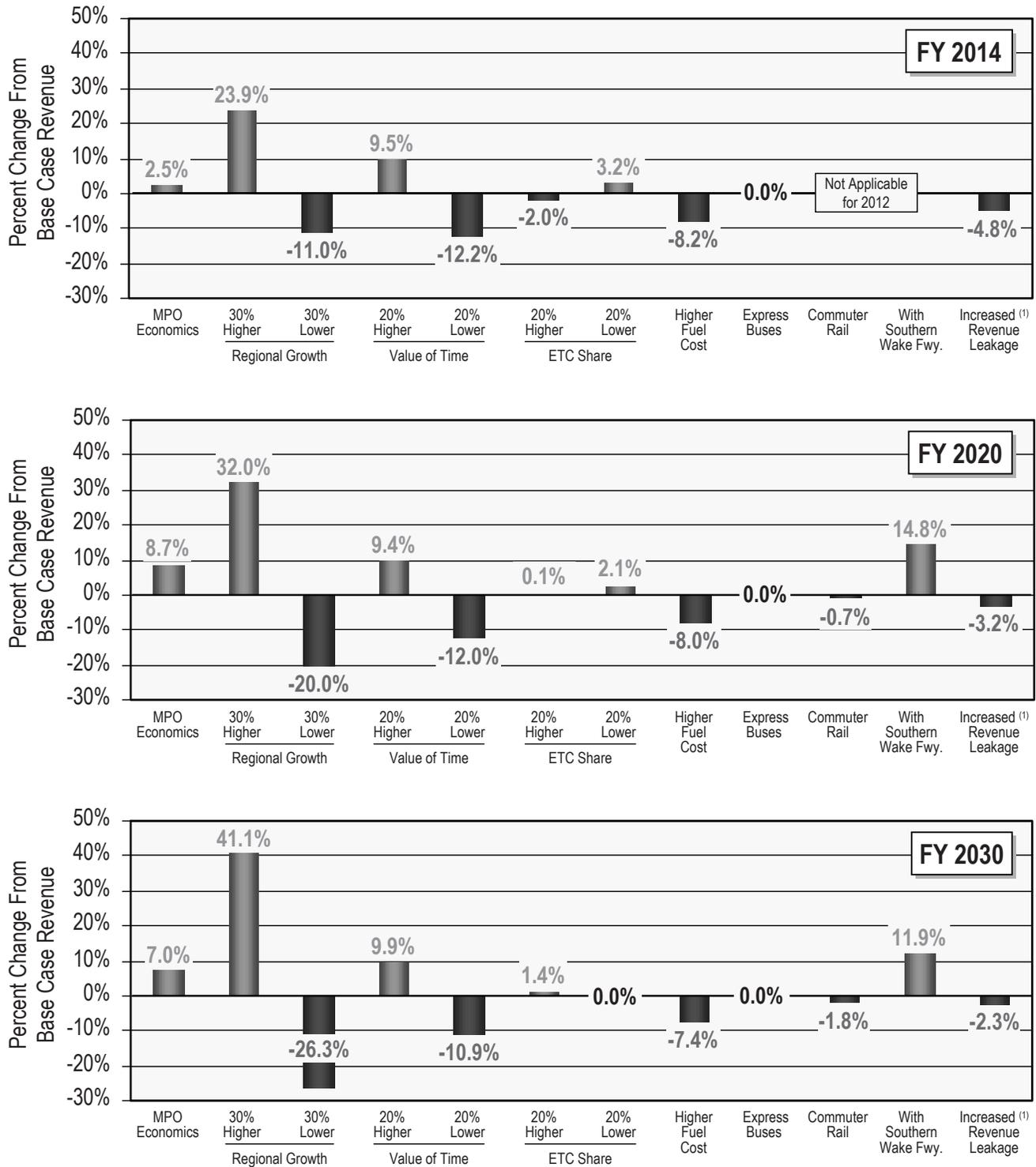
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(1) The sensitivity tests were performed during the course of this comprehensive study to estimate the percent difference from the base case. For this final report, which incorporates the effects of the current recession, the original percent differences were applied to the final base case forecasts to estimate the net differences from the base case forecasts.



# Proposed Triangle Expressway Comprehensive Traffic and Revenue Study

NC 103278 / 3-13-09 / Portrait.ppt



(1) Based on Collected Toll Revenue Excluding Fees and Penalties



## REVENUE SENSITIVITY TESTS FY 2014, 2020, 2030

FIGURE 7-1

- **Commuter Rail in Triangle Expressway Corridor** – Commuter rail service is available within the Triangle Expressway study area between NC 55 Bypass and the transit center east of the Davis Drive and Hopson Road Interchange;
- **Southern Wake Freeway** – The Triangle Expressway is extended from the proposed southern terminus at NC 55 Bypass near Holly Springs to I-40 south of Raleigh; and
- **Increased Revenue Leakage** – Higher revenue leakage rates for both ETC and video traffic.

## **MPO SOCIOECONOMIC FORECASTS**

The base case traffic and revenue forecasts for this study were calculated using the socioeconomic forecasts that were prepared by the independent economist rather than those prepared by the two MPOs in the region, CAMPO and DCHC. The MPOs' socioeconomic forecasts for the Triangle region were somewhat higher than those developed by the independent economist as discussed in more detail in Chapter 4. For this sensitivity test, the travel demand model was recoded using the MPO socioeconomic forecast in the trip generation step of the model. This resulted in gross toll revenues that were 2.5 percent higher for FY 2014, 8.7 percent higher for FY 2020, and 7.0 percent higher in FY 2030 than the revenue for the base case. In the early years, the two sets of socioeconomic forecasts are similar. However, the forecasts diverge in the later years, and the differences are correspondingly larger between the base case and the MPO forecast sensitivity test.

## **LOWER OR HIGHER LONG TERM TRAFFIC GROWTH**

Increases and decreases in the long term regional traffic growth rates were tested to examine the effects of such delays or accelerations on annual transactions and revenues. This was emulated by adjusting the rate of trip growth in the trip tables by plus or minus 30 percent from the base case forecast.

### **INCREASED GROWTH**

This test assumed that the total traffic growth rate in the base-year trip tables would increase by 30 percent. For example, a 4.0 percent annual growth rate for a specific movement in the base case was increased to 5.2 percent annual growth in the sensitivity test. Under this higher growth rate test, the gross toll revenue increased by approximately 24 percent in FY 2014 and over 41 percent by FY 2030.

**DECREASED GROWTH**

Conversely, the lower traffic growth sensitivity test assumed a 30 percent decrease for each movement in the trip tables. As indicated in Table 7-1, the reduction in gross toll revenue is 11 percent in FY 2014 and about 26 percent in FY 2030.

Based on this analysis of higher and lower traffic growth rates, it appears that the gross revenue is more sensitive to higher traffic growth than lower traffic growth.

**VALUE-OF-TIME**

Individual value-of-time (VOT) is a critical parameter in the toll diversion model because a driver's decision to use a toll road is heavily influenced by the travel time saved by using a toll road relative to the toll charged. Values-of-time for individual movements are based on the stated preference (SP) survey results, the estimates of median household income and the annual hours worked by traffic analysis zone (TAZ). In these two sensitivity tests, the base case value-of-time for each movement was increased and decreased by 20 percent.

**HIGHER VALUE OF TIME**

Higher values-of-time would favor the Triangle Expressway because more drivers would be willing to pay a toll to save travel time in comparison to the base case. This test increased the median VOT for all trip purposes in the traffic assignment process by 20 percent. Under this scenario, as presented in Table 7-1, the total annual gross revenue increased by 9.4 to 9.9 percent for the test years: FY 2014, FY 2020, and FY 2030.

**LOWER VALUE-OF-TIME**

Lowering the base case value-of-time by 20 percent had the opposite effect on the Triangle Expressway because fewer people would be willing to pay a toll to save travel time. The reduction in gross toll transactions in comparison to the base case is estimated at between 11 and 12 percent for each of the test years.

Thus the forecast model is slightly more sensitive to lower values-of-time than to higher values-of-time.

**ELECTRONIC TOLL COLLECTION PARTICIPATION**

The base-case assumptions for ETC participation are that participation rates would increase as drivers become more familiar with the lower costs

and convenience of ETC. Conversely the use of video tolling would decrease over the years as ETC increases.

Two sensitivity tests were conducted. The first test assumed higher levels of initial ETC participation and the second test assumed lower levels of ETC participation. Table 7-2 shows the percentages of ETC and video participation for the base case and for the two sensitivity tests.

#### **HIGHER ETC PARTICIPATION**

This test assumes that FY 2014 base case ETC participation would increase from 65 to 78 percent for Class 1 vehicles and from 80 to 96 percent for Class 2 and 3 vehicles. The toll diversion model indicates that this increase would have minimal impact on gross toll revenues. The FY 2014 revenue is estimated to be 2 percent less than the base-case revenue. By FY 2020, the impact is negligible, and by FY 2030 the revenue would increase slightly over the base case. These results are not surprising because of the toll price differentials between ETC and video tolling. With higher ETC participation, the percentage of video tolling customers would decrease. Since these video tolling customers would pay substantially more than ETC customers, the revenue effects of higher ETC participation would tend to be offset.

#### **REDUCED ETC PARTICIPATION**

Similarly, an assumed reduction in ETC participation also has little effect on gross toll revenues because of the price differential of the payment types.

Although these two sensitivity tests indicate that changes in the share of ETC participation have little impact on gross toll revenue, this analysis did not include any allowances for revenue losses due to uncollectible video tolling charges. Under the lower ETC share sensitivity test, more video tolling would occur, which means that more revenue would be lost due to leakage than with the base case.

#### **INCREASED FUEL COST**

This sensitivity test was based on the assumption that significantly higher fuel prices would result in fewer vehicles using the Triangle Expressway. Therefore, in order to reflect gas price increases in the range of 65 percent, the FY 2014, FY 2020, and FY 2030 base trip tables were reduced by 5 percent. Under this hypothetical scenario, total annual revenues were reduced by approximately 7 to 8 percent for each of the test years.

**Table 7-2  
Toll Collection Percentages of Total Transactions -  
Sensitivity Tests  
Triangle Expressway**

<b>Base Case</b>				
<b>Fiscal Year</b>	<b>Model Input Assumptions - Class 1</b>		<b>Model Input Assumptions - Class 2/3</b>	
	<b>ETC</b>	<b>Video</b>	<b>ETC</b>	<b>Video</b>
	2014	65%	35%	80%
2020	77%	23%	89%	11%
2030	84%	16%	89%	11%

<b>Higher ETC Participation</b>				
<b>Fiscal Year</b>	<b>Model Input Assumptions - Class 1</b>		<b>Model Input Assumptions - Class 2/3</b>	
	<b>ETC</b>	<b>Video</b>	<b>ETC</b>	<b>Video</b>
	2014	78%	22%	96%
2020	92%	8%	99%	1%
2030	99%	1%	99%	1%

<b>Lower ETC Participation</b>				
<b>Fiscal Year</b>	<b>Model Input Assumptions - Class 1</b>		<b>Model Input Assumptions - Class 2/3</b>	
	<b>ETC</b>	<b>Video</b>	<b>ETC</b>	<b>Video</b>
	2014	52%	48%	64%
2020	62%	38%	71%	29%
2030	67%	33%	71%	29%

## LONGER RAMP-UP PERIOD

In the base case, it was assumed that full traffic potential would be realized after a three-year period in which the traffic would build up from a 50 percent level the first month of operation to a 100 percent level in month 36. The sensitivity test assumed a five-year ramp-up period, which would result in lower annual traffic and revenue forecasts in comparison to the base case.

The annual ramp-up factors for the three-year and the five-year ramp-ups are listed in Table 7-3. For example, in the first six months of operation, the traffic and revenue forecasts are 55 percent of the full annual forecasts in the three-year ramp-up and 53.8 percent of the full annual forecasts in the five-year ramp-up.

**Table 7-3**  
**Annual Ramp-up Factors -**  
**Sensitivity Test**

<u>Year</u>	<u>Months</u>	<u>3-year</u> <u>Factor <sup>(1)</sup></u>	<u>5-year</u> <u>Factor <sup>(1)</sup></u>
1	1-6	0.550	0.538
	7-12	0.670	0.628
2	1-6	0.773	0.700
	7-12	0.854	0.760
3	1-6	0.915	0.813
	7-12	0.975	0.860
4	1-6	1.000	0.903
	7-12	1.000	0.941
5	1-6	1.000	0.973
	7-12	1.000	0.995
6+	1-12	1.000	1.000

<sup>(1)</sup> Average yearly factor applied to forecast of total traffic before ramp-up.

The total transactions and gross revenues for the three-year and five-year ramp-up periods are compared in Table 7-4 for FY 2012 through FY 2014. The revenues for the five-year ramp-up period are between 4.5 and 11 percent lower than the revenues for the base case depending upon the year of operation. The Triangle Parkway and NC 540 sections of the toll road were assumed to open in FY 2012, and the ramp-up was assumed to cover FY 2012 – FY 2015 for this test. The Western Wake Freeway segment was assumed to open in FY 2013, and its ramp-up was assumed to cover FY 2013 – FY 2016 for this sensitivity test. After FY 2018, the traffic volumes would be the same in both the three-year and the five-year ramp-up cases.

### **EXPRESS BUS SERVICE ON TRIANGLE EXPRESSWAY**

The regional transportation model includes bus services in accordance with the MPOs' long range transportation plans. The services in the area of the proposed Triangle Expressway include bus routes along NC 55 from Apex to a location on Page Road near the Research Triangle Park. In later years, bus service would be extended south to include Fuquay-Varina in Wake County and Lillington in Harnett County.

In this transit sensitivity test, the segment of the bus routes between Old US 1 and NC 55 near Morrisville were re-routed to the Triangle Expressway. The routes would still originate and terminate in the same locations as in the base case, but there would not be bus service on NC 55 between Old US 1 and NC 55 near Morrisville. Figure 7-2 depicts the bus service in this sensitivity test. The headways for these express buses would be:

- 2014: 30 minutes peak (1 route), no off-peak service;
- 2020: 30 minutes peak (2 routes), 60 minutes off-peak (1 route); and
- 2030: 30 minutes peak (2 routes), 60 minutes off-peak.

Since the express buses operating along the Triangle Expressway would offer more rapid service to and from the Research Triangle Park area than buses operating along NC 55, it might be expected that some diversion from automobiles to public transit would occur. Consequently the reduction of automobiles on the Triangle Expressway might lead to a reduction in gross toll revenue. However, this is not the case. The re-routing of buses to the Triangle Expressway would have little effect on gross toll revenue because the Triangle Regional Model (TRM) forecasts little ridership on buses along NC 55 in the study area. In fact, according to 2005

**Table 7-4  
Annual Toll Transactions and Gross Revenue Forecasts  
Five-year Ramp-up Sensitivity Test  
Triangle Expressway  
(Thousands)**

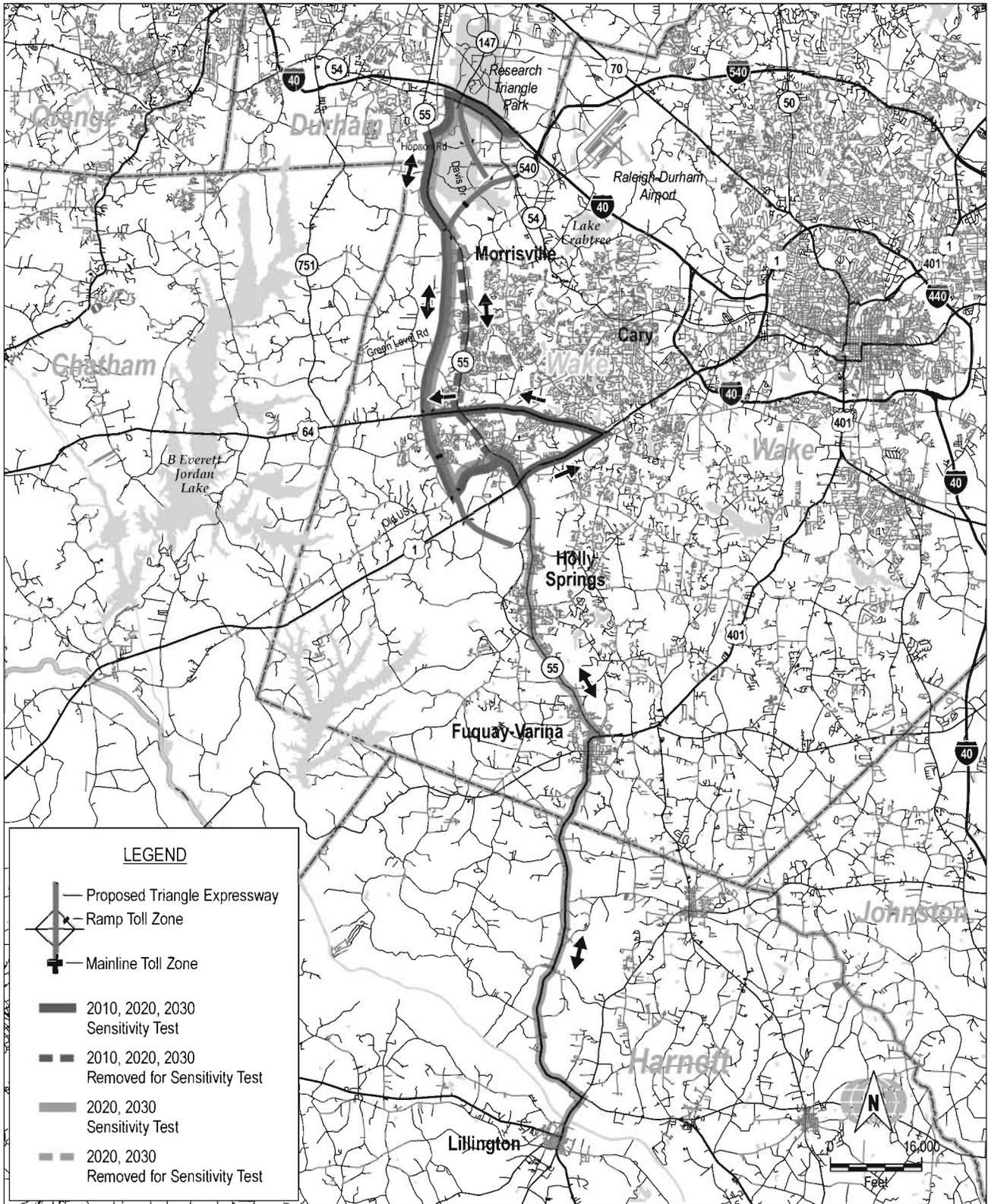
Fiscal Year	Base Case (3-year Ramp-up) <sup>(1)</sup>		Sensitivity Test (5-year Ramp-up) <sup>(2)</sup>		Difference from Base Case		Percent Difference from Base Case	
	Transactions	Revenue	Transactions	Revenue	Transactions	Revenue	Transactions	Revenue
2012	1,183	\$747	1,130	\$713	-53	-\$34	-4.5%	-4.5%
2013	10,205	7,064	9,456	6,543	-749	-521	-7.3%	-7.4%
2014	25,479	18,781	22,725	16,750	-2,754	-2,031	-10.8%	-10.8%
2015	33,131	25,510	29,858	22,998	-3,273	-2,512	-9.9%	-9.8%
2016	38,728	30,825	36,703	29,238	-2,025	-1,587	-5.2%	-5.1%
2017	41,896	34,246	41,494	33,925	-402	-321	-1.0%	-0.9%
2018 - 2051					No Change			

<sup>(1)</sup> Forecasts for FY 2012-FY 2015 reflect an assumed ramp-up to full traffic volumes beginning in the second half of FY 2015 for Triangle Parkway and NC 540 between NC 54 and NC 55 at Morrisville.  
Forecasts for FY 2013 - FY 2016 reflect an assumed ramp-up to full traffic volumes beginning in second half of FY 2016 for Western Wake Freeway.

<sup>(2)</sup> Forecasts for FY 2012 -FY 2017 reflect an assumed ramp-up to full traffic volumes beginning in the second half of FY 2017 for Triangle Parkway and NC 540 between NC 54 and NC 55 at Morrisville.  
Forecasts for FY 2013 - FY 2018 reflect an assumed ramp-up to full traffic volumes beginning in the second half of FY 2018 for Western Wake Freeway

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NC 103278 / 3-13-09 / Bus Sensitivity Test Routes.mxd



ridership data from the Triangle Transit Authority, the average daily transit ridership on the only bus route on NC 55 in the study area was 100.<sup>(2)</sup>

Average annual daily vehicle traffic along NC 55 ranged from 19,000 vpd to 38,000 vpd in 2005. The TRM was run to determine any mode diversions associated with the re-routing of bus services using the headways listed above. The model indicated low future transit ridership with or without the Triangle Expressway.

Because of the low current and forecast transit ridership in the corridor, any diversion of automobile users to transit using the Triangle Expressway would have minimal traffic or gross revenue impact.

However, it should be noted that this sensitivity test is reflective of the current transportation mode choice model, the currently-modeled levels of transit service in the study area, and the expected modal splits between cars and buses. If the bus levels of service and routings were increased substantially and road traffic conditions and costs deteriorated significantly, then some diversion from automobile to bus transit in the study area could be expected, which could lead to reduction of toll revenue to some degree.

## **COMMUTER RAIL IN TRIANGLE EXPRESSWAY CORRIDOR**

In this sensitivity test, a commuter rail line would closely parallel the Triangle Expressway. It would have stops at each interchange and feeder bus lines to connect the rail line to NC 55, the closest major north-south toll-free road. As shown in Figure 7-3, the commuter line would extend from NC 55 Bypass at Holly Springs to the bus transit center on Page Road.

This theoretical rail line would have service characteristics similar to the commuter line that was not approved by the US DOT in 2006:<sup>(3)</sup>

- Rail Headways - 10 minutes peak and 20 minutes off-peak;
- Feeder Bus Headways - 20 minutes peak and 40 minutes off-peak;
- Average Speeds - up to 45 miles per hour depending on distances between stations (average 36 miles per hour);

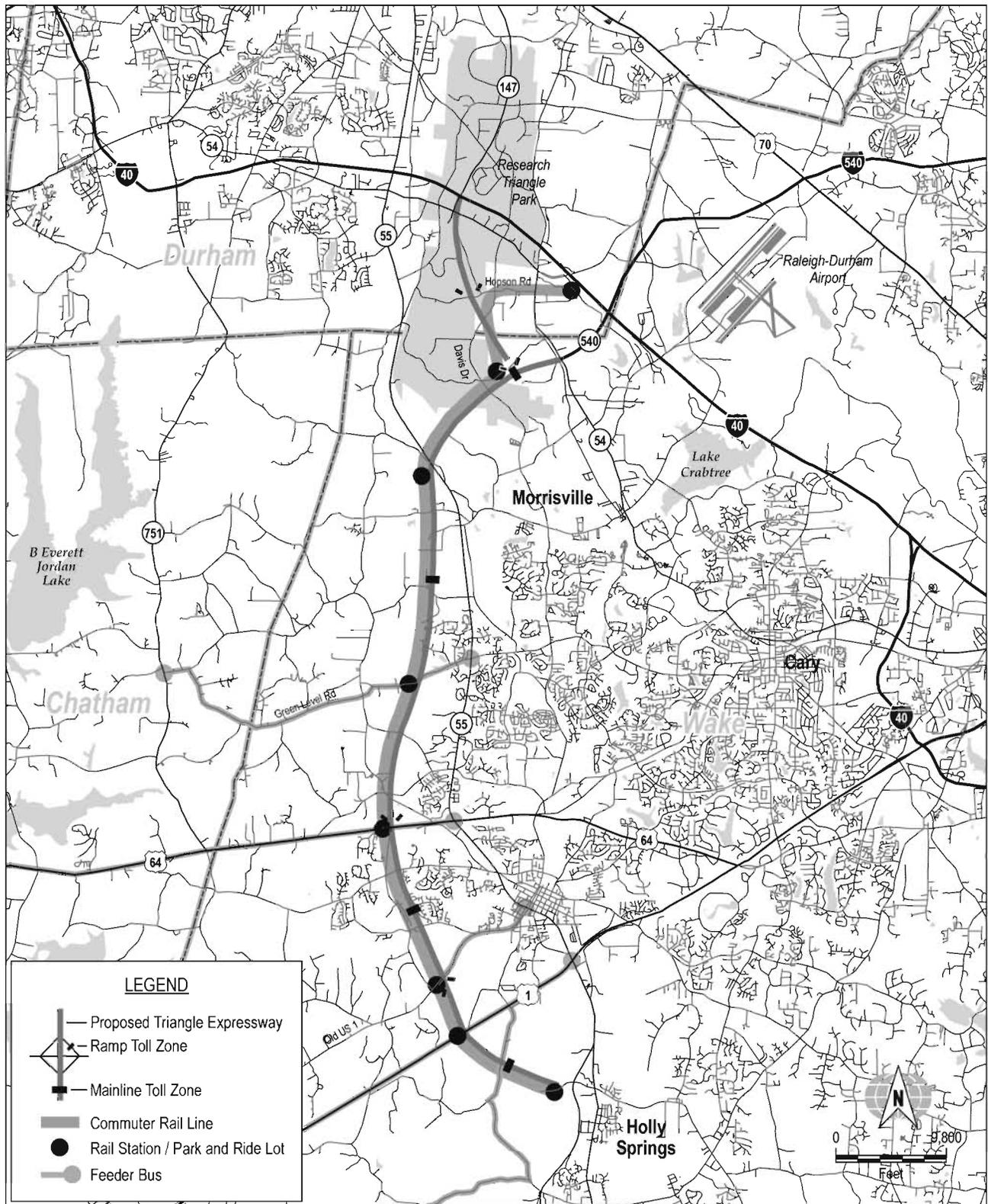
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<sup>(2)</sup> See Table 2-12.

<sup>(3)</sup> This sensitivity test is theoretical in the sense that neither an engineering nor a financial feasibility analysis was conducted to confirm that the rail line could be placed near the Triangle Expressway. The purpose of the sensitivity test was to estimate the effects on the Triangle Expressway gross toll revenue if such a rail line were implemented.

# Proposed Triangle Expressway Comprehensive Traffic and Revenue Study

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- Rail Fares - \$2.00 flat fare in opening year, same as the fare in the earlier rail project for the same distance;
- Feeder Bus Fares - \$0.75 in opening year; and
- Park and Ride Lots - at each station.

Some potential toll road commuters could be attracted to this line for all or portions of certain trips, but the slower speed of the rail line and transfer times between feeder buses and rail would tend to favor the toll road. The average speed of the toll road would be approximately 65 mph, and the average speed over the commuter rail line would be 36 mph. As indicated in Table 7-1, the expected gross toll revenue would be 0.7 percent lower than the base case in FY 2020 and 1.8 percent lower in FY 2030. Clearly other factors such as significantly higher fuel costs, congestion on the area road network, and reduction of available parking in the RTP area would contribute to higher rail usage.

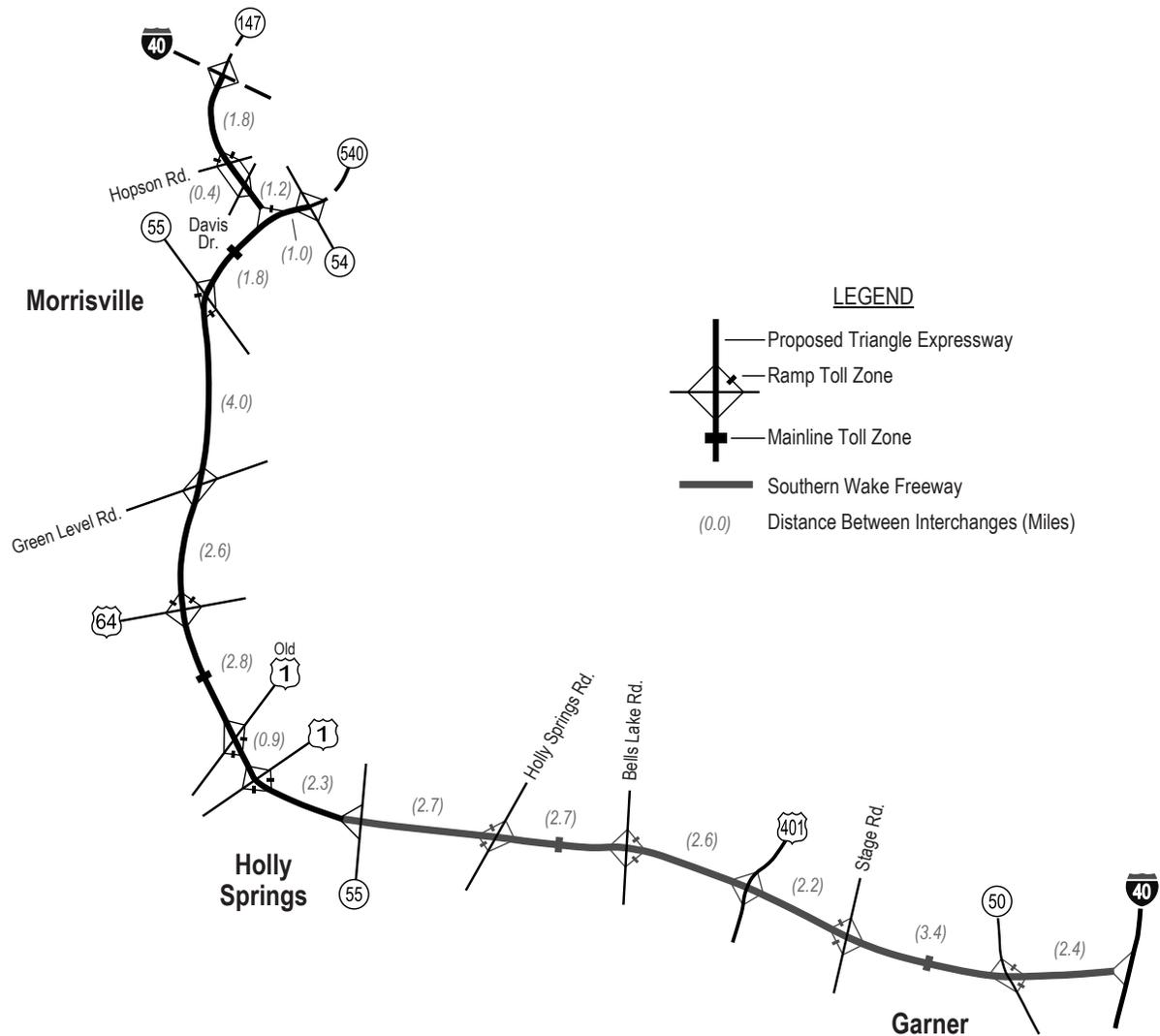
## **SOUTHERN WAKE FREEWAY**

The preliminary traffic and revenue study included an analysis of both the Western Wake and the Southern Wake Freeways.<sup>(4)</sup> However, this comprehensive study does not include the Southern Wake Freeway. A sensitivity test was conducted to estimate the potential impact on Triangle Expressway traffic and toll revenue if the Southern Wake Freeway were available. The Western and Southern Wake Freeways would provide enhanced connectivity for travelers in western and southern Wake County. Figure 7-4 depicts a toll road that includes the Southern Wake Freeway.

The incremental revenue on the Triangle Expressway due to the additional Southern Wake traffic is forecast to be approximately 15 percent higher than the base case in FY 2020 and 12 percent in FY 2030. This revenue is incremental and does not include the revenue for traffic passing through tolling zones on the Southern Wake Freeway itself. It includes only revenue impacts on the Triangle Expressway tolling zones and is used as a basis of comparison to illustrate the effects of the enhanced connectivity offered by the Southern Wake Freeway.

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<sup>(4)</sup> Proposed Western and Southern Wake Parkways Preliminary Traffic and Revenue Study, Wilbur Smith Associates for the North Carolina Turnpike Authority, June 16, 2006.



### LEGEND

- Proposed Triangle Expressway
- Ramp Toll Zone
- Mainline Toll Zone
- Southern Wake Freeway
- (0.0) Distance Between Interchanges (Miles)

## INCREASED LEAKAGE

Table 7-1 presented earlier summarized the effect of leakage assumptions for 2012, 2020, and 2030. In this sensitivity test, higher rates of revenue leakage for ETC and video collection were assumed as shown in Table 7-5. For ETC transactions, it was assumed that 1 percent of the transactions would be uncollected in contrast to 0.5 percent for the base case. For video toll transaction, the assumption for readable plates was reduced from 90 to 85 percent in the opening year and from 95 to 90 percent by FY 2030. The assumption for percentage of registered video accounts, the percentage of toll transactions collected less 30 days after usage, the percentage of toll transactions collected more over 30 days after usage, and the percentage of pending toll transactions were also revised. Table 7-6 presents the results of the sensitivity test for increased leakage. In FY 2014, the higher leakage rates would yield a reduction in collected toll revenue of 5.2 percent. By FY 2030, the reduction would be 2.4 percent, which indicates that the collected revenue is relatively insensitive to the leakage rates tested.

**Table 7-5  
Comparison of Alternative Leakage Assumptions  
for Sensitivity Tests**

<b>Assumption</b>	<b>Class 1 Vehicles</b>					
	<b>Percent by Year</b>					
	<b>FY 2014</b>		<b>FY 2020</b>		<b>FY 2030</b>	
	<b>Base Case</b>	<b>Sensitivity Test</b>	<b>Base Case</b>	<b>Sensitivity Test</b>	<b>Base Case</b>	<b>Sensitivity Test</b>
ETC Collectible	99.5%	99%	99.5%	99%	99.5%	99%
ETC Uncollectible	0.5%	1%	0.5%	1%	0.5%	1%
Total ETC Transactions	100.0%	100%	100%	100%	100%	100%
Readable Plates	90%	85%	93%	87%	99%	90%
Unreadable Plates	10%	15%	7%	13%	5%	10%
Total Plates Imaged	100%	100%	100%	100%	100%	100%
Preregistered Video	25%	15%	30%	22%	40%	25%
Unregistered Video	75%	85%	70%	78%	60%	75%
Total Readable Plates	100%	100%	100%	100%	100%	100%
Postpaid Collectible Before 15 Days	25%	15%	25%	15%	25%	15%
Postpaid Unpaid After 15 Days	75%	85%	75%	85%	75%	85%
Total Unregistered Vehicle	100%	100%	100%	100%	100%	100%
Billable After 15 Days	85%	80%	85%	80%	85%	80%
Unbillable After 15 Days	15%	20%	15%	20%	15%	20%
Total Unpaid After 15 Days	100%	100%	100%	100%	100%	100%
Collectible After 30 Days	60%	50%	60%	56%	60%	60%
Unpaid After 30 Days	40%	50%	40%	44%	40%	40%
Total Billable After 30 Days	100%	100%	100%	100%	100%	100%

<b>Assumption</b>	<b>Class 2 and 3 Vehicles</b>					
	<b>Percent by Year</b>					
	<b>FY 2014</b>		<b>FY 2020</b>		<b>FY 2030</b>	
	<b>Base Case</b>	<b>Sensitivity Test</b>	<b>Base Case</b>	<b>Sensitivity Test</b>	<b>Base Case</b>	<b>Sensitivity Test</b>
ETC Collectible	99.5%	99%	99.5%	99%	99.5%	99%
ETC Uncollectible	0.5%	1%	0.5%	1%	0.5%	1%
Total ETC Transactions	100.0%	100%	100%	100%	100%	100%
Readable Plates	90%	85%	93%	87%	99%	90%
Unreadable Plates	10%	15%	7%	13%	5%	10%
Total Plates Imaged	100%	100%	100%	100%	100%	100%
Preregistered Video	25%	15%	30%	22%	40%	25%
Unregistered Video	75%	85%	70%	78%	60%	75%
Total Readable Plates	100%	100%	100%	100%	100%	100%
Postpaid Collectible Before 15 Days	25%	15%	25%	15%	25%	15%
Postpaid Unpaid After 15 Days	75%	85%	75%	85%	75%	85%
Total Unregistered Vehicle	100%	100%	100%	100%	100%	100%
Billable After 15 Days	85%	80%	85%	80%	85%	80%
Unbillable After 15 Days	15%	20%	15%	20%	15%	20%
Total Unpaid After 15 Days	100%	100%	100%	100%	100%	100%
Collectible After 30 Days	60%	50%	60%	56%	60%	60%
Unpaid After 30 Days	40%	50%	40%	44%	40%	40%
Total Billable After 30 Days	100%	100%	100%	100%	100%	100%

**Table 7-6  
Increased Leakage Sensitivity Test  
Triangle Expressway  
(Thousands)**

<b>Fiscal Year</b>	<b>Collected Toll Revenue <sup>(2)</sup></b>		<b>Difference from Base Case</b>	<b>Percent Difference from Base Case <sup>(2)</sup></b>
	<b>Base Case</b>	<b>Increased Leakage Sensitivity Test</b>		
2014	\$17,403	\$16,498	-\$905	-5.2%
2020	44,089	42,590	-1,499	-3.4%
2030	95,427	93,137	-2,290	-2.4%

<sup>(1)</sup> Forecasts for FY 2014 reflect an assumed ramp-up to full traffic volumes beginning in the second half of FY 2015 for Triangle Parkway and NC 540 between NC 54 and NC 55 at Morrisville and to full traffic volumes beginning in the second half of FY 2016 for Western Wake Freeway.

<sup>(2)</sup> Excludes administrative fees and civil penalties.

# **APPENDIX**

## **Pending Revenue and Unpaid Violations to be Settled Estimates**

**HNTB Corporation**  
Engineers Architects Planners

2 Thomas Drive  
Westbrook, Maine 04092

Telephone (207) 774-5155  
Facsimile (207) 772-7410  
www.hntb.com

**Date**  
July 16, 2009

**To**  
James Eden, NCTA  
Grady Rankin, NCTA



**From**  
Walter Fagerlund, P.E.

**Memorandum**

**Subject**  
Memo date correction

The technical memorandum submitted via email to Robert Weisenberger of NCTA and David Danforth of WSA as an attachment with the file name "NCTA-PendingRevenueMemo-Mar09.pdf" from Walter Fagerlund of HNTB on March 19, 2009 was incorrectly dated within the memo itself as March 19, 2008. A corrected version of the memo is hereby provided by attachment (file name "NCTA-PendingRevenueMemo-Mar09-corrected date.pdf") with the date corrected to reflect the actual submission date of March 19, 2009. This version therefore supersedes the original document.

**Date**  
March 19, 2009

**To**  
James Eden, NCTA  
Grady Rankin, NCTA



**From**  
Walter Fagerlund, P.E.

**Memorandum**

**Subject**  
“Pending” revenue and “Unpaid  
Violations to be Settled” estimates

The following provides documentation of a collaborative effort by the NCTA in conjunction with its consultants, Wilbur Smith Associates (WSA), PBS&J and HNTB to develop estimates of revenue realized and unpaid violations to be settled associated with the proposed video tolling process for the agency.

As part of their most recent updates to the traffic and revenue forecasts (dated March 4, 2009), WSA provided estimates of the number of transactions that would be included as part of the video toll noticing process. WSA assumed a first set of notices collected on in their revenue estimates and from this set, the notices not paid were labeled “pending”. This was where the calculation of revenue by WSA was concluded. WSA recommended that the NCTA use the “pending” transaction volumes along with NCTA’s operations plan and the applicable enforcement legislation to estimate what amount of the “pending” transactions would be projected to be realized as revenue and what amount would be considered “unpaid violations to be settled”.

The following inputs and factors were assumed in calculating the “pending revenue” and “unpaid violations to be settled” amounts:

- Average toll rates for “pending” transactions (WSA T&R)
- Anticipated “pending” notice and transaction volumes (HNTB O&M model)
- Fees and penalty amounts anticipated for paid “pending” transactions (NCTA and PBS&J)
- Adjustments to fees based on limitations of maximum amounts (NCTA and PBS&J)
- Per legislation, fees and penalty amounts were not escalated over time

The following table provides the summary of projected values. Note the “unpaid violations to be settled” amounts are only for toll revenue (does not include potential fees) associated with “pending” transactions to be settled beyond the pending revenue recovery stated. These “unpaid violations to be settled” amounts do not include other types uncollected transactions, such as unreadable license plate images or undeliverable mail, which might also be considered as part of the overall “uncollected revenue”. Furthermore, these estimates only represent planning level documentation by the overall team (NCTA, WSA, PBS&J and HNTB) and therefore should not be considered a formal portion by HNTB of the overall revenue projection. We recommend that the NCTA take these estimates into consideration with their own internal estimates of revenue and uncollected revenue as part of the development of any financing plans.

**"Pending" Revenue and "Unpaid Violations to be Settled" Estimates**  
(Values in Future \$1000s)

<b>Year</b>	<b>"Pending" Revenue Received (Toll and Fee)</b>	<b>"Unpaid Violations to be Settled" (Toll only)</b>
2012	25	18
2013	360	266
2014	853	639
2015	725	549
2016	847	646
2017	875	672
2018	893	691
2019	913	711
2020	938	735
2021	948	765
2022	963	781
2023	978	796
2024	997	816
2025	1,017	835
2026	1,040	858
2027	1,067	886
2028	1,092	910
2029	1,121	940
2030	1,154	972
2031	1,170	998
2032	1,184	1,014
2033	1,227	1,054
2034	1,258	1,084
2035	1,288	1,113
2036	1,317	1,142
2037	1,356	1,178
2038	1,393	1,213
2039	1,432	1,251
2040	1,475	1,292
2041	1,509	1,324
2042	1,536	1,349
2043	1,566	1,377
2044	1,596	1,405
2045	1,626	1,433
2046	1,655	1,460
2047	1,687	1,490
2048	1,719	1,520
2049	1,751	1,550
2050	1,785	1,582
2051	1,818	1,613

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**APPENDIX E**  
**GEC REPORT**

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# Memorandum



HNTB, North Carolina, PC  
343 East Six Forks Rd Suite 200  
Raleigh, North Carolina 27609

To: Mr. Grady Rankin  
NCTA Chief Financial Officer

Date: July 14, 2009

From: Donna C. Keener, P.E.

HNTB Project: 46816

Subject: **ADDENDUM III** – Triangle Expressway Project  
Engineering Report, dated and sealed March 20, 2009

Seal



Please find attached revised sheets for insertion into the Triangle Expressway Project Engineering Report, dated and sealed March 20, 2009. The attached sheet supersedes Addenda I and II and replaces Appendix F, Sheet 2 of 2, “Revised Cost Estimate Summary”.

The cost summary table has been revised to reflect the latest assumptions regarding NCTA administrative costs and the price adjustment contingencies for diesel fuel and asphalt binder. At the time the bids were submitted, prices for these commodities were at near record levels. The contingency fund in the original cost estimate summary was based on these prices, plus an additional ten to fifteen percent annual escalation during construction. Diesel prices dropped from \$4.0016 per gallon in July 2008 to \$1.3685 per gallon in March 2009, followed by an increase to \$1.9136 per gallon in July 2009. Similar price adjustments have occurred for asphalt binder. The revised cost estimate included in Appendix F incorporates the assumption that prices for these commodities will increase 50% above July 2009 levels. In addition, the amount included for NCTA administrative costs for Western Wake Freeway has increased slightly. The net result is an \$11.02M increase in the project cost estimate above the estimate provided in Addendum II, for a total estimated project cost of \$877.79M.

As reported in Addendum II, the Environmental Mitigation costs originally included in the estimate have been borne by NCDOT and will not be repaid by NCTA as part of this project.

If you have any questions or need additional information, please contact me at (919) 788-7150.

**Revised Cost Estimate Summary**  
**Based on 8-5-08 Bid Opening and Updated Fuel Price Adjustment Assumptions**

Item	Cost		
<b>Design-Build Construction</b>			
Segment	Western Wake Freeway	Triangle Parkway & Northern Wake Expressway	Total
Highway D-B Contract Total	\$446,460,000	\$137,450,000	\$583,910,000
Adjustment based on anticipated lower fuel/asphalt binder prices*	-\$4,590,000	-\$1,910,000	-\$6,500,000
Highway D-B Contract Total	\$441,870,000	\$135,540,000	\$577,410,000
Landscaping Estimate	\$4,440,000	\$1,340,000	\$5,780,000
ITS Estimate	\$5,930,000	\$3,850,000	\$9,780,000
Toll Integration Estimate	\$5,770,000	\$3,470,000	\$9,240,000
Specialized Contract Total	\$16,140,000	\$8,660,000	\$24,800,000
<b>Design-Build Contract Total</b>	<b>\$458,010,000</b>	<b>\$144,200,000</b>	<b>\$602,210,000</b>
<b>NCTA Costs</b>			
Right-of-Way	\$201,410,000	\$23,970,000	\$225,380,000
Right-of-Way Negotiation	\$2,220,000	\$550,000	\$2,770,000
Subtotal	\$203,630,000	\$24,520,000	\$228,150,000
Utility Relocation	\$14,600,000	\$4,000,000	\$18,600,000
NCTA Construction Oversight	\$13,910,000	\$5,050,000	\$18,960,000
NCTA Administrative	\$3,800,000	\$670,000	\$4,470,000
Environmental Mitigation **	-	-	-
D-B Stipends & Incentives	\$3,550,000	\$1,850,000	\$5,400,000
Subtotal	\$35,860,000	\$11,570,000	\$47,430,000
<b>NCTA Total Costs</b>	<b>\$239,490,000</b>	<b>\$36,090,000</b>	<b>\$275,580,000</b>
<b>Project Segment Total Costs</b>	<b>\$697,500,000</b>	<b>\$180,290,000</b>	<b>\$877,790,000</b>
<b>Total Project Cost</b>			<b>\$877,790,000</b>

\* Contractor bids were based on fuel and asphalt binder prices as of July 1, 2008. Prices for these commodities have since dropped substantially. The Contractors' prices will be adjusted according to the current commodity price at the time certain construction activities occur. The scenario shown in this table assumes a 50% increase above July 2009 prices. The adjustments shown here are negative due to the substantial decrease in prices that has occurred since July 2008.

\*\* The Environmental Mitigation costs have been borne by NCDOT and will not be repaid by NCTA as part of this project.

# Memorandum



HNTB, North Carolina, PC  
343 East Six Forks Rd Suite 200  
Raleigh, North Carolina 27609

To: Mr. Grady Rankin  
NCTA Chief Financial Officer

Date: June 12, 2009

From: Spencer Franklin, P.E., P.T.O.E.

HNTB Project: 46816

Subject: **ADDENDUM II** – Triangle Expressway Project  
Engineering Report, dated and sealed March 20, 2009



*Spencer T. Franklin*  
6-12-2009

Please find attached revised sheets for insertion into the Triangle Expressway Project Engineering Report, dated and sealed March 20, 2009. The attached sheet supersedes Addendum I and replaces Appendix F, Sheet 2 of 2, "Revised Cost Estimate Summary".

The cost summary table has been revised to reflect the latest assumptions regarding the price adjustment contingencies for diesel fuel and asphalt binder. At the time the bids were submitted, prices for these commodities were at near record levels. The contingency fund in the original cost estimate summary was based on these prices, plus an additional ten to fifteen percent annual escalation during construction. Diesel prices dropped from \$4.0016 per gallon in July 2008 to \$1.3685 per gallon in March 2009. Similar price reductions have occurred for asphalt binder. The revised cost estimate included in Appendix F incorporates the assumption that prices for these commodities will increase 25% above March 2009 levels. The net result is a \$35.756M decrease in the project cost estimate.

The Environmental Mitigation costs originally included in the estimate have been borne by NCDOT and will not be repaid by NCTA as part of this project. The net result is a \$10.79M decrease in the project cost estimate.

These two decreases equate to total project cost estimate savings of \$46.546M.

If you have any questions or additional information, please contact me at (919) 424-0461.

**Revised Cost Estimate Summary**  
**Based on 8-5-08 Bid Opening and Updated Fuel Price Adjustment Assumptions**

Item	Cost		
<b>Design-Build Construction</b>			
Segment	Western Wake Freeway	Triangle Parkway & Northern Wake Expressway	Total
Highway D-B Contract Total	\$446,460,000	\$137,450,000	\$583,910,000
Adjustment based on anticipated lower fuel/asphalt binder prices*	-\$11,690,000	-\$5,300,000	-\$16,990,000
Highway D-B Contract Total	\$434,770,000	\$132,150,000	\$566,920,000
Landscaping Estimate	\$4,440,000	\$1,340,000	\$5,780,000
ITS Estimate	\$5,930,000	\$3,850,000	\$9,780,000
Toll Integration Estimate	\$5,770,000	\$3,470,000	\$9,240,000
Specialized Contract Total	\$16,140,000	\$8,660,000	\$24,800,000
<b>Design-Build Contract Total</b>	<b>\$450,910,000</b>	<b>\$140,810,000</b>	<b>\$591,720,000</b>
<b>NCTA Costs</b>			
Right-of-Way	\$201,410,000	\$23,970,000	\$225,380,000
Right-of-Way Negotiation	\$2,220,000	\$550,000	\$2,770,000
Subtotal	\$203,630,000	\$24,520,000	\$228,150,000
Utility Relocation	\$14,600,000	\$4,000,000	\$18,600,000
NCTA Construction Oversight	\$13,910,000	\$5,050,000	\$18,960,000
NCTA Administrative	\$3,270,000	\$670,000	\$3,940,000
Environmental Mitigation **	-	-	-
D-B Stipends & Incentives	\$3,550,000	\$1,850,000	\$5,400,000
Subtotal	\$35,330,000	\$11,570,000	\$46,900,000
<b>NCTA Total Costs</b>	<b>\$238,960,000</b>	<b>\$36,090,000</b>	<b>\$275,050,000</b>
<b>Project Segment Total Costs</b>	<b>\$689,870,000</b>	<b>\$176,900,000</b>	<b>\$866,770,000</b>
<b>Total Project Cost</b>			<b>\$866,770,000</b>

\* Contractor bids were based on fuel and asphalt binder prices as of July 1, 2008. Prices for these commodities have since dropped substantially. The Contractors' prices will be adjusted according to the current commodity price at the time certain construction activities occur. The scenario shown in this table assumes a 25% increase above March 2009 prices. The adjustments shown here are negative due to the substantial decrease in prices that has occurred since July 2008.

\*\* The Environmental Mitigation costs have been borne by NCDOT and will not be repaid by NCTA as part of this project.

# Memorandum



HNTB, North Carolina, PC  
343 East Six Forks Rd Suite 200  
Raleigh, North Carolina 27609

To: Mr. Grady Rankin  
NCTA Chief Financial Officer

Date: April 14, 2009

From: Spencer Franklin, P.E., P.T.O.E.

Seal

Subject: **ADDENDUM 1** – Triangle Expressway Project  
Engineering Report, dated and sealed March 20, 2009



*Spencer T. Franklin*  
4-14-2009

Please find attached one revised sheet for insertion into the Triangle Expressway Project Engineering Report, dated and sealed March 20, 2009. The attached sheet replaces Appendix F, Sheet 2 of 2, "Revised Cost Estimate Summary".

The cost summary table has been revised to reflect the latest assumptions regarding the price adjustment contingencies for diesel fuel and asphalt binder. At the time the bids were submitted, prices for these commodities were at near record levels. The contingency fund in the original cost estimate summary was based on these prices, plus an additional ten to fifteen percent annual escalation during construction. Diesel prices dropped from \$4.0016 per gallon in July 2008 to \$1.3685 per gallon in March 2009. Similar price reductions have occurred for asphalt binder. The revised cost estimate included in Appendix F incorporates the assumption that prices for these commodities will increase 25% above March 2008 levels. The net result is a \$35.76M decrease in the project cost estimate.

If you have any questions or need additional information, please contact me at (919) 424-0461.

**Revised Cost Estimate Summary**  
**Based on 8-5-08 Bid Opening and Updated Fuel Price Adjustment Assumptions**

Item	Cost		
<b>Design-Build Construction</b>			
Segment	Western Wake Freeway	Triangle Parkway & Northern Wake Expressway	Total
Highway D-B Contract Total	\$446,460,000	\$137,450,000	\$583,910,000
Adjustment based on anticipated lower fuel/asphalt binder prices*	-\$11,690,000	-\$5,300,000	-\$16,990,000
Highway D-B Contract Total	\$434,770,000	\$132,150,000	\$566,920,000
Landscaping Estimate	\$4,440,000	\$1,340,000	\$5,780,000
ITS estimate	\$5,930,000	\$3,850,000	\$9,780,000
Toll Integration estimate	\$5,770,000	\$3,470,000	\$9,240,000
Specialized Contract Total	\$16,140,000	\$8,660,000	\$24,800,000
<b>Design-Build Contract Total</b>	<b>\$450,920,000</b>	<b>\$140,810,000</b>	<b>\$591,730,000</b>
<b>NCTA Costs</b>			
Right of Way	\$201,410,000	\$23,970,000	\$225,380,000
Right-of-Way Negotiation	\$2,220,000	\$550,000	\$2,770,000
Subtotal	\$203,630,000	\$24,520,000	\$228,150,000
Utility Relocation	\$14,600,000	\$4,000,000	\$18,600,000
NCTA Construction Oversight	\$13,910,000	\$5,050,000	\$18,960,000
NCTA Administrative	\$3,270,000	\$670,000	\$3,940,000
Environmental Mitigation	\$8,380,000	\$2,410,000	\$10,790,000
D-B Stipends & Incentives	\$3,550,000	\$1,850,000	\$5,400,000
Subtotal	\$43,710,000	\$13,980,000	\$57,690,000
<b>NCTA Total Costs</b>	<b>\$247,340,000</b>	<b>\$38,500,000</b>	<b>\$285,840,000</b>
<b>Project Segment Total Costs</b>	<b>\$698,260,000</b>	<b>\$179,310,000</b>	<b>\$877,570,000</b>
<b>Total Project Cost</b>			<b>\$877,570,000</b>

\* Contractor bids were based on fuel and asphalt binder prices as of July 1, 2008. Prices for these commodities have since dropped substantially. The Contractors' prices will be adjusted according to the current commodity price at the time certain construction activities occur. The scenario shown in this table assumes a 25% increase above March 2009 prices. The adjustments shown here are negative due to the substantial decrease in prices that has occurred since July 2008.

North Carolina Turnpike Authority

Triangle Expressway Project  
Engineering Report



*Spencer T. Franklin*  
3-20-2009

March 20, 2009

Prepared by:

HNTB Corporation

**HNTB**

North Carolina Turnpike Authority  
Triangle Expressway Project  
Engineering Report

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North Carolina Turnpike Authority

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# North Carolina Turnpike Authority Triangle Expressway Project Engineering Report

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## **EXECUTIVE SUMMARY**

### **I. INTRODUCTION**

This report documents and describes the location, preliminary engineering design features, construction cost estimate, projected operation and maintenance expenses, and a construction schedule for the Triangle Expressway. This project is a new turnpike on new location that will be constructed by 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 House Bill 644 created the NCTA. Since then, legislation has been enacted to further define the powers of NCTA, and to increase the number of studied projects. In addition, the North Carolina Legislature specifically allowed a portion of the Northern Wake Expressway to be included as part of the Triangle Expressway toll facility if permitted by the local Metropolitan Planning Organization. This permission was granted in July, 2006, and the section is now part of the proposed project presented within this report.

The Triangle Expressway project has been in various stages of planning and design since the late 1980's. The main purpose of the Triangle Expressway is to reduce traffic congestion along NC 55 and NC 54 within the counties of Wake and Durham near Research Triangle Park and provides a new location facility. The project is located on new alignment between the major cities of Raleigh, Durham and Chapel Hill and will improve area-wide mobility and safety, as well as enhance development and the quality of life for the Triangle region (See Figure 1).

Schematic designs have been developed and the Triangle Expressway project has been scheduled for construction by the NCTA as the first constructed turnpike project by the Authority. The project will extend NC 147, the Durham Freeway, from the current I-40 interchange to the Raleigh Outer Loop (NC 540/I-540). This segment will connect with the already constructed Northern Wake Expressway (NC 540) which will be modified to provide tolling as a part of this project. In addition, a western portion of the Raleigh Outer Loop will be constructed from NC 55 in Research Triangle Park south to the NC 55 Bypass in Holly Springs. The proposed Triangle Expressway project is a composition of projects identified in North Carolina Department of Transportation's (NCDOT's) State Transportation Improvement Program (STIP). The Western Wake Freeway, from NC 55 (South) to NC 55 (North), is included as project R-2635 in the NCDOT 2007-2013 STIP. The Triangle Parkway, from NC 540 to I-40, is included as Project U-4763B in the 2007-2013 STIP. Both of these projects are now listed as NCTA projects and both are scheduled for construction upon availability of funding).

The Western Wake Freeway project is located entirely within the Capital Area Metropolitan Planning Organization (CAMPO) boundaries. Triangle Parkway is located in both CAMPO and the Durham-Chapel Hill-Carrboro Metropolitan Planning Organization (DCHC MPO). Both project components are listed in their respective MPO's 2030 Long Range Transportation Plans (LRTP). (Note: Currently both LRTPs are being updated to 2035 and have been approved in a draft form with finalization scheduled for June 15, 2009. Both project components remain listed appropriately in the draft 2035 LRTPs.) With the creation of the NCTA, the Authority studied the feasibility of the project as a toll road and has now assumed responsibility for the construction of the Triangle Expressway. This will enable the project to be implemented faster than could be expected under the normal NCDOT implementation process. The sale of turnpike revenue bonds will be used as the primary source to finance the design and construction of the Triangle Expressway project. In addition to the revenue bonds, funding is expected to be received via a loan as a result of the Federal TEA-21's Transportation Infrastructure Finance and Innovation Act of 1998 (TIFIA) and continued by SAFETEA-LU. The TIFIA loan office, established by the Office of the Secretary of Transportation (OST), Federal Highway Administration (FHWA), Federal Transit Administration (FTA) and Federal Rail Administration (FRA) provides federal credit assistance to large-scale highway, transit, passenger rail and intermodal projects. A TIFIA loan can be used by public or private transportation sponsors to complete a project's funding package. NCTA is completing the TIFIA application and is confident in obtaining a subordinate loan. Furthermore, it is anticipated that a gap in funding will exist between the required construction costs and the available loan amounts via these two sources. Therefore, NCTA has requested and received gap funding from the North Carolina Legislature on an annual basis in the amount of \$25 million.

The Triangle Expressway's design and construction will be accomplished through a series of two design-build roadway contracts and three design-build specialty contracts for landscaping, intelligent transportation system, and toll integration. The design-build contracts will require a guaranteed price and completion schedule as part of the process. This will allow the Triangle Expressway project to be completed much more quickly than a traditionally implemented and financed NCDOT project. A geometric design criteria synopsis for the project is listed in Appendix A and roadway typical sections are provided in Appendix B.

## **II. PROJECT DESCRIPTION**

The proposed Triangle Expressway project is located in Wake and Durham Counties on new alignment. The project limits extend south from NC 147/I-40 interchange in the Research Triangle Park to Northern Wake Expressway, and then northeast to the Northern Wake Expressway (NC 540)/ NC 54 interchange and to the south to NC 55 Bypass in Holly Springs.

The Triangle Expressway project is located at an approximate 18 mile radius from downtown Raleigh in an arc from the northwest to the southwest. The Triangle Parkway segment spokes outward paralleling I-40 towards Chapel Hill. The corridor is approximately 18.8 miles in length and includes interchanges at NC 147/ I-40, Hopson Road/Davis Drive, NC 54, NC 55, Green Level Road, US 64, US 1, Old US 1, and NC 55 Bypass. Grade separations will be provided between the toll road and several local roads and small streams, as well as a single mainline CSX railroad on realigned alignment. The construction is expected to be typical for the area with structures limited to normal grade separations and flyovers. Much of the length of the Triangle Expressway project is on

undeveloped land; however, significant growth is occurring in this area and growth is projected by the CAMPO to continue into the future. CAMPO approved the project as a toll road on May 16, 2007. A Memorandum of Understanding outlining the commitments of both parties with respect to the Triangle Expressway was signed on June 25, 2007 (See Appendix C).

The NCTA has planned the development of the Triangle Expressway project in a single phase without planned project extensions. Due to the division of construction, a phased tolling of the project is anticipated. Once construction of the Triangle Parkway portion and toll plazas on the Northern Wake Expressway is complete, NCTA anticipates tolling this 6.2 mile section while construction is being completed on the 12.6 mile Western Wake Freeway section.

A portion of the Triangle Expressway project from NC 54 to NC 55 has been funded by NCDOT and was completed in the summer of 2007 as part of NCDOT's STIP. This segment does not currently include provisions for tolling. The toll facilities will be installed, constructed and financed by the NCTA. In addition, supplemental through-lane construction will be implemented from Triangle Parkway to existing NC 147 to facilitate the transition. See Figures 1 & 2 for the project location and anticipated toll collection locations.

### **III. PROJECT COST AND SCHEDULE**

The Triangle Expressway project will be constructed utilizing a series of five design-build contracts – two for general roadway construction on specific segments, and three specialized contracts for landscaping, toll integration and intelligent transportation system integration. The design-build contractors will provide subcontracted construction engineering and inspection services. NCTA, however, will provide independent oversight with their construction management consultant. All contractors performing NCTA work shall be prequalified with the NCDOT to ensure capable firms are employed with a history of satisfactory work performance.

Based upon the preliminary designs prepared by NCTA and NCDOT for the project, the total construction cost including NCTA administrative costs through construction is \$955.1 million. The five design-build contracts are estimated to be: 1) Triangle Parkway Roadway & Northern Wake Expressway Toll Plaza Construction – \$135.8 million; 2) Western Wake Freeway Sections A, B & C Roadway Construction – \$509.3 million; 3) Landscaping – \$5.9 million; 4) ITS – \$8.1 million; and 5) Toll Integration – \$13.6 million. The NCTA costs which include general engineering, right of way acquisition, utility relocations, environmental mitigation, construction oversight, feasibility studies, environmental planning and permitting, surveying and mapping is estimated at \$282.4 million for the project.

The construction contracts for the Triangle Expressway are scheduled to be executed immediately following financial close. Shortly after the construction contracts are executed, subsequent contracts will be issued for ITS, toll system integration, and landscaping over the next six months. NCTA has structured the contracts to enable a phased tolling to begin as early as possible. The Triangle Parkway and Northern Wake Expressway segments are expected to be open to toll traffic 30 months from the date of financial close. The system wide completion date, including Western Wake Freeway, is expected 42 months from the date of financial close.

# TRIANGLE EXPRESSWAY

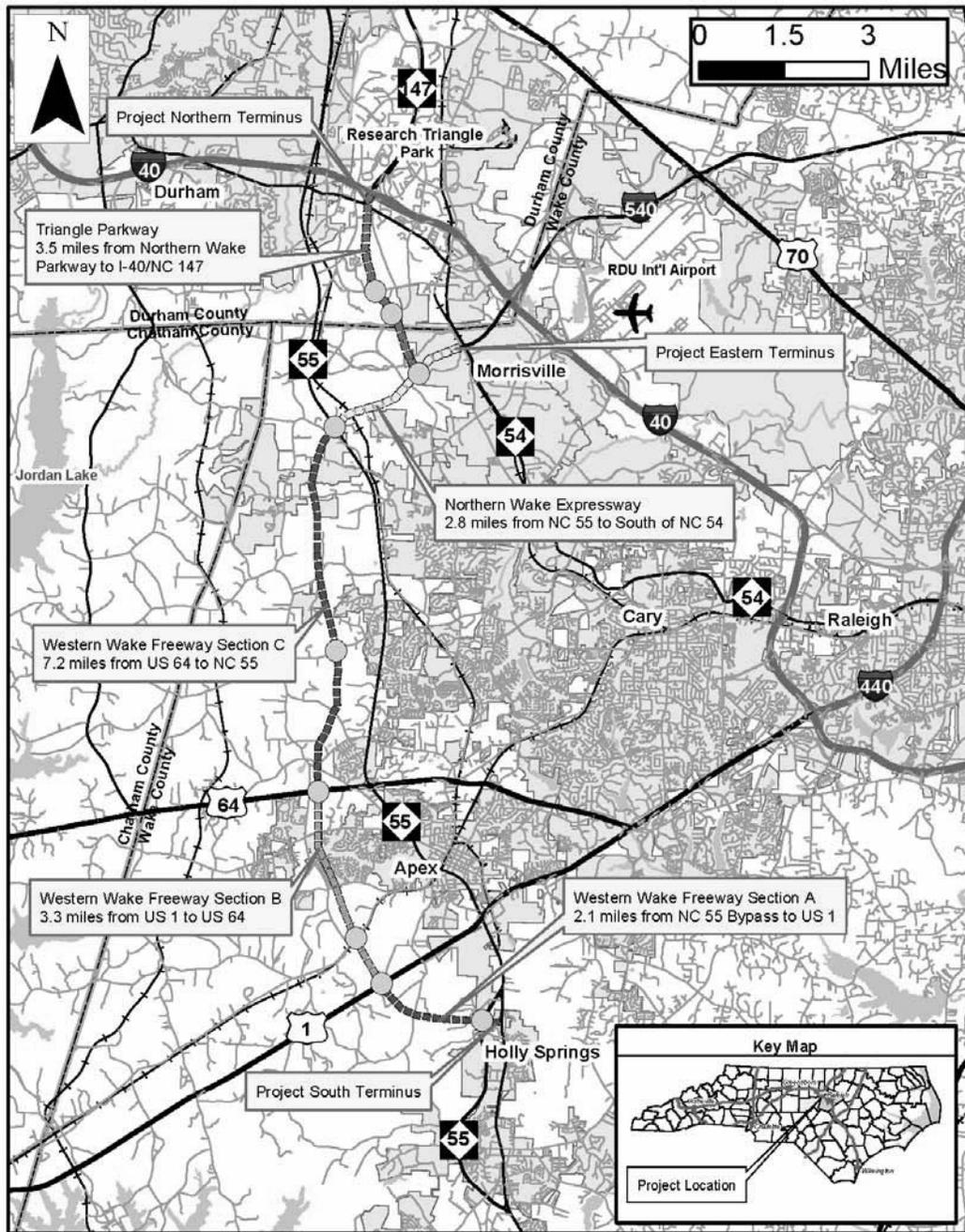
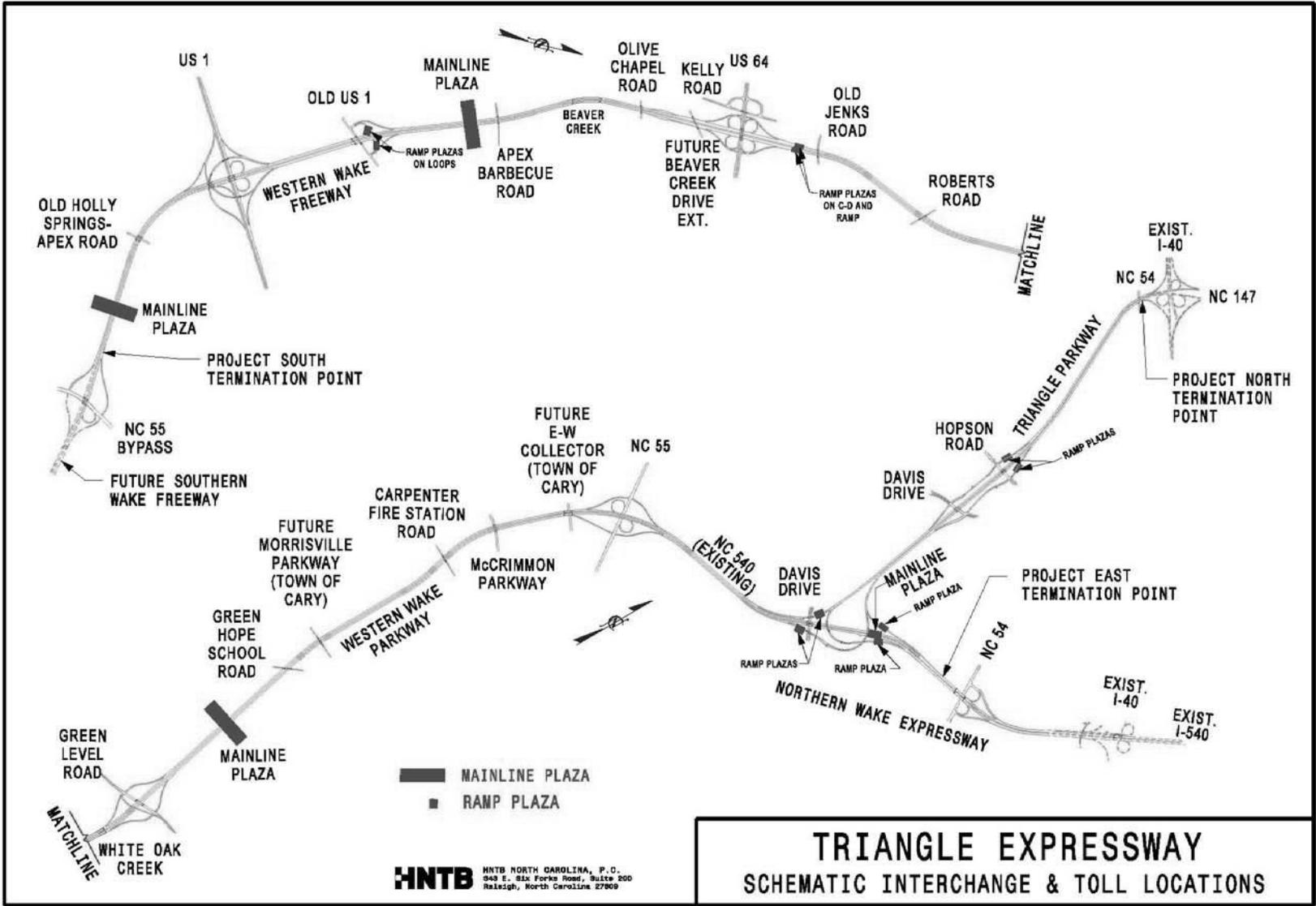


Figure 1 - Project Map

Figure 2 - Schematic Interchange and Toll Layout Sketch



# North Carolina Turnpike Authority

## Triangle Expressway Project

### Engineering Report

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#### **I. INTRODUCTION**

The North Carolina Turnpike Authority (NCTA) is authorized to study, plan, develop and undertake design work on up to nine toll roads in the State of North Carolina. The first toll project, Triangle Expressway, combines three separately planned and environmentally studied projects in the same area, Triangle Parkway, a portion of Northern Wake Expressway and Western Wake Freeway into a single financial bond offering. Individually, two projects were identified by the Capital Area Metropolitan Planning Organization (CAMPO) in their 2007-2013 Project Priority List, released in November of 2005. The Western Wake Freeway was listed as the number two priority and Triangle Parkway as the number eight highest priority project to be implemented in order to meet the mobility needs of the expanded metropolitan area boundary which includes Wake County and portions of Harnett, Franklin, Granville and Johnston counties. The Triangle Parkway portion of the Triangle Expressway is within the Durham-Chapel Hill-Carrboro Metropolitan Planning Organization (DCHC MPO) and CAMPO. In addition, the Regional Transportation Alliance (RTA), an organization whose membership includes over 100 of the leading area businesses and 22 area Chambers of Commerce, fully supports the acceleration of the Triangle Expressway through the use of toll revenue.

The cities of Raleigh, Durham and Chapel Hill, with their pleasant qualities of life, cutting edge employment opportunities in the Research Triangle Park, and renowned universities are continually growing with new residents. The Raleigh-Cary area has grown 10.5% from 2000 to 2003 to a population of nearly 884,000, making it the eleventh fastest growing metropolitan area in the United States during the period<sup>1</sup>. According to the latest U.S Census data, growth in the region is expected to increase 98% between 2002 and 2030<sup>2</sup>. CAMPO employment data indicates approximately 396,000 people were employed in the region in 2002 with forecasts of 541,000 people in 2010, 749,000 in 2020 and 951,000 in 2030<sup>3</sup>. In 2007, CNN's Money.com ranked the Triangle area third in providing the "Best Jobs in the Hottest Markets" and was noted as the top region for technology workers with "one of the most highly educated workforces in the country" with a diverse economy and a large public sector base. In the February 2007 edition of Forbes Magazine, Raleigh, North Carolina topped the list of the best places in the US to find a job. Forbes compiled the list by ranking unemployment rates, job growth, income growth, median household incomes and costs of living in the nation's 100 largest metropolitan areas. These rankings are not unusual for the area. Raleigh and the Research Triangle area have perennially been rated as one of the top places to work and live in the US since the early 1980's. With this rapid increase in population and employment, a

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<sup>1</sup> US Census Table 1 –Population change in the 20 Fastest-Growing Metropolitan Statistical Areas: 2000-2003; [http://www.census.gov/Press-Release/www/2005/2003msas\\_table1.xls](http://www.census.gov/Press-Release/www/2005/2003msas_table1.xls)

<sup>2</sup> CAMPO Socioeconomic Data Population Summary V-2004-02-26, [http://www.campo-nc.us/SEDATA/CAMPO\\_SE\\_DATA-SEC04-POP\\_SUM-V2004-02-26.pdf](http://www.campo-nc.us/SEDATA/CAMPO_SE_DATA-SEC04-POP_SUM-V2004-02-26.pdf)

<sup>3</sup> CAMPO Socioeconomic Data v-04Feb11 Employment Summary, [http://www.campo-nc.us/SEDATA/CAMPO\\_SE\\_DATA-SEC02-EMP\\_SUM-V2004-02-13.pdf](http://www.campo-nc.us/SEDATA/CAMPO_SE_DATA-SEC02-EMP_SUM-V2004-02-13.pdf)

proactive plan for the areas transportation system must be developed to adequately address the corresponding increase in travel demand. The Triangle Expressway is a key component of the regional transportation plan.

One of the driving forces behind much of the area's development is the Research Triangle Park. The Research Triangle, so called because it is centered near three major universities, and their respective cities, is a public/private, planned research park created in 1959 by leaders from business, academia and industry. The proposed Triangle Expressway will provide a critical link for commuters from the Park to communities to the north, south, and east.

With the significant increase in population in the Triangle area, a great burden has been placed on the existing roadway infrastructure. The North Carolina Department of Transportation (NCDOT) anticipated the growth and included these projects in the State Transportation Improvement Program (STIP). However, the State is currently experiencing significant funding shortages for highways, in part, due to rising global construction costs. The Triangle Parkway and Western Wake Freeway are shown to be unfunded in the 2007 STIP, which plans for the next seven years. Using NCDOT's traditional funding mechanisms to construct the combined Triangle Expressway project may take 20 years or more. Constructing Triangle Expressway as a toll facility will begin alleviating the areas congestion in approximately three years time.

The high population growth rate and the associated economic development in the Research Triangle area of North Carolina have outpaced the existing infrastructure's capacity to meet present and projected transportation needs. There is a need for this project, and the need is not solely based on future projections, but on the region's current mobility crisis. The project will result in a less congested and more economically productive transportation system for the Research Triangle area of North Carolina.

## **II. NORTH CAROLINA TURNPIKE AUTHORITY ORGANIZATION**

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 of 2002, North Carolina House Bill 644 provided an act to authorize public toll roads and bridges and the creation of a public agency, the NCTA. The NCTA is administratively associated with NCDOT but exercises powers independently, in most aspects. Initially, the bill limited the number of projects to be constructed to three with additional studied projects limited to three. However, House Bill 253 in August 2005, increased the allowable number of studied projects to a maximum of nine. As the Triangle Expressway evolved, the final section of the Northern Wake Expressway roadway project was under construction. Logistically, this segment would provide a critical link from the Triangle Expressway to I-40 to the north suburbs. However, existing state legislation prevented the conversion of the non-tolled State Highway System to a toll facility. To permit the joining of this portion to the Triangle Expressway project as a toll facility, Senate Bill 1381 in August, 2006, made a specific exemption for the segment of Northern Wake Expressway from NC 55 to I-40 if approved by the local Metropolitan Planning Organization. The Bill also limited the construction of the nine previously authorized planned projects to six specific projects – two of which were Triangle Parkway and Western Wake Freeway in Wake and Durham Counties which now make up the Triangle Expressway.

The NCTA is governed by a 9-member Authority Board. Four representatives are appointed by the General Assembly - 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 Authority Board is responsible for appointing an Executive Director, the chief administrative officer who is charged with the daily administration of the Authority.

The Board of Directors has been organized into four working committees:

- **Executive Committee:** Coordinates responsibilities and actions of other committees and reviews proposals that are to be presented to the Board.
- **Finance Committee:** Oversees the fiscal well-being of the NCTA and its projects.
- **Operations and Personnel Committee:** Oversees all operational aspects of each project, staffing plans, communications and public information efforts.
- **Plans and Programs Committee:** Oversees the environmental, design and construction of each project including schedule, and cost and revenue projections.

## **A. Management and Administration**

Management and administrative policies and procedures have been established to ensure that the operation of the NCTA is carried out in accordance with State law and the requirements of the trust indenture securing the bond financing. The staff of the NCTA ultimately will be responsible for the operation of all facilities of the NCTA, including the Triangle Expressway project. It is anticipated that each aspect of operations, including administration, finance, auditing and accounting, purchasing, toll collection, enforcement, safety and security, and maintenance will have its own policies and procedures. These policies and procedures will be refined and modified, as required, to accommodate the particular requirements as the NCTA is developed into the future.

## **B. Organizational Structure**

The operations of the NCTA are managed by the Executive Director who is appointed by the Board. The Executive Director serves as the chief administrative officer of the NCTA. The Board meets regularly to review, discuss and determine policies affecting the operation and maintenance of the NCTA. The Executive Director reports directly to the Board. The Executive Director has overall responsibility for the operation and maintenance of NCTA facilities, as well as serving as the primary point of contact for NCTA in all dealings with the public and the liaison for all interagency communication and coordination.

The staff of the NCTA is organized into six functional departments, the managers of which will report to the Executive Director: Administration, Finance, Operations, Communications/Outreach and Community Affairs, Engineering and Legal Affairs. Certain functions necessary for the operation of the Authority's facilities, including toll collection, operation, maintenance, law enforcement, auditing and accounting, initially are being contracted out by the NCTA. These contracted activities, however, will be managed and closely monitored by NCTA staff or their consultants. An organizational structure showing the required functional areas follows.

**Administration**, under the direction of the Executive Director who is the chief administrative officer, will be responsible for the daily administration of the toll roads and bridges constructed, maintained and operated. The Director shall appoint, dismiss, and within Board limits, fix the compensation of administrative employees.

**Finance**, under the direction of the Chief Financial Officer, will be responsible for the overall financial activities for the NCTA, including traffic and revenue project studies, bond underwriting activities, bond legal matters, public/private partnerships (P3) issues, purchasing, investments and budget development. This department will manage all financial matters of the NCTA, including investment of funds, budgeting, accounting, auditing and bondholder reporting.

**Operations**, under the direction of the Chief Operating Officer, will be responsible for all toll operations and maintenance activities on NCTA facilities. Toll operations will consist of management of the toll system operations, including system operations and personnel, administration, including toll collection control, toll tag sales, violation enforcement and administration including audit and accounting, toll system maintenance, and toll facilities maintenance. Operations will process all requests for and will administer the procurement of materials, supplies and equipment for the NCTA. System maintenance will involve mowing and vegetation control, property damage repairs (primarily guardrail and signs), litter control, drainage maintenance and repairs, roadway lighting, and minor improvements.

Staff members of the Operations Department also will be responsible for safety, traffic control and law enforcement, and communications on the Triangle Expressway. The Chief Operating Officer will serve as liaison and will administer contracts with the toll collection system operator, data processing management, toll collection systems maintenance contractor, toll auditor, toll tag sales contractor, roadway maintenance contractor, police and emergency services, and the communications system maintenance contractor.

**Communications/Outreach and Community Affairs**, under the direction of the Director of Communication and the Director of Outreach and Community Affairs, will be responsible for the overall public relations activities for the NCTA, including the marketing of toll tags and public involvement efforts.

Public involvement policies and procedures will govern the flow of information from the NCTA and facility operators to the public. Initial responsibilities of the Outreach and Community Affairs Director will be to notify the public of the opening of the toll facility and the operational characteristics of the facility. Advertising and marketing to encourage the use of the facility, including the electronic toll payment, will also be the responsibilities of the Director, both initially and during the course of operations of the facility.

All public involvement and marketing activities will be coordinated through the Executive Director and the NCTA. The NCTA will utilize the services of a consultant specializing in public relations and marketing to properly develop and coordinate a marketing plan and to disseminate information.

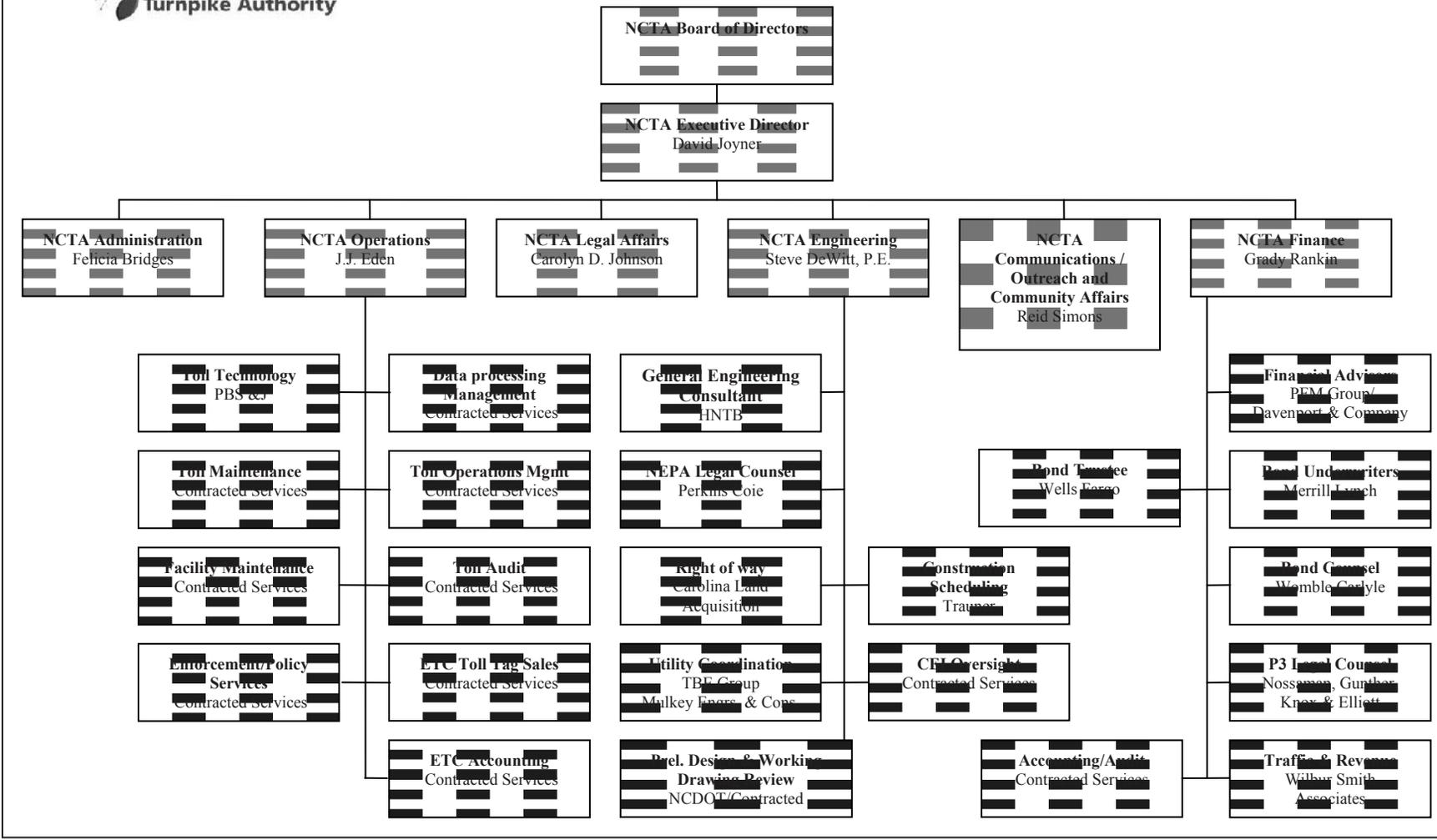
**Engineering**, under the direction of the Chief Engineer, will be responsible for initial project studies, including environmental studies and preliminary designs for design-build advertisement, and construction of toll projects. Final design and construction of projects is

expected to use a design-build process. Engineering will be responsible for preparing specifications, bid packages, plans and standards, engineer's construction cost estimates and review and approval of the design-builder's prepared plans. The Chief Engineer is expected to complete acquisition of all necessary lands and rights of way required of an Authority project as well as coordination with utility owners to relocate and/or install utility facilities involved with the project. In addition, Engineering will be responsible for management of the contracted services of the general engineering consultant and, should the need arise, emergency engineered repairs. The Director of Construction, who reports to the Chief Engineer, will be responsible for instituting a comprehensive construction engineering and inspection services program along with participating in design-build preparation. Due to the complexity of the requirements of the National Environmental Policy Act (NEPA) and the influence upon scheduled projects, the Chief Engineer will also be responsible for coordination with the NEPA legal counsel.

**Legal Affairs**, under the supervision of the General Counsel, will be responsible for handling all legal challenges that face NCTA in a decisive manner. The General Counsel will provide advice to the Executive Director regarding all legal matters performed within or involving NCTA, render opinions about appropriate professional standards, standards of conduct involving NCTA personnel, coordination of significant legal issues including litigation involving NCTA, and establish NCTA policy on general legal issues.

For the initial operations of the Turnpike Authority, the NCTA has employed or is actively pursuing the employment of key staff to successfully implement the purpose of NCTA. The Executive Director, the Chief Financial Officer, the Chief Operating Officer, the Chief Engineer, Director of Construction, the Director of Outreach and Community Affairs, and the General Counsel have been hired with other supporting staff members. See Figure 3 for the NCTA Organization Chart. As the NCTA develops and matures, any number of the functions will be managed by additional in-house staff or supplemented by additional contracted services, as needed.

**North Carolina Turnpike Authority (NCTA)  
Organizational Chart**



**Figure 3 - NCTA Organization**

### **III. TRIANGLE EXPRESSWAY PROJECT DESCRIPTION**

The Triangle Expressway is a part of the transportation improvement program of highways within the Triangle Area and the heart of North Carolina. The project will extend the existing Durham Freeway (NC 147) to and will include a portion of the planned overall outer beltway system planned to encircle the Raleigh, North Carolina area. The project will provide alternative access to the Research Triangle Park from southern and western Wake County as well as easier access from northern Wake County from the already completed portion of NC 540/I-540 Outer Loop and Durham County from NC 147 (see Figure 1). The project is on new location except for the toll construction associated with the already constructed section of the Northern Wake Expressway.

The Triangle Expressway is a six lane divided, fully access controlled, north-south tolled highway on new alignment approximately 18.8 miles in length. It is located in southern Durham County and western Wake County; however, the majority of the project (16.4 miles) is in Wake County. It extends from the I-40/NC 147 interchange in Durham County to NC 55 Bypass near Holly Springs. The project generally parallels NC 55, a two to four lane facility which is the primary free route serving the area. The proposed Triangle Expressway is comprised of three components:

- 1) Triangle Parkway will extend from NC 147 at I-40 south 3.4 miles, terminating at an interchange with the Northern Wake Expressway;
- 2) A 2.8 mile long segment of the Northern Wake Expressway (NC 540) from NC 54 to NC 55. This segment of the Raleigh Outer Loop is being transferred to NCTA in support of this project. This 2.8 mile long segment was completed and opened to traffic in July 2007 by the NCDOT with TIP funds will enable Triangle Parkway and Western Wake Freeway to function as a contiguous toll facility;
- 3) Western Wake Freeway connects with Northern Wake Expressway and will extend from a northern junction with NC 55 near Research Triangle Park to a southern junction with NC 55 Bypass near Holly Springs, for a distance of 12.6 miles. For design purposes, this project was divided into segments A, B and C.

The proposed Triangle Expressway will have controlled access interchanges with the following roads: NC 147/ I-40, Hopson Road/Davis Drive, NC 54, NC 55, Green Level Road, US 64, US 1, Old US 1, and NC 55 Bypass (see Figure 2). Grade separations will be provided between the toll road and several local roads and streams, as well as a single mainline CSX rail line on realigned alignment. The construction is expected to be typical for the area with structures limited to normal grade separations and flyovers. The northern terminus will require widening of NC 147 at the existing I-40 interchange to provide adequate through movements with the toll road. The eastern terminus of the Triangle Expressway is southwest of the NC-540/NC 54 existing interchange and permits entry to/from the already constructed portion of the Northern Wake Expressway (NC 540). The southern terminus will be at the NC 55 Bypass near Holly Springs. The NCDOT is currently studying the Southern and Eastern Wake Freeway segments in order to complete the Raleigh Outer Loop. Construction of this final portion would necessitate the continuation of the through lanes of the Triangle Expressway project to connect with the loop. The future funding source and timeline of the Southern Wake Freeway is uncertain but could conceivably be studied as an NCTA project. The Southern Wake Expressway would extend the system an additional 16 miles from NC 55 Bypass east to I-40 south of Raleigh. Once both portions of the facility are constructed, the system will provide an attractive new route allowing through motorists to avoid increasingly congested sections of I-40 through south and west Raleigh.

NCDOT has identified two future projects which would require additional construction funded by NCTA within the Triangle Expressway Project. The two projects are: the potential widening and interchange improvements at the I-40/NC 147/Triangle Parkway Interchange; and the Triangle Parkway extension from the NC 540/ Triangle Parkway interchange to McCrimmon Parkway (STIP U-4763A). The Project Specific Agreement between NCDOT and NCTA (see Appendix D, page 23) requires NCTA to fund a portion of these projects if certain traffic and financial performance conditions occur. The provisions may further constrain the issuance of further bonds (other than refinancing of the original bonds) if the traffic conditions occur.

The proposed cross section will consist of six mainline travel lanes with inside and outside shoulders divided by a median. Mainline travel lanes will be 12' in width, with 12' minimum inside and outside shoulders. The median is 46' in width on the Triangle Parkway, 60' in width on the Northern Wake Expressway, and 78' for the Western Wake Freeway. All medians will be capable of accommodating future expansion of the main travel way if deemed prudent at some later date.

#### **IV. PROJECT IMPLEMENTATION**

The construction of Triangle Expressway is to be completed using the design-build method of contracting. Request for Qualifications for each roadway contract were received on January 10, 2008, and three short-listed teams were announced in late January, 2008. The Teams submitted Technical Proposals presenting their design details and schedules to NCTA in July 2008 for evaluation based upon the project rating criteria. A "no later than" scheduled completion date will be provided by NCTA and shorter schedules will be encouraged by cost incentives through the use of quality credit. The technical score will be assigned a quality credit as set forth in the request for proposals. The sealed price proposals will then be opened and the quality credit applied. The contractor selection will be based upon the composite price developed from the price proposal and quality credit.

(Note: Prior to the completion of this report, the sealed construction price proposals were opened. The bid results and an updated project cost summary are presented in Appendix F).

The project consists of five major roadway segments: Triangle Parkway, a southwestern portion of the Northern Wake Expressway, and Western Wake Freeways segments A, B and C. Prior to becoming a NCTA toll project, all components except for the Triangle Parkway were in various stages of study/design/construction as NCDOT projects. Preliminary plans were provided to the design-build teams as the project basis; however, the contractor will be responsible for final design of the project within the project criteria and specifications.

Roadway construction is expected to be let in two contracts: 1) Triangle Parkway construction and Northern Wake Expressway improvements; 2) Western Wake Freeway. In addition, three specialized contracts will be let with a similar design-build process for: 1) landscaping; 2) intelligent transportation system integration; and 3) toll system integration. Construction award for the projects is scheduled to be executed immediately following the financial closing date. Substantial completion of construction and the opening of the Triangle Parkway to toll traffic are anticipated to occur 30 months following the availability of funds. The Western Wake Freeway project is expected to open to toll traffic approximately one year later, or 42 months following financial close.

A portion of the Triangle Expressway project from NC 54 to NC 55, a part of the Northern Wake Expressway, was constructed by NCDOT and opened to traffic in July 2007. The toll facilities that will be installed on this section will be constructed and financed by the NCTA as part of the Triangle Expressway project. See Figure 2 for the location and extent of these elements.

The NCTA is implementing a comprehensive and proactive Project Management and Compliance Monitoring Plan for the project, designed to ensure that planning, design, right of way (ROW) acquisition, construction, operation and maintenance of the project meet all applicable federal, state and local laws and regulations (including the requirements generated by the NEPA process, as well as the design and construction standards and specifications). The NCTA will continue to implement and maintain this comprehensive and proactive Project Management and Compliance Monitoring Plan using several procedures, policies and oversight measures. The Plan includes the following concepts:

- Planning: The initial planning completed for the project was conducted by NCTA and/or the NCDOT. The regional FHWA office has been heavily involved in these projects. The regional FHWA office has been invited to attend all formal project public meetings and hearings. Frequent discussions have also been held with the FHWA to ensure project planning and environmental documents are in compliance with applicable federal statutes and regulations.
- Preliminary Design: Preliminary designs for the project were completed in part by external consultants contracted with the NCTA and in part by NCDOT. Enhancements to the overall design, full definition of the ROW requirements, utility designs, and coordination with the design-build teams will continue until project award. NCTA is coordinating closely with NCDOT's division personnel and design groups.
- Final Design: Final design will be completed by the selected design-build teams as part of the scope for the contracts. As part of the NCTA's management process, they will conduct frequent "over-the-shoulder" design reviews and audits of the project with FHWA and NCDOT to ensure that the project is in compliance with applicable design criteria from the earliest stages of design. The NCTA will utilize the NCDOT and other external consultants as necessary to provide direct oversight of the design-build team's design activities. The design-build teams will be required to complete and document an extensive design review program. The NCTA will be responsible for ensuring proper interagency coordination and oversight of these functions.
- Right of Way Acquisition: To ensure compliance with state and federal laws and regulations concerning ROW acquisition, the NCTA has entered into an agreement with Carolina Land Acquisitions (CLA) for professional services related to ROW acquisition. This ROW acquisition firm has a long history of completing ROW acquisition on state projects, having acquired the land necessary for the roadway on new location for the US 64 Bypass of Knightdale in eastern Wake County, the US 17 Bypass of Windsor in Bertie County and the Fayetteville Outer Loop in Cumberland County. As demonstrated on these very successful projects, CLA has a strong understanding of all state and federal laws and regulations pertaining to ROW acquisition. CLA will be responsible for completing all ROW acquisition within the stated guidelines and schedules.
- Construction: The NCTA will utilize private engineering firm(s) that report directly to the NCTA to provide construction management / construction oversight to manage / oversee the construction phase of the project. Activities will include monitoring and reviewing project documentation to ensure that plans, specifications, standards, reporting, procurement and construction are in compliance with applicable federal and state laws and regulations. The

NCTA's Director of Construction, a position within the NCTA Engineering Department, will be responsible for overseeing these activities. In addition, NCTA through the use of subconsultants and/or the General Engineering Consultant (GEC) will provide independent monitoring of construction to verify construction progress, contractor invoicing and quality of work. Construction engineering and inspection will be a part of the design-build contract. The design-build firm will be responsible for certifying the construction.

- QA/QC Testing: The NCTA will require the selected design-build teams to procure independent quality assurance / quality control firms to provide impartial testing and quality assurance services to the NCTA in connection with the project. The NCTA will designate an internal QA/QC coordinator to review and supervise the QA/QC testing activities. The NCTA's Director of Construction and an assigned QA/QC coordinator will be responsible for supervising the design-build teams as they complete these activities.
- Environmental and Permit Monitoring: The NCTA will require the selected design-build teams to procure an independent consultant to provide impartial environmental and permit monitoring services in conjunction with the project; this will include the monitoring of 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 NCTA will designate an internal environmental coordinator to review and supervise this monitoring program. NCDOT will also be assigned with erosion and sedimentation compliance during design reviews and during construction.
- To date, the NCTA has had frequent internal and external coordination meetings with key project stakeholders and team members to ensure that all potential problem areas are identified and resolved as early as possible.
- The NCTA will have an internal staff project manager for each project element. Work responsibilities will include management of the private sector consultants described above either directly or through the use of a primary engineering consultant/GEC, as well as substantive involvement in monitoring contractor payments and daily progress of the Project.
- The design-build teams will be required to hold weekly progress meetings and submit weekly progress/status reports to the NCTA. These efforts will be maintained throughout the duration of the project to ensure advanced notice of potential issues and early identification of related solutions.
- The NCTA will encourage local FHWA participation throughout development of the project. This intention to work closely with local and national FHWA personnel is consistent with project development to date, which has benefited significantly by local FHWA input. To effect the desired FHWA involvement, the NCTA plans to develop a regular meeting schedule with the local FHWA officials, as well as establish the reporting process in a format acceptable to FHWA.
- The design-build team with oversight from NCTA/NCDOT will provide preliminary railroad realignment track plans and preliminary railroad structure plans to CSX Transportation for review and approval. Final design drawings will also require final approval from CSX prior to construction.

## **V. DESIGN STATUS**

The schematic design for the Triangle Expressway project was prepared in consultation with environmental, regulatory and resource agencies. Subsequently, as part of the design/build implementation of the Triangle Expressway project, the preliminary roadway plans have been provided to the short-listed design-build teams. The design-build teams will be responsible for the engineered final design for the contracts.

Based upon NCTA's anticipated schedule, the Triangle Expressway will begin final design immediately following availability of funds.

The specialized design-build contracts involving landscaping, ITS and toll system integration have been coordinated with the roadway construction design-build schedules.

## **VI. DESIGN STANDARDS**

The Design Criteria for the Triangle Parkway, Northern Wake Expressway and Western Wake Freeway projects are consistent with the current practices and standards of NCDOT and the American Association of State Highway and Transportation Officials (AASHTO). The criteria for the geometric design are presented in summary form in Appendix A. As discussed previously, the facility is a compilation of previous NCDOT STIP projects under various levels of study. The system will be built utilizing the design-build process via two major roadway contracts and three specialized contracts.

### **A. Roadway**

The proposed Triangle Expressway project will be a full controlled access facility and designed for safe operating speeds consistent with similar NCDOT roadway facilities. The design shall be in accordance with the *2004 AASHTO A Policy on Geometric Design of Highways and Streets*, *NCDOT Roadway Standard Drawings (July 2006)*, *NCDOT Roadway Design Manual (2002)*, *NCDOT Roadway Design Policy and Procedure Manual*, *Roadway Design Guidelines for Design-Build Projects*, *NCDOT Standard Specifications for Roads and Structures (July 2006)*, and the *AASHTO Roadside Design Guide 2002*. If the *NCDOT Roadway Design Manual*, the *2004 AASHTO A Policy on Geometric Design of Highways and Streets*, the *NCDOT Roadway Standard Drawings (July 2006)* and/or any other guidelines, standards or policies have desirable and/or minimum values, the facility will be designed for the desirable values. Similarly, in case of conflicting design parameters in the various resources, the proposed design shall adhere to the most conservative values.

The proposed new location facility will be a six lane divided section with a variable width median designed and constructed to meet a 70 miles per hour design speed for a rolling urban freeway. Both inside and outside usable shoulders for the Western Wake Freeway shall be 14 feet, of which 12 feet will be paved. Both inside and outside shoulders will have milled rumble strips for safety. Triangle Parkway will utilize 12 foot usable shoulders due to lower projected truck traffic. The 12 foot inside paved shoulders shall be full depth. The outside shoulder will provide two feet of full depth pavement sloped with the travel lane and eight feet of partial depth pavement. For both sections, one lane ramps shall provide a minimum of 16 foot lane width with all ramps utilizing a 4 foot inside and outside full depth paved shoulders. One lane loops shall provide a minimum 18 foot lane width with

a 4 foot wide full depth paved outside shoulder and inside of loops shall be a 2'-6" curb and gutter edge.

Construction of the Northern Wake Expressway was completed and opened to traffic in July 2007. This concrete roadway is a six-lane divided section with a 60 foot median. The inside shoulders were constructed as a future travel lane. The outside shoulders are 14 feet in width, of which 12 feet are full-depth concrete pavement.

The design and construction of all local cross streets (-Y- Lines), ramps, service roads and cul-de-sacs, providing access, widening and improvements shall be of sufficient length to tie to existing based upon the current guidelines and standards. The -Y- Lines shall be designed for the appropriate speed based upon the functional classification and a speed consistent with the currently posted speed limits.

NCTA plans to obtain the permits required 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 NCTA's proposed design and / or construction method, or utility relocation / construction shall be the sole responsibility of the Design-build teams and will be coordinated with NCTA. NCTA will not allow any contract time extensions associated with obtaining a permit modification, public involvement or additional agency coordination / approvals.

## **B. Pavement**

Paving limits shall satisfy the requirements of the approved project plans. Alternate pavement designs have been performed by NCDOT/NCTA and are presented in the pavement management scope of work in each roadway design-build projects Request for Proposals: Volume 2. The pavement design is expected to consist of the following:

A. Western Wake Mainline: (17.75" concrete based pavement section)

13.00" doweled jointed concrete with 15' uniform joint spacing;  
3.00" B25.0B permeable asphalt base course;  
1.25" SF 9.5A asphalt surface course for drainage membrane;  
Subgrade stabilization;

B. Western Wake inside and outside shoulders: (only single option permitted for project)

Option 1: 13.5" total depth asphalt based pavement section;  
Option 2: 11" total depth concrete based pavement section;  
Option 3: 15.25" total depth roller compacted based pavement section;

C. Edge of Paved Shoulder to face of guardrail:

6" aggregate base course with one lift of asphalt surface course;

D. Triangle Parkway Mainline: (asphalt only based pavement section)

Three Alternates with varying total depth of 14.5" to 18.5";  
Subgrade stabilization;

- E. Triangle Parkway mainline shoulders:
  - Inside Shoulder: Same as mainline pavement;
  - Outside Shoulder:
    - Full depth: same as mainline pavement;
    - Partial depth: Three asphalt based alternates with varying total depth of 9.5” to 18.5”;
  
- F. Edge of Paved Shoulder to face of guardrail:
  - 6” aggregate base course or 3” of B25.0 with one lift of asphalt surface course.
  
- G. –Y-Lines:
  - All are site specific, asphalt based pavement sections with varying total depths of 8” minimum to 25.5” maximum.

To document a critical component of the concrete pavement, the Design-build teams will be responsible for providing a calibrated magnetic imaging device that will record dowel bar location and alignment at a minimum set number of joints. The device will be used as process control and allow the contractor to make the necessary adjustment to ensure the dowels are placed in the correct location in all future pours.

The Design-build teams shall be responsible for design of continuous shoulder drains and outlets for the mainline. The shoulder drain design and outlet locations are to be submitted to the NCTA for review and acceptance. The shoulder drain design shall be in accordance with Standard Drawing 816.02 of the NCDOT- Roadway Standard Drawings.

### **C. Bridge and Wall Structures**

Bridge design and construction criteria will 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 will be HS25 loading. Construction and materials shall be in accordance with NCDOT Standard Specifications for Roads and Structures (July 2006), NCDOT Structure Design Unit Project Special Provisions, NCDOT Structure Design Unit Standard Drawings and any special provisions included in the project requirements. Bridge materials will be non-prestressed cast-in-place concrete, prestressed precast concrete, or steel, based on the design-build teams design and subject to NCTA approval. The design-build team shall submit structure recommendations and design criteria for NCTA, NCDOT and FHWA review and acceptance prior to submittal of the preliminary plans.

### **D. Hydraulics**

All designs shall be 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 “Best Management Practices for Construction and Maintenance Activities–2003” and North Carolina Division of Highways Hydraulics Unit web-site:

<http://www.ncdot.org/doh/preconstruct/highway/hydro/>

For pipes up to 48” in diameter and not located under travelways or curb and gutter, Type S or Type D, HDPE pipe meeting the requirements of AASHTO M294 or Aluminized Corrugated Steel Pipe, Type IR meeting the requirements of Article 1032-3(A)-7 of the NCDOT Standard Specifications may be used instead of Reinforced Concrete Pipe, Class III. Installation of both alternate pipe materials shall conform to the requirements of Section 300 of the Standard Specifications for Method A, except that the minimum cover shall be at least 12 inches.

**NCTA will provide the following material:**

- USACE Individual Section 404 Permit and NCDENR-DWQ Section 401 Water Quality Certification for Western Wake Freeway and Triangle Parkway.

**The Design-build team shall be required to do the following:**

- Hold a pre-design meeting with the NCTA and NCDOT Hydraulic Review Engineer upon acceptance of the Preliminary Roadway Plans.
- Design and install all storm drainage systems within the project limits.
- Provide Stormwater Management Plan using Best Management Practices.
- Provide Culvert or Bridge Survey Reports for structures revised in any way from the provided information.
- Provide any necessary permit modification drawings and calculations.
- Ensure all County ordinances are observed.
- Analyze existing culverts and cross pipes adjacent to the project and within existing ROW. Replace any deficient (structurally and / or hydraulically) pipes and / or culverts.
- Prepare Pre and Post Analysis for increases in discharge and take appropriate action in accordance with the above guidelines to make sure additional drainage is adequately handled.
- Prepare CLOMR packages for all crossings that deviate in any way from those provided. No work shall begin in areas in FEMA floodplains until an approved CLOMR is obtained.
- Prepare LOMR packages for any regulated streams impacted by the design for the NCTA’s submittal to FEMA after project is completed.
- Use pipes with minimum 18” diameter for open-ended pipes and minimum 15” diameter for pipes in enclosed drainage systems throughout the project.

**E. Lighting**

Interchange and toll plaza lighting systems will be installed to promote safety at all major decision points along the Triangle Expressway project corridor. The design criteria for all illumination systems will conform to the latest edition of the AASHTO “*Roadway Lighting Design Guide, 2005*” and amended by 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 NCDOT for conformance with the project requirements.

Continuous roadway lighting is not required on the Triangle Expressway project and will not be installed. Complete interchange lighting will be installed at the NC 55 Bypass ramps, US 1, Old US 1, US 64, Green Level Road, NC 55, NC 540, Hopson Road/Davis Drive, and I-40 ramps. Lighting design will illuminate all ramps, roadway intersections, acceleration/deceleration lanes, and weave/merge locations, unless otherwise noted, to address safety issues. To keep traffic flowing smoothly, the express ORT (open-road tolling) lanes will not be lighted; this approach will de-emphasize the tolling equipment where no driver decisions are required.

Standard design documents have been developed by NCTA and 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 a 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. Design-build contractors will design the systems for economy of installation and maintenance. High mast lighting will be used wherever possible. Pole top lighting standards will be used where required to keep light levels outside of ROW. 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.

## **F. 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 Triangle 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 Triangle Expressway. Special signing in advance of the toll plazas will be used to inform drivers of the various payments options at toll lanes.

The Signing Plans shall be prepared by the design-build teams in accordance with the latest edition of the 2003 Manual on Uniform Traffic Control Devices (MUTCD), the 2004 “NC Supplement to the MUTCD”, NCDOT Standard Specifications for Roads and Structures (July 2006), the NCDOT Roadway Standard Drawings (July 2006) for the design and development of signing plans, the latest Standard Specifications for Structural Supports for Highway Signs, Luminaries, and Traffic Signals published by AASHTO, “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 will be utilized by the design-build teams for these specific signs. All electrical installations and coordination are the responsibility of the design-build teams and must meet NEC, State, and local codes. All electrical / electronics equipment and devices must be UL approved and listed. NCTA will provide the design-build team with a Signing Conceptual Map of the toll road corridor for the design-build team's use in developing its signing plan.

In addition to the required signage, NCTA will provide mile markers every 2/10 of mile on the Triangle Expressway. 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. As part of the environmental

commitments, a minimum of four historical markers for the Green Level Historic District will also be provided.

All overhead sign assemblies shall be designed, fabricated, and installed by the design-build teams and shall meet all NCDOT and NCTA requirements. The wind speed for the overhead sign assembly designs 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 signing or exit directional overhead signs.

NCTA has structured the construction of the facility to reduce the possibility of rework from multiple contractors while permitting heavy construction to be performed by the main roadway design-build teams. Intelligent transportation system supports will be provided by the highway design-builders while the digital message signs will be provided by the ITS design-build team.

## **G. Signals**

The design-build teams shall design and prepare plans for the traffic signal installations. This work shall include, but not be 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 shall be 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*” available on the NCDOT Design-Build website.

The Design-build team shall be responsible for providing the safest and most economical design for the public. The Design-build team shall be responsible for ensuring that all plans and designs conform to the current design standards of the NCDOT Intelligent Transportation Systems & Signals Unit and NCTA. All plans and associated design material and specifications must be reviewed and approved by NCTA before installation.

This work consists of installing ten new traffic signals: one new signal at NC 55 Bypass and eastbound ramps of Triangle Expressway, one new signal at Kelly Road and US 64 eastbound ramp, two signals at Green Level Road at Triangle Expressway Ramps (Northbound and Southbound), two new signals at Old US 1 at Triangle Expressway Ramps (Northbound and Southbound), two new signals at Davis Drive and Triangle Parkway (Northbound and Southbound Ramps), and two new signals at Hopson Road and Triangle Parkway (Northbound and Southbound Ramps). Seven existing traffic signals will be revised: two signals at NC 55 and Triangle Expressway Ramps (Northbound and Southbound), NC 55 Bypass at Technology Drive, Davis Drive at Kit Creek Road, Davis Drive at Hopson Road, NC 54 at T.W. Alexander Drive, and NC 55 Bypass and Old Smithfield Road. Fiber Optic Communications Cable (24-fiber) will be utilized to interconnect the traffic signals. The project will cross a railroad facility and the Design-build team will be responsible for pursuing any necessary agreements with any railroad facility that the communications cable would traverse.

## **H. Landscape and Aesthetics**

Pursuant to NCTA desires and commitments, landscaping and special aesthetics treatments will be provided along the Triangle Expressway corridor and shall account for a combined total of approximately 3% of the total construction cost. The design theme for the corridor has been provided via aesthetic guidelines to the design-build teams. The historical and natural features of the area (including building patterns, style, colors, native stone, and native plants) are being selected to support a design image that should reflect the surrounding natural environment.

The Triangle 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 plazas, were developed by the GEC, working with NCTA staff and Board members. An architectural review committee of community representatives was consulted to assure that the design is appropriate for the context in which the Triangle Expressway will be located. The style and detailing of the aesthetic themes was inspired by historic North Carolina civic buildings, particularly the State Capitol Building in Raleigh and Tryon Palace, the seventeenth-century North Carolina Colonial Governor's mansion located in New Bern. Details and materials from these buildings was adapted in a style that is compatible with the contemporary Research Triangle Park and rapidly growing communities of Cary, Apex, Holly Springs and Wake County.

The upgraded design is concentrated around the major interchanges and cross street bridges. Sign structures may also receive special treatment. Public art opportunities, if they are included, are anticipated to be paid for by municipalities or other organizations, and are not part of the design-build contracts.

Consistency of the design motif throughout all of the toll plaza, bridge, abutment, bent, sign structure and other roadway elements is essential to the success of the design. Materials and techniques are simple, and are in common use on freeway projects throughout the U.S. The architectural style is achieved with cast-in-place concrete textured with form liners, and with pre-cast concrete panels either with texture matching the cast-in-place elements or with embedded thin face brick. Mechanically-stabilized earth (MSE) walls with texture matching the cast-in-place elements are used for retaining walls.

Landscape is included in the Aesthetic Guidelines to demonstrate the anticipated landscape approach to the design-build team. The NCTA intends to award a separate landscape contract. The design-build team will need to protect existing vegetation as shown in the prototypical locations, and to allow for the types of planting schemes shown in the guideline examples.

The result of a conscientious application of these aesthetic design guidelines will be a road that is distinctive as a NCTA facility, will provide an enhanced driving experience for its users, and will be an amenity for its surrounding communities. The design approach will develop facilities and features

that fit into the physical setting and preserve the aesthetic, historic, and environmental resources of the community, while maintaining safety and mobility.

## **I. Right of Way**

Right of way (ROW) limits have been established based on construction limits from preliminary plans for bridges, roadways, drainage, and interchanges, to accommodate the Triangle Expressway project. These limits will also permit proper maintenance and operation.

NCDOT has already acquired 23 parcels in advance acquisitions. The remainder of the ROW will be acquired prior to or during the design-build phase. The NCTA has been granted the statutory authority to acquire land, real estate easements, and other interests in real estate by negotiated purchase and by eminent domain for construction, operation, and maintenance of the facility. Once purchased, the ROW will be owned by NCDOT and leased back to NCTA via long term lease (See Project Specific Agreement for Triangle Expressway – Appendix D).

If the design-build teams require additional ROW, all environmental clearances, and the costs and time related to acquiring the additional ROW will be entirely the responsibility of the design-build team.

## **J. Utility Adjustments**

To facilitate utility coordination for the project, NCTA has employed TBE Group (TBE) and Mulkey Engineers and Consultants (Mulkey). TBE is responsible for the coordination of the relocation of all utilities and will draft all utility agreements for the Western Wake Freeway. Mulkey is performing the same tasks for the Triangle Parkway section. The design-build team will not commence work until the utility coordinator has made arrangements with the utility company to protect against damage to the public or utility owner. Any damage by the design-build team will be the responsibility of the design-build team. The design-build team shall confirm all utility locations prior to construction. If the construction of the project does impact any utilities, then the Design-build team is fully responsible for managing these utilities in accordance with this scope of work.

In the event that the design-build team is responsible for the preparation and coordination of the utility impacts as a result of their final design, then the following guidelines shall be followed as listed below:

- (A) *NCDOT Utility Manual - Policies & Procedures for Accommodating Utilities on Highway Rights of Way*
- (B) *Federal Aid Policy Guide- Subchapter G, Part 645, Subparts A & B*
- (C) *Federal Highway Administration's Program Guide, Utility Adjustments & Accommodations on Federal Aid Highway Projects*
- (D) *NCDOT Construction Manual Section 105-8*
- (E) *NCDOT Right of Way Manual - Chapter 16 Utility Relocations*
- (F) *NCDENR Public Water Supply - Rules governing public water supply*
- (G) *NCDENR Division of Water Quality - Title 15A - Environment and Natural Resources*

Any cost for utility relocations shall be the responsibility of the design-build team if the utility demonstrates compensable interest.

## **K. Intelligent Transportation Systems**

The Triangle Expressway project will include Intelligent Transportation Systems (ITS) infrastructure and operational systems to support overall management and operations of traffic flow along with timely response to incidents. The ITS deployment will complement similar NCDOT activities on Interstate highways in the region, and will meet or exceed the State's ITS performance requirements. These items will be included under a separate contract, with the exception of the following elements, which shall be installed within the primary roadway design-build contracts:

- Conduit duct bank system with manhole vaults located at the appropriate spacing along the roadway, supporting the preliminary communications scheme as identified in the preliminary plans.

The above construction will support the fiber communication network design as discussed below.

The future ITS installations are to be included in a separate specialized design-build contract and are anticipated to include the following elements:

- Approximately 64 Microwave Vehicle Detector (MVD) locations including approximately 1-mile intervals in each direction on the mainline and one on each ramp.
- Approximately 14 CCTV camera locations at approximately 1 mile spacing sufficient to provide full viewing of the Expressway and of the interchanging cross roads. Several interchanges are large enough that at least two cameras may be required to cover the area, depending on final mounting height.
- 11 Dynamic Message Sign (DMS) locations in advance of key decision points relative to major cross routes or alternative routes. Three signs are to be installed by NCDOT under separate projects, 2 of which may be appropriate for "takeover" by NCTA based on the nature of information which may be provided.
- One Environmental Sensing Stations (ESS) are to be provided for pavement monitoring (moisture and temperature) along the corridor.

The communications network will support an overall ITS and toll system deployment framework.

## **L. Fiber Communication Network**

The Triangle Expressway project will include two parallel fiber optic backbone communication network (FON) to provide separate dedicated communications for the toll systems, and the intelligent transportation system (ITS) to be deployed. The FON will be configured to connect toll plazas, ITS devices and NCTA and NCDOT traffic management centers. The outside plant system will include a conduit duct bank system with manhole vaults located at the appropriate spacing along the roadway. Electronics and computer equipment will be provided at the NCTA control center and

at the mainline and ramp toll plazas for connections to the communications and toll collections systems networks.

## **VII. TOLL COLLECTION OPERATIONS**

### **A. Operations Plan**

Toll collection operations consist of 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 documentation of the toll collection activities. The Triangle Expressway project will be exclusively operated as a cashless system. Toll collection methods will include payment via toll transponder or video toll. Video tolling options will include either prepaid registration of license plate information or post payment of tolls by those utilizing the facility with unregistered vehicles. Initial studies included the use of automated cash machine (ACM) lanes located in widened areas to the outside of the mainline, whereas dedicated electronic toll collection (ETC) lanes would have been provided on the through lanes. However, the initial cost of providing on-site payment combined with safety concerns, and the limited patronage of the ACM's resulted in the decision to utilize only ETC and video and therefore no on-road cash collection.

Video capture equipment will be installed in all lanes and those customers who do not choose to pay via a transponder or as part of the registered vehicle video toll process will be pursued for payment in accordance with established NCTA policies, as well as North Carolina law for use of the turnpike. Senate Bill 1697 was ratified by the North Carolina General Assembly on July 18, 2006 that will require payment of outstanding turnpike tolls and applicable fees or fines prior to vehicle registration renewal. (Senate Bill 1697 is included in Appendix E) However, it should be noted, Article IX, Section 7 of the State Constitution mandates that the clear proceeds from fines issued for any breach of the state penal laws shall be appropriated for the free county public schools. Recently, a ruling established a maximum of 10% of the fine may (General Statutes 115C-437) be kept for administrative costs. This would permit recovery of the toll from violators but only a small portion of the fine could be used to offset the collection process. This argument was based upon the opinion that the majority of the cost involved was for enforcement and not collection. NCTA plans to set toll rates appropriately to recover the cost of collection under the different payment methods.

The basic components for any toll collection system are the toll collection systems, the customer service center / violation processing center, and overall operations and asset maintenance. Implementation of the toll collection system for the Triangle Expressway is being developed considering the requirements of the NCTA, and the necessary and practical relationship and interface with other toll projects being developed.

### **B. Toll Collection Systems**

The Triangle Expressway project will use a computerized prepaid toll collection system, including ETC that utilizes automatic vehicle identification (AVI) and video toll collection utilizing cameras with optical character recognition (OCR) capability. It is intended that the system will ultimately be fully interoperable with all North Carolina toll roads and potentially beyond so that customers from other locales can use the NCTA's system and vice versa, without having to have multiple transponders on their vehicles or multiple accounts. NCTA has initiated a process for the selection

of a toll collection system integrator for the design of the complete toll collection system for NCTA's complete system.

As described, the Triangle Expressway project will exclusively utilize:

Electronic and Video Toll Collection System: ETC includes a system that automatically recognizes a vehicle, using a valid encoded transponder, and records the vehicle passage through the toll system, thereby collecting the toll from a previously established account. Alternatively, the system will also support video toll collection of registered or unregistered users. Registered video toll collection is primarily priced for the occasional user who would not benefit significantly from the transponder option. The patron establishes a pre-paid account and provides license plate information for users authorized to have toll transactions deducted from the account. This system function will capture and image of the license plate of every vehicle that does not travel with a valid transponder. Processing of the images that are not registered account holders will be handled via post-transaction by a video toll and violations processing center. Images not registered to a valid account or post-paid within a configured period after the transaction will be handled via a violations enforcement process.

There will be four main mainline toll collection areas on the Triangle Expressway project. These areas will include the ETC and video system which will consist of overhead equipment gantries over the mainline.

Additional ramp toll plazas will be located at Hopson Road/ Davis Drive interchange, Northern Wake Expressway entrance/exits from Triangle Parkway entrance/exits, US 64 northbound entrances/exits, and Old US 1 southbound entrances/exits (see Figure 2). The ramp toll plazas will utilize similar overhead structures for ETC and video capture.

### **C. Customer Service Center / Violation Processing Center**

The Customer Service Center (CSC) and the Violation Processing Center (VPC) will be co-located in a facility offsite. NCTA will procure a private sector firm, through an independent procurement process, to provide a statewide CSC and VPC for ETC toll transponder sales / account administration and for violation enforcement. NCTA personnel will oversee the contract and provide audit and accounting for these operations. NCTA will set tolls based on the rate structure requirements for ETC and video (registered and unregistered) tolls to cover the costs of toll collection administration as well as costs for administering the Violation Enforcement System.

NCTA anticipates that toll collection enforcement services will be performed by the VPC as part of the contracted services. Initially, on-site toll collection enforcement will be maximized to minimize toll violations for the new facility; however, enforcement is expected to be reduced with continued operation. Actual violation rates experienced during operations will dictate level of effort for necessary enforcement.

### **D. Toll Collection System Operations and Maintenance**

The NCTA currently anticipates that operations and maintenance will be accomplished using a combination of private sector and NCTA services. NCTA will procure a private sector firm, through

an independent procurement process, to provide the toll collection system operations and maintenance, with NCTA personnel providing oversight of the contract and audit and accounting for traffic and revenue.

Operation of the toll collection system equipment will be contracted out to the toll collection system operator, a contract toll collections service provider, on an annual or other time-frame basis. All preventive, predictive and corrective maintenance for the toll collection system will be performed under a separate contract with the NCTA's toll systems integrator selected for the design and installation of the toll collection system.

These contracts will be administered by the NCTA staff. The maintenance requirements include 24-hour, seven days a week 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.

The toll systems integrator also will be required to utilize a Maintenance On-Line Management System (MOMS) to ensure that toll collection equipment is reliably maintained. The purpose of the MOMS subsystem is to manage and report all maintenance and maintenance support activities within the toll collection system. All toll collection equipment will be monitored for failure and all alarms reported via the MOMS. Predictive and preventive maintenance activities will be scheduled via the MOMS and these activities must be performed on a timely basis.

## **VIII. ROUTINE MAINTENANCE**

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 appurtenances
- Tolling and ITS equipment
- Litter and obstruction removal
- Building infrastructure
- Traffic control
- Emergency maintenance services

The maintenance contractor will be responsible for preparing an annual operations and maintenance plan and budget to be reviewed and approved by the NCTA. The contractor will be required to perform maintenance activities in a safe and efficient manner with a minimum effect on traffic operations.

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.

## **IX. PROJECTED OPERATIONS AND MAINTENANCE COSTS**

The estimate of overall operations costs includes administration, customer service, violation processing, utilities, insurance, professional services, and other costs associated with the operation of Triangle Expressway. Maintenance costs include routine maintenance activities and the repair and rehabilitation program.

Baseline costs have been developed for the initial full year of operation using available cost data for certain administrative costs, as well as data available to NCTA for contracted maintenance services on similar roadway facilities. In addition, the cost projections were adjusted to reflect anticipated organizational changes and changes to the methods of operation to the extent possible. These baseline costs have been projected over a 40 year period and are presented in Table 1.

The rate of increase in operation and maintenance expenses assumes a rate within the range typical to the toll road industry. It is what can reasonably be anticipated in view of the natural aging and wear of the Triangle Expressway subject to the traffic and climatic conditions of the region. It is our opinion that the costs projected for the operation and maintenance of the Triangle Expressway are reasonable estimations of future costs assuming that the Triangle Expressway 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 addition to the costs projected within, the NCTA will also have an arrangement with the NCDOT for reimbursement of certain administrative costs. This funding source is anticipated in addition to revenue sources and provides the majority of the cost coverage for the NCTA's administrative staff, overhead and direct expenses. If at any point in the life of the NCTA should this funding source be altered, the overall operations and maintenance costs projections may require re-evaluation to insure sufficient coverage to maintain the overall operations and financial responsibilities.

**Table 1 - Projected Operations and Maintenance Expense\***

Year	Administration / Operations	CSC/VPC Operations	Infrastructure Utilities and Insurance	Professional Services	Routine Maintenance Program	Repair & Rehabilitation Program	Total
1	694	1,807	696	125	733	492	4,547
2	1,444	2,775	713	2,350	1,719	507	9,508
3	1,100	4,377	731	1,361	2,846	522	10,938
4	979	5,040	749	871	3,063	538	11,241
5	947	5,704	768	893	3,281	554	12,147
6	985	6,118	787	915	3,379	1,009	13,194
7	1,024	6,538	807	938	3,481	588	13,376
8	1,065	7,000	827	962	3,585	605	14,045
9	1,108	7,511	848	986	3,693	623	14,768
10	1,152	7,455	869	1,010	3,803	642	14,932
11	1,198	7,958	891	1,036	3,918	23,123	38,124
12	1,246	8,512	913	1,062	4,035	681	16,450
13	1,296	9,125	936	1,088	4,156	702	17,303
14	1,348	9,801	959	1,115	4,281	723	18,227
15	1,402	10,360	983	1,143	4,409	744	19,042
16	1,458	10,779	1,008	1,172	4,541	767	19,726
17	1,516	11,223	1,033	1,201	4,678	790	20,441
18	1,577	11,693	1,059	1,231	4,818	813	21,192
19	1,640	12,192	1,085	1,262	4,963	838	21,980
20	1,706	12,201	1,112	1,293	5,111	863	22,287
21	1,774	12,643	1,140	1,326	5,265	42,768	64,916
22	1,845	13,112	1,169	1,359	5,423	915	23,823
23	1,919	13,594	1,198	1,393	5,585	943	24,633
24	1,995	14,095	1,228	1,428	5,753	971	25,471
25	2,075	14,609	1,258	1,463	5,926	1,000	26,332
26	2,158	15,141	1,290	1,500	6,103	1,030	27,223
27	2,245	15,693	1,322	1,538	6,286	1,061	28,145
28	2,334	16,266	1,355	1,576	6,475	1,093	29,101
29	2,428	16,862	1,389	1,615	6,669	1,125	30,089
30	2,525	17,449	1,424	1,656	6,869	1,159	31,082
31	2,626	18,028	1,459	1,697	7,075	48,738	79,624
32	2,731	18,628	1,496	1,740	7,288	1,230	33,112
33	2,840	19,247	1,533	1,783	7,506	1,267	34,177
34	2,954	19,887	1,572	1,828	7,732	1,305	35,277
35	3,072	20,548	1,611	1,873	7,964	1,344	36,412
36	3,195	21,233	1,651	1,920	8,202	1,384	37,586
37	3,323	21,940	1,692	1,968	8,449	1,426	38,798
38	3,455	22,671	1,735	2,017	8,702	1,468	40,049
39	3,594	23,427	1,778	2,068	8,963	1,512	41,341
40	3,737	24,208	1,823	2,120	9,232	1,558	42,677

\* All costs in \$1000's future year dollars and estimate does not include administrative costs funded by NCDOT.

## **X. REPAIR AND REHABILITATION PROGRAM**

In addition to being responsible for building the Triangle Expressway, operating and maintaining the facility, paying off its bond indebtedness, and operating with a positive cash flow, the NCTA is also required to protect, preserve and maintain the properties it will construct. In order to protect the investments in its properties, amounts of money are to be allocated annually to a Repair and Rehabilitation Account established in connection with the issuance of bonds to finance the Triangle Expressway project. Amounts in the Repair and Rehabilitation Account can be disbursed only for the purpose of paying for the cost of:

1. Unusual or extraordinary maintenance or repairs, maintenance or repairs not recurring annually, and renewals and replacements, including major items of equipment,
2. Repairs or replacements resulting from an emergency caused by some extraordinary occurrence, so 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, and
3. Paying all or any part of the cost of any capital improvement to the facility.

In light of the fact that the Triangle Expressway project will be an entirely new facility, covered in part by warranties for the initial operations under terms of the design-build contracts, deposit amounts shall be appropriate to meet the projected needs listed in Table 1. 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.

## **XI. ENVIRONMENTAL CONSIDERATIONS**

The preliminary planning and development of the corridor, including the required environmental reviews, have been undertaken in accordance with the National Environmental Policy Act of 1969 (NEPA), Federal Highway Administration regulations, and the NCDOT rules and other applicable federal, state and local laws. Issues considered during the NEPA process include 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 status of the various approvals and permits required for the corridor are outlined in the following status list.

Notes:

- All of the permits and approvals will be complete prior to awarding either of the two roadway design-build contracts or the three specialized construction contracts.

Permits and/or Approvals	Status
FEIS Re-evaluation of Western Wake Freeway	Complete - September 7, 2007
EA/FONSI on Triangle Parkway	Complete –July 29, 2008
Categorical Exclusion for Northern Wake Expressway Toll Plaza	Complete – August 26, 2008
U. S. Army Corps of Engineers 404 Permits Western Wake Freeway Triangle Parkway	Complete – April 22, 2008 Complete – February 5, 2009
NC Department of Environment and Natural Resources 401 Water Quality Certification Western Wake Freeway Triangle Parkway	Complete - March 17, 2008 Complete – November 25, 2008
Conditional Letter of Map Revisions (CLOMRs – FEMA) Western Wake Freeway (Section C only) Triangle Parkway	Complete - March 18, 2007 Complete – August 20, 2008
NC Ecosystem Enhancement Program (Acceptance Of Wetland and Stream Mitigation Requirements) Western Wake Freeway  Triangle Parkway	Complete - August 1, 2008  Complete – February 24, 2009
Transportation Conformity Determination	Complete - June 29, 2007 Update expected June 15, 2009
CSX RR agreement on Western Wake Freeway	Anticipated one year from contract execution
NPDES Stormwater Permits	Complete – December 27, 2007

The project will provide a number of benefits to the Triangle region. While a project of this magnitude cannot be developed without some impacts to the environment, steps are being taken to avoid, minimize and mitigate those impacts to the greatest extent possible. Some of the steps being studied to protect the environment are listed below.

Stormwater: Stormwater drainage systems for the project will be designed in accordance with the requirements of the National Pollutant Discharge Elimination System (NPDES) program. The project will also utilize NCDOT’s Best Management Practices for the protection of surface waters during construction. Other design features such as vegetated berms and swales will be considered and incorporated into the roadway design where appropriate to mitigate any potential transfer of toxins or other nutrients into surface waters. In lieu of concrete pipes, grass-lined ditches will be used, where possible, 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.

Wetlands and Streams: A rigorous evaluation was undertaken to avoid, minimize and mitigate the project's impacts on wetlands and streams. Mitigation will be required for all unavoidable impacts to jurisdictional wetlands and streams. Mitigation needs for the project will be provided through the North Carolina Ecosystem Enhancement Program's In-Lieu Fee Program. Bridges will be utilized where practical and feasible to span wetlands and streams.

Protected Species: The project will not result in the taking of any federally endangered or threatened species or jeopardize their continued survival. The project will comply with the Endangered Species Act of 1973 and other pertinent federal and state laws.

Air: The Triangle Area is in attainment status with a maintenance plan for ozone and carbon monoxide. The Durham-Chapel Hill-Carrboro and Capital Area MPOs have completed updating their 2030 Long Range Transportation Plans, Fiscal Years 2007-2013 Metropolitan Transportation Improvement Programs and the corresponding air quality transportation conformity determination to implement tolling considerations associated with the project. It is expected that the decrease in congestion of the surrounding roadway network (especially NC 55 and NC 54) due to the project will result in improved fuel efficiencies and reduced delay during peak hour travel times. Project level air quality analyses were completed for the project, including a Mobile Air Source Toxic (MSAT) analysis and carbon monoxide "hot spot" analysis. The project will comply with the State Implementation Plan (SIP) and will not violate EPA's National Ambient Air Quality Standards.

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. Noise walls will be constructed where feasible and reasonable. Five locations have been identified for noise wall construction, including one daycare facility, one elementary school and three residential neighborhoods. It is possible that additional locations may qualify for noise abatement. The final decision on noise abatement placement will be determined following completion of the Triangle Parkway Finding of No Significant Impact (FONSI) document. NCTA may also incorporate aesthetic treatment into the noise walls.

Hazardous Materials: The NCTA is ensuring that all state and federal laws will be strictly adhered to in the abatement of hazardous materials located on the project ROW, if encountered. The identification and remediation of these sites that would otherwise remain unidentified is of incalculable benefit to the environment.

Hazardous Spills: In areas with sensitive environmental concerns, the installation of hazardous spill basins will be considered. These facilities would be designed to help capture the spill of a tanker truck to prevent contamination from entering the stream, river or aquifer recharge system.

Human Environment: The NCTA will evaluate ways to integrate landscaping into the project design to promote visual continuity and to blend it into the natural landscape where feasible and reasonable. The design and construction of the project will also accommodate existing and planned bicycle and pedestrian facilities on secondary roads crossing the project where appropriate. NCTA is also working with the appropriate entities to mitigate impacts to the Green Level Historic District and the Feltonville Park.

Extensive coordination was conducted between FHWA, NCTA, NCDOT, and other governmental entities to develop environmental documents for the component projects of the Triangle Expressway. The formal approvals of the required documents are based on the planned construction limits associated with the Preferred Alternatives as presented in the documents. Additional environmental documents have been prepared by NCTA, or its representatives, during the planning phase of the

Triangle Expressway project to identify human and natural environmental impacts and to obtain environmental approvals, which specify mitigation requirements and recommendations.

The design-build team, with the support and oversight of the NCTA, shall be responsible for all coordination with governmental entities during the project. It shall be the design-build team's responsibility to obtain all amendments to NCTA provided environmental approvals – including permit modifications - for any design revisions. The design-build teams shall ensure compliance with the conditions and schedules set forth in approved environmental documents and permits.

## **XII. PUBLIC INVOLVEMENT**

The NCTA has been involved in an extensive public information and outreach program since the early stages of the Triangle Expressway project. This effort has included attendance and presentations at numerous public meetings and with local governments and civic groups, along with preparation and distribution of brochures and information packets to provide information about the Triangle Expressway project. In addition, the NCTA will retain the services of a professional firm to provide the NCTA with marketing, advertising and public information services and advice regarding a public information campaign for marketing of toll roads. The focus of this public information and education campaign will be the development and implementation of a marketing 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.

During the design and construction phases of the Triangle Expressway project, the public information and involvement program will maintain a high level of communication by informing and educating local government agencies, special interest groups, businesses, and the general public about the Triangle Expressway project status throughout the design and construction period. The design-build team will develop a Public Information Plan for the Triangle Expressway 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 Triangle Expressway project will be developed pursuant to a well-executed Public Information Plan.

### **XIII. TRIANGLE EXPRESSWAY PROJECT COSTS**

The construction of Triangle Expressway, as discussed under the implementation section of this document, is to be completed using the design-build method of contracting. Based upon the segment characteristics, toll phasing and various other considerations, roadway construction is expected to be let in two contracts: 1) Triangle Parkway and Northern Wake Expressway; 2) Western Wake Freeway. In addition, three specialized contracts will go through a similar design-build process for: 1) landscaping; 2) intelligent transportation system integration; and 3) toll system integration.

A breakdown of the preliminary cost estimate for implementation of the Triangle Expressway project is presented in Table 2. The construction cost has been summarized for the five design-build projects. The two roadway construction contracts have been further described by listing primary item summaries. The three specialized contract costs are all inclusive – mobilization, construction, design, construction engineering and inspection, and contingencies are included in the one listed cost.

NCTA has reduced contractor project cost risk by performing a number of tasks associated with higher risks prior to the design-build process. Prior to advertisement, it is anticipated that the required environmental permits will be obtained and environmental mitigation costs in place. Furthermore, NCTA is expected to provide a fuel price adjustment for several major items provided in a fuel usage chart and price adjustments for asphalt binder to reduce contractor risk for these items. The design-build contracts will include incentives and liquidated damages for schedule variations from the expected substantial completion dates. Contingencies have been incorporated in the program budget which should be adequate to cover these uncertainties.

(Note: Prior to the completion of this report, the sealed construction price proposals were opened. The bid results and an updated project cost summary are presented in Appendix F).

**Table 2 - Cost Estimate Summary**

Item	Cost		
<b>Design-Build Construction</b>			
<b>Segment</b>	Triangle Parkway & Northern Wake Expressway	Western Wake Freeway	Total
Roadway	\$77,850,000	\$286,000,000	\$363,850,000
Structures	\$32,150,000	\$158,950,000	\$191,100,000
Drainage	\$5,440,000	\$15,980,000	\$21,420,000
Miscellaneous	\$12,980,000	\$38,330,000	\$51,310,000
Toll Structures & ITS Rough-In	\$7,400,000	\$10,110,000	\$17,510,000
Highway Contract Total	\$135,820,000	\$509,370,000	\$645,190,000
Landscaping D-B - all incl.	\$1,270,000	\$4,610,000	\$5,880,000
ITS D-B - all incl.	\$2,280,000	\$5,800,000	\$8,080,000
Toll Integration D-B - all incl.	\$5,900,000	\$7,700,000	\$13,600,000
Specialized Contract Total	\$9,450,000	\$18,110,000	\$27,560,000
<b>Design-Build Contract Total</b>	\$145,270,000	\$527,480,000	\$672,750,000
<b>NCTA Costs</b>			
Right of Way	\$24,950,000	\$202,750,000	\$227,700,000
Right-of-Way Negotiation	\$570,000	\$2,230,000	\$2,800,000
Subtotal	\$25,520,000	\$204,980,000	\$230,500,000
Utility Relocation	\$4,140,000	\$14,600,000	\$18,740,000
NCTA Construction Oversight	\$1,830,000	\$7,260,000	\$9,090,000
NCTA Administrative	\$1,320,000	\$3,580,000	\$4,900,000
Environmental Mitigation	\$2,410,000	\$8,380,000	\$10,790,000
D-B Stipends/Incentives/Fuel	\$2,640,000	\$4,780,000	\$7,420,000
Agency Planning	\$70,000	\$870,000	\$940,000
Subtotal	\$6,440,000	\$17,610,000	\$24,050,000
<b>NCTA Total Costs</b>	\$37,930,000	\$244,450,000	\$282,380,000
<b>Project Segment Total Costs</b>	\$183,200,000	\$771,930,000	\$955,130,000
<b>Total Project Cost</b>			<b>\$955,130,000</b>

#### **XIV. CASH FLOW PROJECTIONS**

Quarterly projections of cash flow required to construct the Triangle Expressway project are shown below in Table 3. Quarterly cash flows are based upon an NCTA expected construction sequence of the five design-build contracts to be utilized. The contracts will utilize a monthly payment based upon verified progress of work. Each design-builder team will submit a construction schedule and cash flow projection prior to start 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 Triangle Parkway and Northern Wake Expressway 30 months following the financial closing date. Based upon the preliminary construction schedule, the system wide opening will follow approximately 12 months later, or 42 months following the availability of project funds. This will permit an interim phased toll operation of less than 12 months.

**Table 3 - Cash Flow Summary**

<b>Quarter Following Financial Close</b>	<b>Estimated D-B Construction Draw</b>	<b>NCTA Construction Oversight</b>	<b>Right of way Purchase/ Negotiation</b>	<b>Utilities</b>	<b>NCTA Administration*</b>	<b>Total</b>
<b>Y1 Q1</b>	\$43,415,000	\$415,000	\$29,470,000	\$3,030,000	\$6,465,000	\$82,795,000
<b>Y1 Q2</b>	\$43,415,000	\$415,000	\$29,470,000	\$3,030,000	\$6,465,000	\$82,795,000
<b>Y1 Q3</b>	\$49,290,000	\$670,000	\$42,890,000	\$3,170,000	\$740,000	\$96,760,000
<b>Y1 Q4</b>	\$49,290,000	\$670,000	\$42,890,000	\$3,170,000	\$740,000	\$96,760,000
<b>Y2 Q1</b>	\$49,290,000	\$670,000	\$42,890,000	\$3,170,000	\$740,000	\$96,760,000
<b>Y2 Q2</b>	\$49,290,000	\$670,000	\$42,890,000	\$3,170,000	\$740,000	\$96,760,000
<b>Y2 Q3</b>	\$49,820,000	\$680,000			\$650,000	\$51,150,000
<b>Y2 Q4</b>	\$49,820,000	\$680,000			\$650,000	\$51,150,000
<b>Y3 Q1</b>	\$49,820,000	\$680,000			\$650,000	\$51,150,000
<b>Y3 Q2</b>	\$49,820,000	\$680,000			\$650,000	\$51,150,000
<b>Y3 Q3</b>	\$44,820,000	\$640,000			\$1,360,000	\$46,820,000
<b>Y3 Q4</b>	\$44,820,000	\$640,000			\$1,360,000	\$46,820,000
<b>Y4 Q1</b>	\$41,510,000	\$590,000			\$1,320,000	\$43,420,000
<b>Y4 Q2</b>	\$41,510,000	\$590,000			\$1,320,000	\$43,420,000
<b>Y4 Q3</b>	\$8,410,000	\$200,000			\$100,000	\$8,710,000
<b>Y4 Q4</b>	\$8,410,000	\$200,000			\$100,000	\$8,710,000
<b>Total Cost</b>	\$672,750,000	\$9,090,000	\$230,500,000	\$18,740,000	\$24,050,000	\$955,130,000

\*NCTA Administration Cost includes general NCTA costs including project environmental mitigation costs, design-build stipends/incentives/fuel and agency planning costs.

## **XV. IMPLEMENTATION SCHEDULE**

The schedule of construction for the design-build contracts is shown in Table 4 below.

**Table 4 - Schedule of Construction Project Milestones**

<b>Event</b>	<b>Date</b>
<b>Triangle Parkway:</b>	
D-B Advertisement	December 3, 2007
Award D-B Contract	Immediately following Financial Closing Date
Notice to Proceed for Construction	Immediately following Financial Closing Date
Open to Traffic	30 months following Financial Closing Date
<b>Western Wake Freeway:</b>	
D-B Advertisement	December 3, 2007
Award D-B Contract	Immediately following Financial Closing Date
Notice to Proceed for Construction	Immediately following Financial Closing Date
Open to Traffic	42 months following Financial Closing Date
<b>Triangle Expressway Landscaping Project:</b>	
Advertisement of Landscaping D-B	Anticipated Jan. 2010
Award Landscaping D-B Contract	Anticipated May 2010
Notice to Proceed for Landscaping Project	Anticipated May 2010
Completion of Landscaping Project	Six months following project opening
<b>Triangle Expressway Toll System Integration:</b>	
Advertisement of Toll System D-B	October 2, 2008
Award Toll System D-B Contract	May, 2009
Notice to Proceed for Toll System Project	Immediately following Financial Closing Date
Completion of Toll System Project	42 months following Financial Closing Date
<b>Triangle Expressway Intelligent Transportation System:</b>	
Advertisement of ITS D-B	January 15, 2009
Award ITS D-B Contract	September, 2009
Notice to Proceed for ITS System Project	September, 2009
Completion of ITS System Project	42 months following Financial Closing Date

# **Appendix A**

## **Geometric Design Criteria**

# Triangle Expressway Project – Geometric Design Criteria

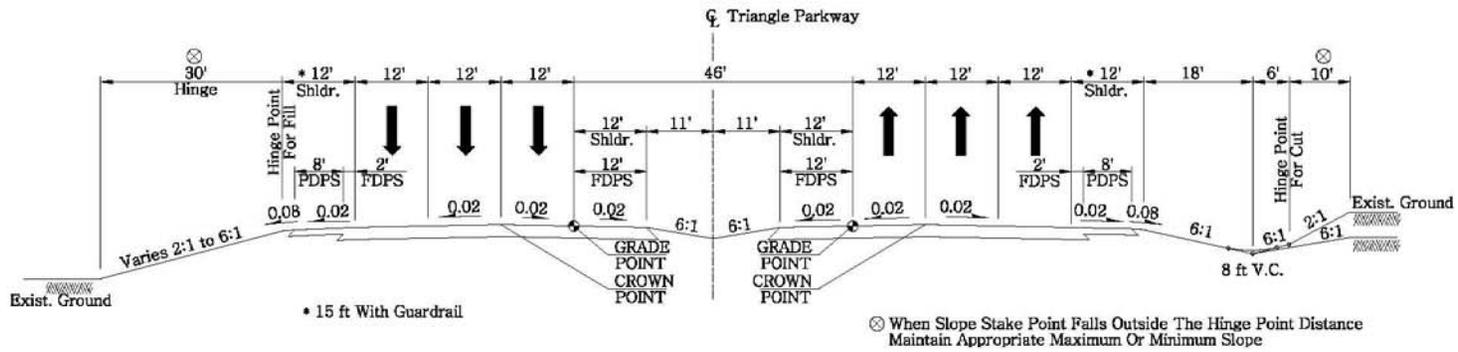
Design Factors	Alignment	Recommended Standards				
Classification	Mainline (-L-#)	Freeway (Interstate)				
Type of Terrain	All	Rolling				
Design Speed	-L- -Y- lines, Service road Flyovers Ramps Loops	110 Kph (70 mph) Variable: 60 to 110 Kph (40 to 70 mph) 90 Kph (55 mph) 60 to 100 Kph (40 to 60 mph) (Upper or Mid Range) 50 Kph (30 mph)				
Pavement Slopes	All	0.02				
Superelevation	-L- -Y- lines, Service road Flyovers Ramps and Loops Bridges	10% maximum 6% maximum 6% maximum 8% maximum 6% maximum				
Grades	-L- -Y- lines, Service road	4.0% maximum, 0.3% minimum 0.3% minimum				
	Freeways	Design Speed Max. Grade %	80 kph (50 mph) 5	100 kph (60 mph) 4	110 kph (70 mph) 4	
	Rural Arterials	Design Speed Max. Grade %	80 kph (50 mph) 5	100 kph (60 mph) 4	110 kph (70 mph) 4	
	Rural Collectors	Design Speed Max. Grade %	60 kph (40 mph) 8	80 kph (50 mph) 7	100 kph (60 mph) 6	
	Local	Design Speed Max. Grade %	60 kph (40 mph) 10	80 kph (50 mph) 8	100 kph (60 mph) 6	
	Loops	10% maximum, 0.3% minimum				
	Ramps	5.0% maximum, 0.3% minimum				
Shoulders		ADT	Total Shld. Width	Total Paved	FDPS	side
	-L- Western Wake	≥15,000	4.3 m (14') 3.7 m (12')	3.7 m (12') 3.7 m (12')	0.6 m (2') 0.0 m (0')	outside median
	-L- Triangle Parkway	≥15,000	3.7m (12') 3.7m (12')	3.0 m (10') 3.7 m (12')	0.6 m (2') 3.7 m (12')	outside median
	-Y-lines					
	Freeways	≥40,000 <40,000	3.7 m (12') 3.7 m (12') 3.7 m (12')	3.7 m (12') 1.2 m (4') 3.0 m (10') 1.2 m (4')	3.7 m (12') 1.2 m (4') 1.2 m (4') 1.2 m (4')	outside median outside median
	Divided arterials and Collectors	≥40,000 <40,000	3.0 m (10') 1.8 m (6') 2.4 m (8') 1.8 m (6')	3.0 m (10') 1.2 m (4') 1.2 m (4') 0.6 m (2')	1.2 m (4') 1.2 m (4') 1.2 m (4') 0.6 m (2')	outside median outside median
	Two lane – two way	>8,000 >4,000 1,500 to 2,000 2,000 to 4,000	2.4 m (8') 2.4 m (8') 1.8 m (6') 2.4 m (8')	1.2 m (4') 0.6 m (2') turf turf	1.2 m (4') 0.6 m (2') turf turf	
	Ramps and flyovers		3.7 m (12') 4.3 m (14')	1.2 m (4') 1.2 m (4')	1.2 m (4') 1.2 m (4')	inside outside
	Loops		4.3 m (14') 3.7 m (12')		Curb & gutter 1.2 m (4')	inside outside

Design Factors	Alignment	Recommended Standards			
Ditches		ADT	Ditch Width	Front Slope	Back Slope
	-L, Ramps, Loops, Flyovers-		5.5 m (18')	6:1	2:1
	-Y-lines				
	freeways		5.5 m (18')	6:1	2:1
	arterials/collectors		5.5 m (18')	6:1	2:1
	locals	> 4,000	5.5 m (18')	6:1	2:1
		< 4,000	3.7 m (12')	6:1 (4:1 max.)	2:1
Slopes	All	2:1 maximum (Fill), 3:1 maximum (Cut) unless directed by Soils and Foundations			
Median Width*	-L-	23.8 m (78')			
Vertical Clearance	-L-	5.0 m to 5.2 m (16'-6" to 17'-0") over asphalt paving (Freeways and Arterials)			
		5.2 m to 5.3 m (17'-0" to 17'-6") over concrete paving (Freeways and Arterials)			
		4.6 m to 4.7 m (15'-0" to 15'-6") (over Local and Collectors)			
		7.0 m to 7.2 m (23'-0" to 23'-6") (over Railroads)			
Pavement Widths	-L-	3.7 m (12') lane			
	-Y- lines, Service road		Lane width for specified design year ADT		
		Design Speed	1,500 to 2,000	>2,000	
	Freeways		3.7 m (12')	3.7 m (12')	
	Rural arterials	60 kph (40 mph)	3.4 m (11')	3.7 m (12')	
		80-100 kph (50-60 mph)	3.7 m (12')	3.7 m (12')	
	Rural locals, collectors	60-80 kph (40-50 mph)	3.4 m (11')	3.7 m (12')	
		100 kph (60 mph)	3.7 m (12')	3.7 m (12')	
	Ramps and Flyovers	4.9 m (16') lane			
	Loops	5.5 m (18') lane			
Vertical Alignment		Design Speed	K <sub>min</sub> Crest	K <sub>min</sub> Sag	
		60 kph	11	18	
		40 mph	44	64	
		80 kph	26	30	
		50 mph	84	96	
		100 kph	52	45	
		60 mph	151	136	
		110 kph	74	55	
		70 mph	247	181	
Horizontal Alignment	-L-	Design Speed	Min Radius	e <sub>max</sub>	
		110 kph (70 mph)	455 m (1,640')	0.10	
	-Y- lines, Loops and Ramps	50 kph (30 mph)	80 m (250')	0.08	
		60 kph (40 mph)	125 m (465')	0.08	
		80 kph (50 mph)	230 m (750')	0.08	
		100 kph (60 mph)	395 m (1,205')	0.08	
		110 kph (70 mph)	500 m (1,820')	0.08	
		60 kph (40 mph)	135 m (510')	0.06	
		80 kph (50 mph)	250 m (835')	0.06	
		100 kph (60 mph)	435 m (1,340')	0.06	
		110 kph (70 mph)	560 m (2,050')	0.06	

# **Appendix B**

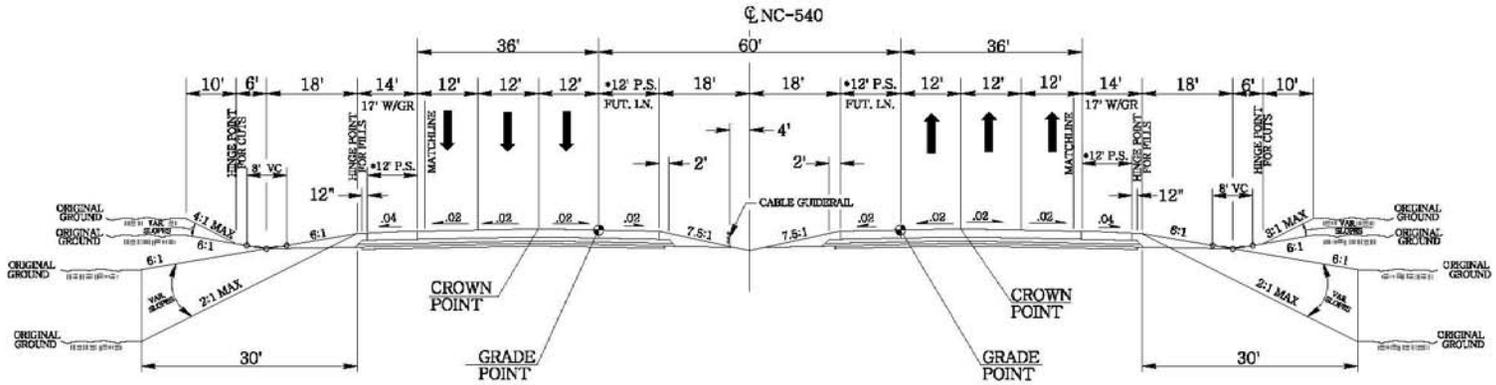
## **Typical Sections**

**Triangle Parkway from NC 540  
 to I-40**



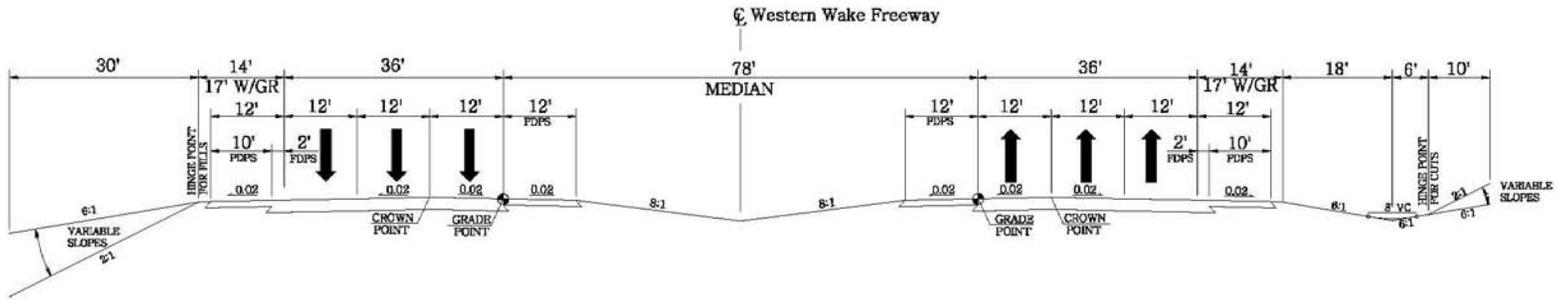
**PROPOSED 6-LANE DIVIDED SHOULDER TYPICAL SECTION**

**Northern Wake Expressway from NC 55  
to NC 54**



**PROPOSED 6-LANE DIVIDED SHOULDER TYPICAL SECTION**

**Western Wake Freeway from NC 55 Bypass  
near Holly Springs to NC 55**



**PROPOSED 6-LANE DIVIDED SHOULDER TYPICAL SECTION**

# **Appendix C**

## **CAMPO Memorandum of Understanding**

## MEMORANDUM OF UNDERSTANDING

This MEMORANDUM OF UNDERSTANDING, dated May 16, 2007, is by and between the NORTH CAROLINA TURNPIKE AUTHORITY, a public agency created pursuant to Article 6H of Chapter 136 of the General Statutes of North Carolina (the "Authority"), and the NORTH CAROLINA CAPITAL AREA METROPOLITAN PLANNING ORGANIZATION, a public agency created pursuant to Article 3A of Chapter 136 of the General Statutes of North Carolina and Section 134 of Chapter 23 of the United States Code (the "MPO"). Terms not otherwise defined herein shall have the meanings given such terms in Article 6H of Chapter 136 of the General Statutes of North Carolina.

**WHEREAS, Section 134(a) of Title 23 United States Code states:**

*"It is in the national interest to encourage and promote the development of transportation systems embracing various modes of transportation in a manner which will efficiently maximize mobility of people and goods within and through urbanized areas and minimize transportation-related fuel consumption and air pollution. To accomplish this objective, metropolitan planning organizations, in cooperation with the State, shall develop transportation plans and programs for urbanized areas of the State. Such plans and programs shall provide for the development of transportation facilities (including pedestrian walkways and bicycle transportation facilities) which will function as an intermodal transportation system for the State, the metropolitan areas, and the Nation. The process for developing such plans and programs shall provide for consideration of all modes of transportation and shall be continuing, cooperative, and comprehensive to the degree appropriate, based on the complexity of the transportation problems."; and,*

**WHEREAS, Chapter 136, Article 3A, Section 136-66.2(a) of the General Statutes of North Carolina require that:**

*"Each MPO, with cooperation of the Department of Transportation, shall develop a comprehensive transportation plan in accordance with 23 U.S.C. § 134. In addition, an MPO may include projects in its transportation plan that are not included in a financially constrained plan or are anticipated to be needed beyond the horizon year as required by 23 U.S.C. § 134. For municipalities located within an MPO, the development of a comprehensive transportation plan will take place through the metropolitan planning organization. For purposes of transportation planning and programming, the MPO shall represent the municipality's interests to the Department of Transportation."; and,*

**WHEREAS, Chapter 136, Article 3A, Section 136.66.2(d) provides that:**

*"For MPOs, either the MPO or the Department of Transportation may propose changes in the plan at any time by giving notice to the other party, but no change shall be effective until it is adopted by both the Department of Transportation and the MPO.";* and,

**WHEREAS,** the Authority has been charged by the General Assembly (the "General Assembly") of the State of North Carolina (the "State") to construct, operate and maintain Turnpike Projects in the State;

**WHEREAS,** the Authority has indicated to the MPO its interest in constructing turnpike projects within the MPO's transportation planning jurisdiction, particularly the proposed Triangle Parkway and the Western Wake Parkway (including the I-540P project now under construction by the N.C. Department of Transportation); and,

**WHEREAS,** the Authority and the MPO wish to enter into this Memorandum of Understanding to memorialize the commitment being made between the two parties to carry out the following principles as they relate to the above turnpike projects;

**NOW THEREFORE,** the following **Memorandum of Understanding** is made:

Section 1. Any funds raised as a result of tolls on the Western Wake Parkway and the Triangle Parkway shall be used for those projects and not diverted to other projects outside the corridor from which those revenues were generated or other areas of the State.

Section 2. The tolls on these projects will end when all financing agreements including the construction costs, both principal and interest, have been paid and, in accordance with the Master Agreement between the Authority and the North Carolina Department of Transportation, these roads shall be returned to the North Carolina Department of Transportation for operation and maintenance.

Section 3. The North Carolina Department of Transportation shall be included in all relevant discussions relating to any funding shortfalls in connection with the Triangle Parkway and Western Wake Parkway. The solution to the gap funding shall not adversely affect the MPO under the State's current highway funding distribution "equity" formula, nor shall a new tax be imposed solely on the residents of Wake County or the MPO's Region, other than by a uniformly applied statewide tax.

Section 4. The Triangle Parkway and Western Wake Parkway shall be designed and constructed to meet or exceed all applicable North Carolina Department of Transportation standards and shall include major design features as set forth in

NCDOT's Environmental Impact FHWA Record of Decision for the Western Wake Freeway, including the following key design elements:

The turnpike projects will be constructed with three basic travel lanes in each direction with full control of access throughout. A median of sufficient width will be provided throughout to accommodate possible future improvements at a later date that will include consideration of accommodations for transit and high-occupancy vehicles.

Grade-separated interchanges for access will be provided at the following locations:

**Triangle Parkway:** I-40 (with ramp improvements to and from I-40), Hopson Road / Davis Drive, I-540 (with overpass for Kit Creek Road)

**Western Wake Parkway:** NC 54, Triangle Parkway, NC 55, Morrisville Parkway Extension, Green Level (High House) Road, US 64 (including overpass with ramps for Kelly Road at US 64), South Salem Street (Old US 1), US 1, NC 55 Bypass.

Section 5. Any sale of this project after its construction, regardless of whether tolls are still being collected, shall be subject to consultation with the MPO and subject to the above four principles.

Section 6. Each of the Authority and the MPO acknowledge that the statement of understandings set forth herein are not intended to create or constitute any legally binding obligation between the Authority and the MPO, but are intended as a good faith expression of present intentions of the parties based upon the facts and circumstances at the time this memorandum is signed by the parties hereto. Neither party shall have any liability or obligation to the other party with respect to the provisions set forth herein, whether based upon breach of contract, damages arising from the reliance upon the provisions hereof, or otherwise.

Any waiver, amendment, modification or supplement of or to any term or condition of this Memorandum of Understanding shall be effective only if in writing and signed by both parties; and the parties hereby waive the right to amend the provisions of this Memorandum, particularly this Section, orally.

Section 7. This Memorandum of Understanding may be executed in multiple counterparts.

Section 8. This Memorandum of Understanding shall be effective immediately upon execution of the parties thereto.

IN WITNESS WHEREOF, the parties agree to this Memorandum of Understanding by the execution hereof as set forth below.

NORTH CAROLINA CAPITAL AREA  
METROPOLITAN PLANNING  
ORGANIZATION

NORTH CAROLINA TURNPIKE  
AUTHORITY

By:  \_\_\_\_\_  
Joe Bryan

By:  \_\_\_\_\_  
Lyndo Tippett

Chairman, N.C. Capital Area  
MPO Transportation Advisory  
Committee

Chairman, N.C. Turnpike Authority  
Board of Directors

Date: 6/21/07

Date: 6/25/07

**Appendix D**  
**NCTA and NCDOT Project Specific Agreement**  
**and Executory Contract for Lease of Right of Way**  
**for Triangle Expressway**

**NORTH CAROLINA TURNPIKE AUTHORITY  
AND  
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
PROJECT SPECIFIC AGREEMENT FOR TRIANGLE EXPRESSWAY  
AND  
EXECUTORY CONTRACT FOR LEASE OF RIGHT OF WAY  
FOR TRIANGLE EXPRESSWAY**

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NORTH CAROLINA TURNPIKE AUTHORITY  
AND  
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

PROJECT SPECIFIC AGREEMENT FOR TRIANGLE EXPRESSWAY  
AND  
EXECUTORY CONTRACT FOR LEASE OF RIGHT OF WAY  
FOR TRIANGLE EXPRESSWAY

**THIS PROJECT SPECIFIC AGREEMENT AND EXECUTORY CONTRACT FOR LEASE OF RIGHT OF WAY FOR TRIANGLE EXPRESSWAY** ("Agreement") for Triangle Expressway ("the Project"), as hereinafter more fully described and defined, is hereby made and entered into this \_\_\_\_\_ day of \_\_\_\_\_, 2008, by and between the NORTH CAROLINA TURNPIKE AUTHORITY ("NCTA") and the NORTH CAROLINA DEPARTMENT OF TRANSPORTATION, ("NCDOT"), agencies of the State of North Carolina.

**WITNESSETH:**

**WHEREAS**, the NCTA was created by the North Carolina General Assembly by the Act to Authorize Public Toll Roads And Bridges in North Carolina and the Creation of a Turnpike Authority in North Carolina General Statute § 136-89.180, *et seq.* (the "Act"), to accelerate the implementation of needed transportation improvements by funding specifically identified projects with tolls;

**WHEREAS**, the NCTA is authorized by the North Carolina General Assembly under the Act to study, plan, develop, design, establish, purchase, construct, operate and maintain certain Turnpike Projects, either on its own initiative, or at the request of the Board of Transportation;

**WHEREAS**, the NCDOT is enabled under the Act and other General Statutes to support the NCTA in addressing the critical transportation needs of the State; and,

**WHEREAS**, the NCDOT and the NCTA (the "Parties") have heretofore entered into an Agreement dated July 13, 2006 ("Master Agreement") in which they have agreed to each assume certain responsibilities to accomplish the purposes set forth in the General Statutes of North Carolina including the Act;

**WHEREAS**, the NCDOT currently owns some of the right-of-way necessary for the Triangle Expressway Project; and, once the NCTA secures appropriate funding, the NCTA will acquire the remaining necessary right-of-way for the Project; then the NCTA, after acquiring the remaining right-of-way necessary for the Project, will convey said remaining right of way for the Project to the NCDOT; and once the NCDOT has title to all the right-of-way necessary for the Project, the NCDOT will lease the right-of-way for the Project to the NCTA in accordance with the provisions set forth below in this Agreement; and the Lease for said right-of-way will be executed once all the right-of-way has been acquired and conveyed to the NCDOT;

**NOW THEREFORE**, the parties hereto, each in consideration of the promises and undertakings of the other as herein provided, do hereby covenant and mutually agree as follows:

Pursuant to the Master Agreement, the parties are required to agree upon and execute an individual Project Specific Agreement, approved by the Board of Transportation, regarding each turnpike project before the NCTA makes any capital expenditure or when the NCTA is committing to expend funds beyond one year. In conformity with those requirements of the Master Agreement, the parties agree on the Project Specific Agreement for the Triangle Expressway as set forth below.

The Parties agree that, after the NCTA has secured appropriate funding and the NCDOT has title to all the right-of-way necessary for this Project, the NCDOT will execute a lease providing the NCTA with uninterrupted access and full use of the right-of-way and other property interests, if any, necessary for the NCTA to construct, maintain and operate this Project, said lease to be executed in accordance with the provisions set forth below in this Agreement. Prior to the effective date of said lease, the Parties agree that the NCTA is authorized to complete design and do work for this Project subject to encroachment agreements as provided in this Agreement.

1. **Definition and Scope of the Triangle Expressway Project:** The Project is 18.8 miles in length and is comprised of three sections:
  - A. Triangle Parkway, which will extend from NC 147 at I-40 south for 3.4 miles and terminate at the interchange with the Outer Wake Expressway;
  - B. Northern Wake Expressway (NC 540), which is the portion of the Outer Wake Expressway extending from NC 54 to NC 55 and is 2.8 miles long; this section was built by the NCDOT with STIP funds and opened to the public in 2007 and will be leased to the NCTA in accordance with this Agreement and a Right of Way Lease Agreement to be executed by the Parties; this section will enable Triangle Parkway and Western Wake Parkway to function as a contiguous toll facility, and the North Carolina General Assembly authorized the conversion of this section into a toll facility; and
  - C. Western Wake Freeway, which will connect with Northern Wake Expressway (NC 540) and will extend 12.6 miles from a northern juncture with NC 55 near Research Triangle Park to a southern juncture with NC 55 Bypass near Holly Springs.

2. **Master Agreement, and Standard Procedures:** The Parties have entered into a Master Agreement, referenced above. All work done with respect to the Triangle Expressway Project is to be performed in accordance with provisions contained in the Master Agreement, the North Carolina Department of Transportation and North Carolina Turnpike Authority Erosion and Sedimentation Control Program Agreement dated May 11, 2007, said documents being incorporated into this Agreement by reference, and this Project Specific Agreement. The NCTA is to follow the NCDOT's policies and procedures during the planning, design, acquisition of right-of-way, contracting procurement, construction, maintenance and operation, unless the Parties agree otherwise in writing.
3. **Revenue Sharing:** There shall be no revenue sharing between the parties on this project. Should the NCTA seek to establish tolls on a portion of I-540, not described in Section 1, the Parties may amend this Agreement to address revenue sharing.
4. **Funding and Repayment:**
  - D. **Funding:** The NCTA will fund the planning, design, right-of-way acquisition, construction, maintenance and operation of this Project. This Project is anticipated to be funded through a variety of funding mechanisms, including but not limited to: Non-Recourse Toll Revenue Bonds, TIFIA Direct Secured Loan(s), Construction Fund Interest Earnings, NCDOT advances (to be repaid) and State appropriations.
    - i. Except as set forth in this or the following paragraph, the NCDOT shall have no obligation to provide financing. However, if requested by the NCTA, the NCDOT will cooperate with and assist by providing information reasonably necessary for the NCTA to secure financing, including the execution of appropriate estoppel certificates, as required.
    - ii. Any offering document prepared by the NCTA in connection with financing (collectively, the "Bond Documents") shall be submitted to the NCDOT for a limited review prior to its issuance or use. The NCDOT's review of the Bond Documents shall be limited solely to the description of the terms of this Agreement, the description of the NCDOT operations, and to confirm that the Bond Documents do not contain any impediments to or conflict with the NCTA's or the NCDOT's obligations. The NCDOT shall have 15 business days after receipt of any Bond Document to object to the description of the terms of this Agreement, the description of the NCDOT operations, or to any perceived impediments to or conflicts with the NCTA's or the NCDOT's obligations.

The NCTA will submit subsequent changes to the final Bond Documents that affect the foregoing review conditions to NCDOT for review.

E. **Reimbursement:**

- i. In accordance with North Carolina General Statute §§ 136-176(b) and 136-89.191 the NCTA will reimburse the NCDOT for all monies advanced and all expenses incurred by the NCDOT for the Triangle Expressway Project, unless there is explicit approval by the NCDOT Board of Transportation providing that monies advanced or expenses incurred by the NCDOT for this Project will not be reimbursed, or except as provided in subdivision ii immediately below. Monies advanced include any and all funds provided by the NCDOT to the NCTA for its use in the planning, design, right-of-way acquisition, construction, maintenance and operation of the Triangle Expressway. Expenses incurred by the NCDOT include, but are not limited to, expenses incurred and charged for time worked by the NCDOT personnel, the NCDOT's contractors, the NCDOT's attorneys and their private experts on any phase of this Project, both prior to and following the execution of this Agreement. The NCDOT and the NCTA may agree in a separate writing for certain advances to be repaid to the NCDOT within a specified time after the NCTA secures funding for this Project.
- ii. The NCDOT will bear the costs and will not ask for repayment for work performed prior to August 31, 2006 for the Western Wake Freeway segment of the Triangle Expressway.
- iii. With the consent of the NCDOT, NCDOT counsel and attorneys in the Attorney General's Office and their staffs may be involved in consultations and litigation related to preconstruction, right-of-way acquisition and condemnation and post construction matters for this Project. All time, expenses, costs, settlement amounts and court-ordered costs and damages incurred in anticipation of and during litigation, including, but not limited to, fees and costs for title searches; filing fees; service fees; publication fees; recording fees; excise tax fees; deposits of estimated compensation and any subsequent amended deposits of estimated compensation; expert witness fees and expenses; subpoena fees; mediation fees; exhibit preparation costs; survey and mapping costs; wetland assessment costs; land planning studies and other

studies prepared in anticipation of or for litigation; costs associated with depositions and transcripts; travel expenses including mileage reimbursement, lodging and meals during travel; guardian ad litem fees; court-ordered interest; any court-ordered costs, including costs for the property owners' experts and other witnesses; and damages, penalties, sanctions, attorneys' fees, awarded by a court for all claims, including but not limited to, condemnation and inverse condemnation claims, are authorized to be billed as agreed upon by the Parties through a WBS element number for billing to this Project, and all such time and expenses are to be reimbursed to the NCDOT by the NCTA. Other NCDOT staff expenses, including, but not limited to, consultations by Right-of-Way officials, and surveying, mapping, providing right of way monuments as needed within the Project and trial exhibit preparation by Location and Survey officials will also be reimbursed by the NCTA.

iv. The NCTA will also reimburse the NCDOT for any monies spent by the NCDOT on right-of-way claims processed by NCDOT for this Project. Additionally, the NCTA will reimburse the NCDOT for work done by NCDOT officials on portions of this Project. Also, any NCTA use of the NCDOT funded agency positions is to be reimbursed to the NCDOT pursuant to GS 136-176(b). The NCDOT is authorized to bill time for all such work and expenses incurred for this Project as agreed upon by the Parties through a distinct a WBS element number for billing to this Project. Reimbursement shall be in accordance with the Master Agreement and applicable state law.

5. **Use of NCDOT Personnel:** The NCTA may seek assistance from any or all of the NCDOT's various units and personnel for this Project, and the NCDOT may provide assistance to the NCTA. However, the NCTA must contact the NCDOT State Highway Administrator's Office pursuant to standard operating procedures agreed upon by the Parties. The NCDOT State Highway Administrator's Office will coordinate all assistance for the NCTA. The NCTA may contact other NCDOT personnel directly with the consent of the State Highway Administrator's Office to discuss ongoing Project work. As set forth in Paragraph 4(B) above, all time and all expenses incurred for this Project by the NCDOT will be reimbursed by the NCTA. The NCTA must provide the NCDOT with an authorized Turnpike WBS element number to charge all work and expenses prior to any NCDOT personnel beginning work.

6. **Right-of-Way:**

A. The NCDOT shall hold title to all right-of-way, including but not limited to fee simple title, temporary construction easements,

temporary drainage easements, permanent drainage easements, temporary slope easements, utility easements, permanent easements, licenses, rights of entry, leaseholds, and other property rights together with any control of access, necessary for this Project. Except to the extent otherwise agreed upon in writing by the Parties, the NCDOT, in its sole discretion, shall receive and hold fee simple or other title to all structures, road surfaces, rail lines and other improvements located anywhere within the Project right-of-way. Nothing, however, in this section shall be intended or construed to impact or interfere with the NCTA's ability to lease the right-of-way from the NCDOT pursuant to this Agreement, to charge and collect tolls on leased right-of-way, or to pledge tolls and other revenue as security for bonds, notes and loans to finance the construction, operation and maintenance of the Project.

B. The NCTA will be responsible for negotiating and acquiring all remaining right-of-way, easements, licenses, rights of entry, leaseholds, any uneconomic remnants (residues), and other property rights necessary for this Project. The NCTA will acquire all right-of-way in fee simple together with all warranties and any control of access, except that for contaminated property the NCTA will acquire such property as permanent easement as set forth in subdivision D below. Prior to the property owners transferring to the NCTA any interests for any right-of-way together with any control of access, any easements, licenses, rights of entry, leaseholds, and other property rights, the NCTA shall disclose to the NCDOT in writing:

- i. Any environmental assessments of any portion of the property or interests to be acquired;
- ii. Any known environmental contamination or hazard of any portion of the property or interests to be acquired; and
- iii. Any commitments to property owners made by the NCTA. The NCTA will be liable for all commitments made to property owners and will bear all costs for said commitments.

The NCTA will designate a person with authority who will accept deeds prior to recording with the appropriate Office of the Register of Deeds. The NCTA and other third parties working for the NCTA to acquire right-of-way will follow the policies and procedures established by the NCTA, the NCDOT and the FHWA to ensure compliance with federal and state laws and regulations concerning right-of-way acquisition and relocation assistance. These policies and procedures are set out in the NCDOT Division of Highway Right of Way Branch's Uniform Appraisal Standards and General Legal Principles for Highway Right of Way Acquisitions, the most

recent NCDOT Right of Way Manual, and the NCTA Right of Way Acquisition Policy. The NCTA will comply with policies and procedures contained in any future changes to said manuals.

- C. The NCTA will re-convey its right-of-way together with any control of access, any easements, licenses, rights of entry, leaseholds, residues and other property rights along with all warranties enjoyed by the NCTA to NCDOT once all remaining right-of-way necessary for the project has been acquired. The re-conveyance(s) to the NCDOT must be free and clear of all claims for compensation. If any parcel of land has been condemned and is still in litigation as of the date of the re-conveyance(s), the NCTA is liable for all costs and additional compensation agreed upon or court-ordered in said condemnation lawsuits or any inverse condemnation lawsuits filed or which may be filed for parcels along this Project, as specified in subdivision 4. B. iii. above. The NCTA will prepare the instruments for the re-conveyance to the NCDOT in accordance with the NCDOT's Instruments of Conveyance Section in the NCDOT Right of Way Manual. Prior to said re-conveyance, the NCTA will present all instruments conveying title to the Manager of the Right of Way Branch of the NCDOT for acceptance.
- D. The NCTA will acquire any property with environmental contamination or hazards in permanent easement and not in fee simple right-of-way. The NCTA will be responsible and bear all costs for remediation of property containing any known environmental contamination or hazard to a level as approved by the North Carolina Department of Environment and Natural Resources ("DENR") or other appropriate regulatory agency.
- E. The NCTA will be responsible and bear all costs for removing or demolishing any structures or other improvements within the Project right-of-way after conducting all necessary abatement in accordance with federal and state statutes and regulations. The NCDOT can provide the NCTA with a list of abatement contractors. The NCTA will also be responsible for and bear all costs for any deferred taxes for parcels along this project and all pro rata ad valorem taxes for parcels during the year acquired.
- F. The NCTA will be responsible and bear all costs for removing graves from the right-of-way in compliance with all pertinent federal and state statutes and regulations.
- G. The NCTA will follow the Uniform Relocation Act for all relocations. This Act is set out in the NCDOT Right of Way Manual. The NCTA will approve and pay for relocation payments. The NCDOT will audit the NCTA's relocation files to ensure compliance with the Act.

- H. The NCTA will appraise the leasehold interests and any bonus values for outdoor advertising structures within the proposed right-of-way in accordance with the policies and procedures set out in the NCDOT Division of Highway Right of Way Branch's Uniform Appraisal Standards and General Legal Principles for Highway Right of Way Acquisitions, and the NCDOT Right of Way Manual. The NCTA will use the most current version of the foregoing manuals that are in effect at the time of the appraisal.
- I. All residues already acquired by the NCDOT for the Northern Wake Expressway and the Western Wake Freeway, and all residues which may be acquired by the NCTA for the other segments of the Triangle Expressway will be under the control of the NCDOT. The NCTA will provide the NCDOT with an updated list of all residues as each is acquired.
- J. The NCTA will follow all property management policies and procedures of the NCDOT.
- K. The NCTA will process claims for settlements and requests for condemnation deposits. The NCDOT will review each individual right-of-way claim to ensure compliance with all pertinent federal and state statutes and regulations regarding acquisition and relocation. The NCTA will pay all necessary payments for settlements, condemnation filings, recording fees, relocations, and other associated expenses out of the NCTA's funds.
- L. The NCTA or its contractor will provide the NCDOT with a signed letter certifying whether or not all right-of-way has been acquired for the Project and certifying that all right-of-way acquired was acquired in accordance with federal and state regulations. The NCDOT will certify to the FHWA only that the process for certification was followed by the NCTA or its contractor.
- M. **Lease For Triangle Expressway:** The NCDOT agrees to lease the right-of-way acquired for this Project to the NCTA pursuant to a Lease and Access Agreement ("Lease") effective after the NCTA secures appropriate funding and after the NCTA acquires the remaining right-of-way necessary for this Project. The property subject to the Lease will be right-of-way and other necessary property interests so the NCTA may construct, operate and maintain the Triangle Expressway Project. The Lease will initially include the right-of-way acquired for the Triangle Parkway and the Western Wake Freeway. The Lease will be amended in writing to include the Northern Wake Expressway (NC 540) when NC 540 is ready to open as part of a toll road, since NC 540 is currently open and operating as a state highway. The Parties will agree upon the form of Lease not later than April 1, 2008, so that such form may be included

as a part of the NCTA credit rating reviews and financing applications as required.

- i. The term of the Lease will be from its execution until the Project is transferred or reverts to the NCDOT.
- ii. The property subject to the Lease includes right-of-way and any other property interests necessary for the construction, operation and maintenance of this Project. The NCDOT agrees to lease the right-of-way and other necessary property interests for this Project to the NCTA for \$1.00 per year, due annually on July 1 of the first year of the Lease and continuing until the NCTA ceases to operate said toll facility, or the NCTA transfers its interest in the operation of the facility to the NCDOT, or the Project reverts to the NCDOT.
- iii. Prior to the delivery of said Lease the NCDOT shall disclose to the NCTA in writing:
  - a. Any environmental assessments of any portion of the property subject to the Lease in the possession or control of the NCDOT;
  - b. Any known environmental contamination or hazard of any portion of the property subject to the Lease; and
  - c. Any commitments to landowners made by the NCDOT before or during the acquisition of any portion of the right-of-way subject to the Lease.
- iv. The parties understand and agree that should NC 540, Western Wake Freeway or Triangle Parkway hereafter be combined with other proposed nearby project(s) as a Public Private Partnership or otherwise, said Lease may be used to secure funding for such combined project. However, the NCTA may not sublease, assign or subrogate its responsibilities to any third party for such combined project without the express written consent of the NCDOT Board of Transportation.

v. When the toll facility is open to the traveling public, the NCTA will ensure that all portions of the Project shall be maintained to NCDOT standards or above. Should the NCTA enter into any third party agreements to operate or manage any portion of the Project, the NCTA is responsible for any failure to operate the roadway and Project in accordance with NCDOT standards. The NCTA is also responsible for the cleanup and costs associated with any incident involving hazardous materials and will ensure that all federal and state laws will be adhered to in the abatement of hazardous materials located on the Project's right-of-way.

vi. If at any time, the NCTA determines that the Triangle Expressway Project is no longer viable as a toll project or if any section of the Triangle Expressway Project (NC 540, Western Wake Freeway or Triangle Parkway) is not suitable as part of a toll facility, the NCTA will execute an instrument for recording with the appropriate Office(s) of the Register of Deeds indicating any Amendment or Termination of the Lease, and will transfer all right-of-way, property, interests and assets associated with the Project to the NCDOT. Said instrument shall be accepted in writing by the authorized representative of the NCDOT prior to recordation with the Register of Deeds. The NCTA will provide the NCDOT with written notice of NCTA's intent to amend or terminate, the Lease at least 180 days prior to amending or terminating the Lease and transferring all right-of-way, property, interests and assets associated with the Project to the NCDOT.

The NCTA shall nevertheless be responsible for reimbursements as provided herein.

vii. During the lease period, the NCDOT retains access rights to the leased premises for inspection purposes and for certain maintenance responsibilities. The NCDOT and its contractors may enter the leased premises to conduct such work necessary for said inspection and maintenance responsibilities. The NCDOT and its contractors will provide reasonable notification to the NCTA and its contractors as may be required by the NCTA and shall plan and conduct the NCDOT work in a manner that creates the least possible disturbance to the construction of the project or to the traveling public. The NCDOT will have complete access to Northern Wake Expressway (NC 540) without providing any notice to the NCTA until NC 540 is ready to open as part of a toll road.

viii. Lease for Northern Wake Expressway:

- a. The Amendment to the Lease to include the Northern Wake Expressway (NC 540) from the NCDOT to the NCTA, when NC 540 is ready to be opened as part of a toll road, shall include all right of way acquired by the NCDOT for the NC 540 project and all ancillary structures since such excess right of way may be needed in aid of erection of tolling structures and equipment. The lease will not include any residues. The NCTA will give the NCDOT 180 days written notice prior to NC 540 being ready to open as a toll road so an Amendment to the Lease can be executed. The NCTA and its contractors will be able to construct any necessary connections from NC 540 to the other portions of the Triangle Expressway as well as any necessary toll facilities, signage, lighting, signals and signal synchronization pursuant to an encroachment agreement with the NCDOT to be executed before the NCTA is ready to start such construction on NC 540. As soon as practicable, the NCTA will cooperate with the NCDOT to enter into encroachment agreements providing for any construction and changes in the connection of NC 540 as a toll road with the NCDOT non-toll highways. The NCTA will be responsible for and pay for any said construction or changes required for the connection of NC 540 as a toll road with the NCDOT non-toll highways, including but not limited to, any necessary changes to existing signage, lighting, signals and signal synchronization before tolls are collected.
- b. Prior to the effective date of the Lease for NC 540 as provided for herein, the Parties shall cooperate and shall execute and submit such letters or other writings necessary for the FHWA to designate the NC 540 Project a toll road.
- c. Notwithstanding the Lease of NC 540 as provided above:
  1. NC 540 shall be open to traffic without tolls until it is ready to be opened as part of a toll road as part of the Triangle Expressway Project.

Unless otherwise hereafter agreed by the parties in writing, NC 540 shall be operated and maintained under its usual standards by and at the cost of the

NCDOT until the NCTA has completed all steps necessary to open this section as part of a toll road, including providing 180 days written notice to the NCDOT as required above.

**7. Encroachments:**

**A. Encroachment with the NCTA:** An encroachment to perform Project work prior to the effective date of the Lease is part of this Agreement, subject to any Lease conditions when said lease becomes effective and the conditions set forth below, except for NC 540 for which the parties will enter a separate written Encroachment Agreement so that the NCTA can perform work on this road until it is ready to open as part of a toll road, as set forth in subdivision immediately above. The encroachment agreement will commence concurrently with the effective date of this Agreement, except for NC 540.

- i. The NCTA or its contractors will need access to NCDOT highways for preconstruction purposes. The NCTA will provide reasonable written notification to the NCDOT, and the NCDOT will provide access via written communication from the NCDOT Division 5 Engineer on NCDOT maintained right of way. The NCTA will also need access to existing NCDOT highways in order to connect them to the Triangle Expressway Project. The NCTA will cooperate with the NCDOT to enter into necessary encroachment agreements providing for any necessary construction and changes in the connection of this Project with the NCDOT non-toll highways. The NCTA will be responsible for any said construction or changes and all associated costs required for the connection of this Project with the NCDOT non-toll highways, including but not limited to changes or additions to signage, lighting, signals and signal synchronization. The NCTA will plan and conduct the NCTA work in a manner that creates the least possible disturbance to the traveling public. Any traffic control work requiring disruption of traffic in any way by the NCTA or its contractors on existing NCDOT highways will be coordinated with the NCDOT prior to performing the work and will be in accordance with NCDOT approved restrictions or as outlined in an encroachment agreement between the NCTA and the NCDOT.
- ii. All work performed by the NCTA and its contractors on the NCDOT right-of-way will be done in accordance with all applicable NCDOT standards, policies, and procedures unless otherwise agreed to in writing by the NCDOT Division 5 Engineer.

B. **Encroachments with Third Parties:**

The NCTA and the NCDOT Utility Unit have agreed upon and will use a Right-of-Way Encroachment Agreement for Controlled Access Highways for Turnpike Projects. This three party encroachment agreement (NCTA, NCDOT, and "encroacher") will be used for encroachments due to right-of-way ownership issues. However, where the NCTA will not retain operational control after the completion of the Project, such as along y-lines where driveway and/or other 3<sup>rd</sup> party allowances are permitted, the NCDOT will be the sole approval authority. If the NCTA is responsible for any funds for any of these activities, such as any utility reimbursements, NCTA will be a party to the encroachment agreement. All utility encroachments shall be in accordance with the NCDOT's Policies and Procedures for Accommodating Utilities on Highway Rights of Way Manual, specifically those procedures for controlled access highways. The NCTA will coordinate with the NCDOT regarding all encroachments for this Project.

8. **Withdrawal of NCDOT Funding Participation:**

- A. If at any time prior to the closing on any bond issuance, the NCTA determines that the Triangle Expressway Project is no longer viable as a toll project; or if the NCTA is unable to secure satisfactory financing, or if, in the opinion of the NCDOT Board of Transportation, satisfactory progress has not been made to implement or secure funding for this Project; or if the Project is not awarded by the NCTA by February 3, 2010, the NCDOT Board of Transportation may withdraw Project funding as provided in the Master Agreement and this Agreement as set forth in subsection B below.
- B. In the event that NCDOT intends to withdrawal funding pursuant to the conditions set forth in paragraph 8A above, the NCDOT will provide written notice to the NCTA of the NCDOT's intent to withdraw Project funding. After said notice, the NCTA shall have 180 days to cure the defect. At the conclusion of the 180 days, If NCTA has failed to cure the defect to the satisfaction of NCDOT, NCDOT shall give NCTA 90 days notice prior to withdrawing Project funding and terminating, or within its discretion, assigning the lease if in effect at such time. The issuance of senior toll road revenue bonds by the NCTA to provide all or a portion of the construction financing for the Project shall in all events constitute satisfactory progress to implement funding for the Project.

9. **The NCTA's transfer of the Project to the NCDOT for Inclusion in the State Highway System:**

- A. At the termination of the Lease and upon fulfillment of all financing agreements and reimbursement to the NCDOT of all monies loaned by the NCDOT, spent by the NCDOT for its employees, contractors or counsel working on this Project, and for all costs and expenses incurred by the NCDOT, as set forth in Section 4. B. Reimbursement above, the NCTA shall transfer of the Project's roadway, all right-of-way, property, interests and assets associated with the Project from the NCTA to the NCDOT as provided in the Master Agreement. The NCTA will convey the roadway to the NCDOT for maintenance after the NCTA has removed all toll facilities and toll signage from the Project. The roadway must conform to NCDOT standards, including minimum maintenance conditions, prior to conveyance and acceptance to the State Highway System for Maintenance. An assessment of all highways and bridge assets will be conducted by the NCTA in compliance with the NCDOT performance targets. If the roadway does not meet NCDOT standards, the NCDOT will charge the NCTA the costs of bringing the roadway into compliance. The NCDOT may require the NCTA in writing to remove certain obstacles at the NCTA's expense, prior to the NCDOT agreeing to accept the roadway. The NCTA will provide the NCDOT with written notice 120 days in advance of the desired transfer date. The NCDOT Board of Transportation must approve the transfer. After approval by the Board of Transportation, the NCTA will execute an appropriate instrument memorializing this transfer to the NCDOT.
- B. When the Project is transferred to the NCDOT, all portions of the Project must be in compliance with all federal, state and local laws and regulations. The NCTA must bear all costs of bringing items into compliance.

10. **Compliance with Environmental Laws and Regulations:** The NCTA will be responsible, to the exclusion of the NCDOT except with respect to NC 540 as set forth below, for compliance with all applicable federal and state environmental laws and regulations, including, but not limited to, the National Environmental Policy Act (NEPA), the State Environmental Policy Act (SEPA), the Clean Water Act, the Clean Air Act, the USDOT Act, the National Historic Preservation Act, and the Endangered Species Act. The NCTA will be responsible, to the exclusion of the NCDOT except with respect to NC 540 as set forth below, for all claims or actions arising out of any alleged violations of any federal or state environmental law or regulation, including the costs of any litigation or administrative proceeding, and any attorneys' fees. Such costs for the time and expenses of the NCDOT's counsel and members of the Attorney General's Office and their staffs as well as attorneys' fees assessed for counsel representing parties other than the NCDOT and NCTA, and expenses, costs, settlement amounts and court-ordered costs and damages incurred during litigation, including, but not limited to, fees and costs for expert witness fees and expenses; subpoena fees; mediation fees; exhibit preparation costs; survey and mapping costs; wetland assessment costs;

land planning studies and other studies prepared for litigation; costs associated with depositions and transcripts; travel expenses including mileage reimbursement, lodging and meals during travel; court-ordered interest; any court-ordered costs, including costs for the other parties' experts and other witnesses; and damages, penalties, sanctions, attorneys' fees, awarded by a court for any such claims are authorized to be billed as agreed upon by the Parties through a WBS element number for billing to this Project, and all such time and expenses are to be reimbursed to the NCDOT by the NCTA.

The NCDOT shall remain responsible for all of its acts and omissions and those of its contractors and agents relative to NC 540 prior to the effective date of the Amendment to the Lease to incorporate NC 540 in the Lease, or a date, agreed to by the Parties, upon which date the NCTA will assume operations and maintenance of NC 540, whichever occurs later.

- A. Documentation required by the NEPA and/or SEPA has been completed for the Western Wake Freeway. The NCTA must complete the NEPA process for the Triangle Parkway prior to acquiring right of way or beginning construction of that portion of the Project. Provided, the NCTA may accept donations of property for the Project, subject to the concurrence of the FHWA. The NEPA or SEPA document must be completed on NC 540 prior to the NCTA's beginning construction of toll collection facilities on NC 540. Completion of the NEPA process consists of obtaining a Categorical Exclusion ("CE"), a Finding of No Significant Impact ("FONSI") or a Record of Decision ("ROD") document signed and approved by both the FHWA and the NCDOT. The NCTA will be responsible for preparing any supplemental environmental documentation required by NEPA, SEPA or FHWA regulations, such as consultations, re-evaluations, or other supplemental documents. All supplemental environmental documentation must be signed and approved by the NCDOT and the FHWA, if applicable. Any future improvements to the Project or to other area roadways not covered by previously-approved environmental documents must comply with NEPA and/or SEPA as applicable. Commitments made in the environmental documents for the Project, commonly known as the "Green Sheet" commitments, will be carried out by the NCTA, except when a local, state or federal government has submitted a formal resolution to the NCTA and the NCDOT advising that it no longer requires a specific commitment. The NCTA will certify to the NCDOT and the FHWA that it has met said commitments.
- B. The NCTA will prepare, sign, and submit all required federal and state environmental permit applications for the Project. The NCTA will provide to the NCDOT Project Development and Environmental Analysis (PDEA) Branch for review and comment a copy of any draft permit application at least two weeks prior to submittal, and will provide to the PDEA Branch a copy of any

draft permit conditions received from a regulatory agency within two business days of receipt. The NCTA will be solely responsible for compliance with all environmental permits issued for the Project, including, but not limited to, all costs, fines, penalties, and damages associated with any permit violations and all costs associated with correcting or responding to those violations, including the costs of any litigation or administrative proceeding and any attorneys' fees.

- C. The NCTA will ensure that stormwater drainage systems for this Project will be designed in accordance with the requirements of the National Pollutant Discharge Elimination System (NPDES) program. The NCTA has a NPDES Permit for this Project. The NCTA will use NCDOT's Best Management Practices for the protection of surface waters during construction.
  - D. The NCTA and the NCDOT agree to cooperate for the utilization of the Ecosystem Enhancement Program (EEP) for project mitigation. The NCTA will be responsible for paying any mitigation costs to the EEP.
  - E. The NCTA agrees to follow the North Carolina Department Of Transportation and North Carolina Turnpike Authority Erosion and Sedimentation Control Program signed on behalf of the NCDOT and the NCTA on May 11, 2007 during construction of this Project. (This document is attached hereto.)
11. **Municipal Agreements:** The NCTA will honor all municipal agreements in effect prior to the entry of this Agreement which will be affected by this Project. The NCTA is responsible for preparation and execution of all necessary agreements with various local governments for this Project. The NCDOT will be a party to these agreements, when such agreements significantly impact the NCDOT facilities. If the NCTA agrees to any provisions with local governments which are outside of the authority granted to the NCDOT by the North Carolina General Statutes and beyond what is provided in AASHTO and NCDOT policies and procedures, the NCDOT will not be responsible for carrying out such terms of any agreements should the Project be transferred to the NCDOT.
12. **Design Standards:** The NCTA and its contractors will adhere to established design standards and guidelines, including, but not limited to, Project specific design criteria as included in the Design-Build contract documents which will incorporate AASHTO and FHWA design guidelines and policies, and NCDOT standards, unless otherwise agreed upon by the NCTA, the NCDOT and the FHWA.
13. **Procurement:** The NCTA will follow procurement procedures and the procedures as set forth in North Carolina General Statute § 136-89.194.
14. **Construction of the Project:** The construction of this Project will be in accordance with the NCDOT Construction Manual in effect at the time of construction, except as modified by the Design-Build contract documents and

agreed upon by the NCTA, the NCDOT and the FHWA. The NCTA and the FHWA will separately agree upon toll collection technology issues which are not covered in the NCDOT Construction Manual. The NCTA or its contractors will perform quality assurance during construction. The NCTA will provide written assurance of compliance during all phases of the Project to the NCDOT and the FHWA. The NCTA will conduct structural design reviews with the NCDOT in accordance with established NCDOT policies and procedures.

15. **Traffic Control:** The NCTA will follow the United States Department of Transportation Manual on Uniform Traffic Control Devices (MUTCD) and the NCDOT Manual on Uniform Traffic Control Devices as well as the NCDOT's policies and procedures for installation and placement of traffic control devices on the Project and on highways connecting to the Project. The NCTA will coordinate with the NCDOT and the FHWA for traffic control planning, and congestion and incident management planning for this Project as well as for establishing traffic counting techniques and standards for the Project and highways connecting to the Project. The NCTA will provide periodic reports and conduct audits for traffic control planning and devices to the NCDOT and the FHWA as agreed upon by these three entities.
16. **Civil Rights Program:** The NCTA's Disadvantaged Business Enterprises (DBE) program will follow the federally approved NCDOT DBE program. The NCTA will ensure that its contractors adhere to this program and civil rights requirements and provide necessary reports to the NCDOT with appropriate documentation. The NCTA will enforce civil rights compliance, if necessary, by withholding payments from contractors or other administrative remedies. The NCTA will also ensure that the NCTA and its contractors comply with the Americans with Disabilities Act (ADA) from the preconstruction phases of this Project until the reversion of or the transfer of the Project to the NCDOT when the toll facilities have been removed.
17. **Safety:** Before and during construction and while operating and maintaining this project, The NCTA will follow safety related programs and procedures established by the NCDOT and the FHWA, including but not limited to those in the NCDOT Workplace Safety Manual and the NCDOT Safety Policies and Procedures Manual, and will conduct audits for and provide periodic reports on safety control to the NCDOT and the FHWA as agreed upon by these three entities.
18. **Warranties:** The NCTA will ensure that all warranties from its contractors, including the Design Build team will automatically be assigned to the NCDOT upon transfer of the Project to the NCDOT or the reversion of the Project to the NCDOT. Also, at all times, all warranties are to be in force in accordance with the NCTA's contract and all warranty work is to be performed as required by the contract specifications. The NCTA will perform quality assurance on the warranty process to ensure compliance. If during the warranty periods, which are initiated with the date of substantial completion of the contract, any work is found to be defective or not in accordance with the contract requirements, the NCTA Director of Construction, or the NCDOT State Construction Engineer, if the Project has been transferred to the NCDOT, will

notify the contractor in writing of its responsibility to perform corrective work in accordance with the contract provisions. If the contractor is in non-compliance with the contract requirements to perform warranty work, the NCTA Director of Construction, or the NCDOT State Construction Engineer, if the Project has been transferred to the NCDOT, will arrange for the work to be performed by others. The NCTA or the NCDOT will arrange for the cost reimbursement by the responsible contractor through a deductive contract modification or other means.

**19. Operation and Maintenance:**

- A. Prior to tolls being collected on NC 540, the NCDOT will perform routine maintenance along NC 540 to a comparable level with other controlled access highway corridors. The NCDOT will not be responsible for maintaining any items within the future toll construction contract for the Project or any items added as a result of the conversion of this segment to a turnpike facility. The NCDOT will completely operate and maintain NC 540 which is now part of the State Highway System until it is opened as a toll road, except for the NCTA's required construction to connect NC 540 with the rest of the Project.
  
- B. After the Project is opened as a toll road, the NCTA will be responsible for all operations and maintenance of this Project. The NCDOT will be responsible for the operation and maintenance of any right-of-way outside the Project limits. With regard to the termini points on ramps and/or loops, the NCDOT right-of-way line or an imaginary line projected along the assumed right of way width along any non-NCTA owned y-line crossing either over or under Triangle Expressway will be considered the delineation line for responsibility for the NCDOT and the NCTA as it relates to maintenance or other functions. The Parties will be responsible for operation and maintenance for their respective parts on either side of said lines. These limits will be graphically depicted on the final design plans.
  - 1. New signals and revisions to existing signals will be necessary along existing NCDOT highways prior to inception of tolls on the corridor. The NCTA will contract for this work in accordance with appropriate NCDOT engineering guidelines unless the NCDOT has preference on existing signals such as Division 5 Traffic Services performing the work in lieu of a contractor. If the NCDOT forces perform this work, the NCTA will reimburse the NCDOT for all costs and expenses, including parts and hours worked by the NCDOT personnel or its contractors. The NCTA will coordinate with the NCDOT regarding any necessary signal timing and details, traffic control requirements and other related issues to ensure NCDOT policies, procedures, and

requirements are met. The NCTA will bear all costs for said signals, signal synchronization and modifications.

2. New signs and revisions to existing signs will be necessary along existing NCDOT highways prior to inception of tolls on the corridor. The NCTA will contract for this work in accordance with appropriate NCDOT engineering guidelines. The NCTA will coordinate with NCDOT regarding any sign designs and details, and traffic control requirements necessary for this Project to ensure NCDOT policies, procedures, and requirements are met. The NCTA will bear all costs for said signs and modifications.
3. The NCTA will coordinate with NCDOT to install any necessary lighting along existing NCDOT highways prior to inception of tolls on the corridor. The NCTA will contract for this work in accordance with appropriate NCDOT engineering guidelines. The NCTA will coordinate with the NCDOT regarding any lighting designs for this Project to ensure NCDOT policies, procedures, and requirements are met. The NCTA will pay for energy usage for lighting elements installed by the NCTA regardless of location. The NCTA will bear all costs for said lighting and modifications.

20. **ITS Technologies and Integration into the NCDOT Traffic Operations Center:**

New ITS equipment or revisions to the existing equipment will be necessary along existing NCDOT highways prior to inception of tolls on the corridor. The NCTA will contract for this work in accordance with appropriate NCDOT engineering guidelines unless the NCDOT has preference on existing ITS equipment such as Division 5 Traffic Services performing the work in lieu of a contractor. If the NCDOT forces perform this work, the NCTA will reimburse the NCDOT for all costs and expenses, including parts and hours worked by the NCDOT personnel or its contractors. The NCTA will coordinate with the NCDOT regarding any necessary ITS designs and installations to ensure NCDOT policies, procedures, and requirements are met. The NCTA will bear all costs for said signals and modifications. The NCTA agrees to share video and traffic flow data with the NCDOT at no cost to the NCDOT. The NCDOT will provide space at the NCDOT Traffic Operations Center. The NCTA will bear all costs associated with wiring and equipment necessary and all work associated with meeting their requirements.

21. **Outdoor advertising adjacent to roadway:** The United States Congress mandated that the states effectively control outdoor advertising adjacent to interstate or Federal-aid primary highway systems, such as the Triangle Expressway, pursuant to 23 U.S.C. § 131, *et seq.* Should the states fail to effectively control outdoor advertising adjacent to said highways, the states could lose a significant portion of their federal funding for highways. In accordance with Congressional mandate, The North Carolina General

Assembly delegated to the NCDOT authority to control outdoor advertising adjacent to interstate or primary highway systems within this state, pursuant to the North Carolina Outdoor Advertising Control Act, North Carolina General Statute § 136-126, *et seq.* The NCTA will refer all matters relating to outdoor advertising control to the NCDOT.

22. **Junkyards:** The United States Congress mandated that the states effectively control junkyards adjacent to interstate or Federal-aid primary highway systems, such as the Triangle Expressway, pursuant to 23 U.S.C. § 136, *et seq.* Should the state fail to effectively control junkyards, the state could lose a significant portion of federal funding for highways. In accordance with Congressional mandate, The North Carolina General Assembly delegated to the NCDOT authority to control junkyards adjacent to interstate or primary highway systems within this state, pursuant to the North Carolina Junkyard Control Act, North Carolina General Statute § 136-141, *et seq.* The NCTA will refer any matters relating to junkyard control to the NCDOT.
23. **Logo Program:** The North Carolina General Assembly delegated to the NCDOT the authority for owning and erecting logo signs in the right of way, pursuant to North Carolina General Statute § 136-89.56. The NCTA will manage the logo signs program along this Project in accordance with federal and state laws and regulations and with the NCDOT policies and procedures.
24. **Oversize and Overweight Permits:** The United States Congress mandated that the states obtain compliance with size and weight requirements by vehicles operating on the Interstate System and federal-aid Primary roads, such as the Triangle Expressway, pursuant to 23 U.S.C. § 127. Should the states fail to certify to the FHWA that they are enforcing state laws respecting maximum vehicle size and weight or should states fail to enforce state laws respecting maximum vehicle size and weight, the states could lose a significant portion of their federal funding for highways, pursuant to 23 CFR § 657.19. In accordance with Congressional mandate, the North Carolina General Assembly delegated to the NCDOT authority to issue permits for qualifying oversize and overweight vehicles and fine operators of oversize and overweight vehicles who fail to obtain permits, pursuant to North Carolina General Statute § 20-119, *et seq.* The NCTA will refer all matters relating to oversize and overweight vehicles to the NCDOT. No moves for oversize or overweight vehicles will be routed through the NCTA routes without prior coordination with the NCDOT.
25. **Regulation and Enforcement Responsibilities:** Any regulatory or enforcement responsibilities that the NCDOT is charged with administering along the State's highways will be the responsibility of the NCTA during the term of the Lease, except matters relating to outdoor advertising control, junkyard control, oversize and overweight vehicles and other matters specifically delegated to the NCDOT and for which the NCDOT is subject to lose federal or state funding for noncompliance.
26. **Emergency and NCDOT Use of Toll Project:** In the event the Governor shall declare a State of Emergency that requires the use of the toll facility as an evacuation route, the use of the roadway will be free at all times during

the applicable period of such declared emergency. Emergency vehicles, as to be defined in the NCTA Toll Policy, will be reimbursed for use of the roadway at all times when responding to an emergency. The NCTA will provide transponders to the NCDOT to allow access to the roadway by NCDOT personnel when conducting official business specific to this NCTA toll facility.

27. **Incident Motorist Assistance Patrol (IMAP):** Any IMAP functions performed on the Triangle Expressway during the term of the Lease will be at the discretion and cost of the NCTA and coordinated with the NCDOT as necessary. The NCTA may contract with private entities for IMAP functions and the costs for such services will be born by the NCTA.

28. **Future Improvements to Triangle Expressway:** The Parties desire to outline the conditions and terms that must be met before the NCTA will be required to plan, design, fund and construct improvements to the I-40/NC 147/Triangle Parkway interchange and any other associated improvements. With respect to these future improvements, the Parties agree as follows:

A. The NCTA, subject to the financing conditions set forth in Section B below, will plan, design, program (fund and schedule) and implement improvements to the I-40/NC 147/Triangle Parkway interchange and any other associated improvements. The work will be done on a schedule based on the earliest occurrence of items i, ii, or iii as listed below:

i. The NCTA will fund the planning, design, and construction of the future improvements at the interchange and any other associated improvements so that the construction of the improvements will be completed at the time the annual average daily traffic ("AADT") is 50,000 vehicles per day on the Triangle Parkway.

ii. The NCTA will fund and begin the planning and design for the improvements at the interchange and any other associated improvements when the Durham Chapel Hill Carrboro and the Capital Area Metropolitan Planning Organizations and the NCDOT programs funds to begin the planning for improvements along I-40 in the vicinity of the interchange. The NCTA will fund the construction and implement the improvements to the interchange and any other associated improvements on the same schedule or on a compatible schedule as the construction of the I-40 improvements.

iii. The NCTA will fund and begin the planning and design for the improvements at the interchange and any other associated improvements when funds are identified to begin planning of the

Triangle Parkway Extension from the McCrimmon Parkway to NC 540 (Project U-4763 A). The NCTA will fund the construction and implement the interchange improvements and any other associated improvements at the same time or on a compatible schedule as the construction of project U-4763 A.

- B. Notwithstanding the conditions set forth in Section A above, the NCTA will plan, design and fund any future improvements along I-40/NC 147/Triangle Parkway if the NCTA, in consultation with its financial advisor, determines that:
- i. Revenue collected from the Triangle Expressway exceeds the then existing financial operating and maintenance requirements and debt obligations and commitments arising out of the construction of thereof; provided if funding comes from revenue bonds, all capital costs must be validated by an independent consulting engineer and toll revenue forecasts must be validated by an independent traffic and revenue consultant;
  - ii. All of the NCTA financing covenants will be met including the additional bonds test, the rate covenant, and the maintenance of investment grade senior lien bonds as required by TIFIA; and
  - iii. Any credit rating agency maintaining ratings on the NCTA will provide written affirmation that the NCTA credit ratings will maintain no less than a minimum investment grade credit rating if additional bonds are to be issued to fund the traffic improvements along the I-40/NC 147/Triangle Parkway interchange.
- C. NCTA shall not issue any parity bonds, other than refunding bonds (i.e., refinancing the original bonds), for any project before the improvements along I-40/NC 147/Triangle Parkway interchange and associated improvements are financed, provided that at least one of the circumstances in Section A are present at the time NCTA seeks to issue the bonds. If none of the circumstances in Section A are present, this restriction does not apply.

29. **Audit and Monitoring Requirements:** The procedure for documentation for this Project and control of same will be in accordance with the NCDOT Construction Manual. Certain modifications to NCDOT Construction Manual procedures may be made provided that the NCTA Chief Engineer and the NCDOT Highway Administrator or his designee agree beforehand in writing. The NCTA shall submit to the NCDOT such data, reports, records, contracts and other documents relating to the project as the NCDOT may request in order to ascertain the performance by the NCTA of its obligations under this and the Master Agreement. If requested by the NCDOT, the NCTA shall provide the NCDOT with a copy of any contract or proposed contract between the NCTA and a third party for procurement of consultant services, construction or commodities or any amendments, with respect to the project. All records are subject to being audited by the FHWA, the State Auditor and the NCDOT.
30. **Compliance with Laws:** The Parties agree to comply with all applicable federal, state and local laws, codes, ordinances, rules and regulations while this Agreement is in force.
31. **Notices:** Any notices given pursuant to this Agreement shall be given in writing and sent via First Class United States Mail, State Courier Service or personal delivery to the Parties at the address below. The notices shall be effective on the date received.
32. **Attachments:** All exhibits and other attachments to this Agreement are incorporated herein by reference.
33. **Governing Law:** This Agreement shall be construed under and in accordance with the laws of the State of North Carolina.

34. **Remedies and Liabilities of the Parties:** The Parties hereby expressly agree that the remedy for any noncompliance by either party under this Agreement shall be specific performance, except as set forth herein. Should the NCDOT be required to have the NCTA bring this Project into compliance with NCDOT standards prior to reversion or transfer of the project, the NCDOT will be allowed to recover all costs incurred in any litigation for this purpose. To the extent allowed by law, each party shall be responsible for its respective actions under this Agreement, including responsibility for any assessments, claims, fines, penalties or other liabilities resulting from or arising out of this Agreement. Except as otherwise provided in the following two sentences, the NCTA acknowledges and fully accepts its responsibility for the planning, design, acquisition of right-of-way, construction, maintenance, regulation, signage, signalization, illumination and overall operation of the Triangle Expressway, and hereby contracts to release the NCDOT from responsibility therefor in any litigation, except with respect to the gross negligence or willful misconduct of the NCDOT. Nothing, however, contained in this Agreement or elsewhere shall impose any liability on the NCTA for or with respect to the operation of NC 540 prior to it becoming part of the toll facility. Until any construction work is performed on NC 540 to alter it for use as a toll road, the NCDOT acknowledges and fully accepts its responsibility for the design and construction thereof. However, when the NCTA begins construction to connect NC 540 to the other sections of this Project, the NCTA acknowledges and fully accepts responsibility for the planning, design, right-of-way acquisition, construction, maintenance, regulation, signage, signalization, signal synchronization, illumination and overall operation thereof, including control in the work zone during construction and when the construction is complete, and hereby contracts to release the NCDOT from responsibility therefor in any litigation, except with respect to the gross negligence or willful misconduct of the NCDOT.

NCDOT shall reasonably assist the NCTA in the NCTA's pursuit of any breach of contract, negligence or other claim against any of the NCDOT's contractors, which assistance may include the NCDOT's assignment of its rights to the NCTA, sharing of documentation, providing access to its employees and consultants, or, if necessary, joinder in any legal action, provided that the NCTA shall promptly reimburse the NCDOT for all costs it incurs as a result. Further and to the extent allowed by law, the NCTA shall be fully subrogated to the NCDOT and shall be entitled to maintain an action over and against any third party or parties (but not against the NCDOT) legally liable for having caused the NCTA or the NCDOT to pay or disburse any sum of money in connection with any previously completed portion of the Project. Neither the NCDOT nor the NCTA waives, relinquishes, limits or conditions its governmental immunity or any other right to avoid liability which it otherwise might have to third parties. Nothing in this Agreement shall be construed as creating any liability in favor of any third party or parties against either the NCDOT or the NCTA, nor shall it ever be construed as relieving any third party or parties from any liabilities of such third party or parties to the NCDOT or the NCTA.

35. **Severability:** In case any one or more of the provisions of this Agreement shall be found invalid, unlawful or unenforceable for any reason, in any respect, the remainder of this Agreement shall remain in effect and construed as if such invalid, unlawful or unenforceable provision had never been contained herein.
36. **Headings:** The headings and section captions contained herein are for convenience only and shall not in any way limit or amplify the plain meaning of any term or provision herein.
37. **Amendments:** No, amendment, modification or alteration of any term or provision herein shall be valid or binding, unless the same shall be in writing, dated subsequent to the effective date of this Agreement, and duly executed by the authorized representatives of the NCTA and the NCDOT.
38. **Construction of this Agreement:** In the construction of this Agreement, whether or not so expressed, words used in the singular or in the plural, respectively, include both the singular and the plural, and the masculine, feminine and neuter genders include all other genders. The Parties agree that no single Party shall be deemed the author of this Agreement, and that the Agreement shall not be construed more or less strictly against one Party than against the other Party.
39. **Termination of this Agreement:** This Agreement may be terminated only by written mutual agreement and consent of the parties hereto, except as specifically herein provided.
40. **Successors and Assigns:** This Agreement shall bind, and shall be for the sole and exclusive benefit of the respective Parties and their legal successors.
41. **Limitations:** All covenants and obligations of the NCDOT and the NCTA under this Agreement shall be deemed to be valid covenants and obligations of said entities, and no officer, director, or employee of the NCDOT or the NCTA shall have any personal obligations or liability hereunder.
42. **Sole Benefit:** This Agreement is entered into for the sole benefit of the NCDOT and the NCTA and their respective successors and permitted assigns. Nothing in this Agreement or in any approval subsequently provided by either party hereto shall be construed as giving any benefits, rights, remedies, or claims to any other person, firm, corporation or other entity, including, without limitation, the public in general.
43. **Relationship of the Parties:** Nothing in this Agreement shall be deemed or construed by the parties, or by any third party, as creating the relationship of principal and agent between the NCDOT and the NCTA, nor any joint enterprise.

44. **Authorization**: Each party to this Agreement represents to the other that it is fully authorized to enter into this Agreement and to perform its obligations hereunder and that no waiver, consent, approval, or authorization from any third party is required to be obtained or made in connection with the execution, delivery, or performance of this Agreement.
45. **Cooperation**: Each party to this Agreement recognizes that time is of the essence with respect to executing duties and obligations as required pursuant to this Agreement. The NCTA will timely supply information and/or documents to the NCDOT for review. The NCDOT will complete such review of information and/or documents, including any Exhibit hereto, supplied by the NCTA without unreasonable delay.
46. **"Force Majeure"**: shall mean any of the following events which materially and adversely affect the parties obligations hereunder and which could not have been avoided by due diligence and use of reasonable efforts by the parties:
- a. Actual delay or permanent or temporary inability to perform due to events beyond the parties' reasonable control, including fire, flood, earthquake, hurricane, inclement weather, epidemic or other unavoidable casualties or acts of God, freight embargo, strikes or general inability to obtain labor or materials, civil commotion, sabotage, terrorism or enemy action;
  - b. Any change in a governmental rule, or change in the judicial or administrative interpretation of, or adoption of any new governmental rule which is materially inconsistent with the governmental rules in effect at the execution of this Agreement; and
  - c. Any lawsuit restraining, enjoining or delaying the granting or renewal of any governmental approval of the Project.

[Remainder of Page Intentionally Left Blank]

IN WITNESS WHEREOF, this Agreement has been executed, in duplicate, the day and year first written above, on the part of the NCDOT and the NCTA by authority duly given.

STATE OF NORTH CAROLINA, through  
its agency, the Department of Transportation

BY \_\_\_\_\_

NAME: J Douglas Galvin

TITLE: Chairman Board of Transportation

Address:  
Transportation Building  
1501 Mail Service Center  
Raleigh, North Carolina 27699-1501

ATTEST:

Tammy Denning  
SECRETARY TO THE BOARD OF  
TRANSPORTATION AND CUSTODIAN  
OF THE SEAL OF THE DEPARTMENT  
OF TRANSPORTATION

NORTH CAROLINA  
WAKE COUNTY

I, Tracey C. Humphries, a Notary Public in and for the County and State aforesaid, do hereby certify that Tammy Denning, Secretary of the Board of Transportation and Custodian of the Seal of the Department of Transportation of the STATE OF NORTH CAROLINA, personally came before me this day and acknowledged that she is the Secretary of the Board of Transportation and that by authority duly given and as the act of the Department of Transportation of the STATE OF NORTH CAROLINA, the foregoing PROJECT SPECIFIC AGREEMENT FOR TRIANGLE EXPRESSWAY AND EXECUTORY CONTRACT FOR LEASE OF RIGHT OF WAY FOR TRIANGLE EXPRESSWAY was signed in its name by Tammy Denning, sealed with its official seal and attested by herself as Secretary of the Board of Transportation.

In WITNESS WHEREOF, I have hereunto set my hand and Notarial Seal, the 6<sup>th</sup> day of March, 2008.

Tracey C. Humphries  
NOTARY PUBLIC  
Tracey C. Humphries  
(Printed Name of Notary)

My Commission Expires:

08-14-2010



**NORTH CAROLINA TURNPIKE AUTHORITY:**

By:

  
\_\_\_\_\_

Name: David Joyner

Title: Executive Director

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**Appendix E**  
**Senate Bill 1697**  
**(Toll Enforcement Legislation)**

GENERAL ASSEMBLY OF NORTH CAROLINA  
SESSION 2007

SENATE BILL 1697  
RATIFIED BILL

AN ACT TO PROVIDE FOR THE ENFORCEMENT OF TOLLS ON TURNPIKE PROJECTS OF THE NORTH CAROLINA TURNPIKE AUTHORITY, TO MODIFY LAWS APPLICABLE TO THE NORTH CAROLINA TURNPIKE AUTHORITY, AND TO CLARIFY THE AUTHORIZATION MADE IN A PRIOR LAW TO TOLL AN EXISTING SEGMENT OF N.C. 540.

The General Assembly of North Carolina enacts:

**SECTION 1.** Article 6H of Chapter 136 of the General Statutes is amended by designating the current sections in that Article as Part 1 with a heading that reads as follows:

"Part 1. Turnpike Authority and Toll Projects."

**SECTION 2.** Article 6H of Chapter 136 of the General Statutes, as amended by Section 1 of this act, is amended by adding a new Part to read:

"Part 2. Collection of Tolls on Turnpike Projects."

**"§ 136-89.210. Definitions.**

The definitions in G.S. 136-89.181 and the following definitions apply in this Article:

- (1) Reserved.
- (2) Open road toll. – A toll payable under an open road tolling system.
- (3) Open road tolling system. – A system of collecting a toll for the use of a highway that does not provide a way to pay the toll in cash while traveling on the highway.

**"§ 136-89.211. Tolls for use of Turnpike project.**

In exercising its authority under G.S. 136-89.183 to set tolls for the use of a Turnpike project, the Authority may not do any of the following:

- (1) Set open road tolls that vary for the same class of motor vehicle depending on the method by which the Authority identifies a motor vehicle that drives on the Turnpike project. This does not preclude the Authority from allowing a discount of up to thirty-five percent (35%) of the amount of a toll for a motor vehicle equipped with an electronic toll collection transponder.
- (2) Exempt a motor vehicle that is not a law enforcement vehicle, an emergency fire or rescue vehicle, or an emergency medical services vehicle from the requirement of paying a toll for the use of a Turnpike project.

**"§ 136-89.212. Payment of toll required for use of Turnpike project.**

A motor vehicle that is driven on a Turnpike project is subject to a toll imposed by the Authority for the use of the project. If the toll is an open road toll, the person who is the registered owner of the motor vehicle is liable for payment of the toll unless the registered owner establishes that the motor vehicle was in the care, custody, and control of another person when it was driven on the Turnpike project.

A person establishes that a motor vehicle was in the care, custody, and control of another person when it was driven on a Turnpike project by submitting to the Authority a sworn affidavit stating one of the following:

- (1) The name and address of the person who had the care, custody, and control of the motor vehicle when it was driven. If the motor vehicle

- was leased or rented under a long-term lease or rental, as defined in G.S. 105-187.1, the affidavit must be supported by a copy of the lease or rental agreement or other written evidence of the agreement.
- (2) The motor vehicle was stolen. The affidavit must be supported by an insurance or police report concerning the theft or other written evidence of the theft.
  - (3) The person transferred the motor vehicle to another person by sale or otherwise before it was driven on the Turnpike project. The affidavit must be supported by insurance information, a copy of the certificate of title, or other evidence of the transfer.

**"§ 136-89.213. Administration of tolls and requirements for open road tolls.**

(a) Administration. – The Authority is responsible for collecting tolls on Turnpike projects. In exercising its authority under G.S. 136-89.183 to perform or procure services required by the Authority, the Authority may contract with one or more providers to perform part or all of the collection functions and may enter into agreements to exchange information that identifies motor vehicles and their owners with one or more of the following entities: the Division of Motor Vehicles of the Department of Transportation, another state, another toll operator, or a toll collection-related organization. Identifying information obtained by the Authority through an agreement is not a public record and is subject to the disclosure limitations in 18 U.S.C. § 2721, the federal Driver's Privacy Protection Act.

(b) Open Road Tolls. – If a Turnpike project uses an open road tolling system, the Authority must operate a facility that is in the immediate vicinity of the Turnpike project and that accepts cash payment of the toll and must place signs on the Turnpike project that give drivers the following information:

- (1) Notice that the driver is approaching a highway for which a toll is required. Signs providing this information must be placed before the toll is incurred.
- (2) The methods by which the toll may be paid.
- (3) Directions to the nearby facility that accepts cash payment of the toll.

**"§ 136-89.214. Bill for unpaid open road toll.**

(a) Bill. – If a motor vehicle travels on a Turnpike project that uses an open road tolling system and a toll for traveling on the project is not paid within 15 days after the travel occurs, the Authority must send a bill by first-class mail to the registered owner of the motor vehicle for the amount of the unpaid toll. The Authority must send the bill within 90 days after the travel occurs. If a bill is not sent within the required time, the Authority waives collection of the toll. The Authority must establish a billing period for unpaid open road tolls that is no shorter than 15 days. A bill for a billing period must include all unpaid tolls incurred by the same person during the billing period.

(b) Information on Bill. – A bill sent under this section must include all of the following information:

- (1) The name and address of the registered owner of the motor vehicle that traveled on the Turnpike project.
- (2) The date the travel occurred, the approximate time the travel occurred, and each segment of the Turnpike project on which the travel occurred.
- (3) An image of the registration plate of the motor vehicle, if the Authority captured an electronic image of the motor vehicle when it traveled on the Turnpike project.
- (4) The amount of the toll due and an explanation of how payment may be made.
- (5) The date by which the toll must be paid to avoid the imposition of a processing fee under G.S. 136-89.215 and the amount of the processing fee.

(6) A statement that a vehicle owner who has unpaid tolls is subject to a civil penalty and may not renew the vehicle's registration until the tolls and civil penalties are paid.

(7) A clear and concise explanation of how to contest liability for the toll.

**"§ 136-89.215. Required action upon receiving bill for open road toll and processing fee for unpaid toll.**

(a) Action Required. – A person who receives a bill for an unpaid open road toll must take one of the following actions within 30 days after receiving the bill:

(1) Pay the bill.

(2) Send a written request to the Authority for a review of the toll.

(b) Fee. – If a person does not take one of the actions required under subsection (a) of this section within the required time, the Authority may add a processing fee to the amount the person owes. The processing fee may not exceed six dollars (\$6.00). A person may not be charged more than forty-eight dollars (\$48.00) in processing fees in a calendar year.

The Authority must set the processing fee at an amount that does not exceed the costs of identifying the owner of a motor vehicle that is subject to an unpaid toll and billing the owner for the unpaid toll. The fee is a receipt of the Authority and must be applied to these costs.

**"§ 136-89.216. Civil penalty for failure to pay open road toll.**

(a) Penalty. – A person who receives one or more bills for unpaid open road tolls during the first or second six-month period in a year and who has not paid the amount due on those bills within 30 days after the end of the six-month period is subject to a civil penalty of twenty-five dollars (\$25.00). The period from January 1 through June 30 of a year is the first six-month period in a year, and the period from July 1 through December 31 is the second six-month period in a year. Only one penalty may be assessed for a six-month period.

(b) Payment. – The Authority must send a notice by first-class mail to a person who is assessed a civil penalty under this section. A person who is assessed a civil penalty must pay the unpaid toll for which the civil penalty was imposed, the amount of any processing fee due, and the civil penalty within 30 days after receiving the notice.

(c) Penalty Proceeds. – A civil penalty imposed under this section is payable to the Authority or, if collected when a vehicle registration is renewed, to the Division of Motor Vehicles of the Department of Transportation. The clear proceeds of a civil penalty imposed under this section must be credited to the Civil Penalty and Forfeiture Fund established in G.S. 115C-457.1. The guidelines used by the Office of State Budget and Management to determine an agency's actual costs of collecting a civil penalty and the clear proceeds of the civil penalty apply to the determination of the clear proceeds of a civil penalty imposed under this section.

**"§ 136-89.217. Vehicle registration renewal blocked for unpaid open road toll.**

(a) Registration Block. – Failure of a person to pay an open road toll billed to the person under G.S. 136-89.214, any processing fee added under G.S. 136-89.215, and any civil penalty imposed under G.S. 136-89.216 is grounds under G.S. 20-54 to withhold the registration renewal of a motor vehicle registered in that person's name. The Authority must notify the Commissioner of Motor Vehicles of a person who owes a toll, a processing fee, or a civil penalty. When notified, the Commissioner of Motor Vehicles must withhold the registration renewal of any motor vehicle registered in that person's name.

(b) Collection by DMV. – A person whose motor vehicle registration renewal is blocked under this section may pay to the Division of Motor Vehicles of the Department of Transportation the amount owed for unpaid tolls, processing fees, and civil penalties due under this Part when renewing the vehicle registration. The Division must remit to the Authority the amount of tolls, fees, and civil penalties collected. The Division's costs of collecting tolls, fees, and civil penalties are considered a necessary expense of

the operation of the Authority, and the Authority must reimburse the Division for these costs.

**"§ 136-89.218. Procedures for contesting liability for unpaid open road toll.**

(a) Informal Review. – A person who receives a bill for an unpaid open road toll and who disputes liability for the toll may contest the toll by sending to the Authority a request for review of the toll. The person may include a sworn affidavit described in G.S. 136-89.212 that establishes that someone else had the care, custody, and control of the motor vehicle subject to the toll when the toll was incurred. The person must send the request for review to the Authority within 30 days after receiving the bill for the toll. A person who does not send a request for review to the Authority within this time limit waives the right to a review. If a person sends a timely request for review to the Authority, the Authority may not collect the disputed toll and any processing fee added to the bill for the toll until the conclusion of the review process in this section.

(b) Administrative Hearing. – If the Authority conducts an informal review under subsection (a) of this section and determines that the person who requested the review is liable for the toll, the Authority must send the person a notice informing the person of the Authority's determination. The person may contest this determination by filing a petition for a contested case hearing at the Office of Administrative Hearings in accordance with Article 3 of Chapter 150B of the General Statutes.

(c) Judicial Review. – Article 4 of Chapter 150B of the General Statutes governs judicial review of a final decision made in a contested case authorized under subsection (b) of this section."

**SECTION 3.** G.S. 136-89.181 reads as rewritten:

**"§ 136-89.181. Definitions.**

The following definitions apply to this Article:

- (1) "Department" means the Department. – The North Carolina Department of Transportation.
- (2) "Turnpike Authority" means the Turnpike Authority. – The public agency created by this Article.
- (3) "Authority Board" means the Authority Board. – The governing board of the Turnpike Authority.
- (4) "Turnpike Project" means a Turnpike project. – Either of the following:  
a. A road, bridge, or tunnel project planned, or planned and constructed, in accordance with the provisions of this Article.  
b. A segment of the State highway system the Authority Board converts to a tolled highway pursuant to the authorization in G.S. 136-89.187.
- (5) "Turnpike System" means collectively all Turnpike Projects developed in accordance with the provisions of this Article. – Turnpike system. – All Turnpike projects."

**SECTION 4.** G.S. 136-89.183(a) reads as rewritten:

"(a) The Authority shall have all of the powers necessary to execute the provisions of this Article, including the following:

- (1) The powers of a corporate body, including the power to sue and be sued, to make contracts, to adopt and use a common seal, and to alter the adopted seal as needed.
- (2) To study, plan, develop, and undertake preliminary design work on up to nine Turnpike Projects. At the conclusion of these activities, the Turnpike Authority is authorized to design, establish, purchase, construct, operate, and maintain the following projects:  
a. Triangle Parkway Expressway, including segments also known as N.C. 540, Triangle Parkway, and Western Wake Freeway in Wake and Durham Counties.

- b. ~~Gaston East-West Connector-Connector, also known as the Garden Parkway.~~
  - c. ~~Monroe Connector-Connector/Bypass.~~
  - d. Cape Fear Skyway.
  - e. A bridge of more than two miles in length going from the mainland to a peninsula bordering the State of ~~Virginia-Virginia, pursuant to G.S. 136-89.183A.~~
  - f. ~~I-540 in Wake and Durham Counties.~~
- Any other project proposed by the Authority in addition to the projects listed in this subdivision must be approved by the General Assembly prior to construction.
- A Turnpike Project selected for construction by the Turnpike Authority shall be included in any applicable locally adopted comprehensive transportation plans and shall be shown in the current State Transportation Improvement Plan prior to the letting of a contract for the Turnpike Project.
- (3) Repealed by Session Laws 2005-275, s. 2, effective August 12, 2005.
  - (4) To rent, lease, purchase, acquire, own, encumber, dispose of, or mortgage real or personal property, including the power to acquire property by eminent domain pursuant to G.S. 136-89.184.
  - (5) To fix, revise, charge, and collect tolls and fees for the use of the Turnpike Projects. Prior to the effective date of any toll or fee for use of a Turnpike Facility, the Authority shall submit a description of the proposed toll or fee to the Board of Transportation, the Joint Legislative Transportation Oversight Committee and the Joint Legislative Commission on Governmental Operations for review.
  - (6) To issue bonds or notes of the Authority as provided in this Article.
  - (6a) To invest the proceeds of bonds or notes of the Authority that are pending disbursement or other idle funds of the Authority in any investment authorized by G.S. 159-30.
  - (7) To establish, construct, purchase, maintain, equip, and operate any structure or facilities associated with the Turnpike System.
  - (8) To pay all necessary costs and expenses in the formation, organization, administration, and operation of the Authority.
  - (9) To apply for, accept, and administer loans and grants of money or real or personal property from any federal agency, the State or its political subdivisions, local governments, or any other public or private sources available.
  - (10) To adopt, alter, or repeal its own bylaws or rules implementing the provisions of this Article, in accordance with the review and comment requirements of G.S. 136-89.182(j).
  - (11) To utilize employees of the Department; to contract for the services of consulting engineers, architects, attorneys, real estate counselors, appraisers, and other consultants; to employ administrative staff as may be required in the judgment of the Authority; and to fix and pay fees or compensation to the Department, contractors, and administrative employees from funds available to the Authority.
  - (12) To receive and use appropriations from the State and federal government.
  - (13) To adopt procedures to govern its procurement of services and delivery of Turnpike Projects.
  - (14) To perform or procure any portion of services required by the Authority.
  - (15) To use officers, employees, agents, and facilities of the Department for the purposes and upon the terms as may be mutually agreeable.

- (16) To contract for the construction, maintenance, and operation of a Turnpike Project.
- (17) To enter into partnership agreements with the Department of Transportation, agreements with political subdivisions of the State, and agreements with private entities, and to expend such funds as it deems necessary, pursuant to such agreements, for the purpose of financing the cost of acquiring, constructing, equipping, operating, or maintaining any Turnpike Project. An agreement entered under this subdivision requires the concurrence of the Board of Transportation if the Department of Transportation is a party to the agreement.
- (18) To utilize incentives in any contract for development or construction of a Turnpike Project, in order to promote expedited delivery of the project."

**SECTION 5.** G.S. 136-89.187 reads as rewritten:

**"§ 136-89.187. Conversion of free highways prohibited.**

The Authority Board is prohibited from converting any segment of the nontolled State Highway System to a toll facility, except for a segment of ~~Interstate N.C. 540~~ under construction as of July 1, 2006, located in Wake and Durham Counties, ~~County~~ and extending from I-40 southwest to N.C. 55, ~~the N.C. 54 exit on N.C. 540 to the N.C. 55 exit on N.C. 540.~~ No segment may be converted to a toll route pursuant to this section unless first approved by the Metropolitan Planning Organization (MPO) or Rural Planning Organization (RPO) of the area in which that segment is located."

**SECTION 6.** G.S. 136-89.194 reads as rewritten:

**"§ 136-89.194. Laws applicable to the Authority; exceptions.**

(a) Motor Vehicle Laws. – The Turnpike System shall be considered a "highway" as defined in G.S. 20-4.01(13) and a "public vehicular area" as defined in G.S. 20-4.01(32). All law enforcement and emergency personnel, including the State Highway Patrol and the Division of Motor Vehicles, shall have the same powers and duties on the Turnpike System as on any other highway or public vehicular area.

(b) Applicable Contracting. – For the purposes of implementing this Article, the Authority shall solicit competitive proposals for the construction of Turnpike Projects in accordance with the provisions of Article 2 of this Chapter. Contracts for professional engineering services and other kinds of professional or specialized services necessary in connection with construction of Turnpike Projects shall be solicited in accordance with procedures utilized by the Department of Transportation. Cost estimates prepared for the purpose of comparing bids for a Turnpike project are confidential and may not be disclosed until after the opening of bids for the project.

(c) Alternative Contracting Methods. – Notwithstanding the provisions of subsection (b) of this section, the Authority may authorize the use of alternative contracting methods if:

- (1) The authorization applies to an individual project;
- (2) The Authority has concluded, and documented in writing, that the alternative contracting method is necessary because the project cannot be completed utilizing the procedures of Article 2 of this Chapter within the necessary time frame or available funding or for other reasons the Authority deems in the public interest;
- (3) The Authority has provided, to the extent possible, for the solicitation of competitive proposals prior to awarding a contract; and
- (4) The approved alternative contracting method provides for reasonable compliance with the disadvantaged business participation goals of G.S. 136-28.4.

(d) Entry for Surveys. – The Turnpike Authority and its employees and contractors shall have the same right of entry for surveys, borings, soundings, or examinations as granted the Department of Transportation in G.S. 136-120.

(e) Plans and Contract Documents. – The requirements for registering right-of-way plans set in G.S. 136-19.4 apply to right-of-way plans of the Turnpike Authority. In applying G.S. 136-19.4 to the Authority, references to the "Department" are considered references to the "Turnpike Authority" and references to the "Board" are considered references to the "Authority Board."

Diaries and analyses for contracts of the Turnpike Authority are subject to the same restrictions on disclosure that apply to diaries and analyses for contracts of the Department under G.S. 136-28.5.

(f) Construction Claims. – G.S. 136-29 applies to the adjustment and resolution of Turnpike project construction claims. In applying G.S. 136-29 to the Turnpike Authority, references to the 'Department of Transportation,' the 'State Highway Administrator,' and a 'State highway' are considered references to the 'Turnpike Authority,' the 'chief engineer of the Turnpike Authority,' and a 'Turnpike project.'

(g) Contract Exemptions. – The following provisions concerning the purchase of goods and services by a State agency do not apply to the Turnpike Authority:

(1) Article 3 of Chapter 143 of the General Statutes. The Authority may use the services of the Department of Administration in procuring goods and services that are not specific to establishing and operating a toll revenue system.

(2) Article 3D of Chapter 147 of the General Statutes. The Authority may use the services of the Office of Information Technology Services in procuring goods and services that are not specific to establishing and operating a toll revenue system. All contract information for contracts for information technology are subject to disclosure in accordance with G.S. 147-33.95.

(h) APA. – Chapter 150B of the General Statutes does not apply to the Turnpike Authority, except as provided in this section and G.S. 136-89.218."

SECTION 7. G.S. 20-54 is amended by adding a new subdivision to read:

"(10) The North Carolina Turnpike Authority has notified the Division that the owner of the vehicle has not paid the amount of tolls, fees, and civil penalties the owner owes the Authority for use of a Turnpike project."

SECTION 8. G.S. 20-63(g) reads as rewritten:

"(g) Alteration, Disguise, or Concealment of Numbers. – Any operator of a motor vehicle who shall willfully mutilate, bend, twist, cover or cause to be covered or partially covered by any bumper, light, spare tire, tire rack, strap, or other device, or who shall paint, enamel, emboss, stamp, print, perforate, or alter or add to or cut off any part or portion of a registration plate or the figures or letters thereon, or who shall place or deposit or cause to be placed or deposited any oil, grease, or other substance upon such registration plates for the purpose of making dust adhere thereto, or who shall deface, disfigure, change, or attempt to change any letter or figure thereon, or who shall display a number plate in other than a horizontal upright position, shall be guilty of a Class 2 misdemeanor. Any operator of a motor vehicle who shall willfully cover or cause to be covered any part or portion of a registration plate or the figures or letters thereon by any device designed or intended to prevent or interfere with the taking of a clear photograph of a registration plate by a traffic control or toll collection system using cameras commits an infraction and shall be fined under G.S. 14-3.1. Any operator of a motor vehicle who shall otherwise intentionally cover any number or registration renewal sticker on a registration plate with any material that makes the number or registration renewal sticker illegible commits an infraction and shall be fined under G.S. 14-3.1. Nothing in this subsection shall prohibit the use of transparent covers that are not designed or intended to prevent or interfere with the taking of a clear photograph of a registration plate by a traffic control or toll collection system using cameras."

SECTION 9. G.S. 47-30(l) reads as rewritten:

"(l) ~~The provisions of this~~ This section shall ~~does not~~ apply to the registration of highway right-of-way plans provided for in ~~G.S. 136-19.4~~ G.S. 136-19.4 or ~~G.S. 136-89.184~~, nor to the registration of roadway corridor official maps provided for in Article 2E of Chapter ~~136~~ 136 of the General Statutes."

**SECTION 10.** G.S. 146-65 reads as rewritten:

**"§ 146-65. Exemptions from Chapter.**

~~None of the provisions of Chapter 146 shall~~ This Chapter does not apply ~~to~~ to any of the following:

- (1) The acquisition of highway rights-of-way, borrow pits, or other interests or estates in land acquired for the same or similar purposes, or to the disposition thereof, by the Board of ~~Transportation~~; or Transportation or the North Carolina Turnpike Authority.
- (2) ~~The North Carolina State Ports Authority, the authority and powers thereof set forth or provided for by G.S. 143B-452 through G.S. 143B-467 or to the exercise of all or any of such authority and powers, Authority in exercising its powers under G.S. 143B-452 through G.S. 143B-467.~~

~~Nor shall the provisions of Chapter 146 abrogate or alter any otherwise valid contract or agreement heretofore made and entered into by the State of North Carolina or by any of its subdivisions or agencies during the term or period of such contract or agreement."~~

**SECTION 11.** G.S. 136-89.183A reads as rewritten:

**"§ 136-89.183A. Accelerated Pilot Toll Bridge Project.**

(a) Findings. – The General Assembly finds that there is a need for a bridge connecting the Currituck County mainland to the Currituck County Outer Banks; that the bridge should be implemented as a toll bridge; that the bridge should be implemented in a manner that protects the natural environment and quality of life on the Outer Banks; and that the character of the existing road system in Currituck County and Dare County Outer Banks should be preserved.

~~(a)~~(b) Contract to Construct Accelerated Pilot Toll Bridge Project. – The Authority shall contract with a single private firm to design, obtain all necessary permits for, and construct the toll bridge described in G.S. 136-89.183(a)(2), known as the Mid-Currituck Bridge, a bridge of more than two miles in length going from the mainland to a peninsula bordering the State of Virginia, in order to provide accelerated, efficient, and cost-effective completion of the project.

~~(b)~~(c) Preconstruction Participation. – In addition to the authority granted by G.S. 136-89.191, the Department shall participate in the cost of preconstruction activities related to the project described in this section, if requested by the Authority.

(d) Environmental Protection. – The Authority shall ensure that the Mid-Currituck Bridge is implemented in a manner that accomplishes all of the following:

- (1) Ensures the preservation of water quality in Currituck Sound.
- (2) Mitigates the environmental impact of the bridge on the Currituck County mainland and the Outer Banks.
- (3) Reduces traffic congestion and vehicle miles traveled, and preserves the character of the existing road system, in Dare County and Currituck County on the Outer Banks.

~~(e)~~(e) Report on Project. – The Authority shall report to the Joint Legislative Transportation Oversight Committee on December 1, 2005, and each December 1 thereafter until completion, on the progress of the accelerated pilot toll bridge project described in this section."

**SECTION 12.** Section 7 of this act becomes effective January 1, 2011. Section 8 of this act becomes effective December 1, 2008. The remainder of this act is effective when it becomes law.

In the General Assembly read three times and ratified this the 18<sup>th</sup> day of July, 2008.

\_\_\_\_\_  
Marc Basnight  
President Pro Tempore of the Senate

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Joe Hackney  
Speaker of the House of Representatives

\_\_\_\_\_  
Michael F. Easley  
Governor

Approved \_\_\_\_\_m. this \_\_\_\_\_ day of \_\_\_\_\_, 2008

**Appendix F**  
**August 5, 2008 Roadway Construction Bid Opening**  
**Results and Revised Cost Estimate Summary**

**Triangle Parkway & Northern Wake Expressway**

QUALITY ADJUSTED PRICE RANKING (U-4763B / Wake/Durham COUNTIES) C201994					
Vendor	Technical Score	Quality Credit (%)	Price Proposal (\$)	Quality Value (\$)	Adjusted Price (\$)
S.T. Wootern Design-Build Team	92.8	19.00	\$137,446,000.00	\$26,111,740.00	\$111,334,260.00
Team United	85.7	13.08	\$144,885,747.00	\$18,951,055.71	\$125,934,691.29
WC English	86.5	13.75	\$146,528,000.00	\$20,147,600.00	\$126,380,400.00
ENGINEER'S ESTIMATE			\$135,700,000.00		

**Western Wake Freeway**

QUALITY ADJUSTED PRICE RANKING (R-2635A,B,C / Wake COUNTY) C201993					
Vendor	Technical Score	Quality Credit (%)	Price Proposal (\$)	Quality Value (\$)	Adjusted Price (\$)
Lane/Skanska JV	87.4	14.50	\$505,000,000.00	\$73,225,000.00	\$431,775,000.00
Raleigh Durham Road Builders	92.9	19.08	\$446,460,000.00	\$85,184,568.00	\$361,275,432.00
Wooten/Barnhill JV	91.9	18.25	\$464,750,000.00	\$84,816,875.00	\$379,933,125.00
ENGINEER'S ESTIMATE			\$508,700,000.00		

## Revised Cost Estimate Summary Based on 8-5-08 Bid Opening

Item	Cost		
<b>Design-Build Construction</b>			
<b>Segment</b>	Triangle Parkway & Northern Wake Expressway	Western Wake Freeway	Total
Roadway	--	--	--
Structures	--	--	--
Drainage	--	--	--
Miscellaneous	--	--	--
Toll Structures & ITS Rough-In	--	--	--
Highway Contract Total	\$137,446,000	\$446,460,000	\$583,906,000
Landscaping D-B - all incl.	\$1,340,000	\$4,440,000	\$5,780,000
ITS D-B - all incl.	\$3,850,000	\$5,930,000	\$9,780,000
Toll Integration D-B - all incl.	\$3,470,000	\$5,770,000	\$9,240,000
Specialized Contract Total	\$8,660,000	\$16,140,000	\$24,800,000
<b>Design-Build Contract Total</b>	<b>\$146,106,000</b>	<b>\$462,600,000</b>	<b>\$608,706,000</b>
<b>NCTA Costs</b>			
Right of Way	\$23,970,000	\$201,410,000	\$225,380,000
Right-of-Way Negotiation	\$550,000	\$2,220,000	\$2,770,000
Subtotal	\$24,520,000	\$203,630,000	\$228,150,000
Utility Relocation	\$4,000,000	\$14,600,000	\$18,600,000
NCTA Construction Oversight	\$5,050,000	\$13,910,000	\$18,960,000
NCTA Administrative	\$680,000	\$3,270,000	\$3,950,000
Environmental Mitigation	\$2,410,000	\$8,380,000	\$10,790,000
D-B Stipends/Incentives/Fuel	\$8,660,000	\$15,500,000	\$24,160,000
Agency Planning	-	-	-
Subtotal	\$11,750,000	\$27,150,000	\$38,900,000
<b>NCTA Total Costs</b>	<b>\$45,320,000</b>	<b>\$259,290,000</b>	<b>\$304,610,000</b>
<b>Project Segment Total Costs</b>	<b>\$191,426,000</b>	<b>\$721,890,000</b>	<b>\$913,316,000</b>
<b>Total Project Cost</b>			<b>\$913,330,000</b>

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**APPENDIX F**

**OPERATIONS AND  
MAINTENANCE EXPENSE GUARANTY AGREEMENT  
AND CONSTRUCTION COMPLETION ASSURANCE AND  
STANDBY RENEWAL AND REPLACEMENT FUNDING AGREEMENT**

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**OPERATING AND MAINTENANCE EXPENSE GUARANTY AGREEMENT**

Dated as of Aug. 20, 2008

by and between

**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION**

and

**NORTH CAROLINA TURNPIKE AUTHORITY**

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**OPERATING AND MAINTENANCE EXPENSE GUARANTY AGREEMENT**

**THIS OPERATING AND MAINTENANCE EXPENSE GUARANTY AGREEMENT**, dated as of August 20, 2008, by and between the **NORTH CAROLINA DEPARTMENT OF TRANSPORTATION** (“NCDOT”), a department of the State of North Carolina duly organized and existing pursuant to Section 143B-345 *et seq.* of the North Carolina General Statutes, as amended, and the **NORTH CAROLINA TURNPIKE AUTHORITY** (“NCTA”), a body politic and corporate and a public agency of the State of North Carolina duly organized and existing pursuant to Article 6H of Chapter 136 of the North Carolina General Statutes, as amended (the “Enabling Act”);

**WITNESSETH:**

**WHEREAS**, the General Assembly of North Carolina has created NCTA to study, plan, develop, design, establish, purchase, construct and operate and maintain Turnpike Projects (as defined in the Enabling Act) in the State;

**WHEREAS**, Section 136-89.183 of the Enabling Act provides that NCDOT and NCTA may enter into partnership agreements for purposes of financing the costs of acquiring, constructing, equipping, operating or maintaining any Turnpike Project;

**WHEREAS**, Section 136-89.191 of the Enabling Act provides that NCDOT may participate in the cost of preconstruction activities, construction, maintenance or operation of a Turnpike Project;

**WHEREAS**, Section 136-18(39) of the North Carolina General Statutes authorizes NCDOT to enter into partnership agreements with the NCTA to finance the cost of equipping, maintaining, and operating transportation infrastructure in the State;

**WHEREAS**, the Authority is undertaking a Turnpike Project located in Wake County and Durham County known as the “Triangle Expressway Project” as more fully described in Section 1 of the Project Specific Agreement for Triangle Expressway, dated March 6, 2008, between NCDOT and NCTA (the “Project”), and intends to finance the cost of acquisition, construction and equipping of the Project with revenue bonds issued by the Authority and other indebtedness incurred by the Authority pursuant to the Enabling Act and The State and Local Government Revenue Bond Act, Article 5 of Chapter 159 of the General Statutes of North Carolina, as amended; and

**WHEREAS**, NCDOT desires to support the financial viability of the Project and the financing thereof, and to this end has determined to guaranty the payment of Operating and Maintenance Expenses (hereinafter defined) of the Project in order to (a) assure the purchasers and owners of revenue bonds and other indebtedness issued or incurred to finance the Project that the first use of the revenues of the Project will be used to pay the debt service with respect to such bonds and other indebtedness and to maintain required reserves prior to the payment of Operating and Maintenance Expenses, subject to the terms of this Agreement, and (b) assure

NCTA that at all times there will be sufficient funds available to pay Operating and Maintenance Expenses of the Project;

**NOW THEREFORE**, the parties hereto, each in consideration of the promises and undertakings of the other as hereinafter provided, **DO HEREBY** covenant and mutually agree as follows:

Section 1. Definitions. In addition to the meanings of certain capitalized terms as set forth in the recitals set forth above, the following terms shall have the following meanings in this Agreement:

“Agreement” means this Operating and Maintenance Expense Guaranty Agreement, as the same may be supplemented or amended from time to time.

“Credit Facility” means a line of credit, letter of credit, standby bond purchase agreement or similar liquidity or credit facility established or obtained in connection with the incurrence of any Indebtedness.

“Credit Provider” means the entity providing a Credit Facility.

“Debt Service Reserve Fund” means a debt service reserve fund or account created by the Trust Agreement or any other documentation relating to Indebtedness of NCTA as a reserve to provide funds to pay principal of or interest on Indebtedness authorized thereby if insufficient Receipts are available for such payment. The Trust Agreement or such other documentation may establish one or more of such fund funds for this purpose, each of which shall be a “Debt Service Reserve Fund” for purposes of this Agreement.

“Debt Service Reserve Fund Requirement” means, as of the time of any calculation, the aggregate amounts then required to be placed or maintained in any Debt Service Reserve Fund. In the event that the Trust Agreement or other documentation relating to Indebtedness provides that a withdrawal of funds from a Debt Service Reserve Fund is to be replenished over a period of time, or additional funding of such Debt Service Reserve Fund is otherwise required to be made over a period of time, the term “Debt Service Reserve Fund Requirement” as used herein means only the amount required to be on deposit at the time of the calculation.

“Debt Service Requirement” means, for any period for which such determination is made, the aggregate of the required deposits to be made by NCTA to one or more corporate trustees or other entities in respect of principal (whether at maturity or pursuant to a sinking fund redemption or otherwise) or interest (whether or not separately stated) on Indebtedness during such period; including directly to the holders of Indebtedness, such as the United States Department of Transportation. Notwithstanding the foregoing, Indebtedness does not include, for purposes of this Agreement, any amounts owed to NCDOT pursuant to this Agreement.

“General Engineering Consultant” means any independent engineer or independent firm of engineers of favorable reputation retained by NCTA to assist NCTA in assessing the status of maintenance and upkeep of the Project, the costs associated therewith and the expected cost of unusual or extraordinary maintenance, repairs, renewals or replacements or capital improvements

related to the Project, and advising NCTA regarding the level of reserves that should be maintained to assure that funds will be available when needed for that purpose.

“General Reserve Fund” means the fund created under the Trust Agreement that shall be the repository for the deposit of Receipts that are not required to be used to pay or fund the Debt Service Requirement, the Debt Service Reserve Fund Requirement, the Operating Reserve Fund Requirement or the Renewal and Replacement Reserve Fund Requirement or be deposited in the Operations and Maintenance Expense Fund.

“Indebtedness” means all obligations incurred or assumed by the NCTA in connection with the ownership or operation of the Project:

(a) for payments of principal and interest with respect to borrowed money, including any obligation to repay a Credit Provider for moneys drawn to pay and retire or purchase Indebtedness; 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 Indebtedness shall include only such obligations as are secured by Receipts.

“Operating and Maintenance Expenses” means the NCTA’s cash expenses, exclusive of all and any such like expenses capitalized as Project costs, for the operation, maintenance and repair of the Project, including, without limiting the generality of the foregoing,

(a) expenses of repair and maintenance of the Project, including periodic roadway resurfacing and repair, replacement of toll collection, vehicle identification, toll integration and video enforcement equipment and all administrative and engineering expenses relating to repair and maintenance of the Project,

(b) expenses for toll collection,

(c) salaries and other compensation of NCTA personnel allocable to the operation of the Project,

(d) operating lease payments, for property, plant and equipment needed for the operation of the Project,

(e) insurance premiums and expenses, including deposits of reserves required for additional self-insurance, infrastructure replacement, or business interruption coverage required by bond covenants and subject to review by the Risk Management Division of the North Carolina Department of Insurance,

(f) engineering and consulting expenses relating to the operation, maintenance or repair of the Project, including engineering certifications required pursuant to this Agreement,

(g) fees and expenses of the bond trustees, registrars and paying agents, and fees and expenses for similar services with respect to the Project;

(h) expenses for incident response;

(i) costs of legal services relating to Project management and operation;

(j) expenses of marketing, promotion and advertising relating to the Project; and

(k) fees and expenses otherwise required or permitted to be paid by the NCTA under the provisions of the Trust Agreement, by any other documentation relating to Indebtedness or by law for management and operation of the Project;

but Operating and Maintenance Expenses shall not include

(a) deposits to the Renewal and Replacement Reserve Fund or any other reserves for extraordinary replacements or repairs,

(b) any allowance for depreciation or amortization of financing expense;

(c) payments made by NCTA or the Trustee to any reserve accounts under the Trust Agreement, any expenses of Extraordinary Maintenance and Repair, or any payments of Debt Service; and

(d) Project costs and expenses of any nature not directly required for the Project, such as operating expenses included in the Annual Plan of Work or Project costs payable from bond proceeds including, but not limited to: administrative office space, supplies, equipment, telephone and other communications service fees; administrative salaries and wages, and travel expenses; bond financing, insurance and legal fees; and like expenses properly allocable to other NCTA turnpike projects.

“Operating Reserve Fund” means the fund or funds created pursuant to the Trust Agreement as a reserve for the payment of Operating and Maintenance Expenses in the event that Receipts are not sufficient for such purpose.

“Operating Reserve Fund Requirement” means, as of the time of calculation, the maximum aggregate amounts required by the Trust Agreement to be set aside in the Operating Reserve Fund as a reserve to fund Operating and Maintenance Expenses in the event that Receipts are not sufficient for such purpose; provided, however, that the Operating Reserve Fund Requirement may not exceed at any time one-fourth (1/4) of the Operating and Maintenance Expenses for the Project for the current Fiscal Year as set forth in the Annual Budget.

“Operations and Maintenance Expense Fund” means the fund or funds created pursuant to the Trust Agreement pursuant to which deposits are to be made from Receipts to pay Operating and Maintenance Expenses.

“Project” has the meaning given such term in the preambles to this Agreement.

“Receipts” means all receipts, revenues, income, proceeds and money received in any period by or for the NCTA in respect of the Project, including, but without limiting the generality of the foregoing,

(a) all toll payments, proceeds, fees, charges and rents,

(b) any proceeds of use and occupancy or business interruption insurance, and

(c) payments from the State of North Carolina received by NCTA to the extent that such payments have been pledged to pay Indebtedness and other obligations of NCTA pursuant to the terms of the Trust Agreement.

“Renewal and Replacement Reserve Fund” means the fund created by the Trust Agreement as a reserve to provide funds to pay the costs of maintenance, repair, renewal, reconstruction or replacement of any portion of component of the Project of a type which is not normally included as an annually recurring cost in the NCTA’s Annual Budget for the Project.

“Renewal and Replacement Reserve Fund Requirement” means, as of the time of any calculation, the aggregate amount then required to be placed or maintained in the Renewal and Replacement Reserve Fund by the Trust Agreement.

“State” means the State of North Carolina.

“Trust Agreement” means the Master Trust Agreement, to be executed between NCTA and the Trustee, as the same may be supplemented and amended from time to time, or any similar instrument entered into or adopted by the NCTA that provides for the issuance or incurrence of Indebtedness and contains the terms regarding the collection and disposition of Receipts.

“Trustee” means the Trustee service as such or any successor Trustee under the provisions of the Trust Agreement.

Section 2. Guaranty of Payment of Operating and Maintenance Expenses. (a) NCTA shall provide in the Trust Agreement or any other documentation pursuant to which any Indebtedness is incurred that the Receipts shall be set aside as received and applied on or prior to the last day of each month in the following order of priority:

(i) for the payment of the Debt Service Requirement on Indebtedness then due and payable;

(ii) to any Debt Service Reserve Fund for Indebtedness so that the amount in each such Debt Service Reserve Fund equals the Debt Service Reserve Fund Requirement;

(iii) to the Renewal and Replacement Reserve Fund so that the amount in the Renewal and Replacement Reserve Fund equals the Renewal and Replacement Reserve Fund Requirement;

(iv) to the Operations and Maintenance Expense Fund so that the amount in the Operations and Maintenance Expense Fund is equal to the Operating and Maintenance Expenses budgeted for the next succeeding month as set forth in the Annual Budget; and

(v) to the Operating Reserve Fund so that the amount in the Operating Reserve Fund equals the Operating Reserve Fund Requirement;

(vi) to NCDOT any amounts necessary to reimburse NCDOT for payments made by NCDOT to NCTA pursuant to this Agreement, interest thereon at the rates and in the manner specified in this Agreement; and

(vii) the balance, if any, to the General Reserve Fund for uses as provided in the Trust Agreement.

Notwithstanding the foregoing, NCTA may change the order of priority for required deposits of Receipts to fund the Debt Service Requirement or the Debt Service Reserve Fund Requirement; for one class of Indebtedness from another class of Indebtedness in order to provide that selected classes of Indebtedness, and the deposit to a Debt Service Reserve Fund in connection therewith, is senior or subordinate to other Indebtedness, or is payable prior to or after the deposit of any Receipts to fund the Renewal and Replacement Reserve Fund Requirement, and may also provide that deposits of any Debt Service Requirement or Debt Service Reserve Fund Requirement with respect to any Indebtedness may be made after deposits to the Operations and Maintenance Expense Fund and the Operating Reserve Fund.

(b) The Authority shall provide in the Trust Agreement that Operating and Maintenance Expenses are to be paid as due from the Operations and Maintenance Expense Fund. If at any time amounts in the Operations and Maintenance Expense Fund shall not be sufficient to make the required payments, then the Trust Agreement shall provide that a transfer shall be made from the Operating Reserve Fund to the Operations and Maintenance Expense Fund in the amount of such deficiency to the extent that amounts on deposit in the Operating Reserve Fund are available for such purpose. Subject to the availability of funds as provided in subsection (c) below, NCDOT hereby guarantees to NCTA that NCDOT will pay to, or on behalf of, NCTA (i) the amount necessary to replenish the Operating Reserve Fund for any transfers so made to the Operations and Maintenance Expense Fund from amounts held in the Operating Reserve Fund 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 pursuant to the Trust Agreement (up to the Operating Reserve Fund Requirement at the time such transfer is required by the Trust Agreement) to the extent that there are not sufficient Receipts held in the Operating Reserve Fund for such purpose. Payments to NCTA shall be paid by NCDOT upon sixty (60) days' written notice from NCTA (or by the Trustee on behalf of NCTA) to NCDOT advising NCDOT of the amount transferred from the Operating Reserve Fund to the Operations and Maintenance Expense Fund and requesting reimbursement therefor. Any such written request shall be accompanied by a certificate of a General Engineering Consultant stating that in the opinion of such General Engineering Consultant, the then current Renewal and Replacement Reserve Fund Requirement is reasonably necessary in order to assure that funds will be available as needed to pay the cost of unusual or

extraordinary maintenance, repairs, renewals or replacements or capital improvements related to the Project in accordance with prudent management practices.

Notwithstanding the foregoing, if following any transfer or required transfer from the Operating Reserve Fund as provided above, but before the time of payment by NCDOT pursuant to the preceding paragraph, additional Receipts have been deposited in the Operating Reserve Fund, then NCTA will provide immediate notice to NCDOT of the amount of Receipts so deposited in the Operating Reserve Fund and the required payment by NCDOT pursuant to the preceding paragraph shall be reduced by the amount of Receipts so deposited in the Operating Reserve Fund. The parties hereto hereby acknowledge and agree that there may be multiple payment from, and deposits to, the Operating Reserve Fund.

(c) The payments to be paid by NCDOT pursuant to Section 2(b) are to be funded from amounts then available in the State Highway Fund. The payment by the NCDOT is subject to appropriation and availability of funds for such use in the State Highway Fund. All payment requests shall be subject to periodic audits to ensure such payments include only those Operations and Maintenance Expenses allowable pursuant to this Agreement. In the event of an overpayment, NCDOT will withhold or decrease future payments to recoup the overpayment. Costs incurred for maintenance or operations that exceeds the standards agreed upon by the parties herein will not be reimbursed without prior written concurrence.

(d) The NCTA will include in its Annual Project Budget and Annual Plan of Work a schedule that includes an accounting of operations and maintenance obligations incurred to date (including interest owed), a schedule of anticipated NCDOT operations and maintenance support requirements for the current budget year and future budget years, and a schedule of anticipated NCTA repayments for the current budget year and future budget years.

(e) The Authority shall keep accurate records and accounts of all items of costs and of all expenditures relating to the Operation and Maintenance of the Triangle Expressway System and of the revenues collected and the application of such revenues. Such records and accounts shall be open to the inspection of the NCDOT.

The NCTA shall cause its accountant, which may be the State Auditor, to prepare and deliver to the NCTA within 180 days after the close of each Fiscal Year an audit of NCTA's books and accounts relating to the Triangle Expressway System. Reports of each such audit shall be delivered by the NCTA to NCDOT in writing. 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 Triangle Expressway System 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.

(f) NCTA shall conform to NCDOT's performance standards for Operation and Maintenance for the Statewide Tier Network. (See Attachment A) NCTA may exceed these standards for litter pick-up, Incident Response and Snow and Ice Removal.

Section 3. Repayment of Guaranty Payments. (a) In the event that NCDOT makes any payment to NCTA pursuant to Section 2 of this Agreement, the amounts so paid shall become an obligation of NCTA to NCDOT to repay the amount so paid, with interest on the unpaid principal, computed at a rate equal to that payable by the NCTA in accordance with G.S. 136-176(b).

(b) NCTA shall repay the obligations to NCDOT as provided in subsection (a) of this Section solely from Receipts available for such repayment as provided Section 2(a)(ix) above or from amounts deposited and held in the General Reserve Fund. Payments by NCTA shall be credited first to unpaid interest, then to the payment of unpaid principal. The failure to pay any payments due pursuant to this Section 3(b) shall not constitute an event of default hereunder if insufficient Receipts or other amounts held in the General Reserve Fund are not available to make such payments.

Section 4. Annual Budget. NCTA hereby covenants with NCDOT that it shall maintain an Annual Budget that, to the extent practicable, budgets sufficient funds to make all payments of Operating and Maintenance Expenses from Receipts. Subject to the terms of the Trust Agreement regarding the establishment and maintenance of tolls and other Receipts, NCTA shall endeavor to set tolls at a rate sufficient to generate Receipts to pay the Operating and Maintenance Expenses set forth in the Annual Budget.

Section 5. Term of this Agreement. The obligation of NCTA to make payments pursuant to Section 2 of this Agreement shall remain in effect for so long as any Indebtedness of the NCTA remains outstanding and unpaid. The obligation of NCTA to reimburse NCDOT for payments made pursuant to Section 3 of this Agreement shall remain in effect until all payments to be paid by NCTA to NCDOT hereunder have been paid.

Section 6. Remedies; Enforcement NCDOT and NCTA hereby expressly agree that the sole remedy for any noncompliance by either party under this Agreement shall be specific performance enforceable only by an action filed by the other party to this Agreement.

Section 7. Amendment of the Trust Agreement. Following the execution and delivery of the Trust Agreement by NCTA, the NCTA shall not enter into any amendment to the Trust Agreement that affects the rights or obligations of NCDOT under this Agreement without the consent of NCDOT.

Section 8. Authorization: Each party to this Agreement represents to the other that it is fully authorized to enter into this Agreement and to perform its obligations hereunder and that no waiver, consent, approval, or authorization from any third party is required to be obtained or made in connection with the execution, delivery, or performance of this Agreement. The execution and delivery of this Agreement by NCDOT has been approved by the State Board of Transportation as required by Section 136-89.183 of the Enabling Act.

Section 9. Governing Law: This Agreement shall be construed under and in accordance with the laws of the State.

IN WITNESS WHEREOF, NCDOT and NCTA have entered into this Agreement all as of the 20 day of August, 2008.

**NORTH CAROLINA DEPARTMENT OF  
TRANSPORTATION**

By: J. Douglas Galyon  
Name: J. Douglas Galyon  
Title: Chairman, Board of Transportation

(SEAL)

**NORTH CAROLINA TURNPIKE  
AUTHORITY**

By: David W. Joyner  
Name: DAVID W. JOYNER  
Title: Executive Director

## NCDOT Maintenance and Operations Performance Standards for the Statewide Tier

ELEMENT		RELATIVE IMPORTANCE	ELEMENT WT. VALUE	2008		2009		2010		
				TARGET	EL. POINTS	TARGET	EL. POINTS	TARGET	EL. POINTS	
SHLD & DITCH	RM-1	Low Shoulder	8	3.25%	85	2.76	90	2.93	95	3.09
	RM-2	High Shoulder	7	2.85%	85	2.42	90	2.56	95	2.70
	RM-3	Lateral Ditches	6	2.44%	85	2.07	90	2.20	95	2.32
DRAINAGE	RM-4	Crossline Pipe (Blocked) < 54"	6	2.44%	85	2.07	90	2.20	95	2.32
	RM-5	Crossline Pipe (Damaged) < 54"	7	2.85%	85	2.42	90	2.56	95	2.70
	RM-6	Curb & Gutter (Blocked)	5	2.03%	85	1.73	90	1.83	95	1.93
	RM-7	Curb & Gutter (Damaged)	4	1.63%	85	1.38	90	1.46	95	1.54
	RM-8	Drop Inlets, CB's, etc (Blocked)	5	2.03%	85	1.73	90	1.83	98	1.99
	RM-9	Drop inlets, CB's, etc (Damaged)	4	1.63%	85	1.38	90	1.46	98	1.59
ROADSIDE APPURT	RM-10	Guardrail/Cable/Median Barrier/Conc	9	3.66%	99	3.62	99	3.62	99	3.62
	R-8	ROW Fence	2	0.81%	94	0.76	94	0.76	94	0.76
	R-6	Stormwater Devices	4	1.63%	90	1.46	90	1.46	90	1.46
	RM-11	Impact Attenuators	9	3.66%	99	3.62	99	3.62	99	3.62
ROADSIDE	R-1	Mowing	7	2.85%	90	2.56	90	2.56	90	2.56
	R-2	Brush & Tree Control	6	2.44%	85	2.07	85	2.07	90	2.20
	R-3	Turf Condition	4	1.63%	80	1.30	85	1.38	90	1.46
	R-4	Uncontrolled Growth	4	1.63%	70	1.14	70	1.14	70	1.14
	R-5	Litter & Debris Control	4	1.63%	90	1.46	90	1.46	90	1.46
	R-7	Landscape Beds	3	1.22%	90	1.10	90	1.10	90	1.10
TRAFFIC/ITS	T-1	Long line pavement markings	8	3.25%	85	2.76	90	2.93	95	3.09
	T-2	Words % Symbols	5	2.03%	85	1.73	90	1.83	95	1.93
	T-3	Pavement Markers	7	2.85%	85	2.42	90	2.56	95	2.70
	T-5	Overhead Signs	6	2.44%	92	2.24	92	2.24	92	2.24
	T-4	Signs ground	8	3.25%	92	2.99	92	2.99	92	2.99
	T-6	Rwdy, Bridge & IC lighting	4	1.63%	90	1.46	90	1.46	90	1.46
	T-7	Traffic Signal Systems	8	3.25%	90	2.93	90	2.93	90	2.93
	T-8	Traffic Signal Maintenance	8	3.25%	90	2.93	90	2.93	90	2.93
	T-9	Traffic Signal Emergency	9	3.66%	90	3.29	90	3.29	90	3.29
	T-12	Dynamic Message Sign	8	3.25%	90	2.93	90	2.93	90	2.93
BRIDGES	B-2	Bridge Decks	9	3.66%	80	2.93	85	3.11	85	3.11
	B-3	Superstructure	9	3.66%	80	2.93	85	3.11	90	3.29
	B-4	Substructure	9	3.66%	80	2.93	85	3.11	90	3.29
	B-6	Pipes & Culverts > 54"	7	2.85%	90	2.56	90	2.56	90	2.56
	B-5	NBIS Culvert	7	2.85%	80	2.28	80	2.28	80	2.28
	B-7	Overhead Sign Structures	6	2.44%	95	2.32	95	2.32	95	2.32
	PVMT	P-2	Asphalt pavement repair	9	3.66%	95	3.48	95	3.48	95
P-3		Concrete pavement repair	9	3.66%	95	3.48	95	3.48	95	3.48
P-1		Pvm't Shoulder Condition	6	2.44%	90	2.20	90	2.20	90	2.20
Total			246	100.00%	87.84		89.93		92.07	

### OTHER IMPORTANT MEASURES

RKPI-1	Rest Area & Welcome Cts	90	90	90
B-9	Tunnels	100	100	100
B-8	Drawbridge Machinery	100	100	100
RMKPI-1	Snow & Ice Control (all lanes clear)	12 HR	12 HR	12 HR
PKPI-1	Ride Quality	1.5/85	1.5/85	1.5/85
PKPI-2	Pavement Condition Rating (% in Good Cond)	85	85	85
PKPI-3	Narrow Lane Width	99	99	99
PKPI-4	Paved Shoulder Width	95	95	95
BKPI-1	Bridge Condition Rating (% in Good Cond)	90	90	90
TKPI-1	Incident Clearance Time (min. TMC/non-TMC)	30/90	30/90	30/90
TKPI-2	ITS Devices (min. TMC/non-TMC)	15/30	15/30	15/30

**CONSTRUCTION COMPLETION ASSURANCE AND STANDBY RENEWAL AND  
REPLACEMENT FUNDING AGREEMENT**

**Dated as of April 15, 2009**

**by and between**

**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION**

**and**

**NORTH CAROLINA TURNPIKE AUTHORITY**

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**CONSTRUCTION COMPLETION ASSURANCE AND STANDBY RENEWAL  
AND REPLACEMENT FUNDING AGREEMENT**

THIS **CONSTRUCTION COMPLETION ASSURANCE AND STANDBY RENEWAL AND REPLACEMENT FUNDING AGREEMENT**, dated as of \_\_\_\_\_, 2009, by and between the **NORTH CAROLINA DEPARTMENT OF TRANSPORTATION** (“NCDOT”), a department of the State of North Carolina duly organized and existing pursuant to Section 143B-345 *et seq.* of the North Carolina General Statutes, as amended, and the **NORTH CAROLINA TURNPIKE AUTHORITY** (“NCTA”), a body politic and corporate and a public agency of the State of North Carolina duly organized and existing pursuant to Article 6H of Chapter 136 of the North Carolina General Statutes, as amended (the “Enabling Act”);

**WITNESSETH:**

**WHEREAS**, the General Assembly of North Carolina has created NCTA to study, plan, develop, design, establish, purchase, construct and operate and maintain Turnpike Projects (as defined in the Enabling Act) in the State;

**WHEREAS**, Section 136-89.183 of the Enabling Act provides that NCDOT and NCTA may enter into partnership agreements for purposes of financing the costs of acquiring, constructing, equipping, operating or maintaining any Turnpike Project;

**WHEREAS**, Section 136-89.191 of the Enabling Act provides that NCDOT may participate in the cost of preconstruction activities, construction, maintenance or operation of a Turnpike Project;

**WHEREAS**, Section 136-18(39) of the North Carolina General Statutes authorizes NCDOT to enter into partnership agreements with NCTA to finance the cost of equipping, maintaining, and operating transportation infrastructure in the State;

**WHEREAS**, NCTA is undertaking a Turnpike Project located in Wake County and Durham County known as the “Triangle Expressway System” as more fully described in Section 1 of the Project Specific Agreement for Triangle Expressway, dated March 6, 2008, between NCDOT and NCTA (the “Triangle Expressway System”), and is now undertaking the construction of the Triangle Expressway System by the construction of a new approximately 19 mile toll road facility (the “Initial Project”) and intends to finance the cost of acquisition, construction and equipping of the Initial Project with revenue bonds issued by NCTA and other Indebtedness incurred by NCTA pursuant to the Enabling Act and The State and Local Government Revenue Bond Act, Article 5 of Chapter 159 of the General Statutes of North Carolina, as amended; and

**WHEREAS**, NCDOT desires to support the financial viability of the Initial Project and the financing thereof, and to this end has determined to enter into this Agreement to (a) assure the purchasers and owners of revenue bonds and other Indebtedness issued or incurred to finance the Initial Project that funds will be available to NCTA to complete the Costs of the Initial Project in the event that the proceeds of the revenue bonds and other Indebtedness described above is not sufficient and (b) assure NCTA that at all times there will be sufficient funds

available to pay for necessary renewals and replacement of the various components of the Initial Project;

**NOW THEREFORE**, the parties hereto, each in consideration of the promises and undertakings of the other as hereinafter provided, **DO HEREBY** covenant and mutually agree as follows:

Section 1. Definitions. In addition to the meanings of certain capitalized terms as set forth in the recitals set forth above, the following terms shall have the following meanings in this Agreement:

“Agreement” means this Construction Completion Assurance and Renewal And Replacement Fund Guaranty Agreement, as the same may be supplemented or amended from time to time.

“Costs of the Initial Project” means all costs for right-of-way acquisition and design, engineering, construction, acquisition and equipping of the Initial Project in accordance with the Plans and Specifications therefore.

“Credit Facility” means a line of credit, letter of credit, standby bond purchase agreement or similar liquidity or credit facility established or obtained in connection with the incurrence of any Indebtedness.

“Credit Provider” means the entity providing a Credit Facility.

“Debt Service Reserve Fund” means a debt service reserve fund or account to be created by the Trust Agreement or any other documentation relating to Indebtedness of NCTA as a reserve to provide funds to pay principal of or interest on Indebtedness authorized thereby if insufficient Receipts are available for such payment. The Trust Agreement or such other documentation may establish one or more of such funds for this purpose, each of which shall be a “Debt Service Reserve Fund” for purposes of this Agreement.

“Debt Service Reserve Fund Requirement” means, as of the time of any calculation, the aggregate amounts then required to be placed or maintained in any Debt Service Reserve Fund. In the event that the Trust Agreement or other documentation relating to Indebtedness provides that a withdrawal of funds from a Debt Service Reserve Fund is to be replenished over a period of time, or additional funding of such Debt Service Reserve Fund is otherwise required to be made over a period of time, the term “Debt Service Reserve Fund Requirement” as used herein means only the amount required to be on deposit at the time of the calculation.

“Debt Service Requirement” means, for any period for which such determination is made, the aggregate of the required deposits to be made by NCTA to one or more corporate trustees or other entities in respect of principal (whether at maturity or pursuant to a sinking fund redemption or otherwise) or interest (whether or not separately stated) on Indebtedness during such period; including directly to the holders of Indebtedness, such as the United States Department of Transportation. Notwithstanding the foregoing, Indebtedness does not include, for purposes of this Agreement, any amounts owed to NCDOT pursuant to this Agreement.

“General Engineering Consultant” means any independent engineer or independent firm of engineers prequalified to do work in North Carolina, in accordance with the established guidelines of the North Carolina Department of Transportation, who is retained by NCTA to assist NCTA in assessing the status of maintenance and upkeep of the Triangle Expressway System, the costs associated therewith and the expected cost of unusual or extraordinary maintenance, repairs, renewals or replacements or capital improvements related to the Initial Project, and advising NCTA regarding the level of reserves that should be maintained to assure that funds will be available when needed for that purpose.

“General Reserve Fund” means the fund to be created under the Trust Agreement that shall be the repository for the deposit of Receipts that are not required to be used to pay or fund the Debt Service Requirement, the Debt Service Reserve Fund Requirement, the Operating Reserve Fund Requirement or the Renewal and Replacement Reserve Fund Requirement or be deposited in the Operations and Maintenance Expense Fund.

“Indebtedness” means all obligations incurred or assumed by NCTA in connection with the ownership or operation of the Triangle Expressway System:

(a) for payments of principal and interest with respect to borrowed money, including any obligation to repay a Credit Provider for moneys drawn to pay and retire or purchase Indebtedness; 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 Indebtedness shall include only such obligations as are secured by Receipts.

“Initial Project” has the meaning given such term in the preambles to this Agreement.

“Operating Reserve Fund” means the fund or funds created pursuant to the Trust Agreement as a reserve for the payment of Operating and Maintenance Expenses in the event that Receipts are not sufficient for such purpose.

“Operating Reserve Fund Requirement” means, as of the time of calculation, the maximum aggregate amounts required by the Trust Agreement to be set aside in the Operating Reserve Fund as a reserve to fund Operating and Maintenance Expenses in the event that Receipts are not sufficient for such purpose; provided, however, that the Operating Reserve Fund Requirement may not exceed at any time one-fourth (1/4th) of the Operating and Maintenance Expenses for the Project for the current Fiscal Year as set forth in the Annual Budget.

“Operations and Maintenance Expense Fund” means the fund or funds created pursuant to the Trust Agreement pursuant to which deposits are to be made from Receipts to pay Operating and Maintenance Expenses.

“Receipts” means all receipts, revenues, income, proceeds and money received in any period by or for NCTA in respect of the Triangle Expressway System, including, but without limiting the generality of the foregoing,

(a) all toll payments, proceeds, fees, charges and rents,

(b) any proceeds of use and occupancy or business interruption insurance, and

(c) payments from the State of North Carolina received by NCTA to the extent that such payments have been pledged to pay Indebtedness and other obligations of NCTA pursuant to the terms of the Trust Agreement or other documentation relating to Indebtedness of NCTA.

“Renewal and Replacement Reserve Fund” means the fund to be created by the Trust Agreement as a reserve to provide funds to pay the costs of maintenance, repair, renewal, reconstruction or replacement of any portion of component of the Triangle Expressway System of a type which is not normally included as an annually recurring cost in NCTA’s Annual Budget for the Triangle Expressway System.

“Renewal and Replacement Reserve Fund Requirement” means, as of the time of any calculation, the aggregate amount then required to be placed or maintained in the Renewal and Replacement Reserve Fund by the Trust Agreement.

“State” means the State of North Carolina.

“Trust Agreement” means the Trust Agreement, to be executed between NCTA and the Trustee, as the same may be supplemented and amended from time to time, and any similar instrument entered into or adopted by NCTA that provides for the issuance or incurrence of Indebtedness and contains the terms regarding the collection and disposition of Receipts.

“Trustee” means the entity serving as Trustee under the provisions of the Trust Agreement.

Section 2. Undertaking to Provide Additional Funds to Pay Costs of the Initial Project.

(a) Based upon the estimate of its engineers and the contract prices proposed to NCTA, NCTA believes that sufficient funds will be available to pay the Costs of the Initial Project from the proceeds of the revenue bonds and other Indebtedness referred to in the preambles to this Agreement. Nevertheless, the parties hereto acknowledge that unexpected or unforeseen circumstances could result in additional unanticipated costs in excess of the amounts available from such revenue bonds and other Indebtedness. In order to provide assurances to NCTA and to the purchasers of NCTA’s revenue bonds or other Indebtedness that sufficient funds will be available to complete the Initial Project, NCDOT hereby undertakes to provide additional funding to provide for the completion of the Initial Project in the event that the funds referred to above are not sufficient therefor.

(b) The payments to be paid by NCDOT pursuant to Section 2(a) are to be funded from amounts then available in the State Highway Trust Fund or the State Highway Fund, as applicable. The payment by NCDOT is subject to appropriation and availability of funds for

such use in the State Highway Trust Fund or the State Highway Fund, as applicable. In the event that NCTA determines that it is necessary to request funds from NCDOT to provide for completion of the Initial Project, NCTA shall provide notice and documentation of such need as soon as such necessity comes to the attention of NCTA and in no event less than ninety (90) days before when such need must be funded. Any such written request shall be accompanied by a certificate of a General Engineering Consultant stating that in the opinion of such General Engineering Consultant, the then current unanticipated costs are reasonably necessary in order to assure that funds will be available as needed to pay the costs of the Initial Project in accordance with prudent management practices.

NCTA will cooperate with the appropriate officials of NCDOT such that the timing of payments to pay the remaining Costs of the Initial Project pursuant to the undertaking set forth above will not disrupt NCDOT's other contractual obligations being funded from the State Highway Trust Fund or State Highway Fund and will not interfere with NCDOT's committed debt service payments.

(c) NCTA shall expend the proceeds of the revenue bonds and other Indebtedness issued to finance the Initial Project in strict compliance with the terms of the Trust Agreement pursuant to which such bonds or other Indebtedness is incurred. Amounts set aside in the Project Fund created under such Trust Agreement shall be used solely for Costs of the Initial Project.

NCTA shall keep accurate records and accounts of all items of costs and of all expenditures relating to the Costs of the Initial Project. Such records and accounts shall be open to the inspection of NCDOT. NCTA shall cause its accountant, which may be the State Auditor, to prepare and deliver to NCTA within 180 days after the close of each Fiscal Year an audit of NCTA's books and accounts relating to the Triangle Expressway System. Reports of each such audit shall be delivered by NCTA to NCDOT in writing immediately upon receipt. In addition, to the extent that there are any findings proposed by the State Auditor, NCTA shall provide the State Auditor's preliminary findings to NCDOT, as well as NCTA's response to those findings. 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 Triangle Expressway System 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.

Section 3. Repayment of Amounts Provided to Pay Costs of the Initial Project. (a) In the event that NCDOT makes any payment to NCTA pursuant to Section 2 of this Agreement, the amounts so paid shall become an obligation of NCTA to NCDOT to repay the amount so paid, with interest on the unpaid principal, computed at a rate equal to that payable by NCTA in accordance with G.S. 136-176(b).

(b) NCTA shall repay the obligations to NCDOT as provided in subsection (a) of this Section solely from Receipts available for such repayment—after payment of the Debt Service Requirement, funding of any deficiency in the Debt Service Reserve Fund Requirement, funding any deficiency in the Renewal and Replacement Reserve Fund Requirement under the terms of the Trust Agreement, funding any deficiency in the Operating Reserve Fund Requirement and

making any deposit to the Operations and Maintenance Expense Fund pursuant to the Trust Agreement or from amounts deposited and held in the General Reserve Fund. Payments by NCTA shall be credited first to unpaid interest, then to the payment of unpaid principal. The failure to pay any payments due pursuant to this Section 3(b) shall not constitute an event of default hereunder if insufficient Receipts or other amounts held in the General Reserve Fund are not available to make such payments.

Section 4. Renewal and Replacement Fund Deposits. (a) NCTA shall provide in the Trust Agreement or any other documentation pursuant to which any Indebtedness is incurred that the Receipts shall be set aside as received and applied on or prior to the last day of each month in the following order of priority:

(i) for the payment of the Debt Service Requirement on Indebtedness then due and payable;

(ii) to any Debt Service Reserve Fund for Indebtedness so that the amount in each such Debt Service Reserve Fund equals the Debt Service Reserve Fund Requirement;

(iii) to the Operating Reserve Fund as a reserve for the payment of Operating and Maintenance Expenses in the event that Receipts are not sufficient for such purpose and the Operations and Maintenance Expense Fund to pay Operating and Maintenance Expenses.

(iv) to the Renewal and Replacement Reserve Fund so that the amount in the Renewal and Replacement Reserve Fund equals the Renewal and Replacement Reserve Fund Requirement; and

(v) other deposits as set forth in the Trust Agreement.

Notwithstanding the foregoing, NCTA may change the order of priority for required deposits of Receipts to fund the Debt Service Requirement or the Debt Service Reserve Fund Requirement, for one class of Indebtedness from another class of Indebtedness in order to provide that selected classes of Indebtedness, and the deposit to a Debt Service Reserve Fund in connection therewith, is senior or subordinate to other Indebtedness, or is payable prior to or after the deposit of any Receipts to fund the Renewal and Replacement Reserve Fund Requirement, and may also provide that deposits of any Debt Service Requirement or Debt Service Reserve Fund Requirement with respect to any Indebtedness may be made after deposits to the Operations and Maintenance Expense Fund and the Operating Reserve Fund.

(b) If at any time amounts in the Renewal and Replacement Reserve Fund shall not be equal to the Renewal and Replacement Reserve Fund Requirement, then subject to the availability of funds as provided in subsection (c) below, NCDOT hereby agrees that NCDOT will pay to, or on behalf of, NCTA (i) the amount necessary so that amounts in the Renewal and Replacement Reserve Fund shall be equal to the Renewal and Replacement Reserve Fund Requirement. Payments to NCTA shall be paid by NCDOT upon ninety (90) days' written notice from NCTA (or by the Trustee on behalf of NCTA) to NCDOT advising NCDOT of the amount of the deficiency and requesting funding therefor. Any such written request shall be accompanied by a certificate of a General Engineering Consultant stating that in the opinion of

such General Engineering Consultant, based upon a methodology agreed upon by NCTA and NCDOT, the then current Renewal and Replacement Reserve Fund Requirement is reasonably necessary in order to assure that funds will be available as needed to pay the cost of maintenance, repairs, renewals or replacements or capital improvements related to the Triangle Expressway System in accordance with prudent management practices.

(c) The payments to be paid by NCDOT pursuant to Section 4(b) are to be funded from amounts then available in the State Highway Trust Fund or the State Highway Fund, as applicable. The payment by NCDOT is subject to appropriation and availability of funds for such use in the State Highway Trust Fund or State Highway Fund, as applicable.

(d) NCTA shall keep accurate records and accounts of all deposits to and costs and expenditures paid from the Renewal and Replacement Reserve Fund. Such records and accounts shall be open to the inspection of NCDOT.

Section 5. Repayment of Amounts Deposited by NCDOT for the Renewal and Replacement Reserve Fund. (a) In the event that NCDOT makes any payment to NCTA pursuant to Section 4 of this Agreement, the amounts so paid shall become an obligation of NCTA to NCDOT to repay the amount so paid, with interest on the unpaid principal, computed at a rate equal to that payable by NCTA in accordance with G.S. 136-176(b).

(b) NCTA shall repay the obligations to NCDOT as provided in subsection (a) of this Section solely from Receipts available for such repayment after payment of the Debt Service Requirement, funding of any deficiency in the Debt Service Reserve Fund Requirement, funding any deficiency in the Renewal and Replacement Reserve Fund Requirement under the terms of the Trust Agreement, funding any deficiency in the Operating Reserve Fund Requirement and making any deposit to the Operations and Maintenance Expense Fund pursuant to the Trust Agreement or from amounts deposited and held in the General Reserve Fund. Payments by NCTA shall be credited first to unpaid interest, then to the payment of unpaid principal. The failure to pay any payments due pursuant to this Section 3(b) shall not constitute an event of default hereunder if insufficient Receipts or other amounts held in the General Reserve Fund are not available to make such payments.

Section 6. Annual Budget. NCTA hereby covenants with NCDOT that it shall maintain an Annual Budget that, to the extent practicable, budgets sufficient funds to make all deposits to the Renewal and Replacement Reserve Fund from Receipts. Subject to the terms of the Trust Agreement regarding the establishment and maintenance of tolls and other Receipts, NCTA shall endeavor to the extent practicable to set tolls at a rate sufficient to generate Receipts to fund the Renewal and Replacement Reserve Fund Requirement set forth in the Annual Budget.

Section 7. Term of this Agreement. The obligation of NCTA to make payments pursuant to Section 2 and Section 4 of this Agreement shall remain in effect for so long as any Indebtedness of NCTA remains outstanding and unpaid. The obligation of NCTA to reimburse NCDOT for payments made pursuant to Section 3 and Section 5 of this Agreement shall remain in effect until all payments to be paid by NCTA to NCDOT hereunder have been paid.

Section 8. Remedies; Enforcement NCDOT and NCTA hereby expressly agree that the sole remedy for any noncompliance by either party under this Agreement shall be specific performance enforceable only by an action filed by the other party to this Agreement.

Section 9. Amendment of the Trust Agreement. NCTA's allocation of funds among the accounts described in Section 3(b) shall not change substantially without the prior written consent of NCDOT.

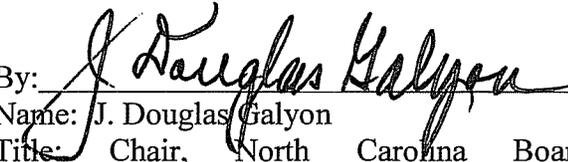
Section 10. Effective Date. NCDOT's obligations under this Agreement shall not become effective until the bonds are sold and the design/build contract has been awarded.

Section 11. Authorization: Each party to this Agreement represents to the other that it is fully authorized to enter into this Agreement and to perform its obligations hereunder and that no waiver, consent, approval, or authorization from any third party is required to be obtained or made in connection with the execution, delivery, or performance of this Agreement. The execution and delivery of this Agreement by NCDOT has been approved by the State Board of Transportation as required by Section 136-89.183 of the Enabling Act.

Section 12. Governing Law: This Agreement shall be construed under and in accordance with the laws of the State.

IN WITNESS WHEREOF, NCDOT and NCTA have entered into this Agreement all as of the 15th day of April, 2009.

**NORTH CAROLINA DEPARTMENT OF  
TRANSPORTATION**

By:   
Name: J. Douglas Galyon  
Title: Chair, North Carolina Board of  
Transportation

(SEAL)

**NORTH CAROLINA TURNPIKE  
AUTHORITY**

By:   
Name: David Joyner  
Title: Executive Director

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**APPENDIX G**

**PROPOSED FORM OF OPINION OF BOND COUNSEL**

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July 29, 2009

Board of Directors of the  
North Carolina Turnpike Authority

We have examined, as bond counsel to the North Carolina Turnpike Authority (the "Authority"), (i) the Constitution and laws of the State of North Carolina, including The State and Local Government Revenue Bond Act, as amended (the "Act"), (ii) certified copies of the proceedings of the Authority showing the adoption of an order authorizing the issuance by the Authority of its \$234,910,000 Triangle Expressway System Senior Lien Revenue Bonds, Series 2009A, dated July 29, 2009 (the "Series 2009A Bonds") and its \$35,173,108.85 Triangle Expressway System Senior Lien Revenue Bonds, Series 2009B, dated July 29, 2009 (the "Series 2009B Bonds," and, together with the Series 2009A Bonds, the "Series 2009 Bonds") and (iii) other proofs submitted relative to the issuance and sale of the Series 2009 Bonds. The Series 2009 Bonds are being issued under and pursuant to a Trust Agreement, dated as of June 1, 2009 (the "Trust Agreement"), between the Authority and Wells Fargo Bank, N.A., as trustee (the "Trustee"), and a First Supplemental Trust Agreement, dated as of July 1, 2009 (the "First Supplemental Trust Agreement"), between the Authority and the Trustee. Capitalized terms used herein and not otherwise defined have the meanings given such terms in the Trust Agreement and the First Supplemental Trust Agreement.

The Series 2009A Bonds bear interest from their date and mature, subject to redemption prior to their maturities, as provided in the First Supplemental Trust Agreement. Interest on the Series 2009A Bonds is payable on each January 1 and July 1, beginning January 1, 2010. Interest on the Series 2009B Bonds will not be paid on a current basis, but will be paid at maturity or earlier redemption in the manner described in the First Supplemental Trust Agreement.

The Series 2009 Bonds are being issued to provide funds, together with other available funds, to (a) to pay the costs of land acquisition, design, construction and equipping of the Triangle Expressway System, an approximately 19-mile toll road facility to be built in Durham and Wake Counties, North Carolina (the "Project"), (b) to provide funds to pay the interest on the Series 2009 Bonds until July 1, 2013, (c) pay the premium for the Bond Insurance Policy issued by Assured Guaranty Corp., (d) to fund the Senior Lien Parity Reserve Account in the amount of the Senior Lien Parity Reserve Account Requirement and (e) to pay certain costs incurred in connection with the issuance of the Series 2009 Bonds.

The Trust Agreement provides for the issuance, under the conditions, limitations and restrictions therein set forth, of additional Senior Lien Revenue Bonds and permits the incurrence of Senior Lien Parity Debt, both on a parity as to the pledge of Receipts with the Series 2009 Bonds, to provide funds for paying (a) all or any part of the cost of any Additional Project, (b) all or any part of completing the Project or any Additional Project, and (c) the cost (including financing costs) of refunding any bonds issued under the Trust Agreement (the Series 2009 Bonds and any such additional Senior Lien Revenue Bonds issued under the Trust Agreement are herein collectively called the "Senior Lien Revenue Bonds"). The Authority, in its discretion, may secure any Senior Lien Revenue Bonds and Parity Debt by

the Senior Lien Parity Reserve Account or by a Senior Lien Special Reserve Account under the conditions set forth in the Trust Agreement. The Series 2009 Bonds will be secured by the Senior Lien Parity Reserve Account. The Trust Agreement also permits the incurrence of Subordinated Lien Indebtedness and TIFIA Indebtedness under the conditions, restrictions and limitations therein set forth. Concurrently with the issuance of the Series 2009 Bonds, the Authority is issuing its Triangle Expressway Revenue Bond, TIFIA Series 2009 pursuant to the Trust Agreement in the principal amount not to exceed \$386,662,363 (the "TIFIA Series 2009 Bond") which constitutes TIFIA Indebtedness under the Trust Agreement. Except as described in the Trust Agreement with respect to the occurrence of a Bankruptcy Related Event, payment of debt service on Subordinated Indebtedness and TIFIA Indebtedness from Receipts is subordinated to payment of Senior Lien Indebtedness.

As to matters of fact material to our opinion, we have relied upon the certified proceedings and other certificates of public officials and others furnished to us without undertaking to verify the same by independent investigation.

Based on such examination, we are of the opinion, as of the date hereof and under existing law, that:

1. The Series 2009 Bonds have been duly authorized, executed and delivered.
2. The Trust Agreement and the First Supplemental Trust Agreement have been duly authorized, executed and delivered by the Authority and, assuming due authorization, execution and delivery by the Trustee, are valid and binding agreements enforceable against the Authority in accordance with their terms.
3. The Series 2009 Bonds and any other Senior Lien Revenue Bonds issued by the Authority under the Trust Agreement and any Senior Lien Parity Debt incurred by the Authority are, to the extent provided in the Trust Agreement, secured by a first priority pledge, charge and lien upon the Receipts.
4. The Series 2009 Bonds are valid and binding special obligations of the Authority secured by a pledge, charge and lien upon, and the principal of, and the premium, if any, and interest on which are payable from, the funds and the income from the investment thereof and in the respective subaccounts of the Senior Lien Debt Service Fund.
5. The Authority is not obligated to pay the principal of, premium, if any, or the interest on the Series 2009 Bonds except as provided in the Trust Agreement and the First Supplemental Trust Agreement. The principal of and interest on the Series 2009 Bonds are not payable from the general funds of the Authority, nor do the Series 2009 Bonds constitute a legal or equitable pledge, charge, lien or encumbrance upon the income, receipts or revenues of the Authority except for the Receipts to the extent provided in the Trust Agreement. Neither the faith and credit nor the taxing power of the State of North Carolina or any political subdivision thereof is pledged to the payment of the principal of, premium, if any, or interest on the Series 2009 Bonds, and no holder of the Series 2009 Bonds has the right to compel the exercise of the taxing power by the State of North Carolina or any political subdivision thereof, or the forfeiture of its property other than the Receipts, in connection with any default with respect to the Series 2009 Bonds. The Authority has no taxing power.
6. Assuming continuing compliance by the Authority with certain covenants to comply with the requirements of the Internal Revenue Code of 1986, as amended (the "Code"), regarding, among other matters, use, expenditure and investment of proceeds of the Series 2009 Bonds, interest on the Series 2009 Bonds (including any original issue discount properly allocable to an owner thereof) is not

includable in the gross income of the owners thereof for purposes of federal income taxation and is not a specific preference item for purposes of computing the alternative minimum tax imposed by the Code on corporations and other taxpayers, including individuals. In addition, pursuant to the American Recovery and Reinvestment Act of 2009, such interest is not includable in the adjusted current earnings of corporations for purposes of computing the alternative minimum tax imposed by the Code on corporations.

7. Interest on the Series 2009 Bonds (including any original issue discount properly allocable to an owner thereof) is exempt from all State of North Carolina income taxes.

The Code and other laws of taxation, including the laws of taxation of the State of North Carolina, of other states and of local jurisdictions, may contain other provisions that could result in tax consequences, upon which we render no opinion, as a result of the ownership or transfer of the Series 2009 Bonds or the inclusion in certain computations of interest that is excluded from gross income for purposes of federal and North Carolina income taxation.

The rights of the owners of the Series 2009 Bonds and the enforceability thereof and of the Trust Agreement and the First Supplemental Trust Agreement may be subject to bankruptcy, insolvency, reorganization, moratorium and other similar laws affecting creditors' rights heretofore and hereafter enacted to the extent constitutionally applicable, and their enforcement may also be subject to the exercise of judicial discretion in appropriate cases.

We express no opinion herein as to the accuracy, adequacy or completeness of the Official Statement relating to the Series 2009 Bonds.

This opinion is given as of the date hereof, and we assume no obligation to update, revise or supplement this opinion to reflect any facts or circumstances that may hereafter come to our attention or any changes in law that may hereafter occur.

WOMBLE CARLYLE SANDRIDGE & RICE  
*A Professional Limited Liability Company*

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**APPENDIX H**

**DTC'S BOOK-ENTRY-ONLY SYSTEM**

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## **DTC's Book-Entry-Only System**

The Depository Trust Company (“DTC”), New York, New York, will act as securities depository for the Series 2009 Bonds. The Series 2009 Bonds will be issued as fully-registered securities 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 2009 Bond will be issued for each maturity of the Series 2009 Bonds, each in the aggregate principal amount of such maturity of such Series 2009 Bond, and will be deposited with DTC. SO LONG AS CEDE & CO. IS THE REGISTERED OWNER OF THE SERIES 2009 BONDS, AS DTC’S PARTNERSHIP NOMINEE, REFERENCE HEREIN TO THE REGISTERED OWNERS OR OWNERS OF THE SERIES 2009 BONDS SHALL MEAN CEDE & CO. AND SHALL NOT MEAN THE BENEFICIAL OWNERS OF THE SERIES 2009 BONDS.

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 over 2.2 million issues of U.S. and non-U.S. equity, corporate and municipal debt issues, and money market instrument from over 100 countries 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, in turn, is owned by a number of Direct Participants of DTC and Members of the National Securities Clearing Corporation, Fixed Income Clearing Corporation, and Emerging Markets Clearing Corporation (NSCC, FICC, and EMCC, also subsidiaries of DTCC), as well as by the New York Stock Exchange, Inc., the American Stock Exchange LLC, and the National Association of Securities Dealers, Inc. 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 highest rating: AAA. 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) and [www.dtc.org](http://www.dtc.org).

Purchases of Series 2009 Bonds under the DTC system must be made by or through Direct Participants, which will receive a credit for the Series 2009 Bonds on DTC’s records. The ownership interest of each actual purchaser of each Series 2009 Bond (“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 Participant through which the Beneficial Owner entered into the transaction. Transfers of ownership interests in the Series 2009 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 Series 2009 Bonds, except in the event that use of the book-entry system for the Series 2009 Bonds is discontinued.

To facilitate subsequent transfers, all Series 2009 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 Series 2009 Bonds with DTC and their registration in the name of Cede & Co. or such other nominee do not effect any change in beneficial

ownership. DTC has no knowledge of the Revenue Bond Actual Beneficial Owners of the Series 2009 Bonds; DTC's records reflect only the identity of the Direct Participants to whose accounts such Series 2009 Bonds are credited, which may or may not be the Beneficial Owners. The Direct and Indirect Participants will remain responsible for keeping account of their holdings on behalf of their customers.

Conveyances 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 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 Series 2009 Bonds may wish to take certain steps to augment transmission to them of notices of significant events with respect to the Series 2009 Bonds, such as redemptions, tenders, defaults, and proposed amendments to the security documents. For example, Beneficial Owners of Series 2009 Bonds may wish to ascertain that the nominee holding the Series 2009 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 Bond Registrar and request that copies of the notices be provided directly to them.

Redemption notices shall be sent to DTC. If less than all of the Series 2009 Bonds within an issue 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 2009 Bonds unless authorized by a Direct Participant in accordance with DTC's Procedures. Under its usual procedures, DTC mails an Omnibus Proxy to the Trustee as soon as possible after the record date. The Omnibus Proxy assigns Cede & Co.'s consenting or voting rights to those Direct Participants to whose accounts the Series 2009 Bonds are credited on the record date (identified in a listing attached to the Omnibus Proxy).

Principal and interest payments on the Series 2009 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, the Trustee or the Bond Registrar on 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 Participant and not of DTC or its nominee, the Trustee, the Bond Registrar or the Authority, subject to any statutory or regulatory requirements as may be in effect from time to time. Payment 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, the Trustee and the Bond Registrar, disbursement of such payments to Direct Participants will be the responsibility of DTC, and disbursement of such payments to the Beneficial Owners will be the responsibility of Direct and Indirect Participants.

DTC may discontinue providing its services as securities depository with respect to the Series 2009 Bonds at any time by giving reasonable notice to the Authority or the Trustee. Under such circumstances, in the event that a successor securities depository is not obtained, Series 2009 Bond certificates 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 2009 Bond certificates will be printed and delivered to DTC.

The information in this section concerning DTC and DTC's book-entry system has been obtained from DTC, a source the Authority believes to be reliable, but the Authority takes no responsibility for the accuracy thereof.

The Authority, the Trustee and the Bond Registrar cannot and do not give any assurances that DTC, Direct Participants or Indirect Participants will distribute to the Beneficial Owners of the Series 2009 Bonds (a) payments of principal of, premium, if any, and interest on the Series 2009 Bonds, (b) confirmations of their ownership interests in the Series 2009 Bonds or (c) prepayment or other notices sent to DTC or Cede & Co., its partnership nominee, as the registered owner of the Series 2009 Bonds, or that they will do so on a timely basis, or that DTC, Direct Participants or Indirect Participants will serve and act in the manner described in this Official Statement.

NEITHER THE AUTHORITY, THE TRUSTEE, NOR THE BOND REGISTRAR WILL HAVE ANY RESPONSIBILITY OR OBLIGATIONS TO DTC, THE DIRECT PARTICIPANTS, THE INDIRECT PARTICIPANTS OR THE BENEFICIAL OWNERS WITH RESPECT TO (1) THE ACCURACY OF ANY RECORDS MAINTAINED BY DTC OR ANY DIRECT PARTICIPANT OR INDIRECT PARTICIPANT; (2) THE PAYMENT BY DTC OR ANY DIRECT PARTICIPANT OR INDIRECT PARTICIPANT OF ANY AMOUNT DUE TO ANY BENEFICIAL OWNER IN RESPECT OF THE PRINCIPAL OF, PREMIUM, IF ANY, OR INTEREST ON THE SERIES 2009 BONDS; (3) THE DELIVERY BY DTC OR ANY DIRECT OR INDIRECT PARTICIPANT OF ANY NOTICE TO ANY BENEFICIAL OWNER THAT IS REQUIRED OR PERMITTED TO BE GIVEN TO OWNERS OF THE SERIES 2009 BONDS UNDER THE TERMS OF THE TRUST AGREEMENT OR THE FIRST SUPPLEMENTAL TRUST AGREEMENT; AND (4) ANY CONSENT GIVEN OR OTHER ACTION TAKEN BY DTC.

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**APPENDIX I**

**SPECIMEN FINANCIAL GUARANTY INSURANCE POLICY**

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**Financial Guaranty Insurance Policy**

Issuer:

Policy No.:

Obligations:

Premium:

Effective Date:

Assured Guaranty Corp., a Maryland corporation ("Assured Guaranty"), in consideration of the payment of the Premium and on the terms and subject to the conditions of this Policy (which includes each endorsement hereto), hereby unconditionally and irrevocably agrees to pay to the trustee (the "Trustee") or the paying agent (the "Paying Agent") for the Obligations (as set forth in the documentation providing for the issuance of and securing the Obligations) for the benefit of the Holders that portion of the Insured Payments which shall become Due for Payment but shall be unpaid by reason of Nonpayment.

Assured Guaranty will make such Insured Payments to the Trustee or the Paying Agent on the later to occur of (i) the date applicable principal or interest becomes Due for Payment, or (ii) the Business Day next following the day on which Assured Guaranty shall have Received a completed Notice of Nonpayment. If a Notice of Nonpayment by Assured Guaranty is incomplete or does not in any instance conform to the terms and conditions of this Policy, it shall be deemed not Received, and Assured Guaranty shall promptly give notice to the Trustee or the Paying Agent. Upon receipt of such notice, the Trustee or the Paying Agent may submit an amended Notice of Nonpayment. The Trustee or the Paying Agent will disburse the Insured Payments to the Holders only upon receipt by the Trustee or the Paying Agent in form reasonably satisfactory to it of (i) evidence of the Holder's right to receive such payments, and (ii) evidence, including without limitation any appropriate instruments of assignment, that all of the Holder's rights to payment of such principal or interest Due for Payment shall thereupon vest in Assured Guaranty. Upon and to the extent of such disbursement, Assured Guaranty shall become the Holder of the Obligations, any appurtenant coupon thereto and right to receipt of payment of principal thereof or interest thereon, and shall be fully subrogated to all of the Holder's right, title and interest thereunder, including without limitation the right to receive payments in respect of the Obligations. Payment by Assured Guaranty to the Trustee or the Paying Agent for the benefit of the Holders shall discharge the obligation of Assured Guaranty under this Policy to the extent of such payment.

This Policy is non-cancelable by Assured Guaranty for any reason. The Premium on this Policy is not refundable for any reason. This Policy does not insure against loss of any prepayment premium or other acceleration payment which at any time may become due in respect of any Obligation, other than at the sole option of Assured Guaranty, nor against any risk other than Nonpayment.

Except to the extent expressly modified by any endorsement hereto, the following terms shall have the meanings specified for all purposes of this Policy. "Avoided Payment" means any amount previously distributed to a Holder in respect of any Insured Payment by or on behalf of the Issuer, which amount has been recovered from such Holder pursuant to the United States Bankruptcy Code in accordance with a final, nonappealable order of a court having competent jurisdiction that such payment constitutes an avoidable preference with respect to such Holder. "Business Day" means any day other than (i) a Saturday or Sunday, (ii) any day on which the offices of the Trustee, the Paying Agent or Assured Guaranty are closed, or (iii) any day on which banking institutions are authorized or required by law, executive order or governmental decree to be closed in the City of New York or in the State of Maryland. "Due for Payment" means (i) when referring to the principal of an Obligation, the stated maturity date thereof, or the date on which such Obligation shall have been duly called for mandatory sinking fund redemption, and does not refer to any earlier date on which payment is due by reason of a call for redemption (other than by mandatory sinking fund redemption), acceleration or other advancement of maturity (unless Assured Guaranty in its sole discretion elects to make any principal payment, in whole or in part, on such earlier date) and (ii) when referring to interest on an Obligation, the stated date for payment of such interest. "Holder" means, in respect of any Obligation, the person or entity who, at the time of Nonpayment, is entitled under the terms of such Obligation to payment of principal or interest thereunder, except that Holder shall not include the Issuer or any person or entity whose direct or indirect obligation constitutes the underlying security for the Obligations. "Insured Payments" means that portion of the principal of and interest on the Obligations that shall become Due for Payment but shall be unpaid by reason of Nonpayment. Insured Payments shall not include any additional amounts owing by the Issuer solely as a result of the failure by the Trustee or the Paying Agent to pay such amount when due and payable, including without limitation any such additional amounts as may be attributable to penalties or to interest accruing at a default rate, to amounts payable in respect of indemnification, or to any other additional amounts payable by the Trustee or the Paying Agent by reason of such failure. "Nonpayment" means, in respect of an Obligation, the failure of the issuer to have provided sufficient funds to the Trustee or the Paying Agent for payment in full of all principal and interest Due for Payment on such Obligation. It is further understood that the term "Nonpayment" in respect of an Obligation includes any Avoided Payment. "Receipt" or "Received" means actual receipt or notice of or, if notice is given by overnight or other delivery service, or by certified or registered United States mail, by a delivery receipt signed by a person authorized to accept delivery on behalf of the person to whom the notice was given. Notices to Assured Guaranty may be mailed by registered mail or personally delivered or telecopied to it at 1325 Avenue of the Americas, New York, New York 10019, Telephone Number: (212) 974-0100, Facsimile Number: (212) 581-3268, Attention: Risk Management Department - Public Finance Surveillance, with a copy to the General Counsel, or to such other address as shall be specified by Assured Guaranty to the Trustee

or the Paying Agent in writing. A Notice of Nonpayment will be deemed to be Received by Assured Guaranty on a given Business Day if it is Received prior to 12:00 noon (New York City time) on such Business Day; otherwise it will be deemed Received on the next Business Day. "Term" means the period from and including the Effective Date until the earlier of (i) the maturity date for the Obligations, or (ii) the date on which the issuer has made all payments required to be made on the Obligations.

At any time during the Term of this Policy, Assured Guaranty may appoint a fiscal agent (the "Fiscal Agent") for purposes of this Policy by written notice to the Trustee or the Paying Agent, specifying the name and notice address of such Fiscal Agent. From and after the date of Receipt of such notice by the Trustee or the Paying Agent, copies of all notices and documents required to be delivered to Assured Guaranty pursuant to this Policy shall be delivered simultaneously to the Fiscal Agent and to Assured Guaranty. All payments required to be made by Assured Guaranty under this Policy may be made directly by Assured Guaranty or by the Fiscal Agent on behalf of Assured Guaranty. The Fiscal Agent is the agent of Assured Guaranty only, and the Fiscal Agent shall in no event be liable to the Trustee or the Paying Agent for any acts of the Fiscal Agent or any failure of Assured Guaranty to deposit, or cause to be deposited, sufficient funds to make payments due under this Policy.

To the fullest extent permitted by applicable law, Assured Guaranty hereby waives, in each case for the benefit of the Holders only, all rights and defenses of any kind (including, without limitation, the defense of fraud in the inducement or in fact or any other circumstance that would have the effect of discharging a surety, guarantor or any other person in law or in equity) that may be available to Assured Guaranty to deny or avoid payment of its obligations under this Policy in accordance with the express provisions hereof. Nothing in this paragraph will be construed (i) to waive, limit or otherwise impair, and Assured Guaranty expressly reserves, Assured Guaranty's rights and remedies, including, without limitation, its right to assert any claim or to pursue recoveries (based on contractual rights, securities law violations, fraud or other causes of action) against any person or entity, in each case, whether directly or acquired as a subrogee, assignee or otherwise, subsequent to making any payment to the Trustee or the Paying Agent, in accordance with the express provisions hereof, and/or (ii) to require payment by Assured Guaranty of any amounts that have been previously paid or that are not otherwise due in accordance with the express provisions of this Policy.

This Policy (which includes each endorsement hereto) sets forth in full the undertaking of Assured Guaranty with respect to the subject matter hereof, and may not be modified, altered or affected by any other agreement or instrument, including, without limitation, any modification thereto or amendment thereof. THIS POLICY IS NOT COVERED BY THE PROPERTY/CASUALTY INSURANCE SECURITY FUND SPECIFIED IN ARTICLE 76 OF THE NEW YORK INSURANCE LAW. This Policy will be governed by, and shall be construed in accordance with, the laws of the State of New York.

IN WITNESS WHEREOF, Assured Guaranty has caused this Policy to be affixed with its corporate seal, to be signed by its duly authorized officer, and to become effective and binding upon Assured Guaranty by virtue of such signature.

ASSURED GUARANTY CORP.

(SEAL)

By: \_\_\_\_\_  
[Insert Authorized Signatory Name]  
[Insert Authorized Signatory Title]

Signature attested to by:

\_\_\_\_\_  
Counsel



1,202 copies of this public document were printed at a cost of \$10,000, or \$8.32 per copy.



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