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# **Statewide Logistics Plan for North Carolina**

*An Investigation of the Issues with Recommendations for Action*

## **FINAL REPORT**

**By**

**George F. List, Ph.D., P.E.**

P.I. and Head, Civil, Construction and Environmental Engineering  
North Carolina State University

**Robert S. Foyle, P.E.**

Co-P.I. and Associate Director, ITRE  
North Carolina State University

**Henry Canipe**

Senior Manager  
TransTech Management, Inc.

**John Cameron, Ph.D.**

Managing Partner  
TransTech Management, Inc.

**Erik Stromberg**

Ports and Harbors Practice Leader  
Hatch, Mott, MacDonald LLC

**For the**

**North Carolina Office of State Budget and Management**

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### **NCSU Team**

Dr. George List, P.E. – Principal Investigator responsible for and involved in all aspects of the entire project, lead writer, editing  
Dr. Alixandra Demers – assisted in project management, vision session co-coordinator and a facilitator, lead writer, recorder of meeting minutes, interviews, report formatting and editing  
Dr. Tom Birkland – vision session facilitator, writing, editing  
Dr. Paul Cohen – interviews and writing  
Dr. Robert Handfield – interviews and writing  
Dr. Billy M. Williams, P.E. – vision session facilitator and writing  
Dr. John Stone – vision session facilitator and writing  
Dr. Joe Hummer, P.E. – vision session facilitator and writing

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Mr. Robert Foyle, P.E. – Co-Principal Investigator responsible for and involved in all aspects of the entire project, lead writer, editing  
Mr. Daniel Findley – vision session co-coordinator and a facilitator, lead writer, recording of meeting minutes, editing  
Ms. Linda Collier – setting up all the vision session sites  
Mr. Jud Lawrie – research and writing  
Mr. Jeff Tsai – research and writing  
Mr. Tom Cook – research and writing  
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Dr. C. Michael Walton, University of Texas at Austin – visionary, interviews, editing  
Dr. Edd Hauser, UNC-Charlotte – vision session facilitator, interviews, and writing  
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Dr. Andrew Brod, UNCG – population growth and economic forecasts for state level analysis  
Dr. Mecit Cetin, University of South Carolina – design and conduct survey of NC trucking companies  
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Dr. John Cameron, TransTech Management, Inc. – lead writer, editing, strategist  
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# Table of Contents

<b>LIST OF FIGURES .....</b>	<b>IX</b>
<b>LIST OF TABLES .....</b>	<b>XI</b>
<b>EXECUTIVE SUMMARY .....</b>	<b>1</b>
<b>1 INTRODUCTION.....</b>	<b>9</b>
<b>1.1 MANDATE FROM THE LEGISLATURE .....</b>	<b>9</b>
<b>1.2 WHAT IS FREIGHT LOGISTICS?.....</b>	<b>9</b>
<b>1.3 RATIONALE FOR THE REPORT.....</b>	<b>11</b>
<b>1.4 STUDY METHODOLOGY.....</b>	<b>14</b>
<b>1.5 LOGISTICS CONCEPTS.....</b>	<b>16</b>
1.5.1 SUSTAINABILITY.....	16
1.5.2 COMMERCE, TRANSPORTATION, AND SOCIETY .....	16
1.5.3 SUPPLY CHAINS.....	17
1.5.4 CONNECTION BETWEEN COMMERCE AND TRANSPORTATION .....	18
1.5.5 CORRIDOR PLANNING .....	18
1.5.6 INTEGRATED MULTI-MODAL SYSTEM.....	20
1.5.7 SUPPLY-PUSH AND DEMAND-PULL .....	20
<b>2 ECONOMIC TRENDS .....</b>	<b>21</b>
<b>2.1 GLOBAL ECONOMIC PICTURE.....</b>	<b>21</b>
2.1.1 CURRENT .....	21
2.1.2 PROJECTED ECONOMY AND TRADE PATTERNS.....	21
<b>2.2 NATIONAL ECONOMIC &amp; TRADE PATTERNS.....</b>	<b>22</b>
<b>2.3 GOODS MOVEMENT: A FEDERAL AND STATEWIDE PERSPECTIVE.....</b>	<b>24</b>
<b>2.4 MANUFACTURING TRENDS.....</b>	<b>27</b>
2.4.1 FUEL COSTS .....	27
2.4.2 FLEXIBILITY .....	28
2.4.3 MANIPULATED CURRENCY – FOREIGN TRADE POLICY.....	29
2.4.4 BRAIN DRAIN .....	30
2.4.5 INDUSTRY REINVESTMENT .....	31
<b>2.5 NATIONAL FUNDING.....</b>	<b>31</b>
<b>2.6 POPULATION AND POPULATION DISTRIBUTION.....</b>	<b>32</b>
<b>2.7 EMPLOYMENT PATTERNS.....</b>	<b>35</b>
<b>2.8 EMPLOYMENT AND LOGISTICS INFRASTRUCTURE NEEDS BY INDUSTRY.....</b>	<b>42</b>
2.8.1 COMMENTS ON DATA/APPROACH.....	45

2.9	TRANSPORTATION INFRASTRUCTURE NEEDS ANALYSIS .....	46
2.10	EXISTING NORTH CAROLINA FREIGHT PATTERNS.....	55
<b>3</b>	<b><u>NORTH CAROLINA’S FUTURE .....</u></b>	<b><u>60</u></b>
3.1	THE CONTEXT FOR THE VISION .....	60
3.2	SETTING THE GOALS.....	61
3.3	OUTREACH TO SPECIFIC INDUSTRY SECTORS .....	64
3.4	STAKEHOLDERS .....	64
3.4.1	AREA PARTNERSHIP COMMISSIONS .....	65
3.4.2	SUPPLY CHAIN CONSORTIUM .....	69
3.4.3	NORTH CAROLINA RAILROAD COMPANY.....	74
3.4.4	NORTH CAROLINA STATE PORTS AUTHORITY .....	75
3.4.5	NORTH CAROLINA INTERNATIONAL TERMINAL .....	76
3.4.6	GLOBAL TRANSPARK AUTHORITY .....	78
3.4.7	AIRPORTS .....	79
3.4.8	TRUCKING INDUSTRY.....	80
3.4.9	RAIL INDUSTRY .....	81
3.4.10	RAIL CORRIDORS .....	84
3.4.11	THIRD PARTY LOGISTICS SERVICE PROVIDERS.....	87
3.5	SUPPORTING THE ACTION ITEMS.....	88
3.5.1	KNOWLEDGE BASED ECONOMY .....	88
3.5.2	SUPPORT EXISTING INDUSTRIES .....	88
3.6	THE BOTTOM LINE .....	102
3.6.1	SHORT-TERM .....	103
3.6.2	MEDIUM-TERM.....	103
3.6.3	LONG-TERM.....	103
3.6.4	SUMMARY .....	104
<b>4</b>	<b><u>INFRASTRUCTURE NEEDS ASSESSMENT.....</u></b>	<b><u>105</u></b>
4.1	CURRENT TRANSPORTATION INFRASTRUCTURE INVENTORY .....	105
4.1.1	HIGHWAY INFRASTRUCTURE.....	105
4.1.2	RAIL FREIGHT INFRASTRUCTURE.....	111
4.1.3	AIR FREIGHT .....	118
4.1.4	PORTS .....	125
4.2	GAP ANALYSIS .....	134
4.2.1	SUMMARY OF INFRASTRUCTURE NEEDS AND ISSUES.....	136
<b>5</b>	<b><u>IMPLEMENTATION STRATEGY .....</u></b>	<b><u>138</u></b>
5.1	ESTABLISH A FREIGHT LOGISTICS ORGANIZATION .....	139
5.1.1	LESSONS LEARNED .....	139
5.1.2	EXAMPLES OF FREIGHT LOGISTICS ORGANIZATIONS IN OTHER STATES .....	140

---

5.1.3	EXISTING FREIGHT LOGISTICS ORGANIZATIONS IN NORTH CAROLINA.....	142
5.1.4	OPTIONS FOR THE FREIGHT LOGISTICS ORGANIZATION IN NORTH CAROLINA	145
<b>5.2</b>	<b>CREATE A FREIGHT LOGISTICS AUTHORITY (CHOOSE OPTION B) .....</b>	<b>148</b>
<b>5.3</b>	<b>PREPARE A COMPREHENSIVE GOODS MOVEMENT PLAN.....</b>	<b>150</b>
<b>6</b>	<b><u>GLOSSARY AND LIST OF ABBREVIATIONS.....</u></b>	<b><u>153</u></b>
	<b><u>APPENDICES.....</u></b>	<b><u>159</u></b>

**APPENDIX A: POWERPOINT SLIDE SETS**

- TOMPKINS ASSOCIATES
- CAMBRIDGE SYSTEMATICS
- GLOBAL INSIGHT

**APPENDIX B: INTERVIEW TRANSCRIPTS**

**APPENDIX C: VISIONING SESSIONS**

**APPENDIX D: SURVEY OF TRUCKING COMPANIES**

**APPENDIX E: SUMMARY OF SELECTED MAJOR HISTORICAL TRANSPORTATION INITIATIVES**

**APPENDIX F: LESSONS LEARNED**

- TOURISM
- PUBLIC TRANSPORTATION
- MILITARY SUPPORT

**APPENDIX G: INFRASTRUCTURE**

- AIR FREIGHT INFRASTRUCTURE
- HIGHWAY INFRASTRUCTURE
- PORT INFRASTRUCTURE
- RAIL INFRASTRUCTURE

**APPENDIX H: FUNDING**

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## List of Figures

FIGURE 1.1 THE SCOPE OF LOGISTICS .....	10
FIGURE 1.2 CATEGORIES OF PARTICIPANTS IN THE VISIONING SESSIONS.....	15
FIGURE 2.1 PANAMA CANAL TONNAGE 2005 AND 2025.....	22
FIGURE 2.2 TRADE VIA U.S. BORDERS.....	23
FIGURE 2.3 2035 COMPARISON OF MODE SHARE IN TERMS OF TONS, VALUE, AND TON-MILES IN THE U.S. ....	24
FIGURE 2.4 AVERAGE FUEL PRICES FOR 2001 AND 2008.....	28
FIGURE 2.5 CHINESE – AMERICAN CURRENCY EXCHANGE TRENDS.....	30
FIGURE 2.6 NORTH CAROLINA AREA GROWTH RATES .....	34
FIGURE 2.7 PERCENTAGE OF EMPLOYMENT BY AREA.....	40
FIGURE 2.8 LOGISTICS IN NORTH CAROLINA, 2007 .....	49
FIGURE 2.9 SPECIALIZED FREIGHT TRUCKING (NAICS 4842) .....	50
FIGURE 2.10 SCHEDULED AIR TRANSPORTATION (NAICS 4811) .....	51
FIGURE 2.11 SUPPORT ACTIVITIES FOR AIR TRANSPORT (NAICS 4881).....	52
FIGURE 2.12 FREIGHT TRANSPORTATION ARRANGEMENT (NAICS 488510).....	53
FIGURE 2.13 WAREHOUSING & STORAGE (NAICS 4931) .....	54
FIGURE 2.14 ESTIMATED AVERAGE ANNUAL DAILY TRUCK TRAFFIC: 1998.....	56
FIGURE 2.15 ESTIMATED AVERAGE ANNUAL DAILY TRUCK TRAFFIC: 2020.....	56
FIGURE 3.1 KEY REASONS FOR MODE CHANGE .....	74
FIGURE 3.2 RELATIVE IMPORTANCE OF VARIOUS ASPECTS OF THE TRUCK FREIGHT SYSTEM .....	80
FIGURE 3.3 THE NS HEARTLAND CORRIDOR .....	84
FIGURE 3.4 THE NS CRESCENT CORRIDOR .....	85
FIGURE 3.5 CSX NATIONAL GATEWAY CORRIDOR.....	85
FIGURE 3.6 MAP OF THE “ALL AMERICAN DEFENSE CORRIDOR” .....	94
FIGURE 3.7 INTERMODAL LOGISTICS CENTER SERVED BY RAIL AND AIRPORT .....	98
FIGURE 4.1 ESTIMATED AVERAGE ANNUAL DAILY TRUCK TRAFFIC: 1998.....	106
FIGURE 4.2 ESTIMATED AVERAGE ANNUAL DAILY TRUCK TRAFFIC: 2020 .....	106
FIGURE 4.3 2006 TRUCK VOLUMES FORECAST .....	107
FIGURE 4.4 NORTH CAROLINA TRUCK NETWORK FOR STAA VEHICLES.....	110
FIGURE 4.5 NORTH CAROLINA RAILROAD SYSTEM .....	111
FIGURE 4.6 NORTH CAROLINA TOTAL RAIL FREIGHT FLOWS, 2002.....	114
FIGURE 4.7 RAIL TRAFFIC FLOWS IN NC, 1999 – 2003 .....	115
FIGURE 4.8 NORTH CAROLINA AIR CARGO AIRPORTS, 2002 .....	121
FIGURE 4.9 NORTH CAROLINA AIR CARGO AIRPORTS, 2006 .....	121
FIGURE 4.10 DESTINATIONS FROM CHARLOTTE DOUGLAS INTERNATIONAL (CLT), 2005 .....	122
FIGURE 4.11 PLANNED INTERMODAL HUB AT CHARLOTTE-DOUGLAS INTERNATIONAL AIRPORT.....	122
FIGURE 4.12 DESTINATIONS FROM RALEIGH-DURHAM INTERNATIONAL (RDU), 2006.....	123
FIGURE 4.13 DESTINATIONS FROM PIEDMONT TRIAD INTERNATIONAL AIRPORT (GSO), 2008 ..	124
FIGURE 4.14 PORT OF MOREHEAD CITY.....	126
FIGURE 4.15 MOREHEAD CITY PORT - SHIP AND BARGE TRAFFIC .....	127

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FIGURE 4.16 MOREHEAD CITY PORT - TONNAGE HANDLED .....	127
FIGURE 4.17 MOREHEAD CITY PORT: EXPORTS - MILITARY AND GENERAL MERCHANDISE .....	128
FIGURE 4.18 PORT OF WILMINGTON .....	129
FIGURE 4.19 SHIPS AND BARGES TONNAGE AND VESSEL TRENDS- WILMINGTON.....	130
FIGURE 4.20 PORT OF WILMINGTON - T.E.U.....	131
FIGURE 4.21 PORT OF WILMINGTON - TONNAGE HANDLED.....	131

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## List of Tables

TABLE 1.1 PERCENT OF LOGISTICS COSTS BASED ON SALES.....	10
TABLE 2.1 SELECT NATIONAL STATISTICS .....	31
TABLE 2.2 METRO AREA DEFINITIONS .....	33
TABLE 2.3 POPULATION BY METRO AREA, 2010-2030.....	33
TABLE 2.4 DECADAL POPULATION GROWTH, BY METRO AREA, 2010-2030 .....	34
TABLE 2.5 PROJECTED EMPLOYMENT, BY SECTOR, IN THOUSANDS .....	36
TABLE 2.6 PROJECTED EMPLOYMENT, BY MANUFACTURING INDUSTRY, IN THOUSANDS .....	37
TABLE 2.7 PROJECTED INDUSTRIAL PRODUCTION INDEXES, BY INDUSTRY, 2002 = 100 .....	37
TABLE 2.8 PROJECTED EMPLOYMENT, BY METRO, BY SECTOR, IN THOUSANDS.....	39
TABLE 2.9 TOP MANUFACTURING INDUSTRIES, BY METRO, 3RD QUARTER 2007 .....	41
TABLE 2.10 MANUFACTURING EMPLOYEES IN HIGH-GROWTH AND NET-LOSS INDUSTRIES, BY METRO, 3RD QUARTER 2007 .....	42
TABLE 2.11 POTENTIAL TRANSPORT/LOGISTICS INDUSTRIES.....	43
TABLE 2.12 TRANSPORT/LOGISTICS CLUSTER FOR THIS ANALYSIS .....	43
TABLE 2.13 ESTABLISHMENTS AND EMPLOYMENT, BY NAICS, 2008.....	46
TABLE 2.14 NUMBER OF ESTABLISHMENTS, BY NAICS AND MAJOR METRO AREA, 2008 .....	46
TABLE 2.15 EMPLOYMENT, BY NAICS AND MAJOR METRO AREA, 2008.....	47
TABLE 2.16 SPECIALIZED FREIGHT TRUCKING FIRMS WITH 5 OR MORE NC LOCATIONS.....	48
TABLE 2.17 FREIGHT SHIPMENTS TO, FROM, AND WITHIN NORTH CAROLINA 1998, 2010, AND 2020 .....	55
TABLE 2.18 SHIPMENTS BY WEIGHT: 2002 AND 2035 (MILLIONS OF TONS).....	57
TABLE 2.19 SHIPMENTS BY VALUE: 2002 AND 2035 (\$ MILLIONS) .....	58
TABLE 2.20 TOP TRADING PARTNERS: 2002 .....	59
TABLE 2.21 TOP TRADING PARTNERS: 2035 .....	59
TABLE 3.1 MODE SELECTION CHANGES FORECAST.....	73
TABLE 4.1 FREIGHT SHIPMENTS BY TRANSPORTATION MODE TO, FROM, AND WITHIN NORTH CAROLINA 1998, 2010, AND 2020 .....	105
TABLE 4.2 NORTH CAROLINA SHORT LINE RAILROADS.....	113
TABLE 4.3 RAIL SHIPMENTS FOR 2002, NC COMPARED WITH OTHER ATLANTIC STATES .....	114
TABLE 4.4 AVERAGE ANNUAL RR CAR-MILES AND THRU-TRAFFIC IN TON-MILES, 1999-2003 .....	117
TABLE 4.5 FREIGHT ORIGINATING AT NC AIRPORTS, 1999 – 2006 (IN THOUSAND POUNDS) .....	119
TABLE 4.6 FREIGHT TERMINATING AT NC AIRPORTS, 1999 – 2006 (IN THOUSAND POUNDS)....	119
TABLE 5.1 EXISTING PUBLIC FREIGHT LOGISTICS-RELATED AUTHORITIES, COMMITTEES, & COMPANIES IN NORTH CAROLINA * .....	143
TABLE 5.2 SUMMARY OF RECOMMENDED INITIATIVES.....	152

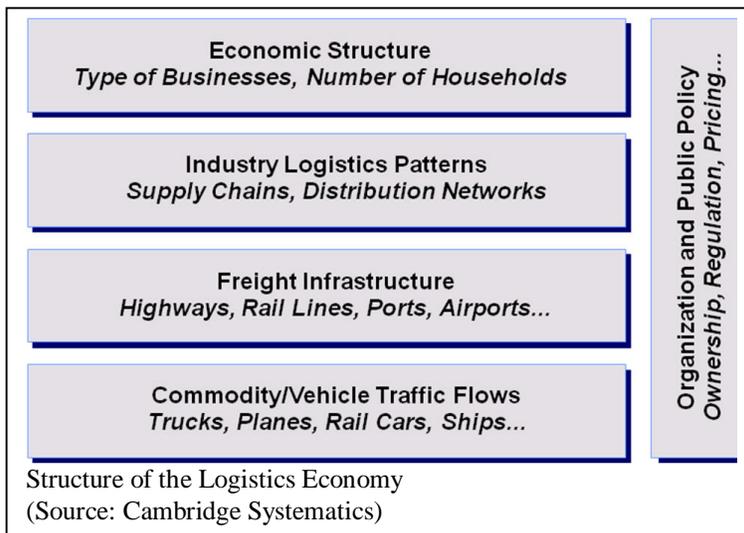


## Executive Summary

This report presents a statewide logistics plan for North Carolina.<sup>1</sup> It responds to House Bill 1005, Session Law 2007-551, which instructed the North Carolina Office of State Budget and Management to develop a statewide logistics plan that addresses the State’s long term economic, mobility, and infrastructure needs. The plan includes three main components: 1) identification of priority commerce needs, 2) enumeration of transportation infrastructure actions, including multimodal solutions that will support key industries vital to the State's long term economic growth, and 3) a timetable to meet these identified needs. It is based on inputs received from a wide range of stakeholders including State agencies, shippers, carriers, and other private sector parties.

The study is *statewide* in that it paints a picture of investments that help meet the needs of all the commerce activities in the state, both present and future. It is consistent with concepts like One-NC. It focuses on *logistics* in that it is primarily concerned with freight flows and the infrastructure needed to support those flows. Passenger flows receive attention primarily in the interplay between passenger and freight activities and the desire to produce synergy, not conflict from the two. It is a *plan* in that it provides a roadmap for how funds from public-private partnerships might be invested, modally and geographically, to enhance the economic vibrancy of the state. It is also a *plan*, or perhaps better yet a *plan to plan*, in that the study team had only four months in which to work, while most similar studies in other states have typically had two years. More analysis will have to follow; but it seems likely that future roadmaps will involve more detail, not new broad-brush ideas.

The diagram at right ties together major thoughts that relate to statewide logistics planning. In every state, there is an economic structure which is comprised of the businesses that exist and the households. These create the logistics patterns: supply chains and distribution networks. Freight infrastructure, provided by NC DOT and the carriers, aligns with these patterns, either pro-actively or in catch-up mode. And these two together produce network-level commodity and vehicle flow patterns: trucks,



<sup>1</sup> Logistics, originally a military term, is the efficient and effective planning, implementation, and control of the flow of goods, services, people, and related information between points of origin and points of consumption to meet customer requirements. (Paraphrased from the Council of Logistics Management Professionals)



planes, ships, rail cars, etc. Laws, regulations, and practices influence the way in which these aspects of the logistics system work together and the path they follow into the future. Commerce and land use planners tend to look at the puzzle from the top down: land use → logistics patterns → infrastructure → flows, while transportation people often see it the other way: flows create a demand for infrastructure which then alters logistics patterns and ultimately economic structure. Public policy experts see the sidebar first: that is, laws, regulations and policies that affect the interplay between the stack of boxes. There are metrics that drive this decision making such as maximization of the gross state product (GSP), consistency in the performance (reliability) of the transportation system, sustainability, and enhancement of the quality of life.

State governments, through their actions, explicitly or implicitly have an impact on the kind of economic development that occurs. Take, for example, the Department of Commerce's interest in forging a knowledge-based economy.<sup>2, 3, 4, 5</sup> To quote one of its recent documents:<sup>6</sup>

“North Carolina has transitioned from a traditional economy based on tobacco, furniture and textiles -- to a global economy that is driven by knowledge-based enterprises -- including advanced manufacturing, software and information technology, bio-pharmaceuticals and financial services.”

The Department of Commerce identifies agriculture (related to biotechnology and winemaking), textiles (as an emerging high-tech sector), and defense-related industries as key features of the future North Carolina economy. Other key sectors include information and communications technology, motor vehicles and heavy equipment, business and financial services, and chemicals, plastics, and rubber. Adding to this mix is growth in sports development, basic science and technology research, the film industry, and North Carolina's traditionally strong and growing tourism, marine and seafood industries.

In many ways, this is a vision of North Carolina's destiny that the state's infrastructure ought to be prepared to support. Consistent with One North Carolina,<sup>7</sup> it mandates investments statewide to synchronize with and support this vision.

Hence, the main question is: what kinds of transportation infrastructure investments support this vision: airports, highways, rail links, ports? For instance, what if every town and city in North Carolina was within 30 minutes of a 7,000-foot ILS Category III-C runway?<sup>8</sup> That would mean, under any and all weather conditions, that a landing site for a regional jet would be close at hand.<sup>9</sup> In hours, products could get to market anywhere in North America. It would mean upgrading some of the lower tier airports in the state. All the population centers in North

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<sup>2</sup> [http://www.wral.com/business/local\\_tech\\_wire/opinion/story/1151854/](http://www.wral.com/business/local_tech_wire/opinion/story/1151854/)

<sup>3</sup> [http://www.ncccs.cc.nc.us/External\\_Affairs/Sweden.htm](http://www.ncccs.cc.nc.us/External_Affairs/Sweden.htm)

<sup>4</sup> <http://www.unctv.org/ncnow/nceconomics/index.html>

<sup>5</sup> [http://findarticles.com/p/articles/mi\\_m0UFV/is\\_/ai\\_n6364571](http://findarticles.com/p/articles/mi_m0UFV/is_/ai_n6364571)

<sup>6</sup> <http://www.nccommerce.com/en/BusinessServices/SupportYourBusiness/FocusedIndustrySupport/>

<sup>7</sup> <http://www.governor.state.nc.us/Highlights/OneNCAgenda.asp>

<sup>8</sup> [http://en.wikipedia.org/wiki/Instrument\\_Landing\\_System](http://en.wikipedia.org/wiki/Instrument_Landing_System)

<sup>9</sup> For example, <http://world.honda.com/HondaJet/> and [http://www.crj.bombardier.com/CRJ/en/home\\_crj.jsp?langId=en&crjId=200](http://www.crj.bombardier.com/CRJ/en/home_crj.jsp?langId=en&crjId=200)



Carolina would be reachable, for either inbound or outbound flights, anytime. Consistent with a knowledge-based economy, it would make every area in the state attractive to companies that engage in biotechnology, information and communications technology, and business and financial services, consistent with One NC and the Department of Commerce's objectives, let alone tourism and other person-focused service industries.

That is but one example of a valuable investment. Existing economic enterprises need to be supported, too, with judicious investments in rail, highway, ports, and other infrastructures. It only sets in place a vision of the future, a set of metrics for prioritization.

While this study report does not purport to dictate what the state or other stakeholders should do, it does highlight opportunities and indicate the benefits that could be derived from synchronizing economic development and infrastructure investment, and what options seem to exist. It is a plan for the future.

One thing that is clear is that North Carolina should act. States like Virginia,<sup>10</sup> California,<sup>11</sup> Florida,<sup>12</sup> and New Jersey<sup>13</sup> have begun reaping the benefits from coordinated economic development and infrastructure investment strategies. Virginia, for example, is creating a "Freight Advisory Committee" and conducting a statewide multimodal freight study. The study looks comprehensively at Virginia's freight issues, takes a multi-modal perspective on future commerce, aims to develop new freight-focused data and tools, and identify critical needs and recommendations. It started in October 2006 and plans to conclude by September 2008. It speaks to the significance of Virginia's economy, the markets it serves, presently and in the future, the importance of transportation to the state's economy (34 percent of the state's GDP is linked to or dependent on transportation), the existing and future economic sectors that need to be supported, the existing and future commodity mixes, the use of various modes, the modal needs in the future, and the partnerships that need to be forged, with private industry, nearby states, and other stakeholders, to attract new business, foster economic development, and align the benefits derived with the investments made.<sup>14</sup> North Carolina needs to take similar actions. Competing states have shown that it is unwise to let investments be happenstance, to have the future be unplanned, or to have economic development locate elsewhere because the synchronization of land use with transportation simply does not or will not occur.

The questions, then, are: what to do, when, how, and with whom? It is not a matter of whether to act or not.

A critical action is creating a "freight logistics authority" that guides, oversees, and helps to synchronize the investments in transportation infrastructure. Comprised of representatives from private industry and public agencies, it works with private industry (e.g., shippers, carriers, logistics managers) and public agencies (e.g., Transportation, Ports, Railroad, Toll Roads, Commerce, Environmental and Natural Resources, and Employment Security) to advise the

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<sup>10</sup> [http://www.ctb.virginia.gov/resources/cm\\_FreightStudy\\_CTB\\_10-10.pdf](http://www.ctb.virginia.gov/resources/cm_FreightStudy_CTB_10-10.pdf)

<sup>11</sup> <http://www.arb.ca.gov/gmp/docs/gmap-1-11-07.pdf>

<sup>12</sup> <http://www.dot.state.fl.us/planning/SITAC/pdfs/sisplanrecomm.pdf>

<sup>13</sup> <http://www.state.nj.us/transportation/freight/plan/pdf/2007statewidefreightplansummary.pdf>

<sup>14</sup> [http://www.ctb.virginia.gov/resources/cm\\_FreightStudy\\_CTB\\_10-10.pdf](http://www.ctb.virginia.gov/resources/cm_FreightStudy_CTB_10-10.pdf)



governor about plans for investments that will improve the state's prosperity and quality of life. California now has a Business, Transportation, and Housing Agency (BTH)<sup>15</sup>. It "oversees the activities of 13 departments consisting of more than 42,000 employees, a budget greater than \$11 billion, plus several economic development programs and commissions. Its operations address financial services, transportation, affordable housing, real estate, managed health care plans and public safety," including the goods movement action plan.<sup>16</sup> Virginia has the Council on Virginia. It aims to make Virginia the best government in the United States, including assurance that Virginia "has a transportation system that is safe, enables easy movement of people and goods, enhances the economy and improves our quality of life."<sup>17</sup> Performance measures monitor the condition of the infrastructure and its ability to support state commerce.<sup>18</sup>

Delaware has an Economic Development Office (DED) that manages the comprehensive economic development strategy for the state.<sup>19</sup> This includes transportation.<sup>20</sup> Oregon has its Freight Advisory Committee (OFAC).<sup>21</sup> With considerable private sector representation,<sup>22</sup> it provides guidance to the governor and legislature concerning infrastructure investments that will facilitate goods movement activities, including prioritization of projects on the statewide transportation improvement plan.<sup>23</sup> Other states, like New Jersey, New York, Florida, Maryland, Maine, Washington, and Indiana are engaged in similar efforts but their influence on governmental agency organization has not been as bold or profound. North Carolina should move to the front, with Virginia and California, and set the pace for such innovation. It also helps position the state to participate in upcoming Federal initiatives, such as the "critical commerce corridors" in which North Carolina is and should be a major player.

Whether North Carolina should create a new agency or coalesce existing ones, or some other option, is something the legislature will have to decide. The study team's main recommendation is that the legislature act. Perhaps it should create an office, reporting to the governor, with its own staff, that coordinates the investment decisions of a number of state agencies, especially transportation and commerce. A statewide logistics board would report to the governor and guide and advise the director of this new oversight authority.

We recommend following the lead of the Department of Commerce and focus on investments consistent with seven main principles:

1. ***Embolden the Knowledge-Based Economy***: stress new infrastructure investments in logistics enterprises that support growth in advanced manufacturing, software and information technology, bio-pharmaceuticals, and financial services. A key infrastructure in this sector is aviation. The state could embrace the idea put forward

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<sup>15</sup> <http://www.bth.ca.gov/>

<sup>16</sup> <http://www.bth.ca.gov/aboutus/default.asp>

<sup>17</sup> <http://www.future.virginia.gov/aboutVAPerforms.php>

<sup>18</sup> <http://vaperforms.virginia.gov/i-infrastructureAdequacy.php>

<sup>19</sup> [http://dedo.delaware.gov/ceds/theplan.shtml#section4\\_5](http://dedo.delaware.gov/ceds/theplan.shtml#section4_5)

<sup>20</sup> [http://dedo.delaware.gov/ceds/theplan.shtml#section4\\_5](http://dedo.delaware.gov/ceds/theplan.shtml#section4_5)

<sup>21</sup> <http://www.oregon.gov/ODOT/TD/FREIGHT/ofac.shtml>

<sup>22</sup> [http://www.oregon.gov/ODOT/TD/FREIGHT/OFAC\\_Membership\\_List.shtml](http://www.oregon.gov/ODOT/TD/FREIGHT/OFAC_Membership_List.shtml)

<sup>23</sup> <http://www.oregon.gov/ODOT/TD/FREIGHT/summary.shtml>



earlier of ensuring that every location in the state is within 15 to 30 minutes of a 7,000-foot Class III-C instrumented runway.<sup>24</sup> This also aligns with the Department of Commerce's interest in encouraging the aerospace and air cargo industries. It also means completing the North Carolina *Intrastate* System and redoubling the state's emphasis on the *Interstate* system that supports it (e.g., I-40, I-85, I-95, I-77). This would ensure ubiquitous air and ground (highway) access to the regions of the state, systems upon which knowledge industries depend. Couple this with state investments in universities, research enterprises (e.g., the Cancer Institute), and other governmental services that support a high quality of life (e.g., cultural activities, the arts), and the leaders of these industries might decide to make North Carolina their home and bring more jobs.

2. ***Support Existing Industries:*** make strategic investments in highway, rail, and air freight capacity to aid the state's already-thriving industries like agriculture,<sup>25</sup> motor vehicle parts and supplies, heavy equipment, chemicals, plastics, and rubber.
3. ***Transform NC DOT into an operations-based agency:*** concerned with the quality of service it provides to its customers, especially highly reliable travel times, levels of safety, and degrees of security. This means minimizing non-recurring congestion, minimizing clearance times for incidents and accidents, providing one-stop-shopping for permits and other clearances, being pro-active at decision-focused meetings among private interests and public agencies, bringing to the table the value added that NC DOT provides to the supply-chain equation for all forms of commerce.
4. ***Facilitate Pass-Through Traffic:*** support the needs of the traffic traveling north-south, particularly on I-95, I-85, and I-77. Use tolls, mileage taxes, or other use-based mechanisms to recover the costs. Provide high value-added services, including expedient incident response to minimize delays, high-quality plazas, and ubiquitous high-bandwidth internet access. It might also mean constructing dedicated use facilities, like truckways that make it possible for such trips to traverse the state without interfering with local travel patterns.
5. ***Support Import/ Export Activity:*** make investments in the ports of Wilmington and Morehead City. Provide on-site improvements and better truck and rail access. Continue to support the development of the North Carolina International Terminal. Redouble efforts to "scope" the port. Carefully determine what customers it should serve and how large it should be. For example, it might strive to compete with Hampton Roads, Charleston, and Savannah, and capitalize on the emerging growth in container traffic entering east-coast ports. It seems like an expensive "me-too" strategy that would involve considerable land use,<sup>26</sup> or a clever plan to move the

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<sup>24</sup> This also aligns with the Department of Commerce's interest in encouraging the aerospace and air cargo industries.

<sup>25</sup> Including crops that would support biofuels or other bio-manufacturing activities.

<sup>26</sup> The amount of land needed by ports like Norfolk, Charleston, and Savannah to handle millions of TEUs per year is considerable. Aerial images suggest areas the size of metropolitan Raleigh. Whether this is compatible with quality of life expectations along the seacoast or not is unclear.



distribution center logistics activity significantly inland.<sup>27</sup> It might, instead, focus on niche cargo markets consistent with other strategic initiatives, like support for military activities.

6. ***Partner with Military Investments:*** make the state's transportation infrastructure align with military logistics needs. With North Carolina having the fourth largest military presence in the nation, there ought to be ample opportunities to provide support for defense-related industries. This would include day-to-day activities related to troops and supplies as well as major airlifts and sealifts associated with activities abroad (e.g., Iraq, Afghanistan, and future humanitarian and peacekeeping missions). North Carolina could respond to these needs by configuring facilities like the Global TransPark to support major airlifts; to have the rail network (like the path from Fort Bragg to NCIT) be well configured to facilitate shipments of heavy equipment; and, with the intense security already being provided at Sunny Point,<sup>28</sup> design NCIT to deal with the very high security military sealifts.<sup>29</sup>
7. ***Support Innovations in Transportation Infrastructure:*** Continue to support, and perhaps expand development, experimental deployment, and implementation of innovations in transportation infrastructure including ubiquitous WiFi support for truckers along major commerce corridors, high-speed tolls, use of RFID tags and other wireless technologies to expedite truck inspections and other types of oversight surveillance, use of ADS-B for aircraft routing, and 24/7/365 electronic permit support.<sup>30</sup>

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<sup>27</sup> One bold way to disentangle these conflicting objectives would be to move the distribution center activity significantly inland, say near I-95 and build dedicated use facilities, like a rail line and a truckway that connect the new port to this inland location.

<sup>28</sup> <http://www.globalsecurity.org/military/facility/sunny-point.htm>

<sup>29</sup> This might also have implications for the market segments that NCIP services, like shippers that have products needing very high security.

<sup>30</sup> In addition to developing freight analysis tools, FHWA stresses using intelligent transportation system (ITS) technologies in freight transportation. Targeted use of ITS technologies for supply chain steps can boost reliability and productivity of freight transportation, and improve global connectivity for domestic and international trading partners. In operational tests at the Chicago O'Hare International Airport and the New York City-JFK International Airport, ITS technologies, such as the Electronic Supply Chain Manifest System, reduced the time spent on processing manifests and transferring loads from one mode to another by 56 to 100 percent. Moreover, processing drivers at air cargo facilities was two to four times faster than using a manual, paper-based system. The time savings resulted in estimated cost savings per shipment of \$1.50 to \$3.50.

ITS technologies are also important in the new environment of increased security and safety, and the push for increased visibility in the transportation process. "Security and safety have always been a concern, but particularly now because of the potential for threats to the supply chain," says Michael Onder, leader of the Intermodal Freight Technology Team in FHWA's Office of Freight Management and Operations. The use of ITS technologies offers greater visibility and potentially a more secure supply chain. Information about ownership and location of freight as it moves through the supply chain is essential to achieving the reliable, efficient, and secure movement of goods – providing the thread that binds individual operations into an efficient intermodal system. Thus, FHWA has launched several intermodal freight technology initiatives. They include testing of ITS freight technologies and developing models to simulate needed changes in infrastructure and operations at border crossings. They also involve partnering with industry to conduct deployment tests that provide cost/benefit data associated with the implementation of various products and practices. And FHWA is partnering with border working groups to ensure that the technology development and deployment initiatives satisfy transportation and security enforcement needs.



These principles suggest a plan of action for the short, medium, and long-run as shown on the next page.

In summary, North Carolina ought to act. It should commit to coordinating economic development and infrastructure investment. It should focus on jobs and increasing the income stream, and then also, synchronously, use that income stream to fund infrastructure investments that allow the expanding economy to thrive. It should think about creating a new, small, government authority with full-time staff positions that would coordinate Commerce and Transportation, and perhaps other government services, like California has done. This freight logistics authority, comprised of private and public sector representatives to help steer that coordination, would be strategic in its infrastructure investments.

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The agency also is supporting a USDOT effort to use electronic seals (E-seals) on container shipments. The E-seal emits a radio frequency as it passes reader devices, displaying information about the container. In an operational test, FHWA affixed E-seals to track cargo between gateways in Canada and the Pacific Northwest. Using this technology in dedicated truck lanes on both sides of the border is expected to reduce truck delays by 800,000 hours per year. This reduction in delays can save an estimated \$150 million annually in truck operating costs, including fuel, driver wages, and maintenance. Source: <http://www.tfhrc.gov/pubrds/04nov/09.htm>



## Executive Summary

	<b>Short-term (0 – 5 years)</b>	<b>Medium-term (5 – 15 years)</b>	<b>Long-term (15 – 25 years)</b>
<b>Across all modes</b>	<ul style="list-style-type: none"> <li>▪ <u>Create a Freight Logistics Authority</u></li> <li>▪ <u>Study linkages between transportation and economic development</u></li> <li>▪ <u>Develop data and performance metrics</u></li> <li>▪ <u>Support existing and future industries</u></li> <li>▪ <u>Support innovations in transportation infrastructure</u></li> </ul>	<ul style="list-style-type: none"> <li>▪ <u>Track and participate in freight initiatives (federal, multi-state, etc.)</u></li> <li>▪ <u>Support NC DOC initiatives and grow a knowledge-based economy</u></li> <li>▪ <u>Land bank for future freight-related facilities</u></li> <li>▪ <i>Eliminate freight bottlenecks</i></li> <li>▪ <i>Make investments in a few new corridors (multimodal, military)</i></li> </ul>	<ul style="list-style-type: none"> <li>▪ <u>Monitor and support system’s health through Programmatic Initiatives</u></li> <li>▪ <u>Plan for and create freight hubs (public- private cooperation)</u></li> </ul>
<b>Air</b>	<ul style="list-style-type: none"> <li>▪ <u>Control land use in flight path areas</u></li> </ul>	<ul style="list-style-type: none"> <li>▪ <i>Improve access to airports, esp. highways</i></li> </ul>	<ul style="list-style-type: none"> <li>▪ <i>Create ubiquitous air cargo support</i></li> </ul>
<b>Highway</b>	<ul style="list-style-type: none"> <li>▪ <u>Transition NC DOT to an operations-focused agency</u></li> <li>▪ <i>Mitigate moderate to severe congestion in collector/ distributor networks, urban interstates and connectors</i></li> <li>▪ <i>Provide adequate truck parking</i></li> </ul>	<ul style="list-style-type: none"> <li>▪ <i>Make I-95 investments (supports pass-through traffic)</i></li> <li>▪ <i>Create Charlotte to Wilmington multimodal corridor</i></li> <li>▪ <i>Enhance, expand the primary highways of the National Truck Network</i></li> </ul>	
<b>Ports</b>	<ul style="list-style-type: none"> <li>▪ <u>Offer support for NCIT EIS process</u></li> </ul>	<ul style="list-style-type: none"> <li>▪ <i>Support efforts to build NCIT (supports import/export activities)</i></li> </ul>	<ul style="list-style-type: none"> <li>▪ <i>Improve rail and road access to/from (supports import/export activities)</i></li> </ul>
<b>Rail</b>	<ul style="list-style-type: none"> <li>▪ <u>Encourage the Crescent Rail Corridor</u></li> <li>▪ <i>Retain existing rail corridors; halt track removal</i></li> <li>▪ <i>Support short-line infrastructure improvements</i></li> </ul>	<ul style="list-style-type: none"> <li>▪ <u>Coordinate schedules carefully to optimize freight and passenger services</u></li> <li>▪ <i>Create Charlotte to Wilmington multimodal corridor</i></li> <li>▪ <i>Expand high-use corridor capacity</i></li> </ul>	<ul style="list-style-type: none"> <li>▪ <i>Provide rail access to NC SPA inland terminals</i></li> </ul>

Notes:

Underlined text = policy-based actions to support infrastructure decision-making

*Italic text* = infrastructure actions

# 1 Introduction

This section introduces some of the study team’s findings from information gathered through research and outreach efforts. The study investigates logistics needs across the state, from the coast to the mountains, through the year 2030. Thus, this section sets the stage for the rest of the report, which fleshes out these ideas or issues and reaches some conclusions on future options for the state concerning logistics movements. Implementation options are provided for consideration by the General Assembly as early as this summer.

## 1.1 ***Mandate from the Legislature***

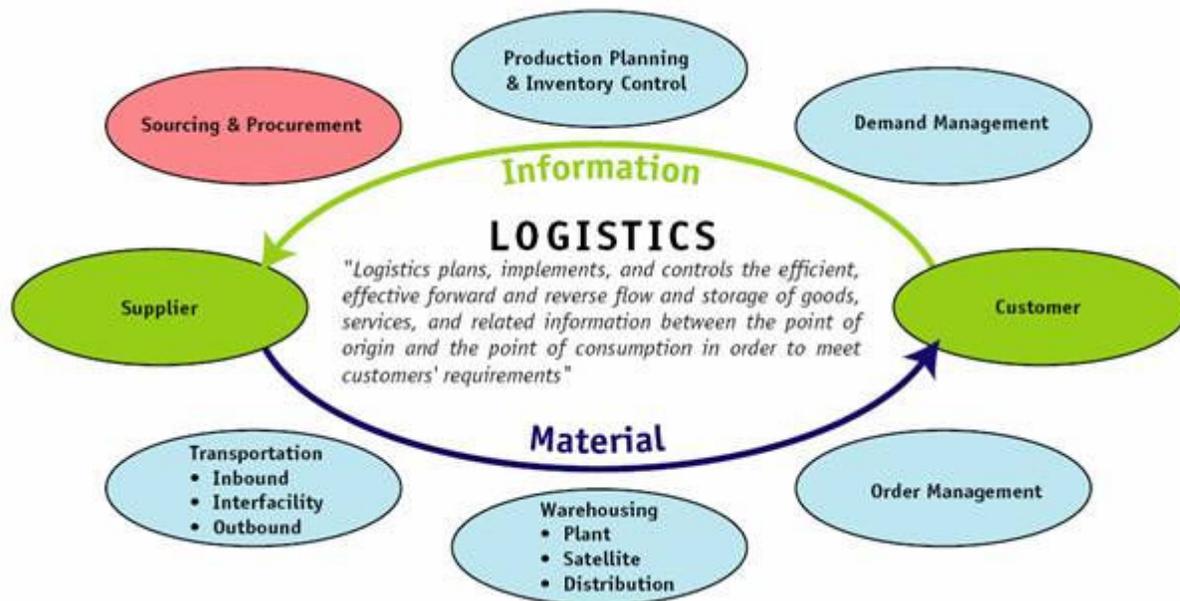
House Bill 1005, Session Law 2007-551, instructs the North Carolina Office of State Budget and Management to develop a statewide logistics plan that will address North Carolina’s long term economic, mobility, and infrastructure needs. The plan needs to include, but not be limited to, all of the following components:

- Identification of priority commerce needs.
- Enumeration of transportation infrastructure actions, including multimodal solutions that will support key industries vital to the State's long term economic growth.
- Endorsement of the plan based on input from State agencies and the private sector regarding these needs and actions.
- A timetable to meet any identified needs.

This report addresses all of these components; however, identifying specific transportation infrastructure actions at the individual project level was beyond the available time for the study. Also, while we did significant outreach to a wide variety of stakeholders, there has been limited effort to obtain feedback on the contents of this report, again due to time constraints. Our hope is that we have captured the intent of the comments and opinions shared with the study team as we merged them together to create a logistics vision for the state.

## 1.2 ***What is Freight Logistics?***

Logistics is originally a military term. It describes the process of getting the right things (militarily, personnel and equipment) to the right place at the right time. The Council of Logistics Management Professionals defines the term as follows: “Logistics is the part of the supply chain process that plans, implements, and controls the efficient, effective forward and reverse flow and storage of goods, services, and related information between the point of origin and the point of consumption in order to meet customers’ requirements”.



**Figure 1.1 The Scope of Logistics**

Logistics has become a critical management area for many companies. Retailers recognize that logistics and supply chain management practices are essential maintaining their competitive edge. Raw materials and bulk products, often with relatively low unit values, are dependent upon well managed logistics operations to allow them to penetrate new market areas.

It is estimated that logistics costs often approach 10 percent of gross sales.

**Table 1.1 Percent of Logistics Costs Based on Sales**

Cost Category	Total Cost (Billions)	Percent of Sales	Percent of Logistics Costs
Transportation	\$590	5.9%	58.4%
Warehousing	\$78	0.8%	7.9%
Inventory Carrying Cost	\$299	3.0%	29.7%
Administration	\$39	0.4%	4.0%
Total	\$1,006	10.1%	100%

(Source: Robert Delaney, Cass Logistics 2001)

In addition, there are significant economic engines for job growth that do not show up in a freight survey; for example, the impact of tourism or NASCAR on the state’s economy. However, all jobs and future population growth rely on freight logistics to ‘make things work.’ Goods are delivered to grocery stores, department stores, home improvement stores, etc., principally by trucks coming out of distribution centers and using the highway network. How those goods get into and out of the state via ports, rail, or air is also part of the big picture.

### 1.3 ***Rationale for the Report***

The timing for this study could not be better on many fronts. The legislative request for this study will have a significant impact on the future direction of logistics planning and funding for the state. This study reaches out to the year 2030 for forecasts and projections. The study team is certainly aware of the 21<sup>st</sup> Century Transportation Committee’s<sup>31</sup> concurrent effort, with a broader focus and shorter time horizon. Both efforts combined will provide short term and long term options for consideration by the legislature.

The NC State Ports Authority is pursuing the building of the new NC International Terminal (NCIT) near Southport. The authority is hopeful that by 2020 at the latest (and perhaps 1-2 years sooner) the new terminal will be fully operational. The EIS was recently approved for development and is certainly a major hurdle to cross. However, bringing this new terminal on line not only will impact freight operations within the state but to some extent will impact operations along the eastern seaboard as well. The NCIT will also complement the increased trade flows to the east coast ports through the expanded Panama Canal, scheduled for completion in 2014.<sup>32</sup> NCIT could also play a role in east coast container shipping from India through the Suez Canal. India will become a major provider of goods, with trade growth placing it third in the world economy by the year 2040. However, what level of access is needed to support the freight activity at the NCIT? Are public-private partnerships needed for new rail or highway access?

Freight movement by rail and highway is on the rise within and outside the state. The state’s population is increasing and will continue to do so; truck travel is exceeding the growth in passenger travel and this trend is likely to continue; and rail traffic will increase as eastern ports take more goods from Asian countries. What should the state be doing to prepare for these important trends?

Many other states have already conducted comprehensive logistics studies along with implementation plans, notably:

- California
- Delaware
- Florida
- Kentucky
- New Jersey
- New York
- Oregon
- Texas
- Virginia
- Washington

In this regard, North Carolina is behind in developing a strategic logistics plan to address market projections for global goods movement both within the state and along the east coast. However, there are certainly opportunities to capture some of the expected increase in east coast shipments if the state desires such an activity.

The Highway Trust Fund Act of 1989 was enacted principally to create a network of multilane highways across North Carolina to spur economic growth and to complete loop roads around

<sup>31</sup> [http://www.ncleg.net/gascripts/Committees/Committees.asp?sAction=ViewCommittee&sActionDetails=Non-Standing\\_6367](http://www.ncleg.net/gascripts/Committees/Committees.asp?sAction=ViewCommittee&sActionDetails=Non-Standing_6367)

<sup>32</sup> <http://www.pancanal.com/eng/expansion/index.html>

several major cities. It had an initial funding period of 13 years. Obviously, the state is still working on fulfilling the construction obligations under this law. However, now is an appropriate time to reflect on the future of this legislation and look for opportunities to best utilize these funds for the good of the state in supporting a strategic statewide logistics vision. For example, should the state be investing in exclusive truck facilities, or establishing planning corridors for strategic rail linkage for both passenger and freight service, or completing I-74 between Wilmington and Charlotte?

The “*Transportation for Tomorrow: Report of the National Surface Transportation Policy and Revenue Study Commission*,” December 2007,<sup>33</sup> clearly calls for finding innovative ways to fund significant transportation infrastructure needs. The report states that the U.S. is currently only spending 40 percent of what is needed to sustain and ensure strong economic growth for the future. While North Carolina enjoys the moniker of “The Good Roads State,” the interstate system within the state is certainly not of the quality it once was, with serious structural problems along many long stretches of I-40, I-77, I-85, and I-95. Clearly there is much work needed on these freeways to bring them up to an acceptable and maintainable standard. How can these needs, and others, be funded in times of shrinking income streams?

The report also points to many interesting trends, some of which are listed below:

- Demographic and Economic Trends
  - The population over the age of 65 will comprise roughly 21 percent by 2050; which will double current population levels and impact travel demand for all modes.
  - Texas, Florida, California, Arizona, Georgia and North Carolina will account for 63 percent of all projected added VMT by 2030.
  - By 2020 it is estimated that there will be approximately 60 areas with populations over a million and that they will house at least 60 percent of the nation’s population.
  - Historic trends show that while work travel has kept pace with the growth in employment, shopping and social/recreational travel has doubled in the last four decades.
  - Commercial Vehicle Miles Traveled (VMT), freight and especially light-duty commercial vehicle travel, is increasing at a faster rate than household VMT. The distribution of e-commerce goods to households and businesses is poised to create a huge demand on the transportation system.
  
- Goods Movement

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<sup>33</sup> [http://www.transportationfortomorrow.org/final\\_report/](http://www.transportationfortomorrow.org/final_report/)

- The growth in intermodal trade has greatly strained the country’s domestic transportation system, especially sections of the highway and rail systems that were built over 50 years ago.
  - In terms of volume, international trade is handled through a limited number of gateway seaports, located mostly in congested urban areas. Capacity at these ports is becoming severely constrained.
  - The demand for freight rail service has grown steadily over the last decades and is projected to increase 69 percent by tonnage and 84 percent by ton-miles between 2005 and 2035.
  - Recent cargo growth projections for container ports anticipate a doubling or tripling of throughput growth in the next 15 to 20 years.
  - In 2002, trucks hauled 64 percent of the value, 58 percent of the tonnage, and 32 percent of the ton-miles of total shipments.
  - Air freight is growing rapidly as U.S. businesses seek timely delivery of goods, creating greater demand for truck and intermodal services as well.
  - Rail carries bulk goods, perishables, and time-sensitive goods such as machinery, automobiles, and parts and over long distances.
  - Imports from Asia through all coasts and borders are forecasted to increase from 114 million tons worth \$351 billion in 2002 to 484 million tons worth \$2.6 trillion by 2035.
  - The possible shift of Asian imports from West Coast to East Coast due to increased trade with India would place additional demands on eastern ports and congested freight facilities, but provide only modest relief to western ports.
- Finance
    - After many years of steady growth Federal and State gas tax, receipts reached a plateau in the late 1990s. Federal gas tax revenues rose from \$125 million in 1932 to a high of \$21.2 billion in 1999. That level declined to \$21.0 billion in 2000 and \$20.6 billion in 2001.
    - In 2004, 51.8 percent of highway capital outlay went for system rehabilitation, while 39.1 percent went for system expansion.
    - As a result of recent Federal revenue and expenditure trends, the Highway Account of the Highway Trust Fund is projected to reach a negative balance in 2009 and the Mass Transit Account balance begins to decline in 2008.
    - In 2004, approximately 49 percent of transportation bonds issued by state governments were backed by highway user revenues, 20 percent were backed by future Federal proceeds, 13 percent by motor-fuel and vehicle taxes, 12 percent by tolls (including some also blended with fuel tax), and 7 percent by other sources such as oil company taxes and personal income taxes.

- Total highway expenditure needs are estimated at \$4.9 trillion through 2020; \$10.0 trillion through 2035; and \$18.3 trillion through 2055, stated in constant 2005 dollars.
- Highway
  - In 2004, Americans traveled a total of 727 billion vehicle miles on the 46,747 mile Interstate System.
  - The United States has 3.9 million miles of roadway, of which 3 million miles are rural roads. The Interstate System accounts for only 1.2 percent of total mileage but carries 24.1 percent of total travel.
  - The Interstate Highway System carries about 721.4 billion vehicle miles of travel (VMT) a year. Of these, approximately 91.3 billion (12.7 percent) are made by heavy single-unit and combination trucks. The Interstate System carries 40.3 percent of single and combination-unit truck travel on all public roads in the United States.
  - Road and street mileage in the U.S. increased by 2.4 percent between 1980 and 2000. However, the number of vehicles using those facilities increased by 39.8 percent and vehicle miles of travel increased by 81.2 percent.
  - While urban mileage constituted only 24.9 percent of total mileage, these roads carried 64.1 percent of the total Vehicle Miles Traveled in the United States for 2004.
  - Over the last four decades, highway lane miles have increased by 6 percent while VMT has increased by 194 percent, placing a greater and greater demand on the highway system.

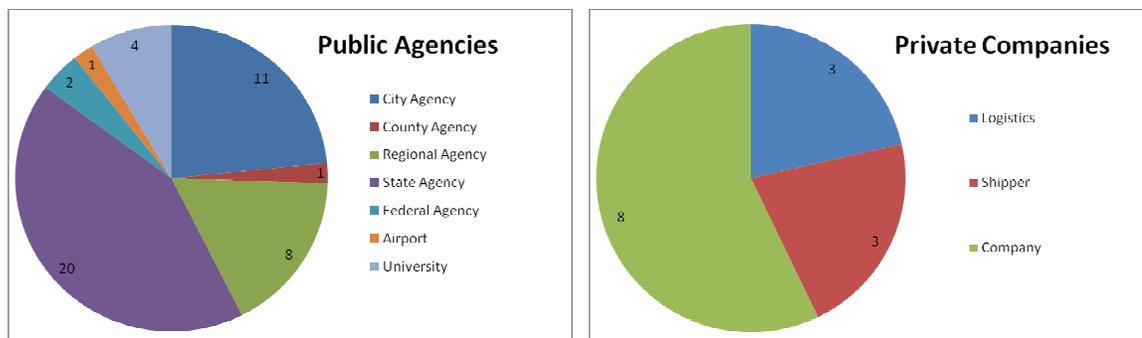
What do these trends mean for North Carolina? North Carolina is an attractive state for both individuals and companies to locate here. As more families and companies establish residency, planning efforts for this growth need to take on more of a statewide perspective. These planning efforts need to encompass highway, rail, public transportation, airports, and ports activity. Local and perhaps even regional planning may fall short of fulfilling the legislature’s vision of what the state should look like by 2030 and beyond. And financing needed infrastructure improvements will become more important as federal and state gas taxes decline and construction costs continue increasing faster than the consumer price index. What is the role or options for public-private partnerships in funding transportation infrastructure needs?

Our interstate system will continue to see much pass-through traffic, particularly along I-77, I-85, and I-95. The state needs to study potential ways to expand capacity and maintain ride quality along these routes while capturing funds to help maintain them.

#### 1.4 ***Study Methodology***

There are principally six activities used by the study team to obtain input for the study.

- 1) Literature Review – a significant effort was devoted to find and review logistics studies performed for other states. Other published literature was found including relevant reports, actions, policy, commentary, and articles. All information was culled through for application to this study. (See Appendix B for examples of success stories across the country.)
- 2) Visioning Sessions – six visioning sessions were held across the state during February 29 to March 17, 2008 in Wilmington, Greenville, Raleigh, Greensboro, Charlotte, and Asheville. Participants invited included representatives from federal, state and county agencies, private trucking firms, universities, and other authorities with a total of 61 attendees (47 from public agencies and 14 from private companies), broken down by subcategories in the following figures.



**Figure 1.2 Categories of Participants in the Visioning Sessions**

(See Appendix C for summaries from each visioning session.)

- 3) Survey – a team at the University of South Carolina conducted a survey attempting to reach 600 logistics and trucking firms in North Carolina. A total of 107 survey responses were obtained. (See Appendix D for a complete report from the survey.)
- 4) Interviews – over 40 leading transportation, logistics, trucking, legislative, and state agency individuals both within and outside of North Carolina were contacted, with either phone or in-person interviews held with these individuals. (See Appendix B for a complete listing of individuals contacted for input into this study.)
- 5) Presentations –four leading groups came and gave presentations to the study team on global freight activity and what this means for North Carolina. Presentations came from Global Insight, Thompkins Associates, Cambridge Systematics, and Prime Focus. (See Appendix A for copies of presentation materials.)
- 6) Team meetings – the study team held several key meetings during the course of the project to hear presentations and discuss issues with nationally known experts; to strategize on the direction for the study and the level of data needed and who could provide it; and to develop the report content and vision and implementation strategies for the state.

All of these outreach efforts were vital in providing the study team with a clearer picture of world economics and global logistics that support this economic activity. North Carolina companies have already been in this market, with 93 companies currently importing and/or exporting goods through the NC ports. Our documentation in this report on these activities is simply catching up to what they already know—global trade directly impacts the way business is conducted both within and through our neighboring states. North Carolina must act now to deal with the issues facing our changing economy.

## 1.5 Logistics Concepts

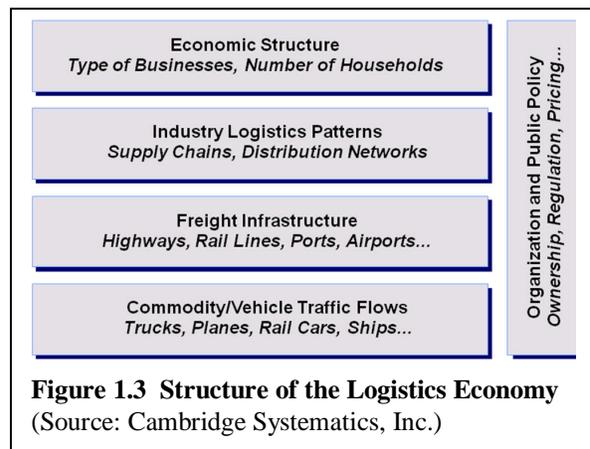
### 1.5.1 Sustainability

Any initiatives undertaken by the NC General Assembly concerning freight logistics must be viewed in terms of sustainability. Long term infrastructure improvements must sustain economic growth for the state by ensuring that companies have access to high quality and uncongested highways, railways, ports, and airports. Time really is money for these companies, and they will go elsewhere if adequate services are not provided. Sustainability also involves maintaining and enhancing the cultural arts, education system, recreational opportunities, environmental sensitivity awareness, and other features of the state that are attractive for companies as they seek locations that are desirable for their employees.

### 1.5.2 Commerce, Transportation, and Society

In Figure 1.3 is an image that ties together the critical elements of commerce transportation, and society. As the figure shows, every economy has an economic structure: the types of businesses that exist here and the households. These create the logistics patterns: supply chains and distribution networks.

Freight infrastructure, provided by NC DOT and the carriers, aligns with these patterns, either pro-actively or in catch-up mode. And this produces commodity and vehicle flow patterns: trucks, planes, ships, rail cars, etc. Public policy and regulation affects the way in which these aspects of the logistics system work together and the path they follow into the future. Commerce and land use planners tend to look at the puzzle from the top down: land use → logistics patterns → infrastructure → flows, while transportation people often see it the other way around: flows create a demand for infrastructure which then alters logistics patterns and ultimately economic structure. Public policy experts see the sidebar first: that is, laws, regulations and policies that affect the interplay between the stack of boxes. There are metrics that drive this decision making such as maximization of the gross state product (GSP), consistency in the performance (reliability) of the transportation system, sustainability, and enhancement of the quality of life.



### 1.5.3 Supply Chains

Global and national logistics play a critical role in connecting supply and demand which benefits the economies of numerous countries. Although some consumers are only cognizant of the final step of the supply chain, a much deeper and more complex system exists. Purchasing an item from the shelf of a local store and taking it to their residence is the final step of a process involving many miles and contact points. The process involves the coordination of suppliers, shippers, manufacturers, customs, and others. The worldwide locations of the organizations or groups involved in the process impact the patterns of travel within the United States. For instance, a shift in manufacturing from one Asian nation to another can determine if the goods enter the United States through the east or west coast en route to their destination and final marketplace. This seemingly small shift can impact the demand for infrastructure within the United States. An example of a supply chain for a retail toy is given below:

- Shipped to the United States from the place of manufacturing (Asia for this example)
- Based upon the logistics of the supply chain, the item enters a North American Port of Entry (POE) which involves subsequent transfer to another mode of transportation, either rail or truck.
- Trucked to the retailer’s distribution center either from the POE or from inland intermodal facility (“The Last Mile”)
- Container is unloaded and items are stored in the retailer’s regional distribution center (RDC)
- Individual items are trucked to the retailer’s local store
- Purchased by the consumer and driven to their residence

Over the past thirty years, manufacturing and sourcing costs have declined which has led to an expansive global network of sourcing of raw materials to manufacturing to distribution to final consumption. For example, the wood used to build most houses in NC last year was shipped from Eastern Europe instead of locally grown and cut. Various aspects have played a role in creating a less expensive, more reliable, and more efficient system, including: containerization, computerization, telecommunications enhancements, deregulation of the freight transportation industry, and vehicular improvements. The lower costs have also allowed companies to increase the frequency of shipping based on product demand which helps save a substantial amount of inventory costs. However, the motive to reduce the cost of storing products can also lead to supply disruptions to the consumer if there is a delay in the supply chain. Capacity, reliability, and redundancy are essential to support the supply chain system.

Despite the long-term trend of decreasing manufacturing and logistics costs, the recent trend has been an increase in costs. The cost of managing, moving, and storing goods (logistics costs) reached a high of about 16 percent of U.S. gross domestic product (GDP) in the 1970’s and a low of about 8.6 percent of GDP in 2003. Due to rising fuel costs, congestion, and lower reliability, logistics costs reached 9.5 percent of GDP in 2005.<sup>34</sup>

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<sup>34</sup> Cambridge Systematics. (2008). Freight Demand and Logistics: Trends and Issues (INC Logistics\_Freight Demand\_v1.ppt presentation given on 3/25/2008, full copy in Appendix A)

#### 1.5.4 **Connection Between Commerce and Transportation**<sup>35</sup>

Reliable freight transportation is vital to any nation’s economy. At any given moment, billions of dollars' worth of goods are being moved by truck, train, ship, or barge, or held in a yard for transport or distribution. In 2001, Americans spent more than \$313 billion on goods and services transported over the Nation's highways. When transportation systems become unreliable, freight-related businesses and their customers are affected in several ways. First, freight assets like trucks become less productive. Second, businesses have to put more trucks on the road to meet their customers' needs. Third, costs associated with warehousing inventory that would otherwise be on the road will increase. Allowing transportation systems to erode puts companies at risk because their commerce is not reliable and it increases the challenges for communities seeking to sustain their economic base and quality of life. Thus, when freight transportation underperforms, the economy and ultimately people pay the price.

FHWA has analyzed the benefits and costs of highway improvements and published its findings in Freight Transportation Improvements and the Economy (FHWA-HOP-04-005). The report, available for download at [www.ops.fhwa.dot.gov/freight/freight\\_analysis/improve\\_econ/](http://www.ops.fhwa.dot.gov/freight/freight_analysis/improve_econ/), documents short- and long-term benefits for both shippers and carriers. Before FHWA conducted this study, only the benefits to carriers had been estimated.

According to FHWA's research, short-term benefits of an improved road network include immediate reductions in transportation costs due to decreases in transit time and improved reliability. Long-term benefits include efficiency gains and further cost reductions resulting from improvements in logistics and supply chain management and changes in a firm's output or location.

FHWA's research suggests that the benefits found in current benefit-cost models should be increased by about 15 percent. FHWA plans to continue its research on refining benefit-cost models to provide more accurate estimates of transportation improvement benefits. An improved model will be a major gain in analytical capability, helping decision makers plan and assess projects in a way that better recognizes the unique contributions of freight transportation to the economy.

FHWA also evaluated the condition of the National Highway System's (NHS) freight intermodal connectors, which are vital links to ports and terminal facilities. The evaluation found that freight intermodal connectors are in relatively poor condition and do not receive adequate attention in transportation planning and programming processes. Examples of poor conditions include pavement deterioration, low bridge clearances, and inadequate turning radii for trucks.

#### 1.5.5 **Corridor Planning**

There are three concepts that need mentioning. First is the Critical Commerce Corridors (3C)<sup>36</sup> concept proposed by ARTBA. The major thrust is to recreate a vision for the country’s highway system that takes the next step beyond the Interstate Highway System (IHS). The IHS was once the envy of the world when it first was constructed and major links connected across states.

<sup>35</sup> Borrowed from: <http://www.tfhrcc.gov/pubrds/04nov/09.htm>

<sup>36</sup> [http://www.senate.mo.gov/07info/comm/statutory/jcto/3C\\_program\\_overview.pdf](http://www.senate.mo.gov/07info/comm/statutory/jcto/3C_program_overview.pdf)

However, major developing countries like China and India are providing as much as four times the amount of investment in highway infrastructure, based on gross domestic product, as the U.S. currently is investing. The 3C program would utilize a “regional (multi-state) planning approach to create a seamless, multi-modal national transportation system.” One important component of the initiative would be recommendations on freight-related user fee mechanisms to finance the recommended 3C program. The program could be initiated as early as 2009.

Second is the NC Strategic Highway Corridors<sup>37</sup> initiative. From NC DOT’s website the initiative is described as follows:

“The Strategic Highway Corridors (SHC) initiative represents the first major implementation step to be advanced under the update of North Carolina's Long-Range Multimodal Statewide Transportation Plan. The Statewide Transportation Plan, adopted by the Board of Transportation (BOT) in September 2004, is the product of an intensive, three-year planning process to greatly enhance a focus on providing and supporting a truly modern, well-maintained, and multimodal transportation system. In keeping with the Plan's emphasis to increase modernization and preservation activities across all of North Carolina's travel modes, the SHC initiative generates a new focus for the North Carolina Department of Transportation to improve, protect, and better plan for a series of critical highway facilities in the State.”

The SHC initiative established 54 corridors composed of freeways, expressways, boulevards, and thoroughfares. These highway types are the primary facilities used by trucks to move goods from origin to destination. Logistics planning must encompass (or perhaps expand) the SHC in any future freight movement plans.

Third is the I-81 Crescent Corridor<sup>38</sup>. As reported in the *Virginian-Pilot* on June 7, 2007:

“Norfolk Southern Corporation is proposing a \$2 billion-plus rail corridor stretching from Louisiana to New Jersey to capture more cargo being moved by trucks on highways. The project would speed cargo shipments while reducing congestion on such highways as Interstate 81 in western Virginia. The plan involves upgrading and expanding existing rail lines to accommodate more and faster trains; purchasing new locomotives and railcars; and building new terminals in Maryland and Tennessee and improving others.

It is far more ambitious than the roughly \$253 million Heartland Corridor that Norfolk Southern is building to shave a day's transit time off cargo shipments between the port of Hampton Roads and the Midwest.”

How do these two major initiatives impact rail operations within the state? Should there be an initiative to establish an improved rail corridor connecting up the NC ports with these other

<sup>37</sup> <http://www.ncdot.org/doh/PRECONSTRUCT/tpb/shc/>

<sup>38</sup> <http://hamptonroads.com/node/278191>

Norfolk Southern initiatives? Will the I-81 initiative relieve some congestion from truck traffic on I-77 near Charlotte? What impact will increased fuel prices have on shipping by truck versus rail?

### 1.5.6 **Integrated Multi-modal System**

Recognizing the complexity of the supply chain then leads into an analysis of multimodal transportation. This applies to freight logistics as much as public transportation needs. How do goods get from sea terminal to distribution centers to the local stores? Which ports are used for which goods? Which commodities or products are best shipped by rail versus truck? How far does a haul route need to be to ‘break-even’ for the rail company? How do truck companies organize routes and products such that dead hauls are avoided as much as possible? The answers to these questions allow the state to continuously plan for and improve the SHC multimodal transportation system that serves both the citizens and the companies located throughout the state.

### 1.5.7 **Supply-push and Demand-pull**

Another way to think about freight activity is in terms of supply-push or demand-pull driven. Supply-push means the state could heavily invest in infrastructure capacity (e.g., interstates, other freeways, runway expansions, water ports) thereby creating an environment that could encourage companies to locate or do business in the state. For example, a major freight distribution center could be targeted for some area within the state, with the state investing in highway and rail capacity to that targeted site. Another option could be to create a Savannah or Charleston size port to accept a portion of the anticipated increase in freight goods activity along the east coast, with associated highway and rail capacity serving the port to destinations both within and outside of the state. If such activities are initiated, what are the opportunities for private investment in sharing the construction burden?

Many transportation investment decisions are made based on demand-pull. If future demand points to congestion, then the state would plan on accommodating that demand by looking at highway expansion, new construction, multimodal options (bus, passenger rail), etc. This approach is more of a reactive approach to planning for the future, but one that is easily understood by many individuals, and fits with traditional planning processes. Is something different needed?

The question here is which combination of activities is appropriate for the state, or perhaps a new process is needed which includes freight activity as a key element in the decision-making process for infrastructure improvements.

All of these logistics concepts point to a tremendous opportunity for the state to set a strategic vision for freight logistics movement both within and through the state. Clearly the logistics decisions made by the legislature should be made with world economics in mind. This report sets this stage and establishes a framework that can assist the state legislature in making sound logistics investment decisions for the future prosperity of the citizens of North Carolina.

## 2 Economic Trends

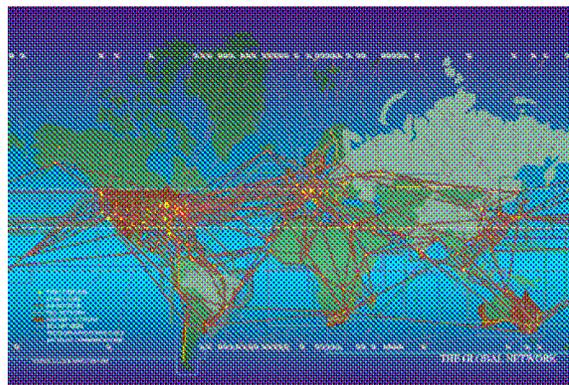
### 2.1 **Global Economic Picture**<sup>39</sup>

#### 2.1.1 **Current**

The current global market is in a state of flux, impacted by a host of factors. The most visible factors to U.S. consumers are the subprime crisis, the rising cost of oil, and the drop of the U.S. dollar as compared to other currencies. The subprime crisis is a worldwide problem, visible here in the U.S. as the number of houses in foreclosure soars. A barrel of oil is reaching record price levels and certainly raising freight travel costs that are now being transferred onto consumers. Hence, the U.S. is in a mild recession, but the world market is not seen to be at risk for a recession. Further factors of interest include what is happening in China, India, and other emerging countries. After the Olympics, China is at risk of a decline in their economic output. Whereas, India is well-insulated from global shocks and expected to increase exports. One concept presented by Global Insight is “Chindia” – China’s manufacturing abilities tied with India’s brain power could produce a formidable trade alliance. Lastly, there are emerging markets such as Latin America which have a strong outlook.

#### 2.1.2 **Projected Economy and Trade Patterns**

Currently, marine trade to and from the U.S. follows the routes shown at right. Since trade is linked to GDP growth, GDP is an appropriate surrogate measurement. The GDP rankings of the top ten countries are expected to change significantly between the years 2000 and 2050 which will mirror the expected shift in production and consumption in the long term. There are several key market shifts to note that highlight that growth is not expected to be uniform.



- China and India are expected to climb steadily reaching the first and third positions by 2050, respectively.
- The U.S. is expected to remain strong (2<sup>nd</sup> by 2050), but lose some ground to China.
- Japan continues along with a slight decline in ranking over the next 50 years.
- Russia and Brazil are expected to eventually increase their market shares to the middle of the top ten countries.

<sup>39</sup> This discussion is based directly upon a presentation given by Bob West of Global Insight, Inc. on 2/28/2008; permission was received for the use of the data and figures presented herein. Forecasts by Global Insight are updated quarterly. Sources: (a) Demers, Alixandra. (2008). Notes of Shifts in Global Trade Patterns – Meaning for North Carolina (notes of the 2/28/2008 meeting and presentation). (b) West, Bob. (2008). Shifts in Global Trade Patterns – Meaning for North Carolina (2/28/2008 presentation). The presentation is in Appendix A.

- Four European countries are expected to be passed by the emerging markets economies and fall to the bottom of the top ten by 2050.

Finally, trade patterns across the world are expected to experience a shift when the Panama Canal expansion project is completed in 2014<sup>40</sup>. The expansion project could alter goods movement within the U.S. which currently moves 60 percent of Asian imports to the eastern part of the country through west coast ports.<sup>41</sup> By 2025, the expanded Panama Canal will process 59 percent of the total tonnage by container compared to only 34 percent in 2005. This increase in containerized shipments will place a greater demand on all U.S. port systems.

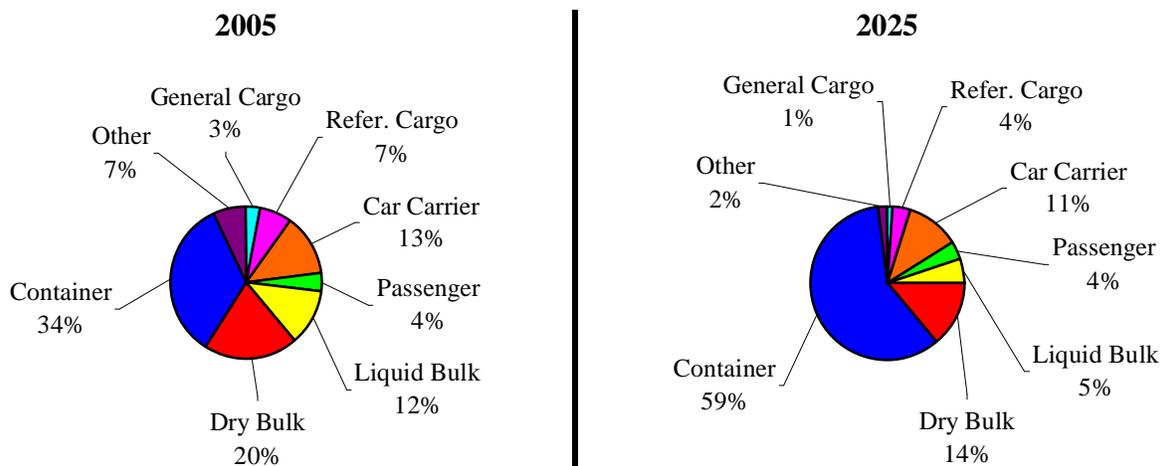


Figure 2.1 Panama Canal Tonnage 2005 and 2025

(Source: Global Insight)

## 2.2 National Economic & Trade Patterns

Economic growth is the primary driver of the demand for freight transportation. Over the next thirty years, the U.S. economy is anticipated to increase by 130 percent. In order to support this growth, freight transportation demand is projected to almost double its current level from 15 billion tons to 29 billion tons in 2035. The following aspects are expected to play a significant role in the growth of U.S. economy and freight transportation:

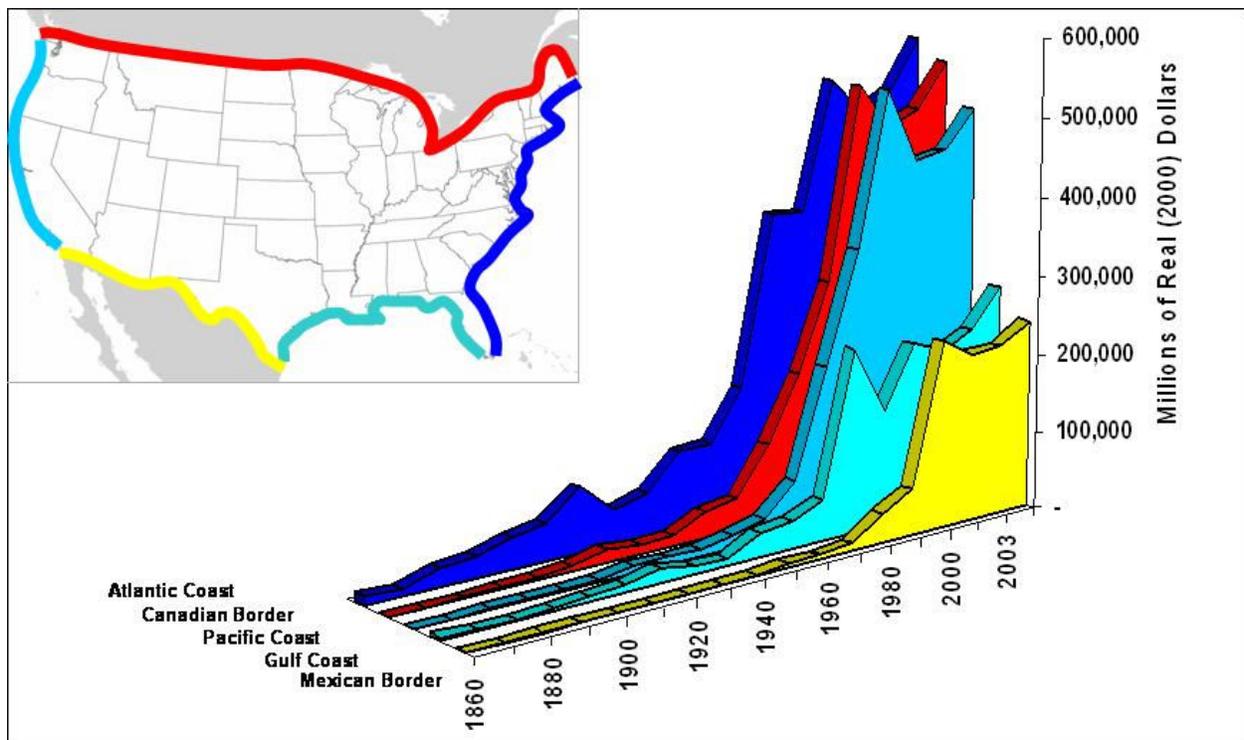
- Consumption:** Freight will support the purchasing of goods by the U.S. population as it reaches 380 million by 2035
- Production:** Freight will support the rise in industrial production that will be generated by increased automation.
- Trade:** Freight will support the accelerating trade into and out of the U.S. Figure 2.2 shows the value of U.S. trade (imports and exports) across the five borders from 1860 to 2005. For the first 100 years shown, the growth in value was slow until a dramatic

<sup>40</sup> See <http://www.panacanal.com/eng/expansion/index.html> (2014 is the expected construction termination date)

<sup>41</sup> Eagar, Tom. (2008). NC State Ports Authority. (REVISED 21st Century Transportation Committee 080214.ppt)

rise began in the 1960's. In 2005, imports and exports represented 27 percent of the U.S. real GDP. However, by 2030 Global Insight expects trade to represent 60 percent of GDP. This growth in trade will place a significant demand on the freight infrastructure.

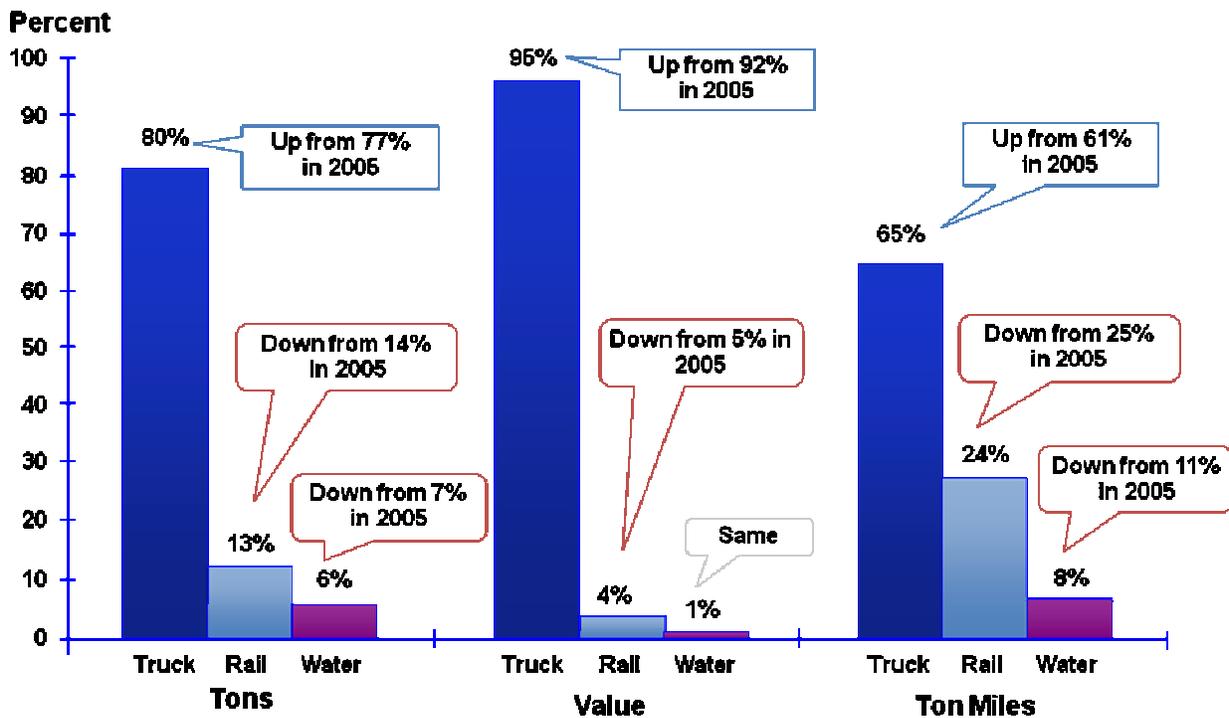
- **Supply Chain Management:** Freight will support the supply chain paradigm of decreasing inventory through more frequent shipments.



**Figure 2.2 Trade via U.S. Borders**

(Source: Cambridge Systematics, Inc.)

The changes that will result from these aspects are expected to generate an additional 14 billion tons of freight by 2035. Figure 2.3 shows how the 2035 tonnage, revenue, and ton-miles are distributed among truck, rail, and water transportation. The trucking industry will see comparative growth in each category since it is anticipated to ship the majority of the new tonnage.



Source: Global Insight 2004 TRANSEARCH data and economic forecasts.

Figure 2.3 2035 Comparison of Mode Share in Terms of Tons, Value, and Ton-Miles in the U.S.

(Source: Cambridge Systematics file 1NC Logistics\_Freight Demand\_v1.ppt)

### 2.3 Goods Movement: A Federal and Statewide Perspective

There have been several studies, reports and analyses performed on the movement of goods and cargo through the North American transportation network performed within the past few years. The one aspect of freight movement that keeps appearing in virtually every report, study and analysis is the fact that the supply chain distribution network is never “fixed” and will change with no apparent logical or economical reason. In the January 2008 North American Port Report for the Supply Chain Consortium (see Chapter 3) a majority of the Supply Chain Consortium respondents to the survey believe that their supply chain network is not optimal with respect to the ports used for their ocean freight. Significant opportunities exist from getting all aspects of the supply chain aligned to optimizing costs and customer service. In fact this point alone may be misleading as it gives the impression that “shippers” of product, merchandise and raw materials have total control over all aspects their supply chain. In fact this is not the case. Again, from the Consortium’s database pertaining to logistics and the supply chain, a significant number of “shippers” rely heavily on third parties (ocean carriers, railroads and third party logistics (3PL’s) firms) to handle the routing and distribution of their cargo and freight.

Thus a major misconception is that supply chain distribution networks become fixed. Where in the 1990’s, supply chain distribution networks tended to remain somewhat constant and stable

for a period of five to ten years, the Consortium is finding that its members are opting for flexibility in their supply chains and are changing the network every one and a half to three years. They are leasing warehouse and distribution facilities versus purchasing them as they did ten years ago.

This fact alone has caused several major transportation and distribution dependant States to re-evaluate their strategies on goods movement. Specifically the study team was intimately involved in the States of California, Washington, Texas, Oregon and New York on the updates to their Goods Movement Plans and Strategies or served in a peer review process evaluating the process and the final documents. Now add in the Federal Government’s National Transportation Strategy which basically places the burden of infrastructure improvement and maintenance on the States, the individual state’s Goods Movement strategy takes on a greater importance for both transportation infrastructure and for the state’s economic development.

Goods Movement Studies; Lessons Learned (CA, WA, TX, OR, NY)

- While everyone associated with goods movement within a state and between states/countries relies heavily on cargo and economic forecasts, the fact is that the forecasts are merely that: forecasts. Thus, one of the major pitfalls of the studies is an over reliance on the forecasts without identification and analysis of alternative scenarios. In almost every aforementioned State, the forecasts were overly optimistic and the underlying assumptions and caveats were not clearly understood..
- Goods movement is “inelastic” (meaning volume flow isn’t significantly effected) until differential fees of approximately \$200 is placed on a container entering a port. Typical fees being proposed would be for security, infrastructure improvement, environmental or additional price increases by a component of the supply chain.
- All of the aforementioned studies had a strong political “hidden agenda” that tended to cloud real issues and most definitely, the final results. Job creation tended to be the most prevalent among the many agendas with the mentality that if a state increased its infrastructure and economic tax incentives, companies would flock to the state with numerous jobs being created. Other agendas that made the report but lacked sustenance were:
  - Private interests should fund new infrastructure and infrastructure improvements. Virtually none of the studies had a clear definition or a program to implement a successful Public-Private Partnership funding mechanism.
  - Congruency (an urban planning term for balancing the system) was overlooked or weakly addressed. The aspect of increasing the capacity of a port complex with increasing the inland transportation (road and/or rail) is the best example of not addressing congruencies within the transportation system.
  - Several States had major revelations from several of their studies and updates. Two of the most important ones was the discovery that many planning studies take a lot for granted. Example: A freeway can be built (or expanded) based

upon the right of eminent domain by the State. What California and Oregon found out was the citizens fought back with the NIMBY (Not-in-my-backyard) approach that either killed the project or substantially increased the costs. The other fallacious assumption was that the costs of environmental impacts would be easily overcome or passed off to the end user of the project.

- Somewhat included in the congruency argument is the true understanding of “capacity” of the network. One of the biggest lessons learned was the inability to define the current condition and the practical capacity of the transportation infrastructure to the extent that its meaning was understood by the decision makers.
- Legislative issues proved to be significant in regards “hidden agendas”. State legislatures cannot mandate prosperity. The lessons learned from Southern California, Houston and New York where legislative bodies have unsuccessfully attempted to mandate and control commerce have done little but add costs and time to a project and in almost every case, a loss of port cargo resulted from their attempts.
- Finally, there are no guarantees. Today’s supply chains have too much flexibility built into them that a “build it and they will come” mentality spells disaster.

With all said, the lessons learned identified above tend to be negative in nature (avoidance of pitfalls); however, there is one significant positive aspect that resulted from virtually every study: the significance of freight and goods movement as an economic generator stood out. Based upon the economic significance and impact of freight, and also upon the Federal legislation for the reauthorization of the Surface Transportation Act (SAFETEA-LU), the major freight moving states have implemented and staffed a “Freight Coordinator” within their State government. Washington and California have had this type of activity for several years and the results have been significant:

- Transportation funding has the voice of freight
- Public outreach and education have demonstrated the economic importance of freight to the State.
- Shippers, ocean carriers, railroads and logistics professionals have an executive level agent with the State government to protect, or at least voice, their interests and concerns

In summary, right now, the U.S. is either in or on the verge of a recession which is having an impact on the world market. However, North American bound container traffic is still expected to grow over the foreseeable future (5 to 30 years) as the North American population continues to climb and trade grows to support it. Thus, a danger on the horizon is that several ports and transportation corridors (road and rail) will reach capacity within the next five to ten years. With the expansion of the Panama Canal, transshipments are expected to increase in the Caribbean which translates into more potential cargo diversion from the West Coast ports. Therefore, more ports and/or innovations in shipping must be created to continue trade growth. Moreover, increased automation and supply chain management will require inland infrastructure support for national and international goods movement.

## 2.4 **Manufacturing Trends**

Customers no longer want mass-produced products. Manufacturers find the margins in mass produced “commodity” products are low. Foreign competition in this area is fierce. Now and moving forward manufacturers are striving to produce customized products to fit unique customer requirements. These customized products represent higher margins but also often require faster transit and foreshortened delivery times. To compete, today’s manufacturers must increase their product innovation and speed up the time to market.

Outsourcing will continue to increase especially to newer plants in foreign countries with government subsidies and lower cost labor and materials. Transportation services outsourcing will also increase due to the increasing sophistication of transportation systems and the sheer cost of creating systems capable of tracking end-to-end supply chain viability. Many seasoned transportation experts are reaching the end of their carriers and few new employees are coming to the industry with multimodal expertise.

Agile manufacturing is a new competence many manufacturers are striving for. To remain competitive manufacturers need to produce multiple items on a single line and or at a single facility. Flexible assembly lines using programmable robots, instead of fixtures, allow manufacturers to move technology components and ensure the right capability in the right place at the right time. Manufacturers must also be able to switch between product lines rapidly to adjust to market demand.

Finally, competition has created an environment where only the nimble and the innovative will survive. To make needed improvements, upgrades and automation, U.S. manufacturers are competing with foreign projects for investment capital. Manufacturers who do not earn their cost of capital will not be able to reinvest or compete over time. Many manufacturers are also facing not-in-kind competitive forces. For example, book and newspaper publishers not only compete versus each other, but also with the internet. These new channels of competition impact many production and distribution decisions.

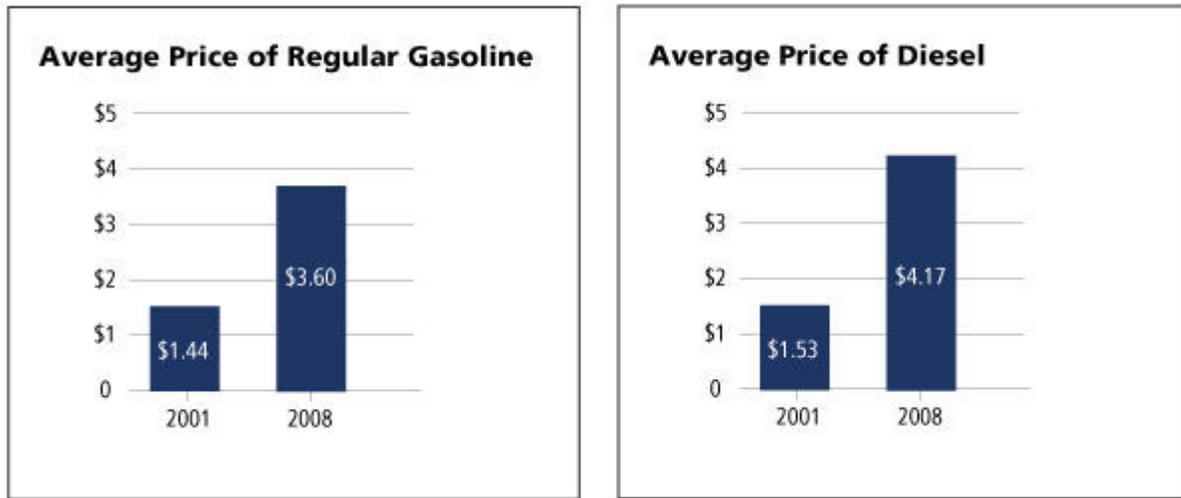
The following trends in manufacturing will impact the demand for logistics:

- Fuel Costs
- Flexibility
- Manipulated Currency
- Brain Drain
- Industry Reinvestment

### 2.4.1 **Fuel Costs**

After 9-11 many manufacturers sought to replace domestic labor by outsourcing and off shoring manufacturing to foreign countries. The first wave of outsourcing went to China at a time when fuel was on average \$1.53 per gallon of diesel, today the prices is \$4.17. The price of fuel is not

projected to fall anytime soon and some analysts predict that oil cost per double will approach \$200 in the coming years.



**Figure 2.4 Average Fuel Prices for 2001 and 2008**

(source: americanprogressaction.org)

This trend in fuel prices will have at least two potentially significant impacts on the logistics economy. The first will be a reduction in overall consumption. As consumers put more of their discretionary budget in to fuel related expenditures (heating/cooling and transportation) the less will be spent on consumer purchases.

The second related logistics impact will be an industry response to shift production and distribution closer to the consumer. This shift will happen for two reasons: first, to be more customer responsive, in terms of elapsed time from order to delivery, and second, to reduce the total delivered cost to the consumer.

Many companies outsourced production to Asia when diesel was \$1.53 per gallon. As fuel increased some companies have begun to bring production back to the United States.

### 2.4.2 Flexibility

Manufacturing companies who will survive in the long term must be flexible and responsive to the market place. This often requires an investment in supply chain visibility tools and in information systems. Supply chain visibility is the ability to see orders in process from the point of manufacturing through each phase of transportation to final resting point. This is often complicated by who owns title to the goods in the supply chain. Due to security and competitive reasons, typically only the shipper of record has access to goods movement flows. In the coming decades it will be important to be able to view goods in the “supply chain pipeline” from origin to destination so that as demand changes or other factors indicate, goods in transit can be viewed as inventory in motion.

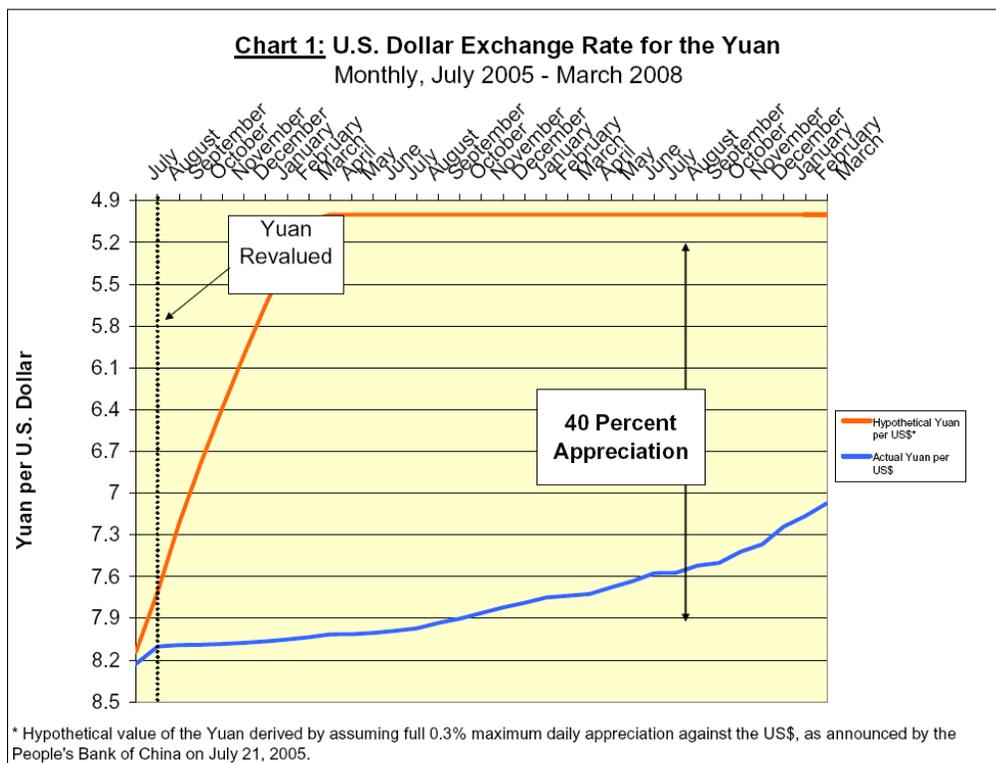
There are two examples of flexibility considerations. The first example will consider snow blowers. Snow blowers are built six to nine months in advance of winter. Machines are sent to regions based on population and a demand forecast. Because weather is unpredictable snow blower demand in Ohio might be greater than Minnesota in November. The flexible manufacturer will be able position inventory in a manner which will be responsive to the first winter events. Consumers will buy what is on the shelf first, usually. If you don't have product on the shelf, the sale will go to the competitor who does have product in stock.

The second example is similar but instead is driven by lead time. Business and customer responsiveness has collapsed lead times. In an example for printing point of sale materials, orders which used to be planned with 2-3 weeks lead times now often have to be turned out in 2-3 days leaving little time for moving inventory around to meet demand. In this example many coated printing paper suppliers are located off shore such that local coated paper producers win this business because they have inventory closer to the customer.

As transportation costs climb the ability to flexibly move product based on changes in consumer demand will require more supply chain information and tools.

### 2.4.3 **Manipulated Currency – Foreign Trade Policy**

The Chinese government has manipulated their currency to make their exchange rates attractive for foreign buyers and for foreign investment. By arbitrarily fixing the Yuan to the U.S. dollar, imports continue to come to the U.S at a record pace. In 2007 the trade deficit in goods with China ballooned to an all-time high of \$256 billion which continues to threaten U.S. Manufacturing. In many developing countries trade and transportation infrastructure has been heavily subsidized reducing the total cost of transportation for many export products. U.S. Foreign trade policy is at a crossroads now reviewing more than a dozen cases which contend foreign producers are dumping subsidized products in the U.S. to the detriment of U.S producers. Regardless of policy the result from a logistics perspective is a continued surge in international trade.



**Figure 2.5 Chinese – American Currency Exchange Trends**

(Source: Chinese Currency Coalition)

This chart illustrates the currency exchange rate between the U.S. Dollar and the Chinese Yuan.

**2.4.4 Brain Drain**

As U.S. demographics change, many manufacturing, distribution and logistics professionals are on the cusp of retirement. Because U.S. Manufacturing has slumped, as a result of U.S. outsourcing and off shoring activities, the industry has been facing recruiting crises. The workforce coming up, by and large has not got the training or the skills in basic manufacturing and transportation disciplines. Because hiring in these disciplines feel by the wayside, University education and training programs in these areas has also shrunken. Few new workers are selecting some of the basic manual and labor intensive jobs associated with freight transportation work, which has traditionally been the training ground for upper management.

The railroad industry has been downsizing since deregulation in the 1980's. Until 2004 railroad ton volumes were shrinking. As we witness growth in freight activities and vehicle miles traveled, interest in mode shifts from highway to rail are increasing, yet many companies lack the internal skills to evaluate basic freight transportation trade-offs, and basic mode metrics.

To complete over the next two decades our nation will need motivated and well educated professionals to position U.S. industries favorably against looming trade challenges.

### 2.4.5 Industry Reinvestment

For U.S. Manufacturers to compete on an international scale we must have talented, well educated and hungry professionals but we also need production facilities which are modern and efficient. U.S. Manufacturers are often dealing with plants and equipment which was built after WWII, for production methods and processes which were efficient and modern at the time. As international competitors challenge our manufacturing industry, they are building state of the art, new facilities often subsidized by government and without exacting environmental review processes and compliance standards. The advantages of new facilities along with low cost labor have resulted in a significant production advantage for off shore companies. For U.S. manufacturers to compete, investment must be made in modern facilities and infrastructure.

### 2.5 National Funding

AASHTO recognized the 50th anniversary of the interstate highway network in 2006. This was the result of the Federal-Aid Highway Act of 1938 called on the Bureau of Public Roads to study the feasibility of a toll-financed system of three east-west and three north-south super highways. In 1944 a plan to include 33,400 miles of national expressways and 5,000 miles of auxiliary urban roads was presented to Congress. By June of 1956 President Dwight D. Eisenhower signed the first Federal-Aid Highway Act of 1956 increasing the proposed system to 41,000 miles. Title I provided nationwide design standards developed through AASHTO and a system to apportion funds among states, and set the federal government’s share to 90 percent. Title II, established by the Highway Revenue Act of 1956 created a Highway Trust Fund as a dedicated source of funding for the Interstate Highway System on a pay as you go basis funded by federal gas tax and other motor-vehicle user fees.

**Table 2.1 Select National Statistics**

	1956	Current
U.S. Population	168,903,031	293,655,404 (2004)
Annual Vehicle Miles	627,843,000	2,829,336,000 (2002)
Federal Gas Tax	3 cents	18.4 cents
Registered Vehicles	54,013,753	135,669,897 (2003)
Registered Trucks	10,678,612	94,943,551 (2003)

(Source: Federal Highway Administration, Program Administration)

The Intermodal Surface Transportation Efficiency Act of 1991 is a United States federal law that posed a major change to transportation planning and policy, as the first U.S. federal legislation on the subject in the post-Interstate Highway System era. It presented an overall intermodal approach to highway and transit funding with collaborative planning requirements, giving significant additional powers to metropolitan planning organizations. Signed into law on December 18, 1991, it expired in 1997. The Transportation Equity Act for the 21st Century (TEA-21) and most recently in 2005, the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) was signed into law in 2005. According to the American Society of Civil Engineers, the program maybe bankrupt by FY2009.

What is the likelihood of a new federal transportation program emerging that will serve the development patterns of the 21st century? The most recently adopted six-year federal transportation program came two years late, and was loaded with over 6,000 congressional earmarks. The core highway and transit programs still account for 85 percent of the funding. The funding appears inadequate to do much of significance to address system growth and there was no interest in raising significant tax revenues through user-paid gas taxes. As far as linking a federal transportation program with supporting growth patterns, such a rational approach is considered too controversial for the federal government. There is no interest in using federal funds to support growth directly, and limited funding to pay for it even if there were a commitment.

Many state's are now faced with developing a vision for their logistics future and subsequent state, regional and local methods to fund future infrastructure projects. In a recent study completed for the Urban Land Institute only about 20 percent of the new lanes and new interstates would generate enough cash to be of interest to Public Private Partnership investors. Even if all of these potential projects were funded, they would not add up to a national network.

## 2.6 ***Population and Population Distribution***

In recent decades, North Carolina has been one of the fastest growing states in the U.S. North Carolina was the 11th most populous state in the 2000 Census, and only eight states recorded growth rates during the 1990s that exceeded North Carolina's 21.4 percent growth. Within the state, the Charlotte and Raleigh-Durham metropolitan areas have been among the fastest-growing areas in the country.

Is this rate of growth likely to be sustained over the next few decades? The North Carolina Office of State Budget and Management provides population projections at the county and state level. These projections imply that statewide population growth will slow to some degree, but that growth will continue to be strong in particular metropolitan areas.

Summarized in this section are demographic projections for six metro areas within North Carolina plus the state as a whole. The following regional definitions are used:

- 7) "MSA" is a Metropolitan Statistical Area, according to the post-2002 definitions, and
- 8) "CSA" is a Combined Statistical Area and is generally composed of more than one MSA.

**Table 2.2 Metro Area Definitions**

<b>Charlotte CSA</b>	<b>Greensboro/ Winston-Salem/ High Point CSA</b>	<b>Raleigh/ Durham/ Cary CSA</b>	<b>Asheville MSA</b>	<b>Fayetteville MSA</b>	<b>Wilmington MSA</b>
Anson	Alamance	Chatham	Buncombe	Cumberland	Brunswick
Cabarrus	Davidson	Durham	Haywood	Hoke	New Hanover
Cleveland	Davie	Franklin	Henderson		Pender
Gaston	Forsyth	Harnett	Madison		
Iredell	Guilford	Johnston			
Lincoln	Randolph	Orange			
Mecklenburg	Rockingham	Person			
Rowan	Stokes	Wake			
Stanly	Surry				
Union	Yadkin				

For ease of reference in what follows, the Greensboro/Winston-Salem metro area will be referred to as the Piedmont Triad or simply the Triad, and the Raleigh-Durham metro area will be referred to as the Research Triangle or simply the Triangle. Projected census totals for these metro areas appear in the following table:

**Table 2.3 Population by Metro Area, 2010-2030**

<b>Region</b>	<b>2000 Census</b>	<b>2010 Census</b>	<b>2020 Census</b>	<b>2030 Census</b>
Charlotte	1,636,956	2,070,342	2,493,359	2,939,477
Piedmont Triad	1,414,670	1,573,488	1,750,425	1,932,093
Research Triangle	1,311,887	1,735,107	2,165,163	2,617,137
Asheville	369,172	421,658	474,567	526,063
Fayetteville	336,608	359,939	393,793	426,887
Wilmington	274,550	365,659	441,700	513,674
Rest of State	2,702,970	2,924,301	3,131,221	3,319,102
<b>North Carolina</b>	<b>8,046,813</b>	<b>9,450,494</b>	<b>10,850,228</b>	<b>12,274,433</b>

(Source: NC State Data Center)

Decadal growth rates are illustrated in the following diagram (Figure 2.6):

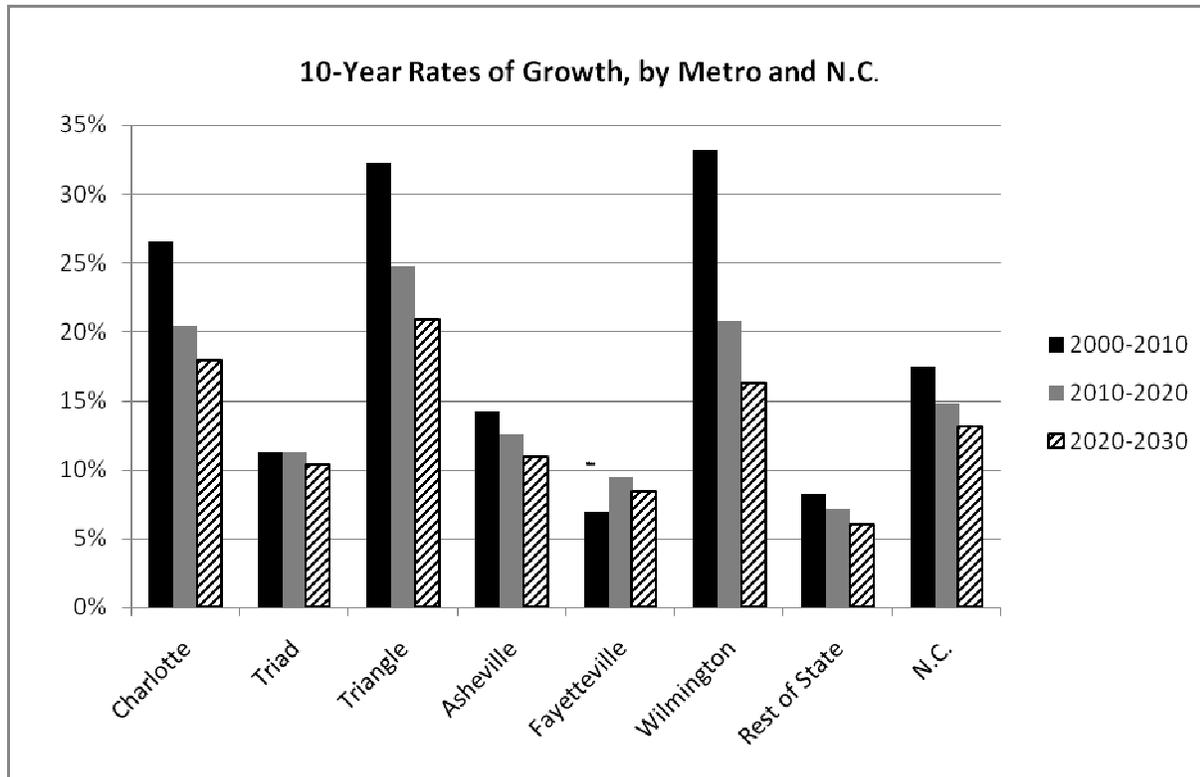


Figure 2.6 North Carolina Area Growth Rates

The projections point to slower growth, not just statewide, but also in the high-growth metro areas of Charlotte, Research Triangle, and Wilmington. Population growth is expected to rise in the relatively slow-growing Fayetteville MSA. Approximately flat growth is projected for the Piedmont Triad CSA. Growth in rural areas is projected to be small and declining.

For completeness, the following table repeats these growth values:

Table 2.4 Decadal Population Growth, by Metro Area, 2010-2030

Region	2000-2010	2010-2020	2020-2030	AAG, 2010-2030
Charlotte	26.5%	20.4%	17.9%	1.8%
Piedmont Triad	11.2%	11.2%	10.4%	1.0%
Research Triangle	32.3%	24.8%	20.9%	2.1%
Asheville	14.2%	12.5%	10.9%	1.1%
Fayetteville	6.9%	9.4%	8.4%	0.9%
Wilmington	33.2%	20.8%	16.3%	1.7%
Rest of State	8.2%	7.1%	6.0%	0.6%
<b>North Carolina</b>	<b>17.4%</b>	<b>14.8%</b>	<b>13.1%</b>	<b>1.3%</b>

(Source: NC Data Center, analysis by author)

Over the two decades from 2010 to 2030, average annual population growth in the Charlotte, Research Triangle, and Wilmington metros is projected to exceed the state average of 1.3 percent per year. Slower than the state average annual growth is projected for the Piedmont Triad, Asheville, and Fayetteville metros areas.

## 2.7 ***Employment Patterns***

Like most states in the U.S., the North Carolina economy is experiencing an unprecedented transformation from Old Economy to New Economy, from a manufacturing-based industrial economy to a knowledge-based post-industrial economy. This structural change can be usefully measured by the declining share of manufacturing employment. Nationally, manufacturing's share of total nonfarm employment fell from about 16 percent in 1990 to 10 percent in 2007.

Nowhere in the country has this transformation been more pronounced than in North Carolina. In 1990, over 26 percent of all payroll workers in the state were employed by manufacturing industries. That made North Carolina the most manufacturing-intensive state in the country. In 2007, just 13 percent of all workers in the state were in manufacturing. Now North Carolina is the 11<sup>th</sup>-most manufacturing-intensive state.

Much of this decline is due to the collapse (in employment terms) of the textile/apparel industry. Though the primary reason for employment declines in apparel manufacturing (off-shore outsourcing) is different than that for textile manufacturing (technological innovation), the employment bottom line is about the same. In 1990, the textile/apparel industry employed 286,000 people in North Carolina and accounted for 9.3 percent of all employment in the state. In 2007, it employed 68,500 people and accounted for only 1.7 percent of the state workforce.

Outside of textiles and apparel, other North Carolina manufacturing industries have mostly tracked national trends. Relative to the manufacturing sector as a whole, employment in furniture manufacturing, another one of North Carolina's signature industries, has fallen only slightly since 1990 (and that is primarily because the state specializes in the manufacture of wood furniture, which has been hit harder by imports than upholstered furniture). In absolute terms, employment is up significantly compared to 1990 in such manufacturing industries as transportation equipment, fabricated metal products, plastics, electronic instruments, and medical equipment and supplies. And pharmaceutical manufacturing employs more than twice as many people now as in 1990.

Overall employment in North Carolina has grown by nearly 29 percent since 1990 (as compared to 23 percent at the national level). The sectors in the state that have gained employment "market share" include health care, education, professional and business services, and leisure and hospitality. Most of these expanding sectors grew faster here than they did nationally, in part because the state's manufacturing decline left a bigger hole to be filled.

Of course a logistics network moves products and commodities, not jobs. The fact that employment declines in textile manufacturing are due mostly to technological innovation rather than globalization implies that there is still much fabric and wood to be shipped to and from

plants in North Carolina. Unfortunately, employment is a much more readily available economic indicator at the industry and regional level.

The economic consulting service Global Insight, to which the North Carolina Office of State Budget and Management subscribes, generates forecasts for a number of useful economic indicators. The following are employment forecasts for broad industry sectors in North Carolina:

**Table 2.5 Projected Employment, by Sector, in Thousands**

Sector	2008	2010	2020	2030	% Chg, 2010-2030
Natural Resources, Mining	6.78	6.74	5.00	4.96	-26.4%
Construction	244.13	248.36	282.06	351.39	41.5%
Manufacturing	525.35	511.50	489.11	453.05	-11.4%
Service-Providing Industries	3,352.08	3,487.39	3,904.79	4,332.30	24.2%
<b>Total Nonfarm</b>	<b>4,128.34</b>	<b>4,253.99</b>	<b>4,680.96</b>	<b>5,141.70</b>	<b>20.9%</b>

(Source: Global Insight)

Overall employment in North Carolina is expected to rise nearly 21 percent between 2010 and 2030 (less than the projected population increase of 30 percent during that time, due in part to an aging population). Most jobs are in service-providing sectors, hence the strong expected increase in those industries. Similarly, construction employment is projected to grow significantly. But the decline in manufacturing employment is projected to continue, with employment falling off over 11 percent between 2010 and 2030.

The next table breaks the manufacturing projections down to specific industries, defined by three-digit NAICS codes. Table 2.6 provides employment projections and fleshes out the overall employment declines in manufacturing. Only four of the 17 industries are projected to increase employment between 2010 and 2030.

Table 2.7 looks at indexes of industrial production and paints a picture nearly diametrically opposed to that of the employment data. Overall manufacturing output is projected to increase 88 percent between 2010 and 2030, and only four of the 17 industries shows a decrease in output during those two decades. The biggest gainers are projected to be computers and electronics, chemicals, and transportation equipment.

**Table 2.6 Projected Employment, by Manufacturing Industry, in Thousands**

<b>Manufacturing Industry</b>	<b>NAICS</b>	<b>2008</b>	<b>2010</b>	<b>2020</b>	<b>2030</b>	<b>% Chg, 2010-2030</b>
Food Manufacturing	311	52.87	54.21	59.15	59.89	10.5%
Beverages, Tobacco Products	312	13.84	11.57	9.66	7.18	-38.0%
Textile Mills	313	38.88	32.98	20.64	14.55	-55.9%
Textile Product Mills	314	8.63	7.57	6.32	4.90	-35.2%
Apparel	315	17.72	15.70	10.76	7.68	-51.1%
Wood Products	321	23.26	24.38	26.24	24.72	1.4%
Paper and Paper Products	322	17.26	17.26	17.66	15.94	-7.6%
Printing, Related Activities	323	15.13	14.77	13.72	12.83	-13.1%
Chemicals	325	41.79	41.81	41.24	39.72	-5.0%
Plastics and Rubber Products	326	35.02	34.14	30.88	25.84	-24.3%
Nonmetallic Mineral Products	327	17.60	17.44	17.94	17.69	1.4%
Fabricated Metal Products	332	42.64	42.77	47.65	46.26	8.2%
Machinery	333	31.32	31.13	31.48	30.17	-3.1%
Computers, Electronic Products	334	39.98	38.03	32.23	33.01	-13.2%
Elec. Equipment, Appliances	335	23.45	22.38	21.44	20.90	-6.6%
Transportation Equipment	336	36.25	37.29	33.74	29.61	-20.6%
Furniture	337	46.65	45.65	45.23	39.68	-13.1%
<b>Total Manufacturing</b>		<b>525.35</b>	<b>511.50</b>	<b>489.11</b>	<b>453.05</b>	<b>-11.4%</b>

(Source: Global Insight, analysis by author)

**Table 2.7 Projected Industrial Production Indexes, by Industry, 2002 = 100**

<b>Manufacturing Industry</b>	<b>NAICS</b>	<b>2008</b>	<b>2010</b>	<b>2020</b>	<b>2030</b>	<b>% Chg, 2010-2030</b>
Food Manufacturing	311	115.48	120.72	144.72	173.63	43.8%
Beverages, Tobacco Products	312	91.53	78.16	70.79	57.06	-27.0%
Textile Mills	313	63.14	58.55	48.24	36.67	-37.4%
Textile Product Mills	314	68.52	62.73	54.10	41.82	-33.3%
Apparel	315	66.59	59.27	35.60	22.53	-62.0%
Wood Products	321	86.74	97.19	112.44	115.20	18.5%
Paper and Paper Products	322	96.13	101.43	120.84	133.16	31.3%
Printing, Related Activities	323	106.65	107.91	119.44	128.96	19.5%
Chemicals	325	109.67	118.22	165.18	247.03	109.0%
Plastics and Rubber Products	326	109.66	114.27	141.19	172.20	50.7%
Nonmetallic Mineral Products	327	103.64	109.19	139.37	149.84	37.2%
Fabricated Metal Products	332	117.35	122.22	144.59	168.86	38.2%
Machinery	333	113.69	119.57	147.86	185.53	55.2%
Computers, Electronic Products	334	217.71	270.02	854.06	3,474.93	1,186.9%
Elec. Equipment, Appliances	335	94.96	99.09	133.41	174.92	76.5%
Transportation Equipment	336	135.63	149.47	188.53	277.48	85.6%
Furniture	337	81.86	85.40	94.39	96.35	12.8%
<b>Total Manufacturing</b>		<b>107.31</b>	<b>112.33</b>	<b>147.60</b>	<b>211.02</b>	<b>87.9%</b>

(Source: Global Insight, analysis by author)

The industries with declining projected outputs between 2010 and 2030 are familiar ones to anyone who reads the business news in North Carolina: tobacco, textiles, and apparel. Unfortunately, projections of industrial production are available only at the state level. The Global Insight projections address only employment at the metro level. Table 2.8 displays employment projections by metro area. “Other Goods-Producing” industries include construction, natural resources, and mining.

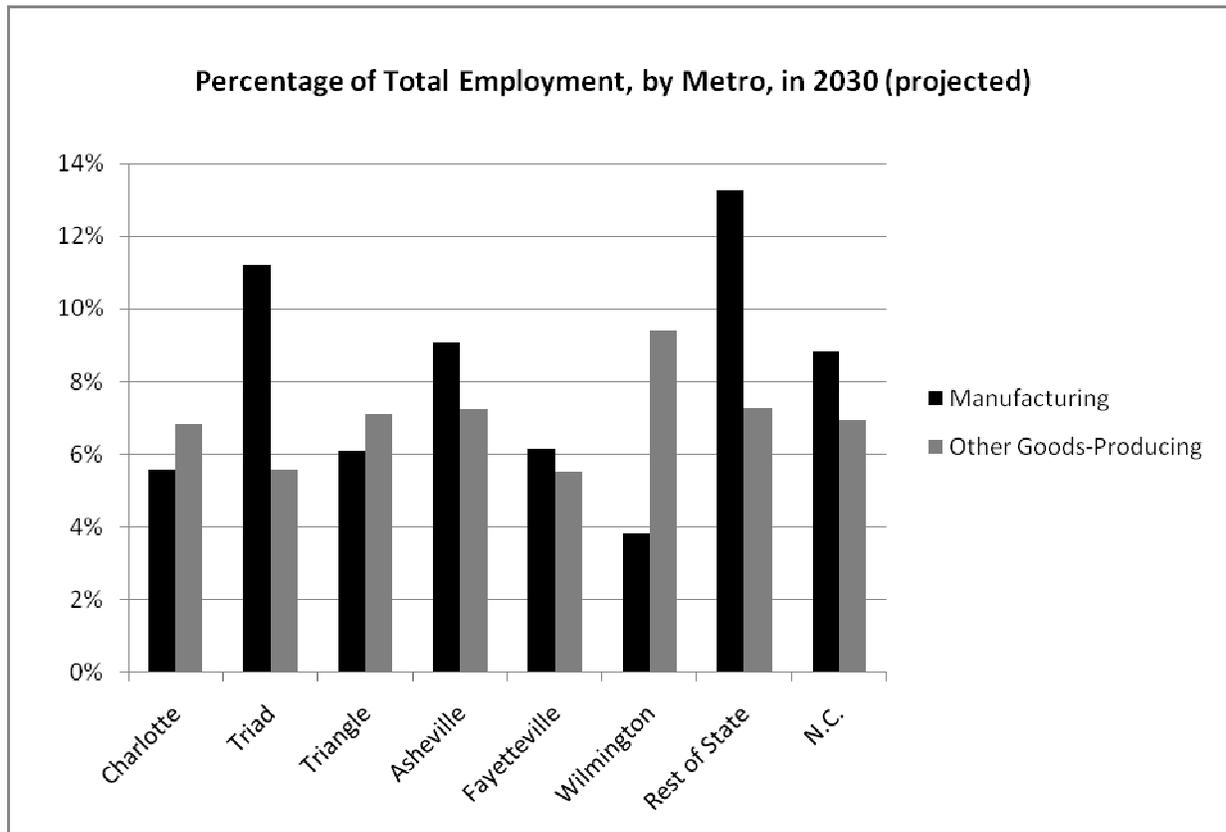
The larger metro areas in this table aren’t precisely the same as the CSAs used in Section 1. For example, the Piedmont Triad metro area is constructed as the sum of the Greensboro/High Point and Winston-Salem MSAs, leaving out a few peripheral counties.

In spite of employment declines, Table 2.8 shows that the Piedmont Triad is likely to remain the top manufacturing metro area in the state, both in terms of number of workers and the share of jobs in manufacturing industries. Goods-producing industries are the ones likely to make the most demands of the state’s logistics system. The following diagram (Figure 2.7) illustrates employment shares for 2030 for manufacturing as well as in other goods-producing industries (construction, natural resources, and mining).

**Table 2.8 Projected Employment, by Metro, by Sector, in Thousands**

<b>Sector</b>	<b>2008</b>	<b>2010</b>	<b>2020</b>	<b>2030</b>	<b>% Chg, 2010-2030</b>
<b>Charlotte</b>					
Manufacturing	79.27	77.09	74.25	68.98	-10.5%
Other Goods-Producing	57.75	59.33	68.01	84.84	43.0%
Total Nonfarm	864.05	911.45	1,062.81	1,241.19	36.2%
Ratio of Mfg to Total	9.2%	8.5%	7.0%	5.6%	
<b>Piedmont Triad</b>					
Manufacturing	89.48	88.05	85.07	79.03	-10.2%
Other Goods-Producing	28.88	29.27	32.33	39.31	34.3%
Total Nonfarm	594.99	612.02	656.23	704.94	15.2%
Ratio of Mfg to Total	15.0%	14.4%	13.0%	11.2%	
<b>Research Triangle</b>					
Manufacturing	73.07	72.09	72.31	68.76	-4.6%
Other Goods-Producing	47.15	48.81	59.81	80.16	64.2%
Total Nonfarm	799.98	835.33	974.65	1,126.96	34.9%
Ratio of Mfg to Total	9.1%	8.6%	7.4%	6.1%	
<b>Asheville</b>					
Manufacturing	20.27	19.75	19.24	18.13	-8.2%
Other Goods-Producing	10.72	10.78	11.87	14.46	34.1%
Total Nonfarm	173.94	177.23	188.78	199.97	12.8%
Ratio of Mfg to Total	11.7%	11.1%	10.2%	9.1%	
<b>Fayetteville</b>					
Manufacturing	10.00	9.78	9.56	9.04	-7.6%
Other Goods-Producing	6.48	6.49	6.86	8.10	24.8%
Total Nonfarm	131.08	132.49	139.79	146.84	10.8%
Ratio of Mfg to Total	7.6%	7.4%	6.8%	6.2%	
<b>Wilmington</b>					
Manufacturing	8.22	8.17	8.06	7.67	-6.2%
Other Goods-Producing	12.89	13.15	15.07	18.95	44.1%
Total Nonfarm	147.67	153.56	177.06	201.41	31.2%
Ratio of Mfg to Total	5.6%	5.3%	4.6%	3.8%	
<b>Rest of State</b>					
Manufacturing	245.03	236.58	220.61	201.46	-14.8%
Other Goods-Producing	87.04	87.27	93.12	110.54	26.7%
Total Nonfarm	1,416.62	1,431.91	1,481.64	1,520.39	6.2%
Ratio of Mfg to Total	17.3%	16.5%	14.9%	13.3%	
<b>North Carolina</b>					
Manufacturing	525.35	511.50	489.11	453.05	-11.4%
Other Goods-Producing	250.91	255.09	287.06	356.35	39.7%
Total Nonfarm	4,128.34	4,253.99	4,680.96	5,141.70	20.9%
Ratio of Mfg to Total	12.7%	12.0%	10.4%	8.8%	

(Source: Global Insight, analysis by author)



**Figure 2.7 Percentage of Employment by Area**

The diagram shows that projected manufacturing shares in 2030 will be above the state average in the Piedmont Triad and Asheville; large construction/natural resources/mining shares are projected for Wilmington, Asheville, the Research Triangle, and Charlotte. By far the largest percentage of manufacturing employment is found outside the six metro areas listed here (“Rest of State”). However, these jobs—and hence the manufacturing activities associated with them—are widely dispersed over more than 70 counties.

A significant challenge of this analysis is that we have indications of substantial growth in output in some industries between now and 2030, and yet we have no good projections of how that growth will be distributed within the state. The best we can do is draw inferences from current employment patterns. Table 2.7 identifies the largest growth for the following industries: computer and electronic products (NAICS 334), chemicals (325), transportation equipment (336), electrical equipment and appliances (335), machinery (333), plastics and rubber products (326), and food manufacturing (311). The four industries projected to suffer reduced output are beverages and tobacco products (NAICS 312), textile mills (313), textile product mills (314), and apparel (315). Table 2.9 lists the largest manufacturing industries (measured by percentage of total employment) in each of the six metros.

**Table 2.9 Top Manufacturing Industries, by Metro, 3rd Quarter 2007**

<b>Region</b>	<b>Total Manufacturing Employment</b>	<b>Top Industries (% of Total Mfg Employment)</b>
Charlotte	72,381	Fabricated Metal Products, 11.4% Machinery Manufacturing, 10.0% Food Manufacturing, 9.6% Plastics and Rubber Products, 7.6% Textile Mills, 7.4% Transportation Equipment, 7.3%
Piedmont Triad	91,394	Furniture and Related Products, 12.7% Textile Mills, 11.8% Beverage and Tobacco Products, 7.0% Chemical Manufacturing, 7.0%
Research Triangle	74,253	Computer and Electronic Products, 33.5% Chemical Manufacturing, 17.8% Food Manufacturing, 7.0%
Asheville	21,952	Electrical Equipment and Appliances, 13.2% Machinery Manufacturing, 12.8% Plastics and Rubber Products, 11.1% Paper Manufacturing, 10.4%
Fayetteville	9,935	Food Manufacturing, 16.2% Transportation Equipment, 12.4%
Wilmington	9,083	Transportation Equipment, 23.5% Nonmetallic Mineral Products, 15.8% Chemical Manufacturing, 14.7% Fabricated Metal Products, 12.7%

(Source: North Carolina Employment Security Commission)

Because the Asheville, Fayetteville, and Wilmington MSAs are so much smaller than the others, only industries for those three with more than a 10 percent share of total manufacturing employment are included. Table 2.9 shows that the Research Triangle’s top three manufacturing industries are all projected to grow significantly between 2010 and 2030. In fact, the Triangle is highly invested in the two highest-projected-growth industries, computers and chemicals. In contrast, the Piedmont Triad’s top four include two industries projected to show declining output through 2030.

Table 2.10 addresses the fact that many industries with small shares in the large metros are bigger than industries with big shares in the smaller metros. The table sums up the total number of employees in the high-projected-growth and projected-loss industries.

**Table 2.10 Manufacturing Employees in High-Growth and Net-Loss Industries, by Metro, 3rd Quarter 2007**

Region	(1) Employment in High-Projected-Growth Industries*	(2) Employment in Projected-Loss Industries**	Ratio: (1)/(2)
Charlotte	33,791	10,732	3.1
Piedmont Triad	33,707	24,627	1.4
Research Triangle	54,040	2,415	22.4
Asheville	11,946	1,763	6.8
Fayetteville	3,475	47	73.9
Wilmington	4,515	281	16.1

(Source: North Carolina Employment Security Commission, analysis by author)

\* NAICS 311, 325, 326, 333, 334, 335, 336      \*\* NAICS 312, 313, 314, 315

Of the three larger metro areas, the two most striking results are the Piedmont Triad’s large number and large proportion of employees in industries projected to lose output through 2030, and the Research Triangle’s large number and large proportion of employees in industries projected to increase output significantly. The ratios are less informative for the smaller metro areas because of their small size.

**2.8 Employment and Logistics Infrastructure Needs by Industry**

One means of understanding and projecting future logistics infrastructure needs is to examine the existing relationship between logistics providers and the transportation system and project how shifts in population and employment patterns are likely to change logistics demands. To this end, the research team generated summary statistics for the North Carolina transport-logistics (T/L) cluster, which is a group of industries related to supply-chain management: transportation, shipping, logistics, and warehousing, and then mapped the locations of these individual locations. The maps highlight relationships such as the proximity to major thoroughfares and to other companies in the cluster. The location of these businesses is therefore highly correlated with the state’s physical and economic infrastructure. Understanding where these businesses locate provides a rich description of the cluster, and it can inform governments as they develop proactive land-use and zoning policies to mitigate the traffic congestion, noise, and air pollution often associated with major transportation hubs.

In North Carolina, the list of industries in the T/L cluster is often derived from a “master list” of 36 statewide clusters identified by researchers at the University of North Carolina at Chapel Hill (see *High-Tech Clusters in North Carolina*, North Carolina Board of Science and Technology, 2000). This cluster definition relies on information on inter-industry linkages and complementary labor requirements.

In a previous study of the T/L cluster in the Triad region of North Carolina<sup>42</sup>, researchers used the following T/L cluster definition (Table 2.11).

<sup>42</sup> Debbage, K. and Brod, A., *The Triad Transport/Logistics Inventory and Cluster Mapping Project*, Center for Business and Economic Research, UNCG, 2007.

**Table 2.11 Potential Transport/Logistics Industries**

NAICS Code	Industry
4811	Scheduled Air Transportation
4841	General Freight Trucking
4842	Specialized Freight Trucking
4881	Support Activities for Air Transportation
4931	Warehousing and Storage
488510	Freight Transportation Arrangement
492110	Couriers
541614	Logistics Consulting Services

For this analysis, the researchers removed the categories General Freight Trucking, Couriers, and Logistics Consulting Services from the list. The basis for this decision was that the primary business of “General Freight Trucking” and “Couriers” is focused on local freight movements; hence they are not quite relevant to the question of statewide logistic planning. Similarly, firms providing “Logistics Consulting Services” typically are arranging for transportation services but do not directly perform such service and may be located remotely from the actual shipping/receiving activity. According, such firms tend to place no greater demand on the transportation infrastructure than non-transportation-based firms. The resulting T/L cluster for this study is below (see Table 2.12):

**Table 2.12 Transport/Logistics Cluster for this Analysis**

NAICS Code	Industry
4811	Scheduled Air Transportation
4842	Specialized Freight Trucking
4881	Support Activities for Air Transportation
4931	Warehousing and Storage
488510	Freight Transportation Arrangement

The following are detailed descriptions of each T/L industry:

- Scheduled Air Transportation (NAICS 4811).
  - This industry comprises establishments primarily engaged in providing air transportation of passengers and/or cargo over regular routes and on regular schedules. Establishments in this industry operate flights even if partially loaded. Establishments primarily engaged in providing scheduled air transportation of mail on a contract basis are included in this industry. Examples of these firms include the following: US Air, Delta, DHL Express, Forward Air, etc.
  - While firms in this group tend to be located near airport facilities, many also provide land-based freight services including local pick-up and delivery, or

expedited, land-based freight transportation. Accordingly, while the primary transportation infrastructure impact of these businesses is related to airport operations and on the highways near airports, they do represent additional demand to the highway transportation system.

- Specialized Freight Trucking (NAICS 4842)
  - This industry group comprises establishments primarily engaged in providing local or long-distance specialized freight trucking. The establishments of this industry are primarily engaged in the transportation of freight which, because of size, weight, shape, or other inherent characteristics, requires specialized equipment, such as flatbeds, tankers, or refrigerated trailers. This industry includes the transportation of used household, institutional, and commercial furniture and equipment. Well-known examples of such firms include the following: ABF, JB Hunt, Old Dominion, Roadway, Schneider, etc.
  - The transportation infrastructure demands of this group tend to be heavily highway-focused but also include a significant volume of intermodal movements (mostly ocean containers mounted on chasses – either from ports or via railroad intermodal yards - but also including highway trailers-on-flatcars).
- Support Activities for Air Transportation (NAICS 4881)
  - This industry group comprises establishments primarily engaged in providing services to the air transportation industry and includes the actual airport authorities. The range of services provided includes airport operation, servicing, repairing (except factory conversion and overhaul of aircraft), maintaining and storing aircraft, and ferrying aircraft. Accordingly, this group tends to be located on or directly adjacent to airports and its impact is primarily on or near airport facilities.
- Warehousing and Storage (NAICS 4931)
  - This industry comprises establishments primarily engaged in operating merchandise warehousing and storage facilities. These establishments generally handle goods in containers, such as boxes, barrels, and/or drums, using equipment, such as forklifts, pallets, and racks. They are not specialized in handling bulk products of any particular type, size, or quantity of goods or products. The transportation infrastructure impact of these firms is primarily highway related. However, some firms also use rail service and/or have operations that are located on or near port facilities that tend to derive some portion of their business from ocean freight movements.
- Freight Transportation Arrangement (NAICS 488510)
  - This industry comprises establishments primarily engaged in arranging transportation of freight between shippers and carriers. These establishments are usually known as freight forwarders, marine shipping agents, or customs brokers and they offer a combination of services spanning transportation modes. Such firms tend to be intermediaries that may or may not be located

near to actual origins or destinations. According, while such firms tend to locate around logistics clusters, they tend to place no significantly greater demand on the transportation infrastructure than non-transportation-based firms.

The data for this analysis comes from the *ReferenceUSA* database, which contains information on more than 14 million businesses in the U.S. *ReferenceUSA* collects data from Yellow and White Pages, annual reports, SEC filings, Chamber of Commerce information, postal data, etc. This data also includes a precise map coordinate for each listed company. The data for this report were accessed in March 2008.

### 2.8.1 **Comments on Data/Approach**

- As the above NAICS descriptions suggest, these groups have significantly different demand on the transportation infrastructure needs. Accordingly, when viewing multiple subcategories on a given map, care must be taken when drawing inferences about specific modal infrastructure needs.
- Each mapped location represents a geographic location where a firm has a facility. However, because no visual reference is used to indicate the size of the firm (e.g. by employment, vehicle, revenues, etc.), equal weight is given each location despite inherent differences in transportation infrastructure volume demands. Somewhat mitigating this concern is the large number of firms identified (1741) in the “Specialized Freight Trucking” category, which should tend to level relative variances in firm size. With respect to the other NAICS codes, a similarly mitigating factor is that such firms tend to be much more concentrated around specific transportation facilities (airports or ports), reducing the lack of visual transportation volume reference.
- None of the mapped NAICS categories capture "private" (corporate) truck fleets, such as those owned by the food, retail, wholesale, construction and service companies. These fleets comprise the largest segment of the trucking industry (approximately 56 percent of total freight volume<sup>43</sup>). Instead, the NAICS codes that include these firms/fleets belong to the appropriate designation for the overall organization. Examples of such fleets include Wal-Mart, Food Lion, Golden States Foods (McDonalds), etc. However, it should be noted that with the exceptions of where such firms choose to locate major distribution facilities or fleet domiciles, the overall impact of private fleets on the transportation infrastructure tends to mirror those commercial fleet operations (i.e., their fleet operations tend to involve shipment movements around larger population areas and/or major transportation junctions with highway movements between these locations.)

While acknowledging the above considerations, the research team believes that the T/L mapping approach remains a valid and powerful way to gain insight into how logistics providers independently made decisions on where to locate facilities and operations.

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<sup>43</sup> [http://www.nptc.org/index.php?option=com\\_content&task=view&id=37&Itemid=72](http://www.nptc.org/index.php?option=com_content&task=view&id=37&Itemid=72) , accessed April 26, 2008.

2.9 **Transportation Infrastructure Needs Analysis**

The first table (Table 2.13) shows the number of establishments and employees in each of the T/L industries in the cluster.

**Table 2.13 Establishments and Employment, by NAICS, 2008**

T/L Industry	Establishments		Employment	
	Number	Share	Number	Share
Scheduled Air Transportation	124	4.5%	4,473	8.3%
Specialized Freight Trucking	1,741	63.0%	38,887	71.8%
Support Activities for Air Transportation	213	7.7%	3,438	6.4%
Freight Transport Arrangement	285	10.3%	3,066	5.7%
Warehousing and Storage	401	14.5%	4,273	7.9%
<b>Total</b>	<b>2,764</b>	<b>100.0%</b>	<b>54,137</b>	<b>100.0%</b>

(Source: ReferenceUSA, analysis by Schnabel Engineering)

Specialized Freight Trucking clearly dominates the cluster in terms of sheer numbers, accounting for 63 percent of all establishments and 72 percent of the total employment. Not only are there many such companies, but they tend to be large. Scheduled Air Transportation companies also tend to be larger than the cluster average.

The next table (Table 2.14) in this section demonstrates that the bulk of the 2,764 such businesses are located in the three major metro areas.

**Table 2.14 Number of Establishments, by NAICS and Major Metro Area, 2008**

T/L Industry	Charlotte	Piedmont Triad	Research Triangle	Total of 3 Metros	Total NC	Metro % of Total
Scheduled Air Transportation	34	29	33	96	124	77.4%
Specialized Freight Trucking	313	335	145	793	1,741	45.5%
Support Activities for Air Transportation	42	36	21	99	213	46.5%
Freight Transport Arrangement	101	51	42	194	285	68.1%
Warehousing and Storage	73	69	45	187	401	46.6%
<b>Total</b>	<b>563</b>	<b>520</b>	<b>286</b>	<b>1,369</b>	<b>2,764</b>	<b>49.5%</b>

Source: ReferenceUSA, analysis by Schnabel Engineering

Scheduled Freight Transportation and Freight Transport Arrangement are associated with commercial airports. Therefore, they tend to locate at larger airports and hence in larger urban areas. Support Activities for Air Transportation is more geographically dispersed because it includes services for general aviation. As we will see, Specialized Freight Trucking is generally located along major roadways.

Table 2.15 conveys similar information about employment in the T/L cluster.

**Table 2.15 Employment, by NAICS and Major Metro Area, 2008**

T/L Industry	Charlotte	Triad	Triangle	Total of 3 Metros	Total NC	Metro % of Total
Scheduled Air Transportation	2,348	750	642	3,740	4,473	83.6%
Specialized Freight Trucking	11,572	7,926	3,556	23,054	38,887	59.3%
Support Activities for Air Transportation	701	1,255	300	2,256	3,438	65.6%
Freight Transport Arrangement	1,041	680	365	2,086	3,066	68.0%
Warehousing and Storage	916	891	605	2,412	4,273	56.4%
<b>Total</b>	<b>16,578</b>	<b>11,502</b>	<b>5,468</b>	<b>33,548</b>	<b>54,137</b>	<b>62.0%</b>

Source: ReferenceUSA, analysis by Schnabel Engineering

The three major metro areas account for just under half of all T/L businesses, but 62 percent of all T/L employees. Clearly, larger businesses are locating in the more urbanized areas.

The following comments apply to the respective maps that follow:

- Figure 2.8 - Logistics in North Carolina, 2007. This map includes all five industries in Table 2.12, and one of its messages is visible in the inset map for the three major metro areas. Each inset shows a grouping of T/L businesses near that metro area’s airport. Obviously, this is also the main lesson of the map of Scheduled Air Transportation.
- Figure 2.9 - Specialized Freight Trucking (NAICS 4842). The map for Specialized Freight Trucking shows clouds of points in metro areas but also along major highways. Specialized trucking companies serve national markets and ship products over long distances. Such companies tend to seek lower-cost locations just outside urban areas and are broadly distributed across the state. Other factors that impact the choice of facility location include proximity to a major customer and/or industry clusters. An additional factor that can impact a carrier’s facility location decision is a desire to offer service to all points within a state. Such a strategy is particularly important to national or regional carriers as it enhances their marketing ability. Accordingly, this factor can influence a carrier’s decision to select a given location as it attempts to provide an efficient network of adjoining freight operations. Illustrating this point is the dominance of such carriers within this group, as identified by the following table (Table 2.16):

**Table 2.16 Specialized Freight Trucking Firms with 5 or more NC Locations**

<b>Carrier Name</b>	<b>No. of Locations</b>
Estes Express Lines	12
Con-Way Freight-Southern	10
Old Dominion Freight Line Inc	10
ABF Freight System Inc	9
UPS Freight	9
Yellow Transportation Inc	9
Fed Ex Freight	8
Southeastern Freight Lines	8
AAA Cooper Transportation	7
Roadway Express Inc	7
Eagle Transport Corp	6
Kenan Transport Co	6
Wilson Trucking Corp	6
Benton Express Inc	5
Saia Motor Freight Line Inc	5
<b>Total</b>	<b>117</b>
	<b>(8% of category total)</b>

- Figure 2.11 - Support Activities for Air Transport (NAICS 4881). The map for Support Activities for Air Transport places most such companies near the major airports, but there are numerous examples located far away from the major metro areas. These tend to be located at small airports serving a general-aviation clientele.
- Figure 2.12 - Freight-Transportation Arrangement (NAICS 488510). Companies in Freight-Transportation Arrangement serve as liaisons between shippers and carriers, coordinating shipments across transportation modes. They tend to locate in corporate parks and employ white-collar workers with significant software and research skills. But as the inset in the map for that industry shows, they also tend to locate near airports.
- Figure 2.13 - Warehousing and Storage (NAICS 4931). Finally, the map for Warehousing and Storage illustrates the reasoning of those economic developers who advocate zoning areas near major highways for warehousing, because storage operations can't afford to be far from the highway. The map shows these businesses gathered tightly along interstates and other highways, and the metro insets underscore this point.

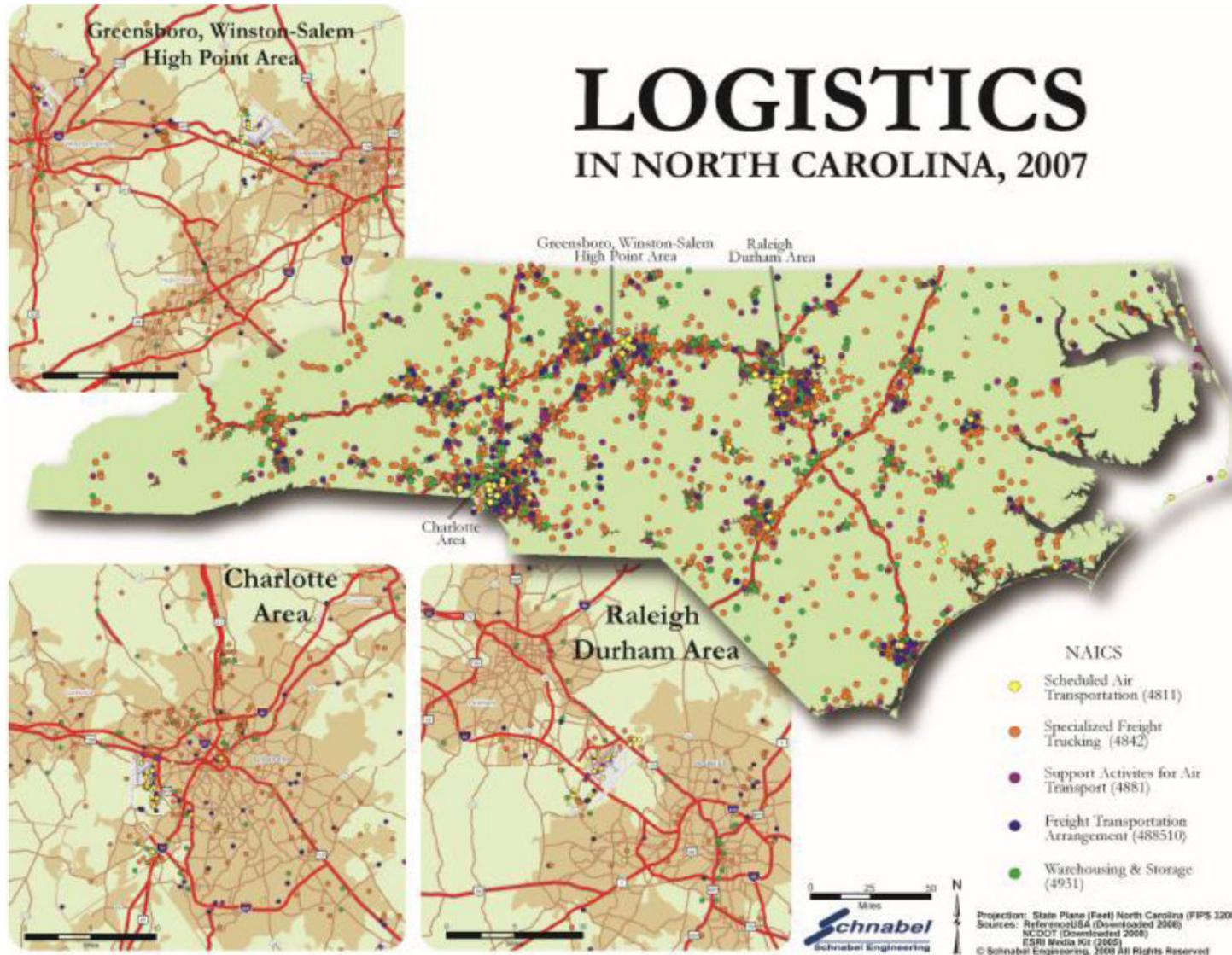


Figure 2.8 Logistics in North Carolina, 2007

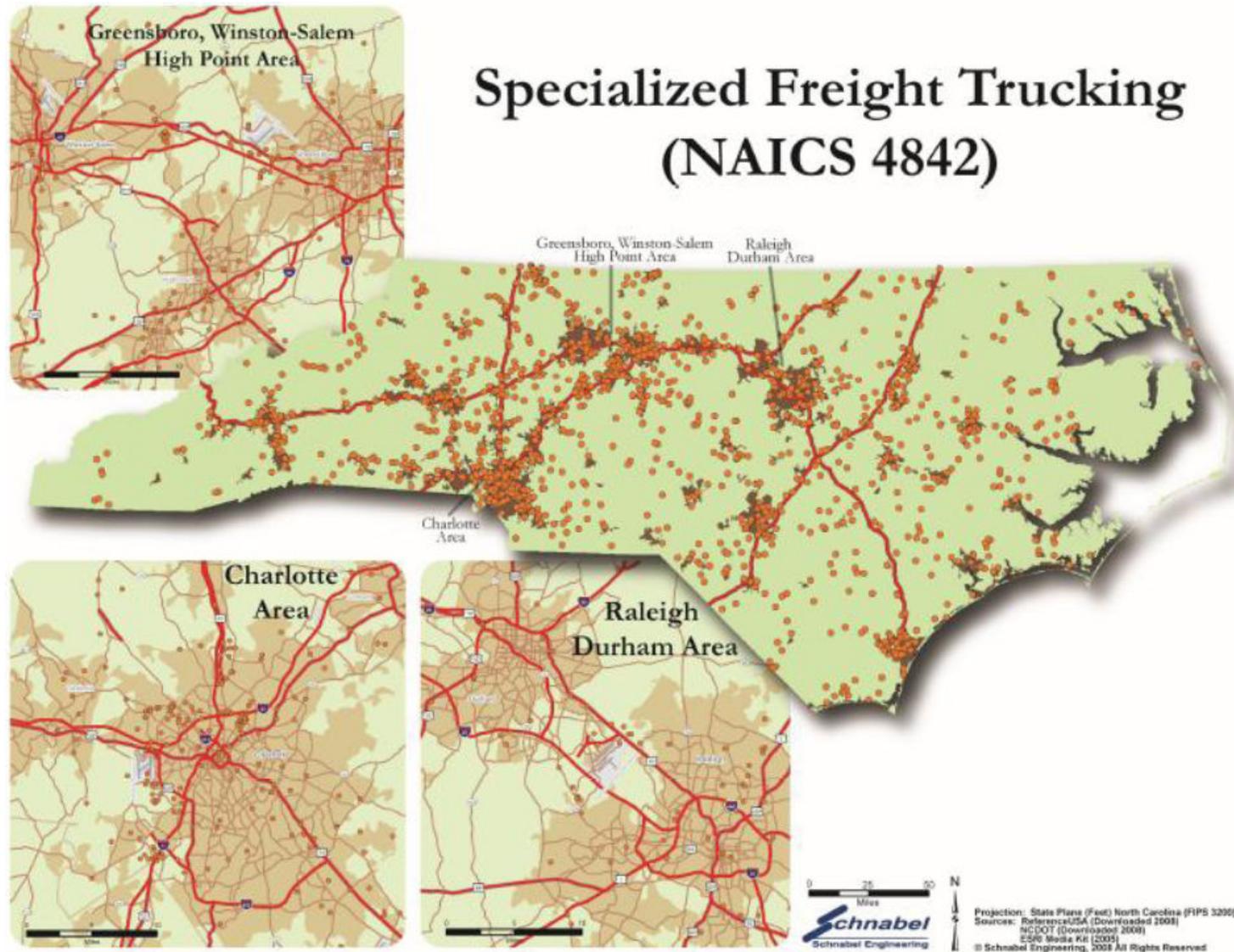


Figure 2.9 Specialized Freight Trucking (NAICS 4842)

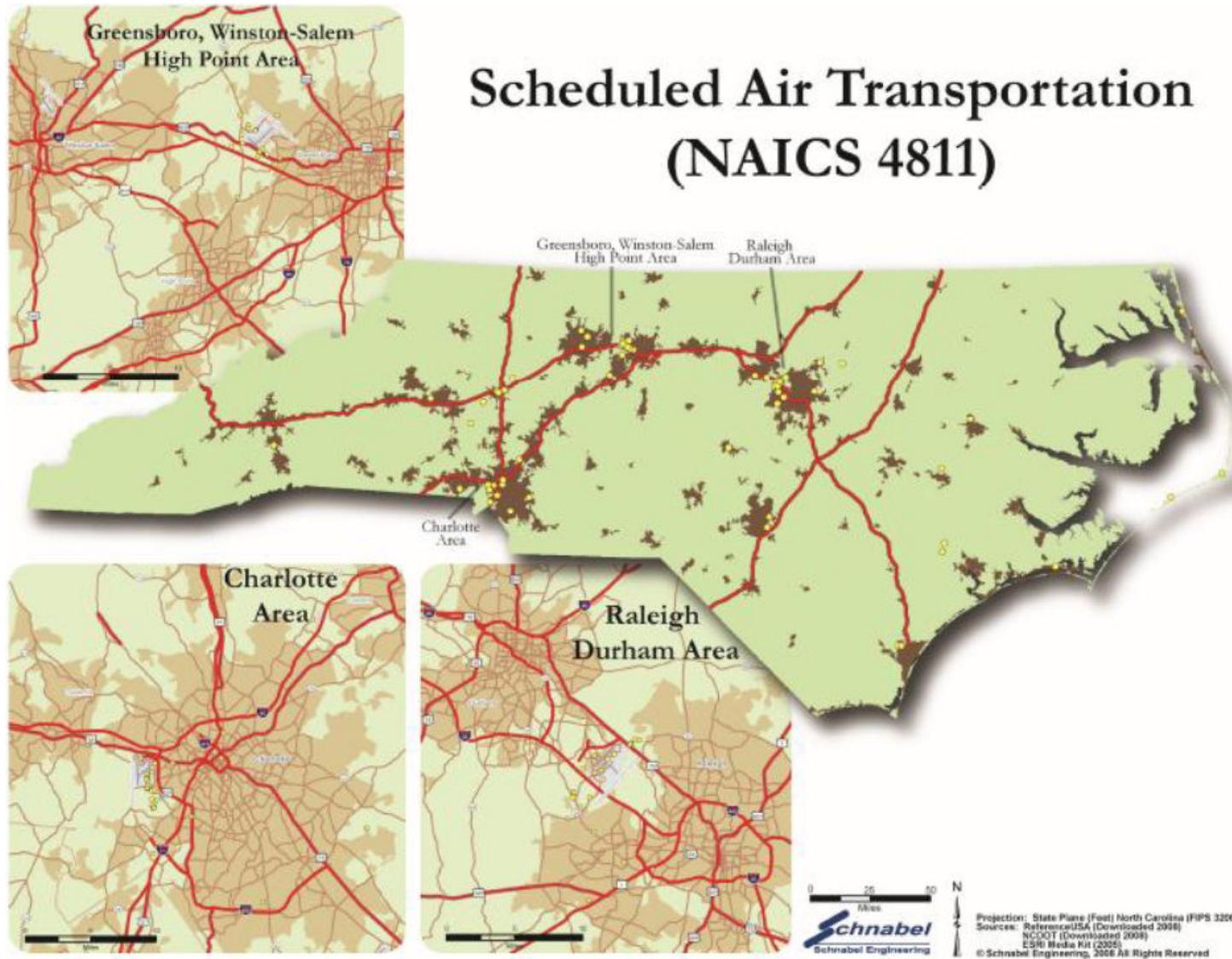


Figure 2.10 Scheduled Air Transportation (NAICS 4811)

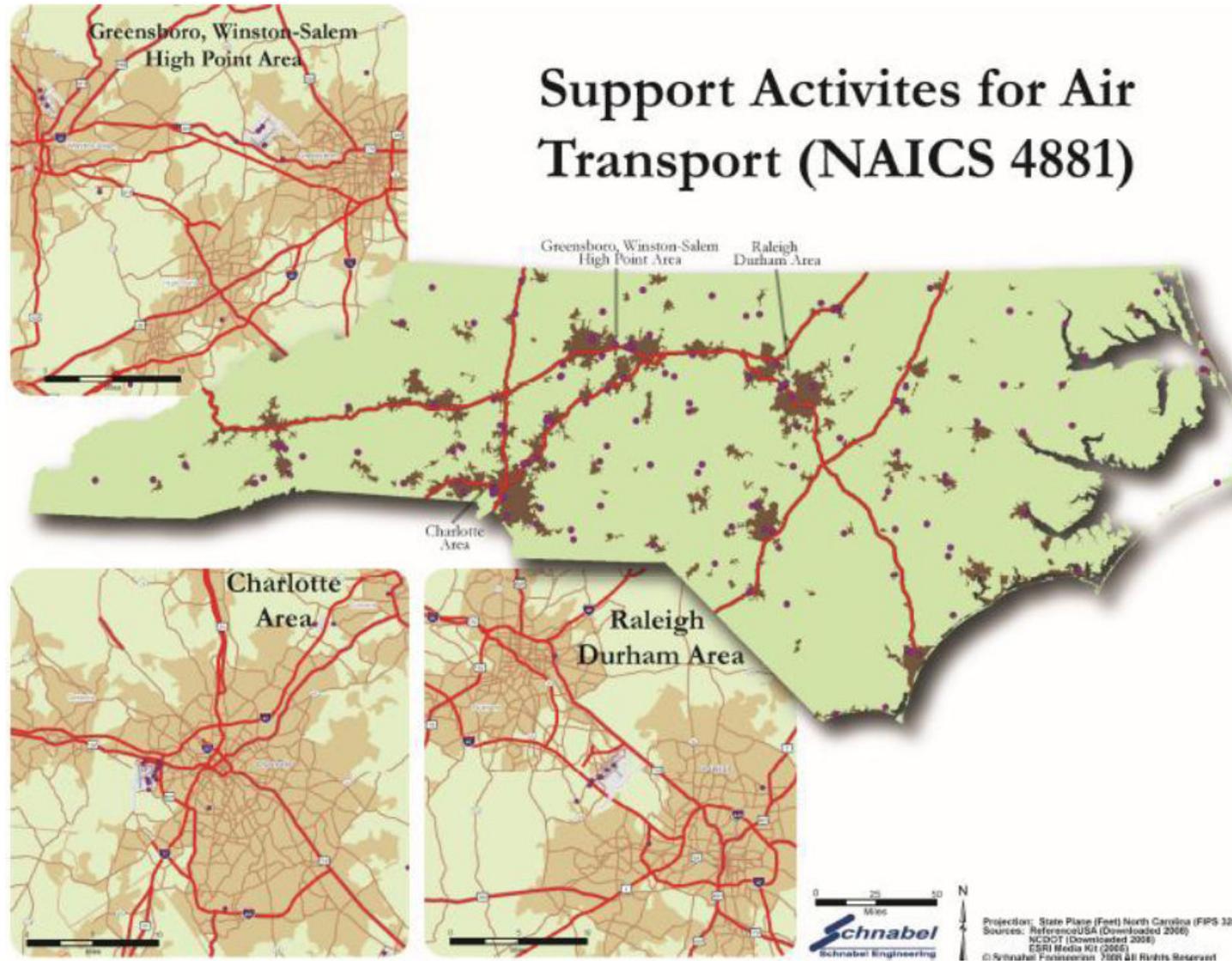


Figure 2.11 Support Activities for Air Transport (NAICS 4881)

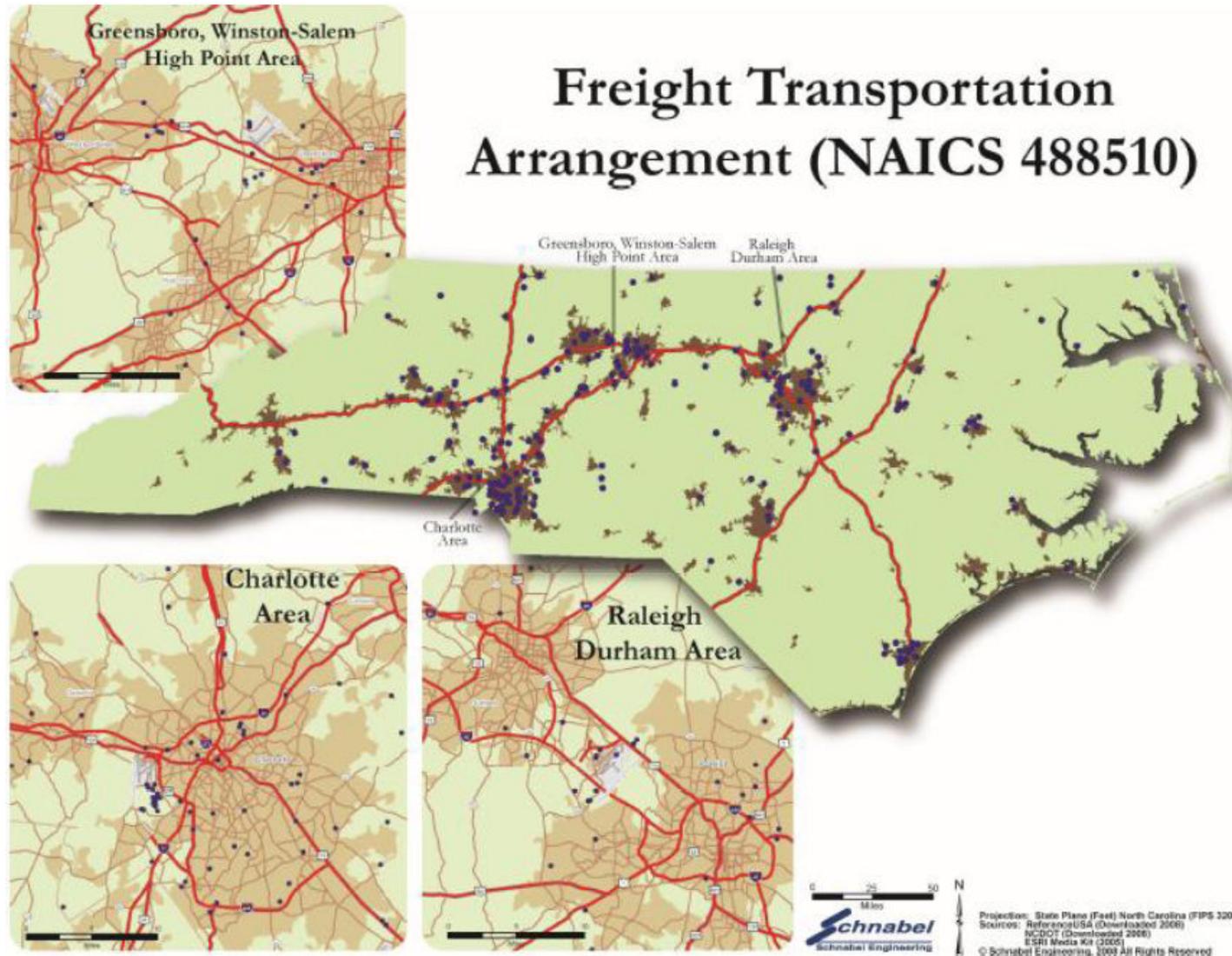


Figure 2.12 Freight Transportation Arrangement (NAICS 488510)

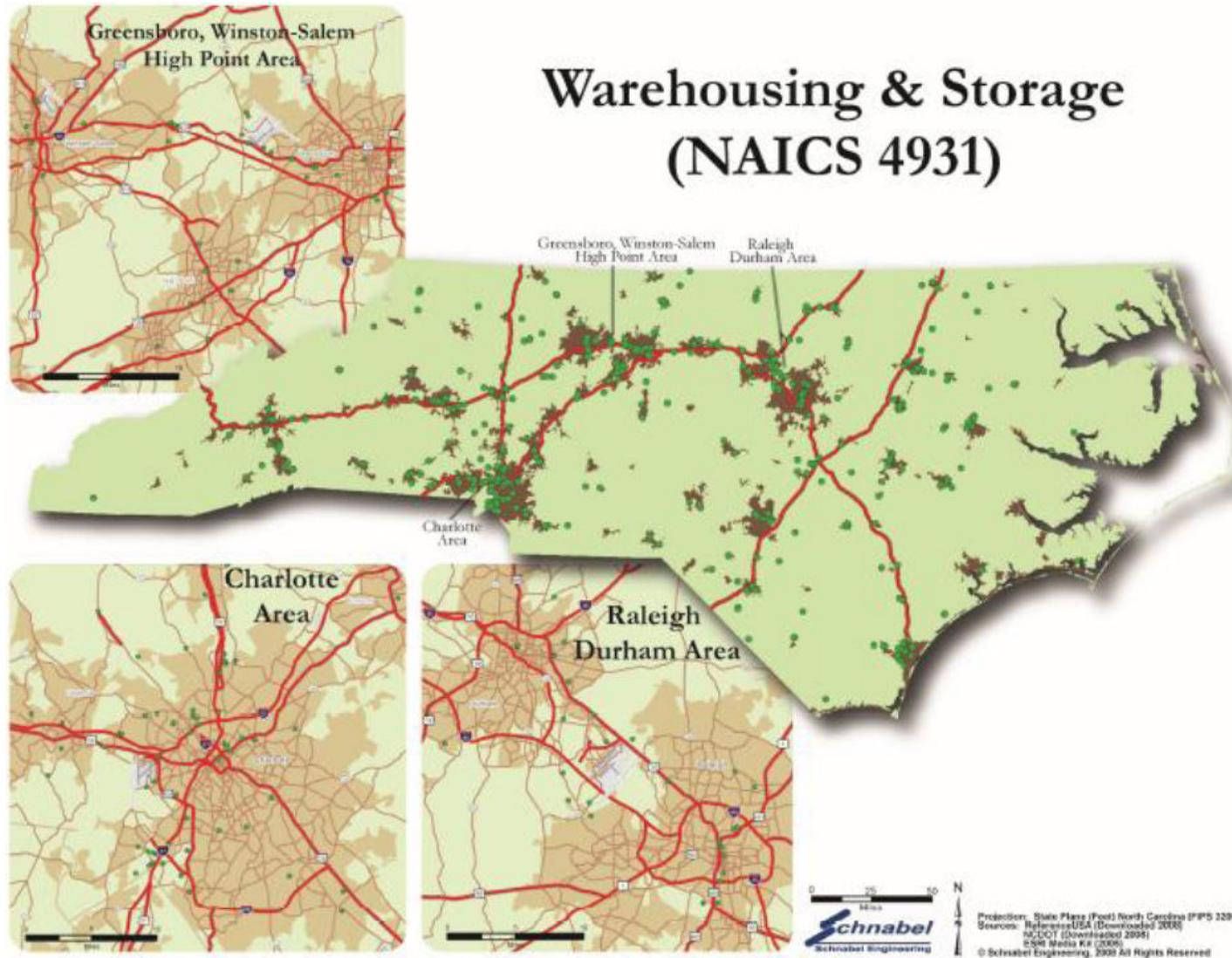


Figure 2.13 Warehousing & Storage (NAICS 4931)

2.10 **Existing North Carolina Freight Patterns**

Table 2.17 describes freight shipments that have either an origin or a destination in North Carolina. As shown in the table, trucks dominated and are anticipated to continue to move the largest percentage of the tonnage and value of shipments, followed by rail.

**Table 2.17 Freight Shipments To, From, and Within North Carolina 1998, 2010, and 2020<sup>44</sup>**

	Tons (millions)			Value (billions \$)		
	1998	2010	2020	1998	2010	2020
<b>State Total</b>	<b>511</b>	<b>756</b>	<b>944</b>	<b>426</b>	<b>820</b>	<b>1,324</b>
<b>By Mode</b>						
Air	<1	1	2	29	72	126
Highway	426	641	808	381	719	1,152
Other <sup>45</sup>	1	3	4	<1	<1	1
Rail	79	104	121	15	26	41
Water	5	7	9	1	2	3
<b>By Destination/Market</b>						
Domestic	493	726	900	392	748	1,189
International	18	30	44	34	72	134

Note: Modal numbers may not add to totals due to rounding.

As the above projections suggest, truck traffic is expected to grow throughout the state over the next 20 years. Much of the growth will occur in urban areas and on the Interstate highway system (Figure 2.14 and Figure 2.15).

<sup>44</sup> From [http://www.ops.fhwa.dot.gov/freight/freight\\_analysis/state\\_info/north\\_carolina/profile\\_nc.htm](http://www.ops.fhwa.dot.gov/freight/freight_analysis/state_info/north_carolina/profile_nc.htm)

<sup>45</sup> The "Other" category includes international shipments that moved via pipeline or by an unspecified mode.

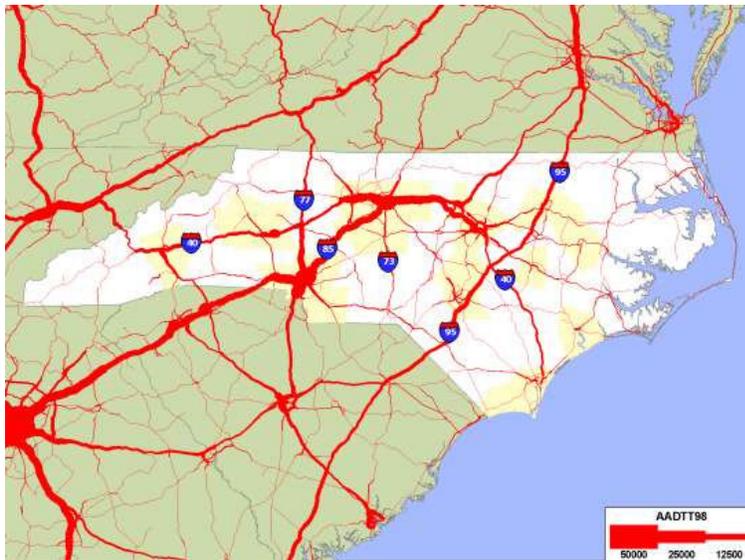


Figure 2.14 Estimated Average Annual Daily Truck Traffic: 1998<sup>46</sup>

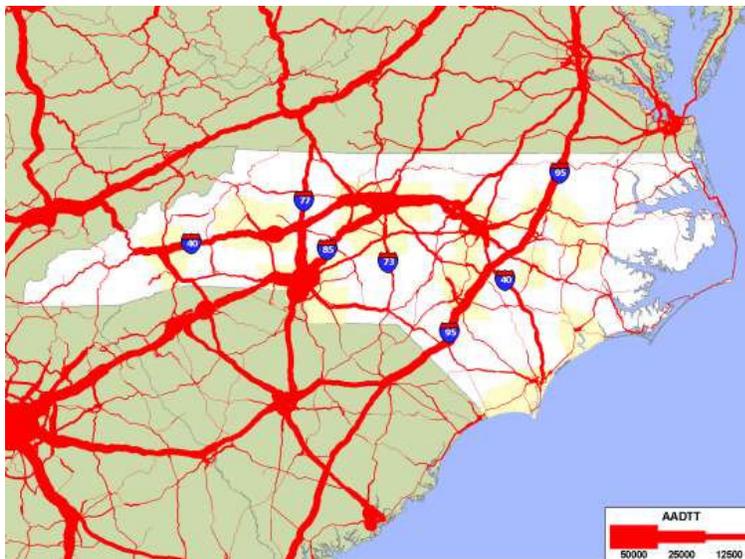


Figure 2.15 Estimated Average Annual Daily Truck Traffic: 2020<sup>47</sup>

<sup>46</sup> [http://www.ops.fhwa.dot.gov/freight/freight\\_analysis/state\\_info/north\\_carolina/profile\\_nc.htm](http://www.ops.fhwa.dot.gov/freight/freight_analysis/state_info/north_carolina/profile_nc.htm)

<sup>47</sup> [http://www.ops.fhwa.dot.gov/freight/freight\\_analysis/state\\_info/north\\_carolina/profile\\_nc.htm](http://www.ops.fhwa.dot.gov/freight/freight_analysis/state_info/north_carolina/profile_nc.htm)

The following tables summarize FAF data:

**Table 2.18 Shipments by Weight: 2002 and 2035 (Millions of Tons)<sup>48</sup>**

	2002						2035					
	Within State		From State		To State		Within State		From State		To State	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Total	302.6	100	108.6	100	167.4	100	460.6	100	231.5	100	299.2	100
Truck	271.6	90	81.8	75	78.5	47	422.7	92	173.0	75	158.4	53
Rail	13.1	4	6.2	6	61.3	37	16.9	4	10.7	5	111.5	37
Water	1.9	<1	0.2	<1	0.6	<1	1.7	<1	0.2	<1	0.5	<1
Air, air and truck	<0.1	<1	<0.1	<1	<0.1	<1	<0.1	<1	0.2	<1	0.1	<1
Truck and rail	<0.1	<1	0.1	<1	0.5	<1	<0.1	<1	0.2	<1	1.2	<1
Other intermodal <sup>49</sup>	0.2	<1	0.5	<1	0.7	<1	0.3	<1	1.0	<1	1.8	<1
Pipeline and unknown <sup>50</sup>	15.8	5	19.8	18	25.9	15	19.1	4	46.3	20	25.6	9

Note: Numbers may not add to totals due to rounding.

<sup>48</sup> From [http://www.ops.fhwa.dot.gov/freight/freight\\_analysis/faf/state\\_info/faf2/pdfs/nc.pdf](http://www.ops.fhwa.dot.gov/freight/freight_analysis/faf/state_info/faf2/pdfs/nc.pdf)

<sup>49</sup> Other intermodal includes U.S. Postal Service and courier shipments and all intermodal combinations except air and truck.

<sup>50</sup> Pipeline and unknown shipments are combined because data on region-to-region flows by pipeline are statistically uncertain.

**Table 2.19 Shipments by Value: 2002 and 2035 (\$ Millions)<sup>51</sup>**

	2002						2035					
	Within State		From State		To State		Within State		From State		To State	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Total	181,204.2	100	201,858.9	100	180,117.6	100	307,222.3	100	396,424.5	100	470,623.9	100
Truck	170,269.7	94	177,923.5	88	139,237.5	77	289,727.2	94	344,936.8	87	345,264.9	73
Rail	510.9	<1	2,267.1	1	6,548.6	4	669.1	<1	3,919.1	<1	10,570.9	2
Water	300.0	<1	22.8	<1	194.9	<1	189.3	<1	34.8	<1	156.4	<1
Air, air and truck	157.3	<1	2,080.3	1	3,196.2	2	160.1	<1	2,959.0	<1	7,835.3	2
Truck and rail	<0.1	<1	285.4	<1	1,395.2	1	<0.1	<1	595.4	<1	3,404.2	<1
Other intermodal	3,780.6	2	11,020.8	5	20,503.8	11	7,671.1	2	24,546.3	6	79,469.0	17
Pipeline and unknown	6,185.7	3	8,259.0	4	9,041.3	5	8,805.6	3	19,433.1	5	23,923.2	5

Note: Numbers may not add to totals due to rounding.

<sup>51</sup> From [http://www.ops.fhwa.dot.gov/freight/freight\\_analysis/faf/state\\_info/faf2/pdfs/nc.pdf](http://www.ops.fhwa.dot.gov/freight/freight_analysis/faf/state_info/faf2/pdfs/nc.pdf)

The following tables, also from FHWA data, identify the current and projected changes in trading patterns with North Carolina.

The following tables (Table 2.20 and Table 2.21) identify North Carolina’s current trading patterns and projected changes projected by 2035:

**Table 2.20 Top Trading Partners: 2002<sup>52</sup>**

Tons (millions)			Value (\$ millions)		
	Number	Percent		Number	Percent
<b>Total</b>	<b>276</b>	<b>100</b>	<b>Total</b>	<b>381,976</b>	<b>100</b>
Foreign	15	5	Foreign	31,632	8
SC	61	22	SC	52,650	14
VA	50	18	VA	36,972	10
KY	22	8	GA	33,309	9
GA	19	7	TN	21,133	6

Note: Numbers may not add to totals due to rounding.

**Table 2.21 Top Trading Partners: 2035<sup>53</sup>**

Tons (millions)			Value (\$ millions)		
	Number	Percent		Number	Percent
<b>Total</b>	<b>531</b>	<b>100</b>	<b>Total</b>	<b>867,048</b>	<b>100</b>
Foreign	39	7	Foreign	116,660	13
VA	96	18	SC	128,834	15
SC	95	18	VA	76,217	9
KY	55	10	GA	63,447	7
GA	42	8	TN	50,899	6

Note: Numbers may not add to totals due to rounding.

As these tables indicate, both the trading volumes and value are projected to grow significantly. In particular, foreign trade will be an increasing important component of North Carolina’s economy, with significant impacts on all modal transportation infrastructure.

<sup>52</sup> [http://www.ops.fhwa.dot.gov/freight/freight\\_analysis/faf/state\\_info/faf2/nc.htm](http://www.ops.fhwa.dot.gov/freight/freight_analysis/faf/state_info/faf2/nc.htm)

<sup>53</sup> [http://www.ops.fhwa.dot.gov/freight/freight\\_analysis/faf/state\\_info/faf2/nc.htm](http://www.ops.fhwa.dot.gov/freight/freight_analysis/faf/state_info/faf2/nc.htm)

### 3 North Carolina's Future

This chapter presents a vision of North Carolina's future. It rests on the proposition that support for logistics is necessary to promote economic growth and the quality of life of all North Carolinians, regardless of their workplaces, homes, or regions. This vision is based on input received from public and private stakeholders, and emphasizes common themes with high potential payoff. In this chapter, we begin by considering the context for our visioning efforts. We then outline the key stakeholders in the future of NC's logistics system. We then summarize the results of information we gathered regionally at the various visioning sessions and in conversation with key partnerships around the state. We conclude with a discussion of a future vision and direction for North Carolina's economic growth and quality of life based on the six action items outlined in the executive summary, including, in particular, the support of existing and emerging markets and industries. The resulting vision recognizes that synergistic bonds are created between regions by a logistics system that is efficient and effective for freight and the motoring public.

#### 3.1 *The Context for the Vision*

Increasing efficiency throughout the supply chain has taken on greater urgency in the past decade as increased efficiencies in transportation practices have been demanded of the logistics network, including by such major users as major retailers and the US Department of Defense. A number of pressures have coalesced in recent years to force this concern for better utilization of transportation infrastructure: rising prices of oil, and increasing costs in all aspects of transportation from rail rates to insurance, a shortage of truck drivers, flat or even decreased demand due to an uncertain economic picture, but overall system capacity still having not caught up with demand both over the past half dozen years, plus projected future trade growth. Along with improved operations and utilization of our transportation systems there is a growing understanding that we haven't dedicated sufficient investment for too long. For example, the last major investment program in this critical element of our economy in North Carolina was the landmark 1989 transportation initiative.

Given scarce public resources, the process of transportation funding must lead to optimal investment strategies. Moreover, our nation's transportation system has historically been a product of both public and private sector participation. With the global economy demanding modern and efficient logistics networks, public policy makers must also consider the full range of project delivery solutions and the variety of available funding options, including greater reliance on public-private partnerships. An example of the understanding of the need for greater efficiency on the part of the public sector has been the heightened interest in expanding the application of asset management, once associated solely with highway maintenance, now being deployed with far greater sophistication and in other modes, including ports.

A vision of statewide logistics, therefore, must be supported by a new public sector culture that emphasizes, planning, construction and maintenance of infrastructure based on fully allocated costs (and benefits), in much the same way that the private sector analyzes capital projects. In the decades to come the ability to attract private sector capital will be critical to realizing new

projects and leveraging funds. Greater involvement of the private sector in traditionally public sector responsibilities of design, development, operations and maintenance of public infrastructure is becoming accepted in the US as it has been elsewhere around the world. The historical distinction between public and private sector responsibilities are evolving. But, it is clear that the best features of both sectors must be applied, especially in capital formation strategies. One such approach credits public agencies as excellent designers and developers of infrastructure but then goes on to recognize the private sector's strength in operating and pricing of such facilities. In order to achieve a common ground and a base discussion lexicon, a similar approach to evaluating projects and programs is needed. According to the U.S. Chamber of Commerce only 20 percent of the new infrastructure necessary to help accommodate logistics will be able to generate a high enough return on investment to attract private capital. Therefore North Carolina must remain vigilant in supporting and promoting freight projects and leveraging all sources of funds.

A recent example of this new management imperative can be found in the recent McKinsey study on the NC DOT (October 2007), "Laying the Foundation for a Successful Transformation." McKinsey provided a "recap of the diagnostic and transformation effort" underway at the NC DOT, and pointed to the need for improvements in processes, structure and systems. The study finds that there are critical needs in the areas of "project design and delivery processes," which are slowed by a lack of "prioritization, accountability and coordination." Moreover, operational processes are in need of organization-wide performance management.

Speedier project delivery is identified as perhaps the key NC DOT goal in the McKinsey study. NC DOT is currently in the process of assessing methodologies to accelerate project design and delivery. Here it might be useful to remember that the private sector logistics goals are not only velocity, but also reliability, information transparency, among others. The agency has recognized this fact and begun to develop a system of performance metrics that will enhance accountability and performance visibility. These initiatives by NC DOT are well timed and will greatly facilitate the development and implementation of an effective state wide logistics program. With the current state of insufficient funding and growing transportation demand for goods as well as people movement, it seems clear that performance management systems should be a focal point of any transformation underway at NC DOT and that those policy shifts survive administration transitions.

### 3.2 ***Setting the Goals***

A vision is incomplete without explicit goals that relate to specific outcomes that the State seeks to achieve. Experience in other states, such as California, Texas, Oregon and Washington (all states with major container ports and in which cargo flows through the state) provides a template for understanding how goals might be set.

The California Goods Movement Action Plan (GMAP) provides a benchmark for setting such goals. According to the California plan, a systematic and transparent "framework for action" is necessary if discernable, defensible benefits are to be achieved. Performance measures then ensure that the evaluation, selection and funding of projects and actions will be conducted in a way that achieves an efficient and effective allocation of resources.

California's, criteria for goods movement infrastructure and operation improvements are the most specific, because the logistics industry has long used three key measures to determine the state of a goods movement system: velocity, throughput, and reliability. No single project will meet all the criteria, but those listed provide a means to evaluate a candidate project's value.

Without going into lengthy details from goods movement and infrastructure studies from the states identified, we have chosen to highlight some of the key points that are common in the studies.

- Those entities associated with goods movement within a state (and between states/countries) rely heavily on cargo and economic forecasts. The fact remains that a forecast is just a forecast. Thus, one of the major pitfalls in all of the studies is an over reliance on a forecast without identification and analysis of alternative scenarios without underlying assumptions and caveats being clearly understood.
- Goods movement is “inelastic” (meaning volume flow isn't significantly affected) until differential fees of approximately \$200 are placed on a container entering a port. Typical fees being proposed (CA, WA and TX) would be for security, infrastructure improvement and environmental mitigation. In addition, price increases by a component of the supply chain such as railroads, trucking and drayage companies and other transportation related entities have exacerbated the situation.
- All of the aforementioned studies had a strong political agenda that tended to cloud the real issues and, in many cases, the final results. Job creation tended to be the most prevalent. Other agendas that made the reports were:
  - Public-Private partnerships and how this relatively new concept could fund new infrastructure and infrastructure improvements. However, the majority of the studies failed to present a clear definition or a program to implement a successful Public-Private Partnership funding mechanism.
  - Congruency (an urban planning term for balancing the system) was overlooked or weakly addressed. All of the studies addressed the systematic nature of goods movement but many failed to quantify the non-highway components of the freight system with increased Port throughput.
  - Every State had the discovery that infrastructure can be planned and built without the public's eye and that the right of eminent domain by the State, Regional or Federal Government does not constitute public acceptance. California and Oregon specifically found out that the citizenry fought back with the NIMBY (Not-in-my-backyard) approach that either killed the project or substantially increased the costs. The other misassumption was that the costs and time for negotiating and the understanding of environmental impacts would be easily overcome
- The true understanding of “capacity” of the network was not clearly stated in terms the public could appreciate. The most significant lessons learned were the inability to define the current condition and the practical capacity of the transportation infrastructure to the extent that its meaning was understood by the decision makers.
- Legislative issues proved to be significant in regards to the final recommendations. State legislatures cannot mandate prosperity.

- There are no guarantees. Today's supply chains have too much flexibility built into them that a "build it and they will come" mentality is not reliable.

The most significant lesson learned from virtually every study was the significance of freight and goods movement as an economic generator. Based upon the economic significance and impact of freight, and also upon the Federal legislation for the reauthorization of the Surface Transportation Act (SAFETEA-LU); the major freight states have implemented and staffed a "Freight Coordinator" within the State government. Washington and California have had this type of activity for several years and the results have been significantly positive. The Freight Coordinator has provided:

- Transportation funding that carries with it, the voice of freight
- Public outreach and education have demonstrated the economic importance of freight to the State.
- Shippers, ocean carriers, railroads and logistics professionals have an executive level agent with the State government to protect, or at least voice, their interests and concerns.

With these values in mind, and based on the results of our interviewing and visioning sessions, we outline the key state goals that the infrastructure strategy will support:

- *Enhance North Carolina's quality of life:* Through the availability of a wide variety of goods and services provided by sustainable transportation methods.
- *Enhance economic prosperity:* Provide access to business and industry to connect to the global marketplace.
- *Enhance sustainability:* Aggressively educate and support companies and agencies that promote and operate in environmentally, economically, and socially responsible ways.
- *Improve freight velocity, throughput, and reliability through connectivity.* The speed at which goods are able to move across the system and arrive on the shelf is crucial. Throughput is an indication of the volume of goods handled by the system. Throughput should be considered on an integrated system-wide basis. Reliability in logistics means consistency in transport times, which is just as valuable as velocity or throughput. Unreliable infrastructure in any segment or mode in the goods movement system will cause bottlenecks and adversely affects other links in the chain. As goods move from one mode to another there will be variations in velocity and throughput. Better connectivity lends itself to increased reliability, velocity, and throughput system wide
- *Reduce congestion:* North Carolina's transportation infrastructure capacity is constrained as freight movement increases; the natural consequence is increased congestion. Increased truck traffic on streets and highways, as well as increased rail trips through non-grade crossings, are directly related to decreased mobility and increased congestion in systems that move people and goods. Reducing congestion would improve the quality of life by recovering lost commuting time, reducing vehicle emissions, and would make North Carolina a more attractive place for personal and business relocation.

- *Improve energy efficiency:* Projects should be evaluated as to their effect on the aggregate energy/fuel consumption across a transportation network. This concept is has been labeled the “Carbon Footprint”. The EPA has a system for shippers and carriers called SMARTWAY which helps identify practices and measures of individual carbon footprints. Infrastructure projects that reduce congestion and minimize fluctuations in velocity would impact the energy efficiency of freight movement and non-freight traffic, thus achieving a wider spectrum of energy efficiency. Other carbon friendly initiatives include turning lanes and ITS solutions such as “smart” traffic lights which adjust their timing based on traffic volumes and backups.
- *Leverage federal, local and private funding:* The extent to which a proposed project has identified and committed supplemental non-State funds should be considered in the selection process. Those projects which demonstrate a higher level of federal, local, or private supplemental funding should be given emphasis.

Additional considerations can be public health and environmental issues and community impact mitigation actions and workforce development actions related to goods movement activities.

### 3.3 ***Outreach to Specific Industry Sectors***

The study team undertook extensive efforts to reach out to members public and private sector organizations that have an interest in the efficient operations of North Carolina’s logistics system. The study team also conducted extensive research into a large database of shippers, manufactures, transportation providers and logistics providers to provide the team a perspective of the criteria for making a decision to ship via North Carolina or to locate a significant aspect of the Supply Chain in North Carolina (see the following section on The Supply Chain Consortium). Meeting notes are included in the appendix. What follows is a compilation and summary of key points made in those sessions and interviews.

The study team was able to gain insights from the generators of freight: shippers, transportation brokers (3PLs), logistics park/inland port/distribution center developers, and the military. In addition, the logistics impacts of tourism and public transportation were assessed. There were also conversations with transportation infrastructure providers and operators, including NC Ports Authority, the North Carolina Railroad Company, Global TransPark, the Norfolk Southern and CSX railroads, and truckers (through a comprehensive survey). Finally, the team interviewed each of the State’s Regional Partnerships to gain the insights of the economic development community. The results of these efforts and their industry sectors are reflected throughout this report, and we collectively term all the groups as stakeholders, because they represent nearly every sector and, indeed, everyone that has a stake in the success of our logistics system and the health of the state’s economy.

### 3.4 ***Stakeholders***

Interviews and group visioning sessions were conducted with a number of public and private stakeholders so that their visions and aspirations could be captured. This section summarizes these interviews and group sessions.

3.4.1 **Area Partnership Commissions**

North Carolina’s regions are increasingly aware of the need for greater cooperation and coordination. As logistics improvements take on greater urgency, and as limited capital resources drive cost effective solutions, the Partnerships and the State Department of Commerce look to where they can combine efforts and resources to form solutions that bring new business into the state as well as identify logical differentiators that each region uniquely presents.

3.4.1.1 **Northeast Partnership**

North Carolina’s Northeast is a region in the midst of what the Northeast Commission calls a “transformation.” Described as the “poorest region” with demographics that are “challenging,” the region’s future economic success will depend on “cluster area development.” Four areas of development exemplify the Northeast’s vision.

- *Aviation.* With a Coast Guard air base and three commercial airports, the Commission is looking to enhance training programs in conjunction with the city/state university at Elizabeth City. There is land available but there needs to be a skilled work force to improve economic viability.
- *Automotive research.* With proximity to I-95 and its mid-Atlantic location the region’s plans are to be an automotive technology and research center of excellence.
- *Biomass fuels and processing center.* With adequate rural acreage, the region looks ahead to being a “cellulosic-based” research center; such research would develop a class of biofuels that would be less prone to increase the prices of staple foods, as we are seeing during the current ethanol boom.
- *Residential growth and increased tourism.* As undeveloped land becomes less available, the Northeast is viewing its geography and physical attractions as a key to future economic prosperity. Key is the proximity to the Hampton Roads Tidewater area. However, the region must plan ahead to avoid the congestion and ill-planned development in order to preserve a highly attractive quality of life.

Transportation infrastructure needs are highlighted by connections to major highway networks and corridors into Southeast Virginia as well as the Outer Banks.

3.4.1.2 **Eastern Partnership**

The Eastern Partnership focused on need for expanded broadband communication, and for improved connectivity to the Global TransPark and the NC Port at Wilmington. The region is also keenly aware of the need for process changes, viewing current systems as Balkanized, with too many silos characterizing the state’s approach to resource allocation in support of economic development. There is a need for greater coordination and integration of effort among the State’s economic development community including a strong role for DOC. In addition, there is a need for better coordination among key state organizations including NC’s DOC, DOT, Labor, community college system, university system, among others. The region envisions a diverse approach to potential clients and economic development with a focus on military and defense related opportunities, marine trades, especially in the area of small craft, bio-tech and life science, agri-business, with value added high tech services, and tourism.

Infrastructure needs include better connections to the Port of Morehead City, including limited access improvements to Hwy 70 and better utilization of the Norfolk Southern rail line. The region must also take better advantage of the Global TransPark.

### 3.4.1.3 Southeastern Partnership

The Southeast Partnership is focused on distribution centers, hoping to duplicate the successful business model at the Port of Savannah. Logistics is crucial, primarily due to the NC Port at Wilmington, but also because of the soon to be finished I-73/74. The Wilmington Port will continue to be the main economic driver in the region and the Port’s planned expansion is vital to that growth. Critical to the success of the Southeast is teaming with the NC Ports and taking advantage of its existing facilities at Wilmington and the proposed terminal in Brunswick County. The NC ports also need the Partnership to succeed. The development of new distribution centers will allow the port can attract additional services, covering more ports in Asia and developing a European service. Manufacturing is another economic engine that would take advantage of proximity to the port and possible distribution centers.

Critical issues include preserving acreage for distribution centers, which is becoming less available as the population base grows. Policy tools, such as zoning and tax incentives, may make land more attractive for distribution centers than for commercial and residential development with lower economic multipliers.

### 3.4.1.4 Piedmont Triad Partnership

Over the next two decades the Triad envisions a future that will include:

- *Aviation:* FedEx and other carriers will establish a major air cargo hub that will be effectively linked by road and high speed rail to other regions, including Charlotte. The area will become, in fact a major “Aerotropolis” such as the facility in Alliance, Texas. A key business target supporting aviation will be the emergence of the region as an east coast hub for perishable freight shipment, surpassing Miami for high value and lightweight air freight
- *Global distribution and logistics education center.* Two universities lead this effort (NC A&T and UNCG) but there are 11 universities and 9 community colleges that all have to some degree an emphasis on logistics. K-12 coordinated effort.

Investment in Honda Jet’s new corporate headquarters, which is combined with manufacturing and distribution in the region, is an example of the sort of manufacturing and aviation-centered growth sought by the region. An example of Greensboro’s logistics leadership position is the fact it co-leads (with Memphis) the Department of Labor’s Workforce Innovative Regional Economic Development initiative in transportation and distribution.

Key issues to be addressed include:

- Developing public and private sector partnerships to create the logistics vision.

- Coordinating with other partnerships to maximize all advantages and minimize disadvantages
- Enhancing access to ports in NC as well as Charleston, Norfolk, and Savannah
- The need for an entity to identify and coordinate planning and marketing efforts, which should be located in Greensboro. High level board with Governor's involvement in Board selection, and across State agencies such as Labor, Commerce, Transportation, along with Universities, Community colleges, Partnerships, and Private sector—shippers and carriers.
- Sustainability and innovative transportation strategies

Four sectors lie at the heart of the piedmont's strategy:

- Logistics and distribution
- Advanced manufacturing
- Health care R&D
- Creative enterprise in the arts (cultural enhancements leading to improved quality of life)

Infrastructure needs include the completion of highway improvements now planned or underway. Public-private partnerships are anticipated, supported by tolling for such improvements. Norfolk Southern and CSX track improvements are also important if freight throughput goals are to be achieved.

### 3.4.1.5 **Research Triangle Regional Partnership**

Key issues for the Research Triangle Partnership include the following:

- Moving people and goods in an area lacking one major urban center; instead, people move to and from multiple points in the region.
- Support the manufacturing sector, which employs eight percent of the workforce.
- Build roads to non-urban areas
- Provide direct global access through RDU airport, beyond the limited service offered by American Airlines.
- Asset management must be incorporated as a transportation infrastructure imperative; the focus must be on ensuring effective capacity and reliability.
- Focusing on key business sectors such as advanced medical, agricultural and biotechnology, analytical instrumentation, logistics and distribution, and the already existing vehicle components industry.
- Maintaining environmental quality, and air quality in particular, to enhance and maintain the high quality of life that drives economic growth in the region.
- Continued commitment to infrastructure even in capital scarce times, so as to remain competitive in the global market.

### 3.4.1.6 **Charlotte Regional Partnership**

Historically, modern transportation infrastructure has been a strong point in Charlotte’s economic prosperity. It is critical now to focus on choke points and avoid becoming another Atlanta. A key issue is improving I-85 including the potential for tolling as a funding source. Work force mobility is becoming affected.

The State needs to focus on the importance of infrastructure development—to create more appreciation as an economic catalyst. Mass transit is now justified in Charlotte, and will be in other regions soon if not already.

Process changes need to be made to improve coordination of state’s economic development strategies and programs.

Norfolk Southern’s planned intermodal rail yard at the Charlotte Douglas Airport represents a significant improvement. Congestion which was a major problem will be alleviated and the economic impact will be substantial. As a result Charlotte is and will continue to be global business hub.

Aviation, for both air cargo and passenger, is important. Companies use UPS out of Columbia SC and FedEx out of Greensboro, but most of the freight moves out of Charlotte Douglas.

Manufacturing:

- Mecklenberg County has more manufacturing employment than the rest of the State combined. 65 percent of the region’s economic activity is manufacturing based. Logistics is crucial today and in future to maintaining the manufacturing legacy.
- New bio-technology is the wave for the future of legacy manufacturing sectors such as textiles. An example is PillowTex with its new campus of 6 million square feet. The national average for manufacturing economic impact is 11-12 percent. Charlotte is moving *downward* toward the national average.
- Better infrastructure investment for goods and people movement is more important than subsidies and tax incentives. Must develop corridors for effective freight and people movements, e.g., tying together Statesville and Salisbury. Gaston county access can be improved through investment in 20 mile stretch—those critical bottlenecks must be identified and improved. Low cost and high mobility are key factors in bringing business to NC.

### 3.4.1.7 **Advantage West Partnership**

For the Advantage West Partnership, strategic targets include:

- “Advanced manufacturing sector” as NC will always be manufacturing state and this is next phase.
- Workforce development, with a focus on apparel and case goods. Principle needs are for machinists, especially in plastics technology.

Infrastructure needs include:

- I-26 connector
- inland port—partnering with railroad interests to make it feasible

Process changes that would be beneficial include:

- Local governments taking lead in advocating importance of goods movement and transportation improvements
- Tolling for truck only lanes (TOL) could be acceptable

### 3.4.2 Supply Chain Consortium

The study team conducted numerous interviews and also used the services of the Supply Chain Consortium's database of benchmarking and best practices for logistics and goods movement.<sup>54</sup> The Consortium consists of more than 200 retail, manufacturing, distribution and wholesale companies that focus on the movement and storage of raw product, inventory, sub-assembled goods and finished product throughout the world. Many Consortium companies have headquarters and main offices in North Carolina or have major distribution and manufacturing facilities in the state. Many of the retail members of the Consortium have a market presence in the state which requires distribution and transportation infrastructure to support.

As part of the data gathering aspect of the project, the Consortium's database was queried regarding key decision criteria of each companies supply chain logistics processes, procedures and policies that could be used to determine significant issues that would create incentives for companies to locate to North Carolina or expanded their current North Carolina Operations. The database was also used to collaborate the findings from the numerous interviews conducted asking the same or similar questions.

Our assumptions as we queried the database were:

- 1) North Carolina has the population centers and is growing rapidly enough so that logistics competitiveness is a major issue that needs addressing;
- 2) Industrial and consumer markets are favorable to economic growth;
- 3) Physical and/or financial constraints are not so extensive that reasonable solutions are not ruled out;

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<sup>54</sup> Courtesy of Tompkins Associates, Raleigh, NC. Tompkins Associates has been the administrator of the Consortium and its associated database since 2004.

- 4) Non freight demands on transportation and transportation infrastructure are considered but placed into the economic development context of the needs of the State.

Additional study considerations were given to:

- 5) North Carolina port capabilities for imports and exports were compared to other regional ports (Charleston, Savannah and Norfolk)
- 6) Inland truck, rail and intermodal capabilities are existing or will be developed as the needs arise;
- 7) Carriers and transportation services providers serving North Carolina (TL, LTL, drayage, ocean, air cargo, rail and intermodal, parcel and 3PL's) have, or can develop, the capabilities and capacities required to service new and/or expanded demands for their services.
- 8) Distribution and warehousing development capabilities and capacities will be met with increasing demand;
- 9) transportation infrastructure capacities (as defined in 3.1 above) can and will be increased to meet demand;
- 10) Existing industries and companies in the State can expand their operations plus others who could relocate to the State were considered as part of the database query.

The important conclusions from the database query include the following:

- Company goals for network optimization remain focused on cost minimization and improvement in customer service. Another factor that we expect is a part of costs and profits East Coast ports will see significantly increased volumes in the next 3 to 5 years as companies continue to shift which ports they use and overall import volume grows. Which ports and transportation corridors (road and rail) will be the beneficiaries of the growth depends on a number of criteria, including:
  - Port and terminal efficiency
  - Carrier effectiveness (includes road, rail, air and ocean)
  - Infrastructure and transportation corridor capacity improvements
  - Removal of capacity and congestion as constraints
  - Reductions in the risk of major disruptions in service and solid contingency planning
- Companies are key decision makers with respect to ports, transportation and distribution centers, but we can't ignore the impact that carriers, vendors and 3PL operations have on those decisions. The trend is toward companies managing less supply chain functions than in the past.
- Companies do not always do as thorough a job with their port selection decision making as we might believe. Active marketing is needed to sell them.
- Consideration must also be given to the export side of the supply chain. The imbalance of material flow is an obstacle to growth.
- There is an increasing trend toward pool consolidation centers as a major part of companies supply chain strategies. This must be a part of the package

- More companies are relying on smaller faster regional distribution centers which cross-dock products instead of large master distribution centers which stock all products.
  - Attracting major parcel carrier operations to the state will be favorable for growing number of companies who use parcel for product shipments.
  - The trend is for companies to outsource distribution and/or lease facilities to improve flexibility and reduce their asset base. This trend is also a strategy employed to keep the overall supply chain network in balance with changing customer needs,
  - Issues such as shipment security and theft loss are major factors in decisions to locate any kind of operation to low crime states.
  - Most companies do not feel that their logistics networks are optimized which indicates major opportunities for improvement if a well thought out strategy is employed.

Points corroborated by the Supply Chain Consortium's database query vis-à-vis the interviews conducted by the study team include:

Infrastructure:

- A shipper's (manufacturer and/or retailer) ability to efficiently and quickly reach and use inland connections from an international port is a critical factor in a shipper's decision to use a particular port over another. Reductions in the cost of movement and lead-time are essential metrics.
- The transportation infrastructure associated with the Global TransPark is critical to its success with shippers. Challenges exist in rail and road connections for this type of inland service to draw companies to the region.
- The major over-the-road trucking issues in many of the major markets in the state relate to traffic and congestion concerns.
- Capabilities must exist across all transportation modes servicing a region to get shippers to grow, expand or relocate. Shippers must have multiple mode choices in order to accommodate rapidly changing demand and customer needs and transportation economics.
- Additional capabilities are needed in rail intermodal for most shippers to improve transportation costs and delivery lead-times.
- Road maintenance programs must keep up with the increased usage of major traffic arteries.
- North Carolina's geography plays a role in congestion and the cost of building new infrastructure. Congestion created by steep grades is hard to mitigate. The beautiful mountains and rivers are costly and expensive impediments to new freight transportation infrastructure.
- A majority of Consortium members (55 percent) are planning major shifts in their port usage over the next 3 to 5 years. The growth of regional ports is not expected to be the same across all East Coast ports. The operations that will see the largest gains are those that are viewed as having the best capabilities and provide the most value to the companies supply chains. The level of growth predicted for East Coast ports

indicates a real opportunity for NC ports and for regional transportation from these ports if the shipping community understands the benefits to be gained.

#### Port Operations

- Competing state port operations have major capacity and capability expansions and enhancements underway that are providing them a competitive advantage in relation to the ports in North Carolina.
- Shippers are looking to the ports with the most efficient operations and a minimum of constraints when making port selection decisions. Issues such as hours of availability for gates and terminals, trucker productivity, vessel scheduling and use of advanced technology are critical criteria.
- Adequate and flexible storage options in close proximity to the port are also considered highly desirable by the shipping community.
- In order for port operations to be viewed positively by shippers and influence their decision making in favor of NC ports congestions issues must be overcome. Companies are seeing increased congestion due to a lack of rail service and capacity to ports as well as inefficient port practices that limit productivity.

#### Distribution Operations

- The types of distribution operations available in the region must match the requirements of shippers in order to attract businesses. The trend is toward facilities with more dock doors for cross-docking goods and capable of cargo track and trace systems. Facilities designed for transshipping containerized goods are also increasing in use.
- Distribution operations are also seeing a large increase in the number and types of value added services they are required to perform, including labeling, customizing and making goods store ready.
- Distribution capacity must be available when and where needed by shippers. There is an increase in the use of outsourced distribution centers to meet flex and seasonal products needs.
- The high quality labor force is needed for today's rapid flow distribution centers.
- Company's views on their distribution network strategies have evolved over time. Today DC operations must be very flexible in terms of what products are fulfilled from each DC, the order quantity is generally smaller in size and dispersed geographically into a wider region. As companies model their distribution networks they are building flexibility into the plan by utilizing third party warehouse services or leasing facilities instead of building. Companies are also using overflow facilities for limited time periods to reach peak period requirements and using manufacturing facilities vacated by outsourcing as distribution operations.
- Very few companies believe their supply chain networks are optimized. Constant change and realignment of suppliers and customers makes optimizing nearly

impossible. Companies feel that their DC’s are closest to being optimized and that their manufacturing operations are the least optimized.

*Parcel Operations*

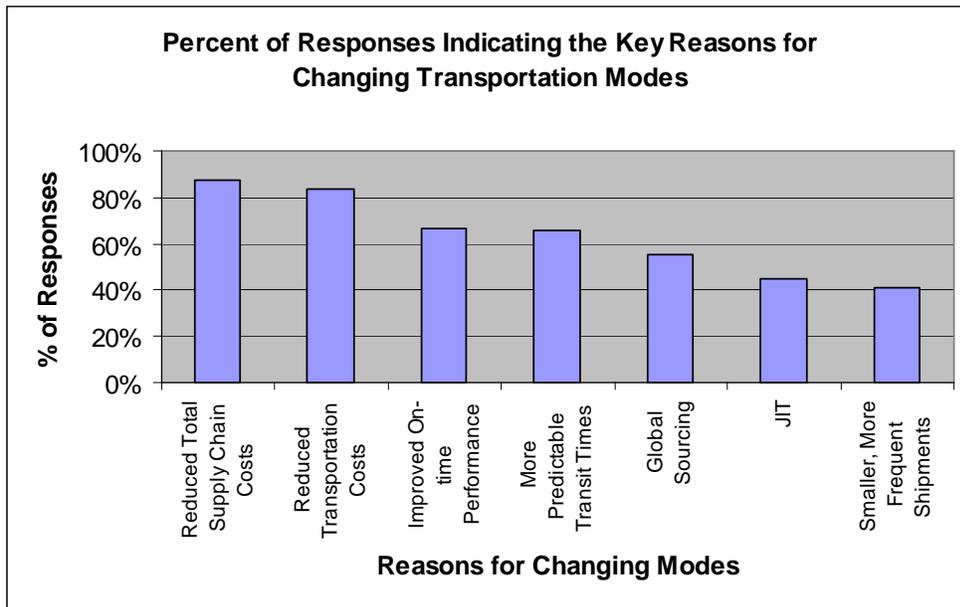
- The location of parcel hub facilities is a strong attraction particularly for retailers, wholesalers and distributors who ship primarily via parcel.
- Parcel shipment has seen significant growth over the last several years keeping pace with customer demand for overnight and next day delivery spurred by internet purchasing. 65 percent of Consortium members have experienced an increase in parcel service and most of that is on the outbound to customer’s side of their businesses. This trend will continue, making the location and efficiency of parcel providers very important to North Carolina.

When viewing the decisions companies make with respect to transportation modes it is important to note that more than a third of inbound ocean shipments are controlled by a third party logistics provider. The point where control transfers to the company varies greatly from at the port to not until the product has reached its final destination. This is important to understand so that efforts to attract manufacturing and distribution to North Carolina must not only focus on the companies themselves, but must also reach third party providers.

Consortium companies are predicting major shifts in the transportation modes they plan to use in three years. Most prevalent is an increase in the use of consolidation operations followed by rail intermodal transportation. Some of this increase is clearly based on the forecast of overall increases in ocean inbound shipments

**Table 3.1 Mode Selection Changes Forecast**

Transportation Mode Selection Changes Forecast Next 3 Years - Percent of Responses				
	Decreasing	Increasing	No Change	Weighted Average % Shipment Change
Truckload	28.6%	39.3%	32.1%	0.2%
LTL	31.0%	37.9%	31.0%	0.0%
Inbound Consolidation	7.2%	59.4%	33.4%	14.1%
Rail-Intermodal	7.4%	59.1%	33.3%	6.1%
Rail-Boxcar	7.7%	26.9%	65.4%	2.6%



**Figure 3.1 Key Reasons for Mode Change**

*Legislative Issues*

The industry standard length for trailers is 53' and any legislation that restricts the use of 53' trailers is a major challenge for shippers. We recommend that the legislature revisit the 53' restriction to determine if there are interstate or other primary road corridors that can safely accommodate longer or multiple-trailer combinations.

**3.4.3 North Carolina Railroad Company**

The North Carolina Railroad (NCR) owns and manages a 317-mile mostly single track rail line between Charlotte and the Morehead City Port Terminal. The NCR has a freight operations agreement with Norfolk Southern Railway and Amtrak operates passenger trains between Selma and Charlotte over the line. The line carries over 70 Norfolk Southern freight trains and eight Amtrak passenger trains daily.

There is currently underway a major study the purpose of which is to investigate the potential use of the NCR rail right of way as a corridor for commuter rail, and to provide information to regional and local organizations for planning and cost assumptions as they consider the feasibility of commuter rail options utilizing the NCR corridor. Completion of the study is anticipated in July 2008.

The study will consider two segments of the corridor—Burlington to Greensboro, to serve the Piedmont Triad area; and Goldsboro to Burlington, to serve the Research Triangle area. Service assumptions are four morning and four evening trains. HNTB is conducting the study, which will assess infrastructure requirements (track, bridges, railroad signal systems, facilities, etc.) and costs.

In remarks to the 21st Century Committee, the NCRRC envisioned a 2020 scenario with:

- 50 percent more double tracking in place, primarily between Charlotte and Raleigh<sup>55</sup>;
- A dozen more freight trains daily to the Intermodal facility at the Charlotte airport;
- Freight shipments growing from the present 1.5 million to 2 million annual carloads; and
- Commuter rail service linking the Piedmont, Triangle, Metrolina, and Eastern North Carolina.

NCRRC is about half way through a \$160 million capital investment program that will run through 2012 to improve safety, speed, and capacity.

- NCRRC supports economic development in North Carolina through the maintenance and development of rail infrastructure.
- Awareness and appreciation for the importance of freight transportation—economic impact of freight rail higher than passenger though public perception is highly skewed toward passenger rail
- Misinformation and stove-piped modal approach impedes optimal development of freight transportation network in NC. Need a comprehensive plan.
- For example, NC Ports, GTP and NCRRC could work together better to address both industrial development and passenger rail needs
  - Must have data in order to develop an effective logistics plan. What are the needs of the key freight generators
  - Based on data, can begin to develop priorities and metrics
- Sustainability--Rail transportation has significantly less carbon footprint than trucking

#### 3.4.4 **North Carolina State Ports Authority**

The North Carolina State Ports Authority has historically found itself in a difficult competitive position due to its geography and history. Much larger, more modern and better connected competing ports in Hampton Roads, Charleston and Savannah provide gateway port facilities and services to much of North Carolina. For example, NC Ports business development professionals estimate that today approximately 70 percent of containerized goods destined for or originating in North Carolina access our state through ports outside our state. However, given the trade and economic trends outlined in Chapter 2 and bold moves to develop infrastructure by NC Ports and the state of North Carolina (including Radio Island property consolidation and other infrastructure investments in and around Morehead City port, and the deepening of the Cape Fear River to 42 feet, the purchase of 600 acres in Brunswick County and major equipment upgrades in Wilmington), NC Ports finds itself a significant emerging player in the market for port services not only in our state but in the South Atlantic port range.

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<sup>55</sup> It is worth noting that double-tracking was an issue that arose at many visioning sessions, because double tracking would also improve the reliability of intercity rail passenger service.

The critical needs of the port at Wilmington to address these opportunities in the containerized trades depend on two major developments: CSX’s interest in making available regular intermodal rail service (essential to support European and South American container services) and, on the interest of distribution center developers and logistics service providers to establish a network of distribution centers in Southeast NC, similar to successful efforts in Norfolk and Savannah. The Port Authority has set itself up to succeed. The market seems to indicate an increasingly favorable position for Wilmington. Infrastructure improvements are either accomplished or planned. Management structure is more efficient and nimble. NC Ports depends on outside public and private sector interest and commitment to doing business at the port. This holds true in Morehead city as well. As the NCSPA executive director stated, future expansion depends on the extent private capital is contributed to equity. Moreover, as an authority that receives no subsidy for its operating expenses, NC Ports must be mindful of its financial position. Alternative uses of its resources to non maritime functions (e.g., commercial uses that generate freight and rents) therefore is a consideration to the extent needed revenues can be generated to support overall strategic port planning requirements – even if those new uses irrevocably change the maritime nature of the property.

### 3.4.5 North Carolina International Terminal

NCIT (North Carolina International Terminal) is a proposed new marine terminal to be located The container terminal will be built on 600 acres of undeveloped land in Brunswick County, about 4 miles from the mouth of the Cape Fear River. The site represents one of a very few locations along the east coast that is suitable for development of a new deepwater terminal. The development of the international terminal is in the initial planning stages. While similar projects typically take 10-20 years to develop, the North Carolina State Ports Authority is pursuing an aggressive timeline with expectations of opening much sooner. The Port Authority estimates the project cost to be in the range of \$1.7 billion or more. Funding will likely have to come from many sources, including the NC State Ports Authority, state and federal funds, and private financing.

According to the NC State Ports Authority, market forecasts project “container traffic to exceed port capacity beginning between the years 2014 and 2019 –around the time when NCIT is projected to start operation – and the unmet demand is projected to be 40 million TEUs (Twenty-foot Equivalent Units, an international measure of container volume) by 2030.” NCIT hopes to capture nearly 1 million TEUs of business soon after opening and triple that volume by 2030. Economic models suggested that revenues from projected volumes would justify funding construction of the terminal and provide a return on investment. Elsewhere, plans for capacity expansion in Norfolk, Charleston, Savannah and Jacksonville will likely increase east coast capacity by over 10 million TEUs.

The competitive strategy includes several key elements. These are: a navigation channel depth in excess of 50 feet to attract large vessels, engagement of markets more than 500 miles from the terminal so that 50 percent of the containers move by rail, efficient highway access to meet market and distribution center needs, high productivity facilitated by the best available

technology, processes and practices to minimize shippers' costs, competitive services to reduce total supply chain costs, and stakeholder engagement.

Three development options are foreseen: (1) development by the Ports Authority; (2) development by a private terminal operating company using a public private partnership; and, (3) development through a joint-venture approach. A public private partnership concession is seen as the best approach. It has the highest likelihood of meeting the demand forecast timeline and it meets the most rigorous tests for return on investment.

The most recent study for NCIT calls for a high-density, automated container terminal capable of serving 12,000-TEU vessels. At full build-out it would have a capacity of 3 million TEUs annually (approximately 1.8 million containers). Total cost is estimated at \$2.28 billion of which \$1.7 billion would be the responsibility of the authority with the remainder provided by other parties. Funding will be provided from a combination of Federal, State, and private sources.

At the heart of the rationale for NCIT is an expectation that mid-Atlantic ports will need added capacity to fill the gap created by west coast ports as they become unable to keep pace with east coast demand for goods. Significant rail investment will be needed to clear tunnels and bridges to allow doublestack traffic to move inland. Funding for these clearance improvements has not been secured.

It must be noted, however, that the studies identified above are based upon an intermodal concept that is deeply rooted in West Coast cargo operational mentalities and philosophy. In order for rail intermodal to be effective, a minimum distance is considered to be between 500 miles and 750 miles for costs, efficiency, time and service reliability. The western railroads have perfected the art of moving vast amounts of containers east and west on a well oiled and maintained system of operational controls and infrastructure. The eastern railroads have not perfected this system. They have concentrated on the movement of goods north and south along the coast and venture into the east-west routes in the northeast (New York to Chicago) and in the deep south (Atlanta to Los Angeles). Infrastructure required to balance the system, especially in regards to North Carolina cargo in non-existent going inland towards the west. Thus the current (and for the foreseeable future) rail philosophy is geared for a long haul, north-south operation with few, if any, stops in North Carolina. That is not to say that intermodal traffic will not find its way to or from the State, but reality will set in when the railroads will require a balanced container flow in all directions. At the current price of fuel no transportation company can afford to handle empty equipment or reposition empties for export loads. Instead the intermodal network is being honed down to a small cluster of balanced lanes which provide density for the railroads and velocity for steamship containers. With the majority of the population on the east coast within 250 miles of deep water ports trucking will continue to play a much greater role in the movement of cargo originating or being delivered to facilities in North Carolina.

In addition, NCIT plans a role in military logistics. An April 2007 Department of Defense Report to Congress on projected requirements for military throughput at strategic seaports indicates that Wilmington and Morehead City are among the nation's fifteen strategic seaports, capable of handling commercial and military requirements simultaneously. Planners for NCIT intend to augment these capabilities with rail access, roll on-roll off (Ro-Ro) capabilities, and an ability to

handle special military shipments. This would support the move of U.S. Army Forces Command (FORSCOM) and U.S. Army Reserve Command (USARC) to Fort Bragg and the Grow the Force initiative at USMC Camp LeJeune.

Adjacency to the All American Defense Corridor is another plus. This corridor will be a powerful tool for linking the strengths associated with military and Homeland Security programs. The corridor evolved from the Base Realignment and Closure (BRAC) Regional Task Force initiatives for the eleven counties surrounding Fort Bragg to transform the regional economy and workforce to meet the needs of emerging Defense and Homeland Security related requirements.

NCIT will provide enhanced port security through partnerships with neighboring facilities including the US Coast Guard, Progress Energy's Brunswick Nuclear Plant, the Military Ocean Terminal at Sunny Point, Archer Daniels Midland (neighboring facility), the NC Ferry Division, and Brunswick County Emergency Services. Such proactive security planning will add an additional layer of security to its neighbors, particularly the adjacent Military Ocean Terminal at Sunny Point.

### 3.4.6 **Global TransPark Authority**

Global TransPark (GTP) intends to become a major aviation based logistics center connecting global markets. Significant investment (\$60M) has been made and approximately an equal amount is needed to complete the most critical missing component needed to realize the original vision: connections to existing transportation networks, especially rail.

Strategic advantages that the GTP offers are its 11,500 foot runway and its 401 and 404 Environmental Permits that are already in place. Other significant strategic advantages include its designation as a Foreign Trade Zone, the Global TransPark Authority management team, the Education and Training Center, and the proximity of the GTP to 5 major military facilities in Eastern North Carolina.

The following sectors can derive the most benefit from the strategic advantages that GTP offers: aerospace manufacturing, aircraft service and maintenance, military supplies, military logistics, homeland security training, emergency / disaster relief, and distribution logistics / supply chains. Parcel distribution could be a very significant industry for GTP.

Several specific opportunities are now being pursued. These include:

- *Military and DOD*: light manufacturing, computer design/reverse engineering, support Bragg, LeJeune, and potentially the National Guard
- *Aviation and aerospace*: now has firm that supplies aircraft parts for used aircraft overseas
- *Free-Trade Zones*: both general and subzones, with more success in outlying subzones to date.

A case study that may prove relevant to the GTP vision is the recent Olympus Project, in which the GTP, NC Ports, NC DOC and the Governor's Office led an effort to convince Boeing to site the construction of its new aircraft in Kinston. The NC bid came in second, with the determining factor a lack of rail. That need is still present and it still is determinative. The Olympus Project revealed several important factors in our State's ability to realize its vision, as well as the potential for GTP—cooperation of public agencies as well as public/private teaming, the attraction of GTP and its adjacent resources, and the need to invest in transportation infrastructure.

### 3.4.7 Airports

Aviation is important to the economic health of the state for two main reasons: as a means by which people move in and out of the state, and as a means by which freight moves in and out as well. Proximity to airports with excellent passenger and freight handling capabilities is an important economic driver in all states, and, with the advent of the regional jet, and of jet-like performance in propeller driven craft, such as the Bombardier Q400, smaller communities like Greenville and Wilmington are able to enjoy more frequent passenger and light freight service.

As noted in this chapter, FedEx is developing a major parcel handling facility at the Piedmont-Triangle Airport (GSO), around which new economic growth can be expected given the easy access to airfreight. Industries that typically develop around such hubs, such as Memphis, include computer repair and redistribution, and the handling of sensitive or perishable goods. But the dominant airport for freight movement in the state remains Charlotte-Douglas International Airport (CLD), with Raleigh Durham International Airport (RDU) serving a key regional role in the eastern piedmont and eastern North Carolina.

The future of air transport is currently clouded by many uncertainties, including, primarily, the historically high price of aviation fuel. The impact on business aviation—flights using chartered or company owned planes—is not clear, but the impact of fuel prices on general aviation, such as sport and recreational flying, is substantial, and, if current trends continue, smaller airports will likely suffer major revenue losses as planes go unused.

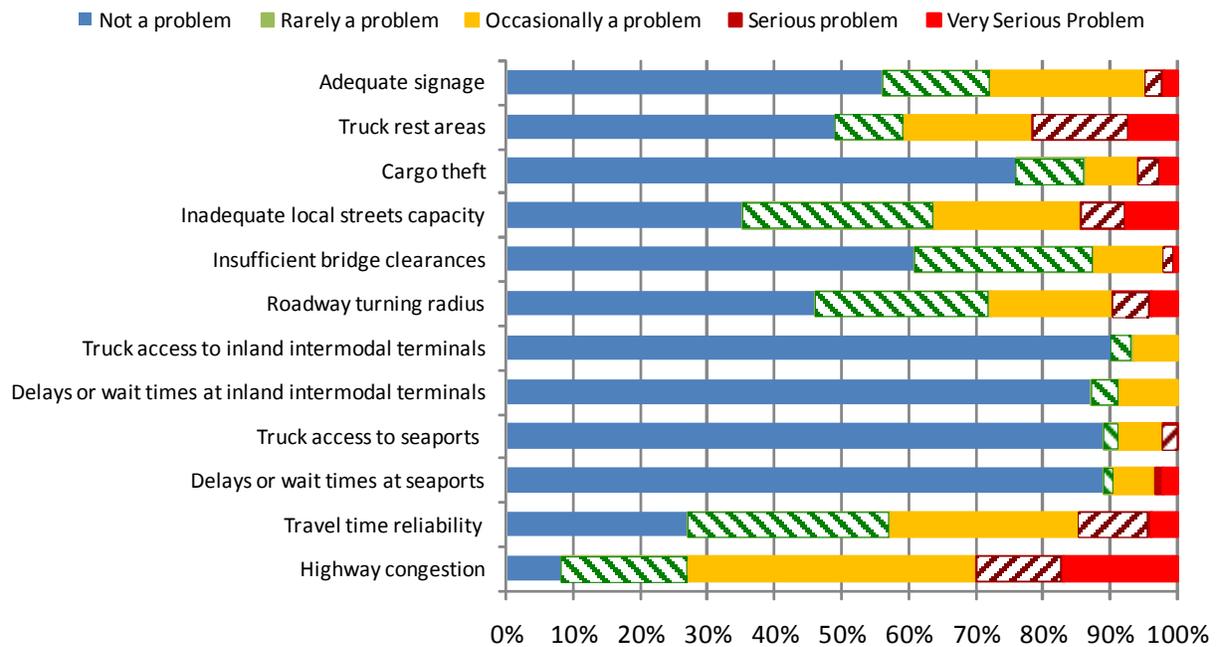
A recent study by ITRE and the Division of Aviation found that crucial features of airport attractiveness are pavement strength, runway length, and all-weather capability. Runway length and strength is important as newer, larger freight aircraft, such as the Boeing 747-8 and the Airbus A380 come on line. Aircraft this size pose significant challenges for airport owners, including, particularly in the Airbus case, the possible need to widen runways and taxiways to allow for passing distance and to avoid foreign object ingestion by the outboard engines that can hang over the sides of the taxiway into the grassy areas between taxiways and runways. On the other hand, the A380s wheel weight at landing is not any greater than a B747 or B777.

It is unclear whether the freight or passenger market will support large numbers of A380-class aircraft; it is more unclear whether such aircraft would serve North Carolina airports. But other large aircraft, on the scale of the B767, are likely to serve CLT, GSO, and RDU, and provisions for the volume of freight carried by these aircraft must be included in airport planning.

Beyond airport capacity, connectivity to the transportation network is crucial. Air freight operators cannot afford to have cargoes stuck in traffic or in logistics bottlenecks. Considerable effort must be devoted to ensuring that airports are supported with appropriate landside links.

### 3.4.8 Trucking Industry

Given the fact that most of the commercial freight--both in terms of value and weight--is moved over the highway network by trucks, it is critical to provide an environment in which where trucking companies can operate as efficiently as possible to enhance the economic vitality of North Carolina. Increased competition in the trucking industry and adoption of just-in-time delivery systems have forced the truckers to pay more attention to being efficient, and responsive to their customers' needs. There are various factors that may inhibit the efficient movement of freight such as traffic congestion, traffic accidents, weather, operating rules and regulations governing loading and unloading facilities, and lack of adequate intermodal connectors to ports and intermodal terminals, etc.



**Figure 3.2 Relative importance of various aspects of the truck freight system**

Parallel to the previous question, respondents were asked about any infrastructure improvements needed by year 2020 to improve goods movement in North Carolina. The main suggestions include: i) increase the Interstate highway capacity (increase the number of lanes from two to three on key corridors, like I-95); ii) complete/build bypasses around major cities and small towns; and iii) keep roads maintained. Interestingly, most of the suggestions were related to highways, and only one respondent cited capacity at seaports as a major concern. This might be attributed to the fact that only 16 percent of the sampled group uses airports, seaports, and intermodal terminals on a regular basis as mentioned before.

Based on the results of the survey and an overall assessment of the trucking industry, it is clear that highway congestion is perceived as a major impediment to efficient freight movement. Clearly, highway congestion increases the costs of transporting goods which are ultimately born by consumers. Traffic congestion and unreliability of travel times cause the trucking companies to waste resources which can be otherwise utilized to haul more shipments to increase productivity and revenue. Other than the need for a congestion-free highway system, truckers need adequate rest and parking areas on the Interstates as pointed out by the respondents to the survey.

In general, trucking companies oppose tolls. However, if the congestion reduction and productivity benefits of driving on toll lanes outweigh the alternative options tolling can be an attractive solution. For example, truck-only toll (TOT) lanes could provide congestion relief and better access to and from key ports and airports. Trucking firms and shippers might be willing to pay tolls in return for the increased speed, reliability, and payload offered by TOT lanes. Prospects for TOT lanes look bright since they are beginning to gain support in some states and among federal government agencies.

#### **3.4.9 Rail Industry**

There are two Class 1 Railroads in North Carolina.

CSX is a Class 1 Railroad (one of 7 in North America), based in Jacksonville, FL. CSX operates 1,137 miles of track in North Carolina, or roughly 44 percent of the total Class 1, right-of-way in the state. Their core network connects users on along the North-South Corridors of I-75/85/95 and along the east – west corridor of I-40. Other secondary lines connect between and around these primary lanes. Gateways with Western Carriers also capture shipments which parallel the I-10 corridor.

CSX has witnessed many changes over the last hundred years, as they (or their predecessor roads) have operated in North Carolina. Since the railroads were first built, they essentially still operate over their privately owned infrastructure. Today, given growth in transportation demand and an increase in environmental awareness, rail carriers strive to strike a balance between a common carrier obligation and maintaining network integrity. Network integrity in today's transportation lexicon is considered to mean providing a cost-competitive (versus other modes) and service-reliable product. Railroads compete with each other in certain lanes, and with other modes of transportation in certain regions.

During the last two decades trade from Asia has dominated the east bound flows in North America but, as recently as 2004, some trade patterns began to shift. These patterns are now more heavily influenced by the weak dollar, the strengths of exports and new port diversification strategies, now popular with many global shippers. Transportation is more dynamic now, than ever. Both east-west and north-south corridors have witnessed some dramatic shifts for not only container flows but other bulk commodity flows as well, such as coal. Historic rail competitors such as trucking companies are now using rail where possible in high frequency and long haul lanes. Public Private Partnerships along the I-95 corridor where CSX operates now help provide

funding to improve infrastructure and railway through put around some difficult chokepoints and bottlenecks.

Demand for rail service has grown as population and trade has increased. In order for the railroads to keep up with the demand, they are looking at various strategies to improve throughput over their existing network. To improve freight flow and velocity, strategies to eliminate chokepoints and add capacity to reduce congestion are being explored. CSX is considering physical expansion (double tracking certain corridors), operational improvements (load centering) and technical strategies, such as positive train control and new breaking technology to allow them to run trains closer together and increase freight volumes.

The development of larger industrial parks where multiple small shippers can aggregate their individual carload volume into one train stop with multiple cars, improves train efficiency. Short-line railroads are also experiencing growth and add value to the Class 1 railroad relationship when they can gather a number of shippers together and provide the Class 1 with a larger group of cars at one time. Any time spent switching cars on or off the mainline reduces the thru-put on the main rail corridor. Therefore any effort to combine shipments into larger train blocks is considered beneficial for a Class 1 railroad and helps with overall network integrity and end to end schedule performance.

North Carolina has a diverse terrain; mountainous areas are difficult and often expensive to improve capacity because of geographic limitations. Areas of higher population density often require slower train speeds if rail and highway crossings are not grade separated. This reduces train throughput therefore any public planning efforts to improve grade separations is welcomed.

Today CSX strives to be more nimble and responsive with shippers and potential network investors than was historically the case. The carrier views itself as a “small bit player” in the comprehensive scope of freight infrastructure and trade networks, primarily because much of their core route has been built. New investment decisions around capacity improvement and strategies to improve through put are central to the carrier’s future success.

In today’s transportation environment, the railroads are trying to stress partnership in long term investments and planning. In order to achieve a more fluid network, railroads are encouraging users of specialty rail car equipment to purchase their own equipment. This will result in users having to invest in rolling stock if they do not use the railroad provided multipurpose cars.

While CSX was reluctant to define the average length of haul for freight or commodities handled, it was clear that each business opportunity must be evaluated based on network contribution and impact.

For North Carolina there are several implications:

- Promote a short line railroads and short line investments. This will allow more users to access the Class 1 railroads while contributing to overall network improvements.

- From a land use and planning perspective – promote the development of integrated logistics parks which promotes shippers to locate near one another to minimize railroad switching time and expense.
- Grade separation programs will become more important as freight density grows. These programs will help reduce vehicle delay at grade crossings and will help rail carriers operate at more efficiently.

Norfolk Southern (NS) is a Class I railroad operating 21000 miles of track in 22 states, and nearly 1500 miles in North Carolina. NS also owns and leases the track operated by the North Carolina Railroad Company.

NS planning prepares for continuing US dependence on international trade flows and foreign capital investment in transportation facilities. This dependency will fundamentally place more pressure on assuring that our nation's transportation networks are efficient, modern with adequate capacity. Global capital will constantly seek best returns on investment. With the growth in commodity markets such as steel and forest products, which are strengths in North Carolina, moving product to market must be highly efficient especially given the increases in logistics costs.

NS has also taken the sustainability challenge seriously. Sustainability serves NS' market interests, especially viz. the trucking sector (railroads have 1/3 the carbon footprint of trucks per fuel ton/mile.) NS will soon roll out a carbon footprint calculation for shippers considering moving by rail or truck. But, the sustainability equation is also of critical importance to NS as it considers capital investment and operating strategies. Efficient movement of trains with minimum economic and environmental costs means a rail system which operates at optimal velocity and reliability. Development and coordination with other transportation infrastructure and with passenger rail is imperative.

In NC, the largest and most important project by far is the Charlotte Intermodal Yard, a \$100 million joint venture among NS (majority funding), the state of NC (\$8-9M), the city of Charlotte, the federal government (\$14M) and the Charlotte Douglas International Airport (CDIA) (\$20M). This project is part of NS' Crescent Corridor and is critical for intermodal moves through the Charleston port and new international trade growth. But its primary market is domestic for both car load and containerized cargo moves. The development was well coordinated with the CDIA, the Charlotte Partnership and the NC DOC and NC DOT. Excavation, which will support CDIA's third runway, will begin in 2011.

This project is a key component of NS Crescent Corridor. With two to three billion dollars projected to be spent, the Crescent Corridor will transit from New Jersey to Birmingham Alabama, connecting with the Meridian Speedway to New Orleans. There are ten inland terminals that will serve as nodes in this corridor—five new and five expansion of existing sites, such as with Charlotte as well as Memphis.

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- Promote a short line railroads and short line investments. This will allow more users to access the Class 1 railroads while contributing to overall network improvements.
- From a land use and planning perspective – promote the development of integrated logistics parks which promotes shippers to locate near one another to minimize railroad switching time and expense.

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### 3.4.10 Rail Corridors

Based on the railroads need for density and long haul economics each of the Class 1 railroad carriers has introduced new rail corridors aimed at improving inland connections and creating a planning model to rally public private partnership programs around. The NS has proposed two corridor programs, one which will impact North Carolina. The first program is the Heartland Corridor which connects the Port of Norfolk to Columbus, along the corridor tunnels will be cleared, inland intermodal terminals will be created to serve rural areas and public funding will be used to aid the program to help promote more traffic to use the rail corridor than the highway alternatives between Virginia and Ohio. This effort was a long term planning effort which required the collaboration of many public and private stakeholders.

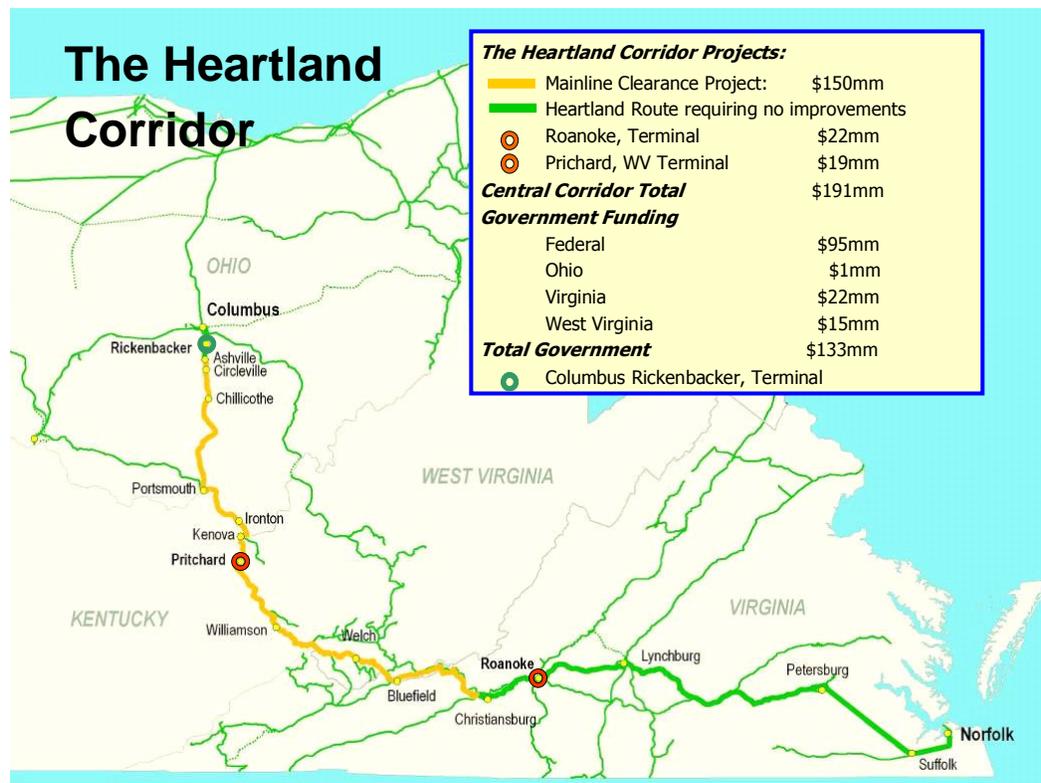
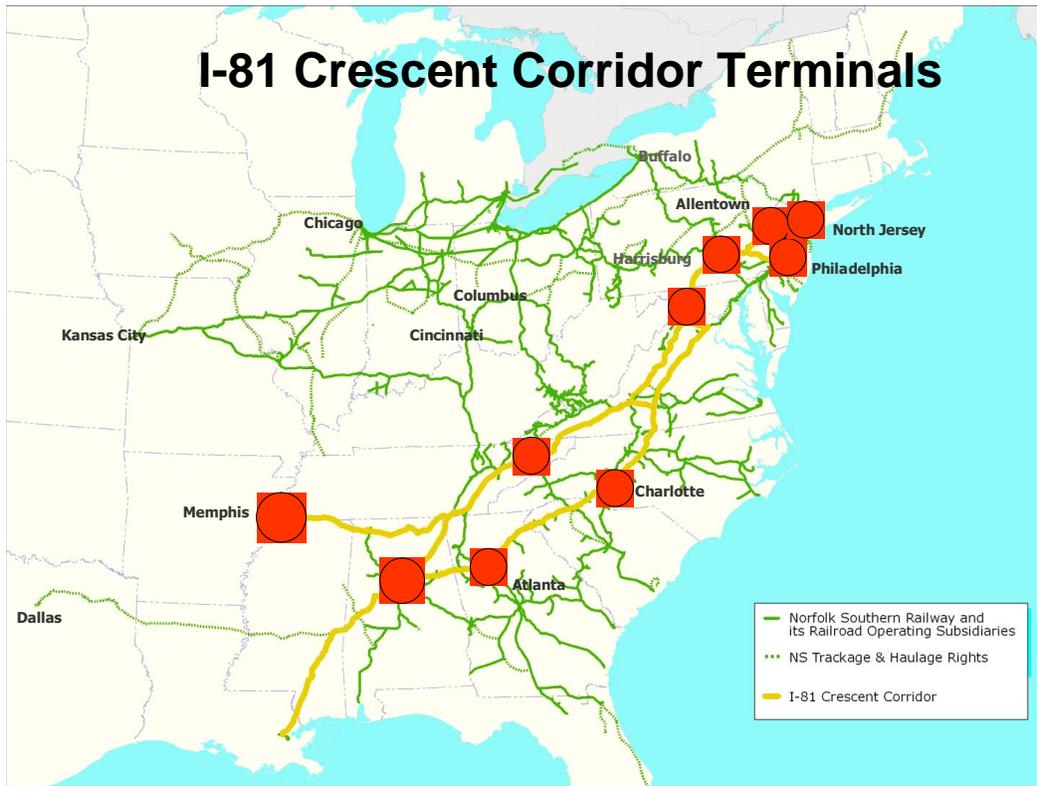


Figure 3.3 The NS Heartland Corridor



**Figure 3.4 The NS Crescent Corridor**

The second corridor that NS has announced is the Crescent Corridor. This corridor connects North Jersey and New Orleans and will operate along the I-81 inland corridor. This corridor will improve the intermodal traffic capacity at Charlotte and help improve connections to North Jersey and the deep South. This corridor is fashioned after the Heartland Corridor and includes public private partnerships, tunnel clearance projects and rural terminal investments.



**Figure 3.5 CSX National Gateway Corridor**

CSX Corporation launched the National Gateway, a \$700 million public-private infrastructure initiative to create a highly efficient freight transportation link between the Mid-Atlantic ports and the Midwest.

When completed, the National Gateway would provide greater capacity for product shipments in and out of the Midwest, reduce truck traffic on already crowded highways, and create thousands of jobs that directly or indirectly support the National Gateway.

CSX has already committed \$300 million to the National Gateway, and will work with several states and the federal government to secure additional funding.

The National Gateway incorporates two primary parts. First, CSX would build or expand several high-capacity, job-producing intermodal terminals where product shipments are exchanged between trucks and trains. At the same time, CSX would work together with state and federal government agencies to create double-stack clearances beneath public overpasses along the railroad. Double-stack clearances allow rail carriers to stack intermodal containers atop each other, enabling each train to carry about twice as many cargo boxes. Currently many overpasses only accommodate single-stack trains.

The National Gateway was launched at the offices of Pacer International, a CSX customer, in Dublin, Ohio with Governor Ted Strickland. The governor has pledged to work with state and federal officials to support the initiative, which calls for two new intermodal terminals in Wood County and Columbus at a cost of \$130 million to CSX. The terminals will ultimately spur the development of related businesses and thousands of jobs to support them.

"In Ohio, this initiative helps solidify our state's position as a transportation gateway for the country," said the Governor. "This is a major competitive advantage that can greatly benefit the citizens of Ohio, and the state of Ohio is committed to doing its part to help build this sort of needed infrastructure. In doing so, we'll also be setting an example for other states around the nation."

The National Gateway will enhance three existing rail corridors that run through Maryland, Virginia, North Carolina, Pennsylvania, Ohio and West Virginia. Those corridors include:

- The I-70/I-76 Corridor between Washington, D.C. and northwest Ohio via Pittsburgh;
- The I-95 Corridor between North Carolina and Baltimore via Washington, D.C.; and
- The Carolina Corridor between Wilmington and Charlotte, North Carolina.

The U.S. Department of Transportation forecasts that by 2020, overall freight tonnage hauled in the United States will have grown by 70 percent from 1998 levels. The National Gateway infrastructure initiative is designed to address the ever-increasing demands placed on the nation's capacity strained freight network.

A study of the National Gateway project by Cambridge Systematics, a nationally recognized transportation research firm based in Cambridge, MA, found that every \$1 of public money invested in rail infrastructure improvements will lead to \$8 in public benefits. The study noted that by improving the flow of freight and shifting freight transportation from the highway to the railway, the initiative will improve safety, relieve congestion, benefit the environment and reduce highway maintenance costs.

These corridors are significant undertakings which should be supported and promoted by North Carolina. First of all they help provide options for modal conversion. Not all trucks or truck trips can be converted to a profitable railroad line haul. But the presence of these corridors will help separate pass through freight from regional activities. The second primary attribute that these corridor designs promote is access to distant markets and connections for rural terminals. North Carolina should work closely with CSX and NS to promote access for all North Carolina shippers.

#### **3.4.11 Third Party Logistics Service Providers**

Third Party Logistics Provider services (3PLs) have grown as the scope and the complexity of our supply chains have expanded. In the 80's and 90's 3PL's helped growing companies focus on their core competencies by taking over the complexity of international shipping and the monitoring of inventory movement across and between various modes of transportation and handling stop offs in route to either consolidate or deconsolidate shipments. As the systems became better and communication improved via internet and wireless communication the price of developing in-house logistics software became prohibitively expensive. Outsourcing technology to 3PL's helps companies stay abreast of the latest functionality without substantial investment. The largest single technology that 3PL's bring is the Supply Chain Management systems, including track and trace capabilities (also including RFID and routing software) and other developments which require systems capable of handling vast amounts of data, often in excess of in-house capabilities. 3PL's have become the software provider as a service agent and deals directly with any system upgrades, maintenance and performance issues. Contracts typically run for 2-5 years in length with penalty clauses for early termination.

3PL's often have a broader geographic reach and can provide better service especially for small volumes or in areas with lumpy demand. Another feature of today's 3PL is their ability to consolidate multiple client volumes into one low cost distribution center.

There are 64 percent of domestic Fortune 500 companies using 3PLs for logistics and supply chain functions according to Armstrong Associates, who estimates that the global Fortune 500 3PL market at \$98.4 billion for 2004. The largest 3PL expenditures by industry are in the automotive sector (\$32.1 billion) and in the technology sector (\$30.9 billion). Additionally, 3PL customers are utilizing 3PLs for an average of three services. The primary 3PL services provided were led by transportation management (22.3 percent), warehousing (21.0 percent), value-added services (19.3 percent) and international 3PL services (8.0 percent).

### 3.5 ***Supporting the action items***

With the foregoing discussion in mind, we return to the action items outlined in the executive summary to explain how the vision relates to the broader goals that logistics is intended to support.

#### 3.5.1 **Knowledge based economy**

North Carolina has an international reputation as a knowledge based economy and as a creator of innovations. The finance sector in Charlotte, coupled with the RTP region and the overall excellence of the State's colleges and universities is a key driver of economic progress in the state.

The knowledge economy in North Carolina creates both demand and supply that can be exploited for the advancement of our economy and the continued reputation for innovation. Biotechnology, pharmaceuticals, computer hardware and software, alternative fuels, modern textiles, and improvements in energy efficiency not only require knowledge—they also yield marketable products that will be shipped worldwide. And, as the economy grows, more workers—many of them well compensated—will move to North Carolina, driving construction and consumer goods industries that will rely on infrastructure. At the same time, these highly paid, highly educated workers and consumers demand a high quality of life, and will likely be sensitive to environmental degradation and traffic congestion. Enhancing quality of life is not the sole province of logistics, but the logistics system is very influential, and innovation and improvement can reduce the real or perceived negative aspects of trucks, trains, planes, and their supporting requirements.

#### 3.5.2 **Support existing industries**

##### 3.5.2.1 **Tourism Industry**

Tourism is one of North Carolina's primary industries and is therefore quite important for the State's future economic development. Clearly, North Carolina has an abundance of natural, cultural and heritage resources that provide an excellent opportunity for continued growth in tourism.

A recent study by Global Insight revealed that 64.5 million people visited the State in 2005, creating an economic impact of \$15.5 billion. Tourism ranked as the 9th largest private industry in the State, and as the 8th largest private sector employer (184,600 jobs directly employed in the tourism business, with another 150,700 indirectly supported). One of every 12 NC workers owes his/her job to tourism.

Looking at both 2005 and 2006, some other pertinent facts about NC tourism include (NC Department of Commerce, 2005, 2006):

- The majority of visitors are traveling for leisure purposes (70-85 percent); 15-30 percent are business travelers.

- Approximately 40 percent of overnight visitors are from elsewhere in the State. About 35 percent come from other southeastern states.
- North Carolina ranked sixth in person-trip volume in 2006, behind California, Texas, Florida, New York and Pennsylvania. (It ranked eighth in 2005.)
- About 85 percent of visitors come by automobile/RV. No more than 13 percent come by plane.
- Almost one-half of tourists stay in a hotel, motel or resort. Another 40-50 percent stay in a private home. The rest stay in a condo, timeshare, B&B or RV Park/Campground.

Tourism has the same influences on goods movement and infrastructure as do the people who live in the state. First, there needs to be places to stay in order for most tourism to occur. This has significant implications for logistics. Access roads must be available or be constructed, as well as other important infrastructure facilities such as water and sewer lines. The lodging facilities have to be built, maintained and operated. This involves the movement of construction materials, goods and supplies, the use of small and large trucks, and the movement of employees who work at the lodging facilities.

Second, tourists usually come to visit “attractions,” whether they are beaches, golf courses, ski resorts, museums, historic sites, or state or national parks. These too must be built, maintained and/or operated, and require access roads and supporting infrastructure.

Tourists compete for highway capacity. The vast majority of overnight visitors to North Carolina arrive by automobile, but even the small number who arrive by plane (or train, or bus) generally need to rent a car to get around. This has important implications for interstate highways, state roads, bridges, parking facilities, airports and train and bus stations. To the extent that tourism creates highway congestion (both from visitors and workers), particularly in popular areas like the Wilmington-Myrtle Beach region or the Outer Banks, the movement of goods and materials is hampered.

Fourth, while in North Carolina tourists dine, shop, buy beach and other recreational equipment, fuel their cars, and otherwise participate in our consumer economy. This results in a constant need to move goods and supplies from distribution locations to restaurants and stores. These activities also create garbage and waste that then has to be hauled away and disposed of.

Fifth, some recreational activities have specific infrastructure implications. For example, bicycling is a common activity on the Outer Banks due to its temperate climate and flat terrain. A similar example is the need for ferry boat service on certain parts of the Outer Banks. Not only do these ferries transport tourists and/or their cars, but also needed supplies to the islands.

There are a number of possible ways to facilitate the growth of tourism in North Carolina while providing necessary logistics services. The most obvious one is to build more infrastructure—construct more bridges, widen roads, improve/expand airport facilities, etc. etc. Of course, this will not always be possible due to land or budget constraints, or local opposition.

Another approach is to improve the efficiency of the existing transportation infrastructure. There are two main ways of doing this:

- 11) Use more public transportation in areas that have a high concentration of tourists, such as beaches, national parks, and ski resorts. Public transportation can be combined with remote parking facilities in order to keep more cars from entering highly-congested areas. An example is the remote employee parking facilities employed in Atlantic City, NJ, which frees up parking garage space for visitors.
- 12) Transportation Demand Management (TDM). This technique seeks to reduce or shift demand for transportation. For example, shifting delivery of goods or garbage pickup to early morning or evening hours can keep many trucks off the road during times of tourist-induced traffic congestion. Or, especially in vacation destinations like the Outer Banks, moving more guest check-ins to Sunday rather than Saturday so that all tourists are not arriving and departing on the same day.

Finally, another strategy that can be considered is expanding the intercity bus and rail network so that more tourists can reach their destinations without using an automobile. This has, admittedly, been a major challenge in North Carolina, a very heavily automobile dependent state.

In conclusion, tourism is a key component of the State's economy. By most accounts leisure and hospitality is a growth industry, both in North Carolina and nationwide. (In-state tourism will grow if for no other reason than because many more people will be living here by 2030.) This creates a dilemma of sorts—as tourism is promoted and grows, it at the same time creates its own infrastructure and logistical needs which may compete with other such needs. However, it's not as if tourism should be constrained because it may interfere with the movement of other goods and freight. A way needs to be found to accommodate both needs.

The issue is complex and for the most part specific to the various tourist destinations involved. A much more detailed study would be necessary to sort out and quantify the various impacts, and to develop solutions where such impacts are undesirable. As pointed out by Gene Brothers, a professor in NC State's Department of Parks, Recreation and Tourism:<sup>56</sup>

There are some things which you have outlined which have been talked about and discussed within the industry such as disaster evacuation and congestion at destinations. This is a critical consideration as the key destinations within the state are becoming more densely developed. There have been some significant planning solutions applied but most destinations are unique in terms of spatial distribution of accommodation, transport and attractions so unique solutions are required. It is unfortunate for most destinations that the "pain" of growth and development needs to become severe before the planning and search for solutions begins.

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<sup>56</sup> Private e-mail communication (2/29/08)

### 3.5.2.2 **Pass-through traffic**

The visioning sessions and other sources have highlighted the importance of the substantial pass-through traffic in North Carolina, particularly along I-95, and also along I-85 and I-77. Much of this traffic is freight passing to and from ports to our north (Virginia, Baltimore) and to our south (Charleston). Of course, there are many passenger cars passing through on the way to and from the north and south, but for this report we are most concerned with freight.

Pass through traffic constitutes two key challenges and serves as a signal for efforts that can address those challenges. First, pass-through traffic clearly contributes to traffic volume, as even the casual traveler on I-95 can see. Maps provided by ITRE and by NC DOT show substantial volumes of pass-through traffic on the main North/South interstates, with volume also between the Triangle and, in particular, the Triad and western NC along I-40. Traffic congestion often suggests the need to build new infrastructure. A key concern is whether and to what extent the costs associated with pass-through traffic are being captured in the motor fuels taxes owed the state (for example, under G.S. 105-449.37 et seq.). In other words, the State wishes to recover the costs of providing a service to those using our roads as part of a national transportation network.

Second, and more to the point, pass-through traffic often represents a lost opportunity. Pass through traffic originating in Savannah or Charleston or Southeastern Virginia carries freight that could be unloaded in Morehead City, Wilmington, and Southport. This situation is no different than that confronted by the state in the 1850s, as the first railroads were being built, and as North Carolina ports competed with our neighboring states' ports. The challenge, as noted throughout this report, is making the NC ports sufficiently large and sufficiently accessible to make them attractive to shippers, while balancing these needs with other industries along our coast, such as tourism and seafood.

### 3.5.2.3 **Import Export Activity**

The promotion of exports, in particular, is a key part of the state's economic success, and providing for that activity is a key strategic goal. Imported goods, particularly when opportunities exist to add value to these goods, should also be encouraged. North Carolina's knowledge based economy drives smaller shipments which move rapidly through the supply chain. The Dell operation is example of this need for a high-value, high-visibility, rapid freight supply chain. Freight arriving/leaving airports typically needs to be moved quickly to the facility for same day transport. Therefore a highly reliable trucking system coupled with a capable air freight system is very important to North Carolina.

### 3.5.2.4 **Military Activity**

Next to California and Texas, North Carolina has the third largest active duty military personnel in the U.S. with over 100,000 soldiers and additional 46,000 civilian, reserve and National Guard. North Carolina is home to:

- Camp Lejeune, United States Marine Corps
- New River Marine Corps Air Station
- Cherry Point, United States Marine Corps Air Station

- Fort Bragg/Pope Air Force, United States Army
- Sunny Point Military Ocean Terminal
- Seymour Johnson Air Force Base, United States Air Force
- United State Coast Guard Air Station in Elizabeth City, Department of Homeland Security

North Carolina military bases have fared well during the 2005 U.S. Department of Defense's Base Realignment and Closure (BRAC) activities. The state government projected North Carolina as a "military friendly" state, which resulted in a significant increase in active military personnel and civilians, especially at Fort Bragg and Camp Lejeune.

Besides increasing personnel, the BRAC realignments have transformed NC's bases into command centers. The U.S. Army Forces Command (FORSCOM) and the U.S. Army Reserve Command (USARC) currently located at Fort McPherson in Atlanta, GA, are to be relocated to Fort Bragg in 2011. This move will result in an increase to 33 general officer positions and an estimated 2,700 additional personnel. These influential officers will spur critical defense-related business and cutting-edge research. Lockheed Martin and Sierra Nevada Corporation are two defense-related firms have already established a presence in North Carolina in recent years.

#### 3.5.2.4.1 *Today's North Carolina Defense Economy*

In spite of the historical heavy military presence in the state, North Carolina ranks 23<sup>rd</sup> in the nation on defense contract dollars with a combined annual contract of \$2.2 billion. Less than 1 percent of the total DOD spending took place in North Carolina. Cumberland, Wake, Mecklenburg, Guilford, Onslow, and New Hanover counties lead in number of defense related contractors in the state.

Recognizing the state has not taken advantage of the military base presences to transform into defense industry economy, various levels of government in the state initiated studies and established organizations hope to capitalize on the economic potential due to BRAC.

#### 3.5.2.4.2 *Tomorrow's Defense Industry*

A 2005 study by Angelou Economics for the NC Military Business Center noted that

The U.S. military is transforming its force into a fast and flexible force dependent on precision weapons and a high-tech network-centric approach. The new doctrine is called Rapid Decisive Operations." The Army calls this the "Future Combat Systems" and is the "greatest technology and integration challenge ever undertaken."

In a nutshell, the DOD transformation shifts away from large-scale weapon platforms toward light, mobile systems integrated by information network, which obviously relates to high technology communications and information processing systems, all of which support highly integrated communication systems, unmanned aerial vehicles, unmanned fighting vehicles, improved personal protection for soldiers, including communication systems, clothes, armor, and new weapons. All of these products and services are being studied and marketed by North Carolina firms.

Angelou's 2005 study recommended target defense industries for North Carolina in these sectors:

**Defense Consumables (Textiles, Food, Printing, & Distribution):** The DOD requires vast sums of everyday goods and services to keep bases running and soldiers clothed and feed. Business niches to support this target industry include food manufacturing, beverage Product manufacturing, textile mills, apparel manufacturing, leather and allied product manufacturing, Printing, and Warehousing and storage. All of these sectors are heavily reliant on a constant and predictable flow of raw materials and final products,

**Base Construction:** Hundreds of millions of dollars is earmarked for construction on North Carolina military installations in 2006 alone. In recent years less than 10 percent of prime contracts for major base construction were awarded to North Carolina firms. Construction of the new NORTHCOM/USARC headquarters will be led by a firm from Illinois and one from Alabama.

Business niches to support this target industry are general contracting, heavy construction, and special trade contractors. Depending on the sector, these are not as logistics intensive as the consumables sector.

**Base Support Services:** With over 100,000 soldiers and support personnel located in North Carolina bases need a vast sum of support services ranging from engineering and IT work to food and laundry preparation. Business niches to support this target industry are : Administrative and support services, Food services, Repair and maintenance, Personnel and laundry services.

**Defense Technologies (Manufacturing, Research, and Services):** North Carolina should target traditional arms and equipment manufacturing, related research and development, as well as military services. Business niches to support this target industry are:

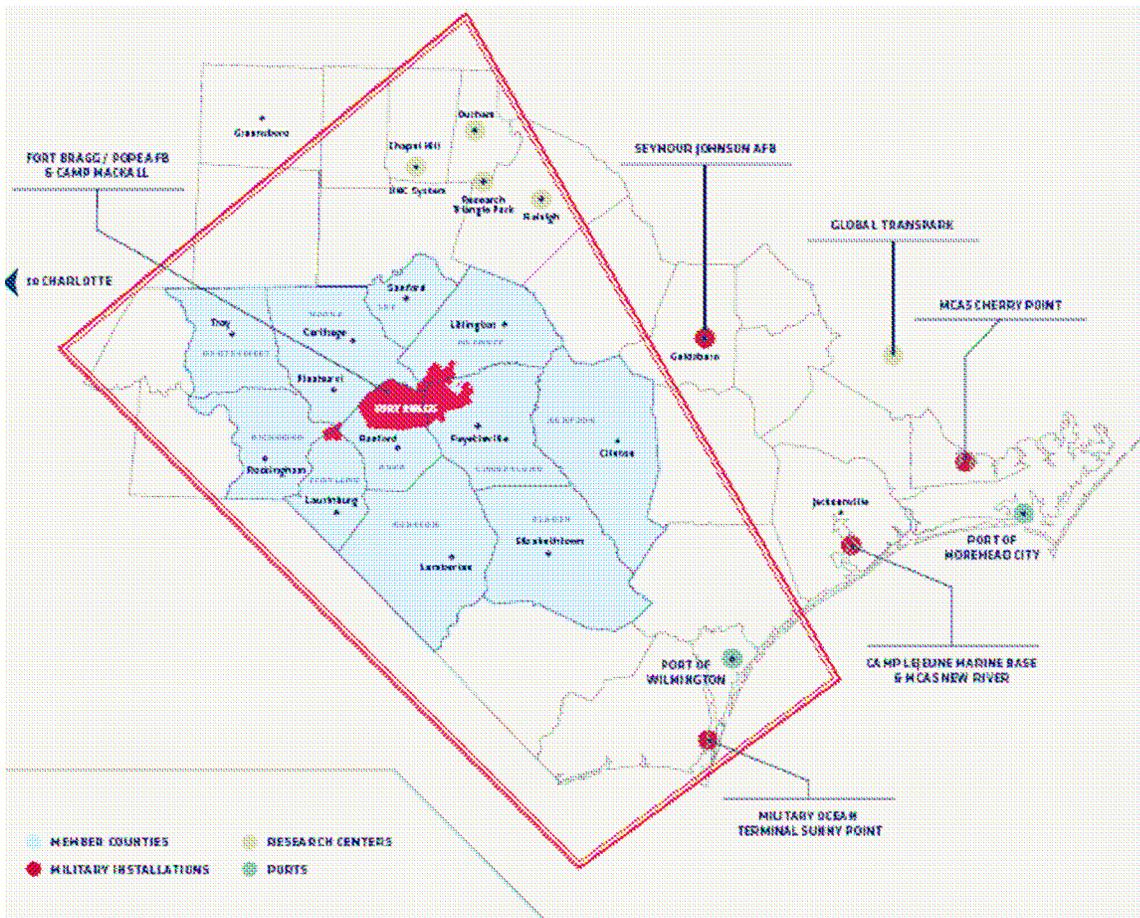
- Machinery manufacturing.
- Computer and electronic manufacturing.
- Electrical equipment manufacturing
- Transportation equipment manufacturing
- Technical services
- Space research
- Professional and technical services
- Management services

It is crucial to understand that the first three target defense industries are **directly related to the base operations and accessibility to the base**. So the infrastructure gaps to support these industry visions include:

- I-95 serving the military bases clustered in eastern North Carolina

- NC-87 from Fort Bragg toward Sanford
- NC-24 from Jacksonville to I40
- NC-24 from Camp Lejeune to US-70
- US-17 from Jacksonville to Wilmington
- US-421 through Sanford
- Truck and rail access to and from bases from ports

The fourth target defense industry (Defense Technologies) stands out as a vision that seems to be a perfect fit for future North Carolina defense industry vision. The BRAC Regional Task Force has begun the process of promoting the All American Defense Corridor (figure 3.7) concept to defense contractors.



**Figure 3.6 Map of the “All American Defense Corridor”**

(Source: BRAC Regional Task Force)

Key strengths of NC’s economy make the state uniquely equipped to align with the military weaponry transformation visions. From a logistics standpoint, consumable and support industries

which supply goods and services directly in and out the bases and need to be in close proximity to the bases. The potential contractors support the defense technologies vision will be numerous smaller firms across the state. The contractors will range from some light manufacturing to high-tech and emerging industries. All of these enterprises will need logistics services to move goods to and from the bases. And the bases themselves will need continued logistics support from roads, rail, and air in order to maintain its presence in the State.

The defense consumables, base construction, and base support services industries will have localized transportation infrastructure impacts.

The fourth industry, defense technologies industry fueled by the state’s high tech and research facilities will attract numerous smaller outfits peppered around the state. Because the military is moving toward weaponries that are highly information based, unmanned and mobile, the industry fueled will not require specialized infrastructure needs (the state won’t be making B-1 bombers or aircraft carriers).

If these observations are correct, then the infrastructure/logistical condition best support the defense industry is commuting time and convenience among industry hot spots, bases, and perhaps to and from the Pentagon. Again, no specialized infrastructure required, just to improve known congestion spots in and around the bases, major metropolitan areas, to the Research Triangle Park, and to the RDU airport.

### 3.5.2.5 **Innovation in Transportation Infrastructure**

#### 3.5.2.5.1 ***Logistics Support Facilities***

Expansion Management magazine reports a Logistics Quotient every year which rates cities and regions on 10 major logistics categories:

- Transportation and Warehousing Industry
- Transportation and Warehousing Work Force
- Road Infrastructure
- Road Congestion
- Road and Bridge Condition
- Interstate Highway Access
- Taxes and Fees
- Railroad Service
- Waterborne Cargo
- Air Cargo

Four North Carolina Metro areas made the composite list of “5 Star Logistics Metros”

- Charlotte- Gastonia-Concord rated in the 83<sup>rd</sup> percentile

- Greensboro High Point rated in the 84<sup>th</sup> percentile
- Northeastern NC rated in the 91<sup>st</sup> percentile
- Winston Salem rated in the 84<sup>th</sup> percentile

While no North Carolina location made it into the Top 10 provider list in any category it is important to note that several of North Carolina's neighbors ranked highly among the states with lowest fuel, taxes and fees. To compete with these neighbors North Carolina will need to benchmark these costs as identified by potential users. For example, Georgia, South Carolina, and Virginia were among the ten states with the lowest fuel taxes and fees (although it should be noted that at least three of the states on the list—Alaska, Wyoming, and Hawaii—are not competitive states for major business relocation).

While all 10 factors are considered when making a warehouse location decision, transportation costs, or access to markets and carrier capacity usually represent 2-4 times the cost of the warehouse on an annual basis. As capacity dwindles access to multiple carriers is another important consideration. With the price of fuel the location of distribution facilities is becoming an important logistics decision. Labor is the second most important factor as many warehouse professionals note that the use of technology and attention to detail is extremely important in large facilities. When asked about incentives, many warehouse professionals note that “there is always a reason the land is free”, finding a site which is in a desirable location, usually results in a higher quality labor pool.

Today's warehouse is not a storage facility anymore. Its focus instead is on continuous movement. Modern facilities are fundamentally about inventory control and information technology, often managed by third-party vendors or independent logistics service providers. Technology has not only expanded the reach of the warehouse but has also helped to expand the logical footprint of the facility, allowing logistics professionals to push more products through fewer, but larger facilities. The warehouse standard of 30 years ago has changed. Today a 400,000 SF facility is becoming the standard. Five years ago the norm was 250,000 SF.

The industry is highly fragmented and it is hard to know just how many warehouses are operating today. Some are operated by large companies and become part of their internal operations, others are contract logistics centers and still another category is the 3PL provider. It is estimated that the U.S. is home to more than 5 billion square feet of warehouse capacity and U.S. Businesses spent approximately \$101 billion in warehouse services in 2007. One third of warehousing is managed by approximately 7,900 commercial operators, the other two-thirds of the business is managed by private firms. According to Armstrong Associates there are more than 5,600 contract logistics warehouses which account for approximately 863 million square feet and command approximately 60 percent of the total market share.

Most of the activities in a value-added warehouse require labor; information technology has both magnified productivity and reduced the number of workers needed. Today's modern facilities use about half the labor which was standard 20 years ago.

Clearly, warehousing is a dynamic industry where innovation based on technical excellence is important. In the past few decades there have been three waves of technology in warehouse operations. The first wave WMS was focused on shipping and receiving activities and reducing the amount of goods in the warehouse. The second wave focused on cross-docking, striving to match inbound freight to outbound orders as quickly as possible, minimizing the dwell time of freight within the walls. The third wave is focused more on synchronizing transportation and inventory to reduce overall holding times and is aimed more at rapid response systems for internet and catalogue buyers.

The Charlotte economy expanded in 2007, led by strong gains in office-using employment. Charlotte's warehouse vacancy rate decreased to 11.2 percent during the fourth quarter of 2007, 5 percent lower than the 2004 reported vacancy rate. Positive absorption in this market has outpaced the new supply by 127,471 SF which has led to the reduction in the warehouse vacancy rate.

During 2007 more than 868,800 SF of space was reported to be under construction. Over 600,000 SF was to be complete by the end of the first quarter of 2008.

#### 3.5.2.5.2 *Freight Corridor Development*

The state needs to identify high velocity, high security corridors specifically targeted for freight. Similar to Stranet and Stratnet for military mobilization corridors, we need to identify system performance needs, measure performance, and communicate results to users. With these data available, the state can prioritize spending and programs for these corridors as an economic development tools. Freight corridors would have direct access to freight nodes and generators such as airports, seaports and rail terminals. Intermodal connectors would be a priority to separate freight from the local environment to a "through route" regional network. Grade separations and Intelligent Transportation Systems would keep freight moving without traffic conflicts or barriers, information transmitted via GPS and wireless connections would be available to inform users of any system barriers or choke points.

Furthermore, the state can support the Norfolk Southern Crescent Corridor and the CSX Gateway corridor with innovative land use policies that concentrated freight development in and around regional freight terminals. The state can also provide TIF financing and programs to fund utilities and highway connectors.

The facilities of the future would allow for the consolidation of freight to efficiently move via antipodal trains with a volume able to support one 240 unit container train both inbound and outbound every day. To support this volume value added manufacturing centers, Foreign Trade Zones, consumers and cross-docking operations are necessary. These facilities would then ideally be connected to an interstate network within 500 miles drive of 65 percent of U.S. Population.

A facility such as Westport at Alliance, TX is a model for this development. This site includes airport, intermodal rail, warehouse and interstate access.



Figure 3.7 Intermodal Logistics Center served by Rail and Airport

3.5.2.5.3 *Congestion Mitigation in Metro Areas*

In order to maintain NC’s desired quality of life, mitigating traffic and choke points in North Carolina is essential for all mobility purposes.

Like in many parts of the nation, North Carolina has choke points and bottlenecks created by signalized intersections. To remedy this problem, turning lanes or ITS solutions may be prioritized. Truck Interchange chokepoints need to be resolve along important corridors connecting North Carolina to Atlanta. North Carolina’s topography adds engineering challenges for freight moving along steep grades. Solutions and strategies might include truck corridors, additional lanes or fleeting options.

3.5.2.5.4 *Land Banking*

Inland ports which accommodate multiple modes of transportation often require 800-1,000 acres of land. To assemble these parcels is nearly impossible in urban areas, but with foresight and planning inland ports can be identified. The key questions when considering land banks are:

- Whose money will pay for the land?
- Who will control the site?
- How many years will the property be “banked”?

Public-private partnerships are ideal for land banking, but often cannot act quickly enough to meet private sector planning goals. Public sector involvement can often facilitate funding or economic development incentives, but often slows down the process.

The recent Base Area Realignment and Closure (BRAC) program has been identified as a mechanism to identify large tracts of government owned land, often rail served, but not always in close enough proximity to population centers which would justify multimodal development.

#### 3.5.2.5.5 *Interstates*

Freight moving on highways will continue to dominate all surface modes of transportation. The cost of congestion has become a significant factor in site location and selection strategies. For North Carolina to achieve their Logistics Vision, a fluid freight network which will accommodate transit for just in time freight and is friendly to the courier and small package companies will be essential to support the vision of the high quality of life that all North Carolinians want to preserve.

The lack of a national transportation policy will require North Carolina to determine their own solutions which best suit their economic development strategies. More than 90 percent of businesses in North Carolina are located on or near an interstate corridor.

Strategies to improve mobility in North Carolina include

- Increased truck size and weights, and investments in infrastructure to support weights, turn radii, and the like.
- Encourage employers to stagger shift times
- Review city, county and state restrictions on local delivery times
- Consider tolling pass through corridors
- Explore and encourage Public Private partnerships in the development of terminals and public rest areas, such as the Oasis program

#### 3.5.2.5.6 *Other Strategies*

Investing in public transportation can also help alleviate congestion and improve mobility for passenger vehicles and freight.

New rail corridors might be assembled from short line properties. Allowing and encouraging short line railroads to collect and gather unit train volumes of freight could help improve Class 1 rail performance. An example of this is Montevideo, Minnesota, where a short line is shuttling ocean containers to rural Minnesota. The length of haul is approximately 150 miles which otherwise would be a profitable drayage move, but given congestion in the Twin Cities area, moving commodity freight for export this short distance makes sense.

Other strategies that should be explored include

- Encouraging shipper participation in NC DOT project funding and prioritization planning.
- Encouraging telecommuting and provide incentives for innovative telecommuting options to reduce congestion and to reduce fuel consumption.
- To encourage people to take public transportation, surcharge parking lots in urban destinations and use the money to help enhance public transportation options and education.

#### **3.5.2.6 Bio-Tech**

Biotech companies in North Carolina consist primarily of two different groups: major international Fortune 500 bio-pharmaceutical companies as well as smaller start-up enterprises. Logistics needs for this sector include national distribution centers with temperature controlled environments, and support of temperature-controlled trucking industries. Moreover, these companies require support of modern and efficient highway access and effective air cargo carrier options. Such systems must also account for the need for competitive air passenger service.

#### **3.5.2.7 Manufacturing**

The manufacturing sector in North Carolina consists of high growth and low-growth sectors. High-growth sectors include heavy agriculture equipment makers, other vehicle and parts makers, and other emerging industries. Dwindling sectors include textiles, furniture, and tobacco. The future transportation vision must take into account the fact of these declining sectors while promoting the growth of emerging sectors.

The manufacturing companies that remain, and that continue to be a central feature of North Carolina's economy, are confronting high fuel and commodities costs. Effective transportation strategies and the shrinking of the supply chain are being sought out to reduce costs. With the weak dollar, export markets are increasingly important as our products become more attractive. But access to these markets must be assured through improved port options, particularly in the Piedmont and west. To remain competitive, the Wilmington port must provide efficient supply chain solutions. As one participant at a visioning group noted, his company found it much more effective to ship into and out of the South Carolina ports than to Wilmington, because reliability and throughput is much greater.

#### **3.5.2.8 Retail Warehouses and Distribution Centers**

Logistics and distribution is one of the high growth areas for the state. There is a significant opportunity, with the incoming growth of the FedEx hub in the Triad area, to create a major hub for transportation and logistics in North Carolina. Many related industries are anticipating this growth, and are exploring opportunities in the Triad for a rapid increase in the number of distribution centers, hubs, and other companies. Retailers are some the largest in this sector, including, most of which rely on imports from Asian suppliers.

In a recent white paper involving interviews with a number of large North Carolina Distribution Center managers, we developed the following insights:

As more organizations look at off-shore sourcing to compete on cost, recent studies are beginning to reveal the flaws with this strategy, IN particular, lower labor costs are offset by longer lead times, inventory commitments and asset losses, and most importantly, an inability to react and meet customer requirements. One of the major changes in the current retail market is the drive towards increased responsiveness, packaging customization, customer-specific pick/pack/ship requirements, all with an inability to charge premium pricing. As a result, more and more companies are finding that their domestic distribution labor costs are increasing, as more of this activity is taking place in North America, therefore driving up demand for semi-skilled labor is expanding, with many firms are employing “temporary labor” as a stopgap measure. The recession may ease this trend in the short run, but retailing models in the “new economy” suggest these trends will continue after the current recession. The increased costs in customization and the use of local labor must be offset by savings through greater logistics efficiency. The visioning sessions found the following:

- Supply chain efficiency is a primary concern. Efficiency to the shipper is a matter of how well the entire supply chain is working including all critical nodes such as the ocean port and intermodal transfer facilities. Considerable concern was raised about the efficiency and throughout of, in particular, the Port of Wilmington. Morehead City has similar constraints.
- Burdensome trucking regulations have a major impact on state distribution networks, and our informants suggest that these regulations do not consider their impact on companies and the economy. Our interviewees argued that there is a need to more broadly review transportation policy regulations before they are enacted. The 53’ trailer restriction was identified as one of the most burdensome requirements. Allowing longer combinations will increase efficiency, but safety and public perceptions of these vehicles will have to be considered.
- 
- Many logistics providers are being forced to carry more inventory to meet stringent customer delivery and fill rate requirements. Others have to do so to support “mom and pop” operations as these companies cannot afford to carry a lot of inventory.
- Our interviewees are eagerly anticipating the future port at Southport. For carriers that do not call on Wilmington, the port is a problem, but the new port can help leverage the attractiveness of this port. The importance of developing the new port to meet the needs of the international shipping community is of paramount importance. Of course, this means the state must think through and develop the infrastructure, including highway and rail access to this port. Rail is particularly important for container business.
- The FedEx hub in Greensboro is anticipated create many business opportunities. However, decision makers are concerned that the state may not be acting strategically to consider what the role of the state should be. Will FedEx engage with the business

community? What are the opportunities here, and what will these new hub-related businesses need? They may produce items, like high value electronic goods, that could go out by airfreight, \is there an infrastructure to support this? Do the skills already exist, or will universities have the logistics and international business programs to build the talent and labor resources?

- Rail resources for domestic and intermodal shipping (that is, connectivity) are believed to be lacking in the state. For instance, one respondent in the Triad noted that he had to move product to Charlotte in order to put it on a rail car, as transrail hauls go from Charlotte to Atlanta. Can the state influence rail carriers to develop more intermodal rail sites to improve transit time, and keep more trucks off the highway? Are there tariff issues here that could change these patterns? Are there other existing rail lines or abandoned lines that could be restored and reused to support industries some distance from the main line?
- The vendor base for many retailers has moved to California, as the amount of off-shore sourcing via all-water services from Asia through the Ports of Los Angeles and Long Beach. Much of the product that used to be manufactured in the east has moved due to cheaper container rates, and many sell FOB to their docks. This means that retailers have had to pay more for cross-country transportation fees. With the price of fuel – this is now a major concern. As such, these retailers have noted that the rail infrastructure from West to East needs to be strengthened, as this is causing a huge ripple effect on transportation costs. Retailers now need to move more trailers to inland ports like New Orleans, Atlanta, Chicago, and Memphis where they can be picked up at moved. There was talk by the American Transportation Association at one time to build a super-highway east to west just for trucks. The current trucking system is exceedingly slow, and it can take up to nine days to move a trailer from east to west, as compared to two days on a railcar which is much faster. The problem of course is that when the shipment arrives at the first rail hub, it can take 3 to 4 days to get to a feeder line to get on to a truck. East to west rail car service is becoming critical.
- While not a logistics issue per se, almost all our visioning session participants noted that passenger rail service requires improved infrastructure. The benefits would include more frequent and potentially less expensive travel on the Raleigh-Triad-Charlotte route, and better connections to Washington and the Northeast Corridor. Such improvements could reduce road and air congestion, creating capacity for freight, although most respondents also noted that rail capacity needs to be upgraded to support passenger service.

In summary, the state needs to consider all stakeholders'; needs in all modes.

### 3.6 ***The Bottom Line***

Based on the evidence presented in this report, the vision for the state's logistics system investments should be focused on several key initiatives, arranged in short, medium and long-term strategies

3.6.1 **Short-term**

- *Enhance the primary highways:* Commonly perceived as the “interstates”, but truly encompassing all limited access facilities, these highways are the backbone of the state’s trucking network. Principal initiatives should focus on capacity investments, ramp improvements, dedicated use facilities (e.g., truckways), more and better truck stops, and 24/7/365 support for trucking activities (e.g., permits, inspections, internet access and support) and Intelligent Transportation Systems for monitoring, messaging road conditions and managing traffic flows. New technology to help improve system velocity should be explored and implemented.
- *Mitigate congestion in collection/distribution networks:* Primarily located in urban areas, these collection/distribution networks, which are typically urban freeways, arterials, collector-distributors are critical to logistics efficiency and effectiveness. Principal initiatives should focus on capacity investments (throughput and parking), turning radius improvements, and route guidance support, through ITS investments. Another initiative should also be explored to extend local pick-up and delivery hours of operation. Many municipalities have curfews on truck deliveries which forces trucks to deliver during the same time period many highway corridors are experiencing peak travel demand (i.e. 8-10 am and 3-5 pm)

3.6.2 **Medium-term**

- *Land banking:* Whether one’s attention is focused on a new port (e.g., NCIT), distribution centers, free-trade zones, future rights-of-way, or protection of existing ones, the State needs to protect land that can be used for freight facilities and corridors, now and in the future.
- *Make investments in a few new corridors:* In a few sharply-focused instances, the State should make investments in new facilities in corridors that will help the state achieve future milestones in economic prosperity. One example is the corridor from Charlotte to Wilmington. Another is I-95. The investments can be heavily focused on one mode (e.g., highway in the case of I-95) or multiple modes (e.g., connecting Charlotte to Wilmington). In some instances, these investments may be coupled to long-range strategic initiatives (see the next bullet). Tolling and truck only lanes may be an area to explore.

3.6.3 **Long-term**

- *Create air cargo support:* Perhaps more controversial, but equally more strategic, are investments in air cargo capacity statewide, airside and landside. Not just limited to the current three major hubs, but in a more general sense, provide easy, close-at-hand access to air cargo across the entire state. Following the paradigm of the State’s 1989 Intrastate Highway Trust Fund, embark on investments that would create runways accessible to regional jets across the entire state. This idea, more than the others, requires careful analysis and assessment, but it could position the state in a unique, leap-forward position so it can participate to the fullest extent in high-tech industries, such as bio-medical manufacturing and aerospace, which are of high value, produce

high-paying jobs, and capitalize on the knowledge-based economy the State is developing.

- It is also important to invest in programmatic initiatives that allow the State to monitor the health of the freight logistics system so it can be responsive to emerging needs, pro-active in its investments, and cognizant of investment opportunities and challenges.

#### 3.6.4 **Summary**

The various actions described above are summarized in the Table 5.2 in the implementation strategy chapter along with results from Chapter 4.

## 4 Infrastructure Needs Assessment

### 4.1 Current Transportation Infrastructure Inventory

In this chapter, we consider what future logistics system investments will be needed to ensure that North Carolina can be a winner in the global economy. We provide a modally-focused overview of North Carolina’s existing transportation infrastructure inventory, describe its current state of performance, include available information on current investment plans and indentify what investments or issues must be addressed to move our State forward. Additional details are available in the appropriate appendix for each transportation mode.

#### 4.1.1 Highway Infrastructure

North Carolina’s public road system comprises over 103,000 miles, the 16<sup>th</sup> largest of all U.S. states. The North Carolina Department of Transportation has direct responsibility for 79,031 miles of this network (over 76.6 percent,) with the balance managed by cities/towns (19.5 percent), Federal agencies (3.1 percent) or other jurisdictions (0.7 percent)<sup>57</sup>. Of particular note, the size of NC’s highway system that is directly managed by the state is second only to Texas, a state with nearly three times the total system size (304,171 miles). Explaining this seeming disparity is that unlike Texas and (effectively) all but two other states<sup>58</sup>, North Carolina has no county-owned DOTs that maintain the secondary road system. While North Carolina’s DOT model avoids some of the inherent duplication associated with have both state and county DOTs, it does significantly broaden NC DOT’s mission when compared to a typical state DOT.

As described in earlier chapters and indicated in Table 4.1, trucks move more freight in North Carolina than any other mode, both in terms of volume and value, and truck volume is expected to grow throughout the state over the next 20 years. FHWA projections<sup>59</sup> indicate that much of the growth will occur in urban areas and on the Interstate highway system, which is demonstrated by a comparison of Figure 4.1 and Figure 4.2.

**Table 4.1 Freight Shipments by Transportation Mode To, From, and Within North Carolina 1998, 2010, and 2020<sup>60</sup>**

	Tons (millions)			Value (billions \$)			Tons (percentage)			Value (percentage)		
	1998	2010	2020	1998	2010	2020	1998	2010	2020	1998	2010	2020
<b>State Total</b>	<b>511</b>	<b>756</b>	<b>944</b>	<b>426</b>	<b>820</b>	<b>1,324</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>
<b>By Mode</b>												
Air	<1	1	2	29	72	126	<0.1%	0.1%	0.2%	6.8%	8.8%	9.5%
<b>Highway</b>	<b>426</b>	<b>641</b>	<b>808</b>	<b>381</b>	<b>719</b>	<b>1,152</b>	<b>83.4%</b>	<b>84.8%</b>	<b>85.6%</b>	<b>89.4%</b>	<b>87.7%</b>	<b>87.0%</b>
Rail	79	104	121	15	26	41	15.5%	13.8%	12.8%	3.5%	3.2%	3.1%
Water	5	7	9	1	2	3	1.0%	0.9%	1.0%	0.2%	0.2%	0.2%

<sup>57</sup> All calculations and data are derived from Table HM-10 - Roadway Extent, Characteristics, and Performance - Highway Statistics 2005 – FHWA, <http://www.fhwa.dot.gov/policy/ohim/hs05/htm/hm10.htm>

<sup>58</sup> The other state DOT’s with similar responsibilities are Virginia and West Virginia.

<sup>59</sup> [http://www.ops.fhwa.dot.gov/freight/freight\\_analysis/state\\_info/north\\_carolina/profile\\_nc.htm](http://www.ops.fhwa.dot.gov/freight/freight_analysis/state_info/north_carolina/profile_nc.htm)

<sup>60</sup> Adapted from [http://www.ops.fhwa.dot.gov/freight/freight\\_analysis/state\\_info/north\\_carolina/profile\\_nc.htm](http://www.ops.fhwa.dot.gov/freight/freight_analysis/state_info/north_carolina/profile_nc.htm)

Note: Percentages may not add to totals due to rounding.

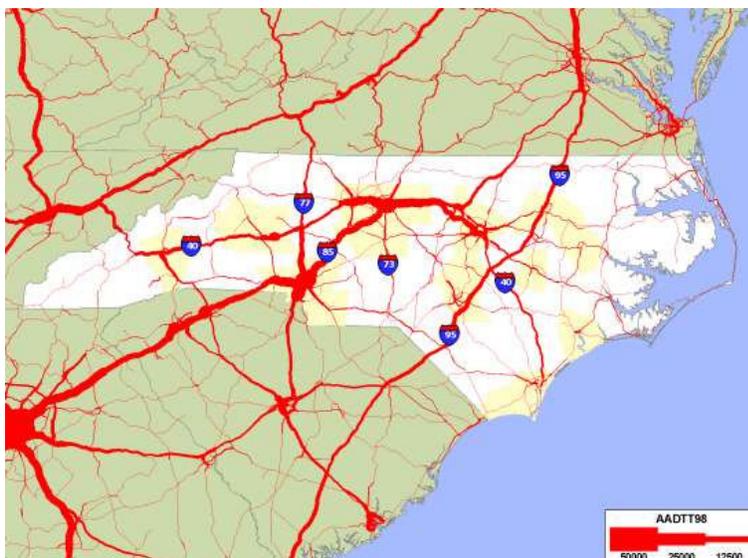


Figure 4.1 Estimated Average Annual Daily Truck Traffic: 1998<sup>61</sup>

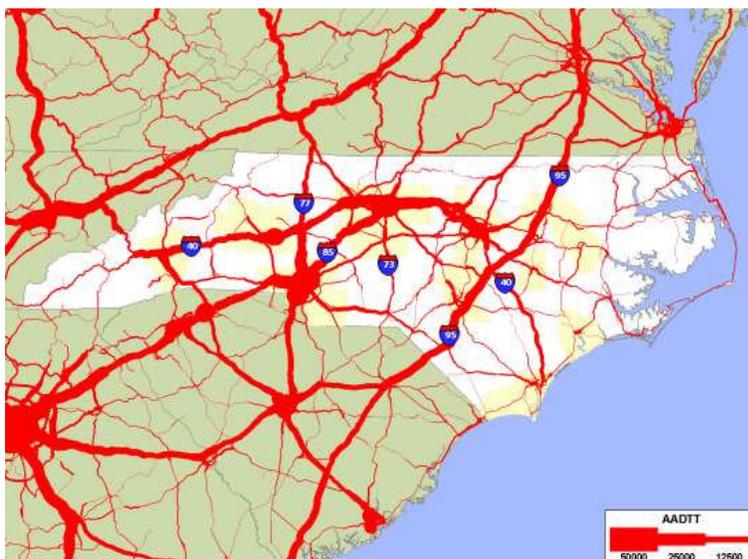


Figure 4.2 Estimated Average Annual Daily Truck Traffic: 2020<sup>62</sup>

Figure 4.3 illustrates the 2006 volume of truck traffic on NC<sup>63</sup> while providing additional system details. This figure appears consistent with FHWA projections and suggests that trends towards increasing congestion in the Charlotte, Triad and Triangle metro areas are likely to continue.

<sup>61</sup> [http://www.ops.fhwa.dot.gov/freight/freight\\_analysis/state\\_info/north\\_carolina/profile\\_nc.htm](http://www.ops.fhwa.dot.gov/freight/freight_analysis/state_info/north_carolina/profile_nc.htm)

<sup>62</sup> [http://www.ops.fhwa.dot.gov/freight/freight\\_analysis/state\\_info/north\\_carolina/profile\\_nc.htm](http://www.ops.fhwa.dot.gov/freight/freight_analysis/state_info/north_carolina/profile_nc.htm)

These figures also support NC DOT studies indicating that only 7 percent of the state’s highway system carries 45 percent of the state’s total vehicles<sup>64</sup>.

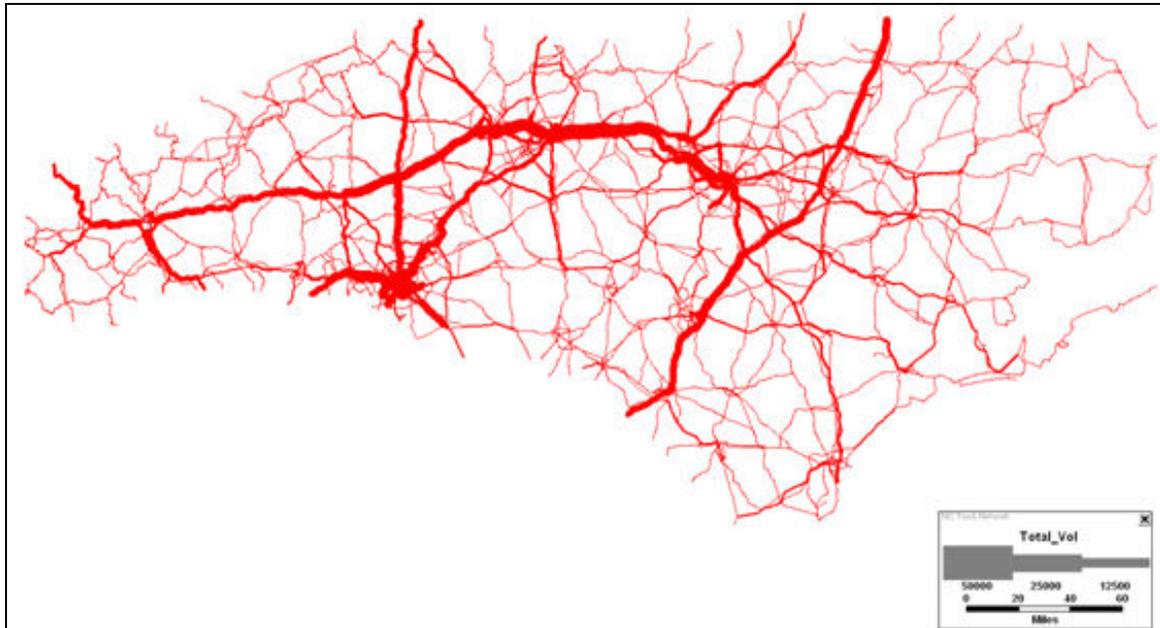


Figure 4.3 2006 Truck Volumes Forecast

#### 4.1.1.1 Highway Freight Infrastructure Gaps

To address our current and long-term highway freight infrastructure needs, North Carolina must ensure that the high-volume roads that move much of our state’s freight be provided priority attention in terms of maintenance (to ensure operational performance) and congestion relief (to relieve current and projected bottlenecks). Specific routes and/or other issues that need priority attention include the following:

- 1) Roads identified as belonging to the “National Truck Network<sup>65</sup>,” which are routes that have been approved for use by vehicle sizes authorized under the Surface Transportation Assistance Act of 1982 (STAA). Such vehicles include 53-foot single trailer and 29-foot twin trailer combinations. (See Figure 4.4 for details.)
- 2) Urban interstates and interstate connectors that already are experiencing moderate to severe congestion, primarily around North Carolina’s largest metropolitan areas (i.e., the greater Charlotte metro area, the Triad and the Triangle).

<sup>63</sup> Stone, J., “Executive Summary: NC Truck Network Model,” North Carolina State University, March 11, 2008.

<sup>64</sup> “The Strategic Highway Corridors Concept Development Report,” North Carolina Department of Transportation Planning Branch, October 2005, page ES-1.

<sup>65</sup> <http://reports.oah.state.nc.us/ncac/title%2019a%20-%20transportation/chapter%2002%20-%20division%20of%20highways/subchapter%20e/19a%20ncac%2002e%20.0426.html>

- 3) North Carolina roads identified as “High Priority Corridors on National Highway System”<sup>66</sup> (essentially future Interstate highways) which include the following:
  - A. Future I-73 routes:
    1. United States Route 220 from the Virginia State line to State Route 68 in the vicinity of Greensboro;
    2. State Route 68 to I-40;
    3. I-40 to United States Route 220 in Greensboro;
    4. United States Route 220 to United States Route 1 near Rockingham; and
    5. United States Route 1 to the South Carolina State line.
  - B. Future I-74 routes:
    1. The I-77/United States Route 52 connector to United States Route 52 south of Mount Airy, North Carolina;
    2. United States Route 52 to United States Route 311 in Winston-Salem, North Carolina;
    3. United States Route 311 to United States Route 220 in the vicinity of Randleman, North Carolina;
    4. United States Route 220 to United States Route 74 near Rockingham;
    5. United States Route 74 to United States Route 76 near Whiteville; and
    6. United States Route 74/76 to the South Carolina State line in Brunswick County.
  - C. Raleigh-Norfolk Corridor, Raleigh, North Carolina, to Norfolk, Virginia.
  - D. Route 29 Corridors from Greensboro, North Carolina, to the Virginia State line.
- 4) Improved highway connections between Charlotte and Wilmington.
- 5) Specific problems/areas identified through interviews and/or surveys with trucking industry stakeholders, including the following:
  - A. Truck parking. Truck drivers (and trucking firms) continue to struggle with the shortage of legal places to park while resting.
  - B. 53-foot trailers. 53-foot trailer are effectively the standard of the truckload shipping industry but many North Carolina roads are not authorized for such trailers. A February 25, 2008 advisory letter issued by the Office of the North Carolina Attorney General<sup>67</sup> effectively expands the number routes available to such trailers but does not definitively address this issue.

<sup>66</sup> <http://www.fhwa.dot.gov/planning/nhs/hipricorridors/index.html> , accessed May 4, 2008.

<sup>67</sup> “Advisory Letter: Interpretation of N.C. Gen. Stat. § 20-115.1(b),” written by Ebony J. Pittman, North Carolina Assistant Attorney General, February 25, 2008.

- 6) Other highway focus areas included addressing specific trucking industry concerns, “last mile” issues (connector roads), and where intermodal junctions occur (discussed in the modal sections that follow).

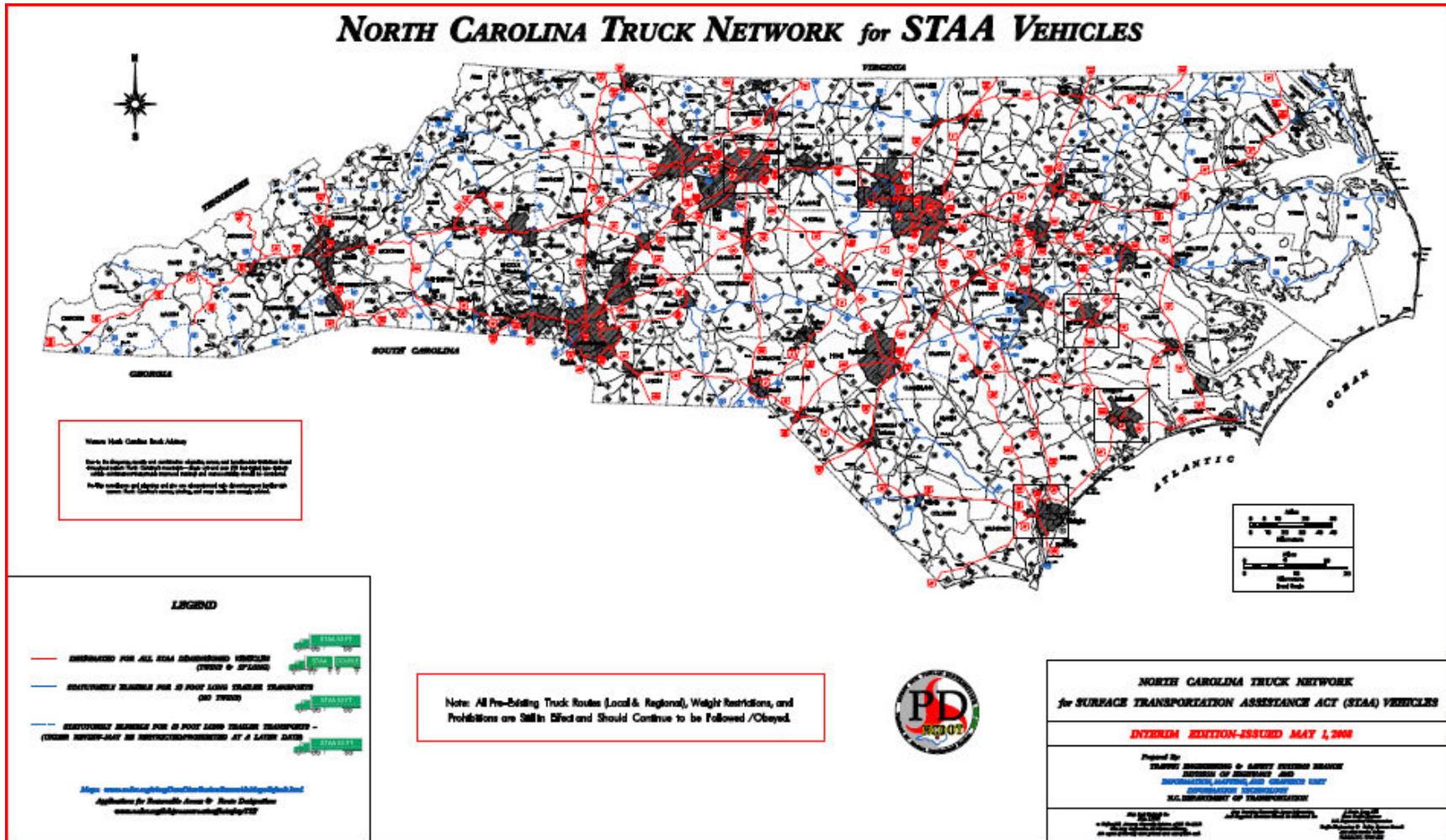


Figure 4.4 North Carolina Truck Network for STAA Vehicles

4.1.2 Rail Freight Infrastructure

North Carolina is served by two Class I railroads and 21 short-line railroads. The two Class I railroads, Norfolk Southern and CSX Transportation, maintain 2,597 miles of track in North Carolina and the short-lines operate on 782 miles (see Figure 4.5).

Norfolk Southern, through its Norfolk Southern Railway Company subsidiary, operates approximately 21,300 route miles in 22 states, the District of Columbia and Ontario, Canada, serving every major container port in the eastern United States and providing connections to western rail carriers. Norfolk Southern operates an extensive intermodal network and is the nation's largest rail carrier of automotive parts and finished vehicles.

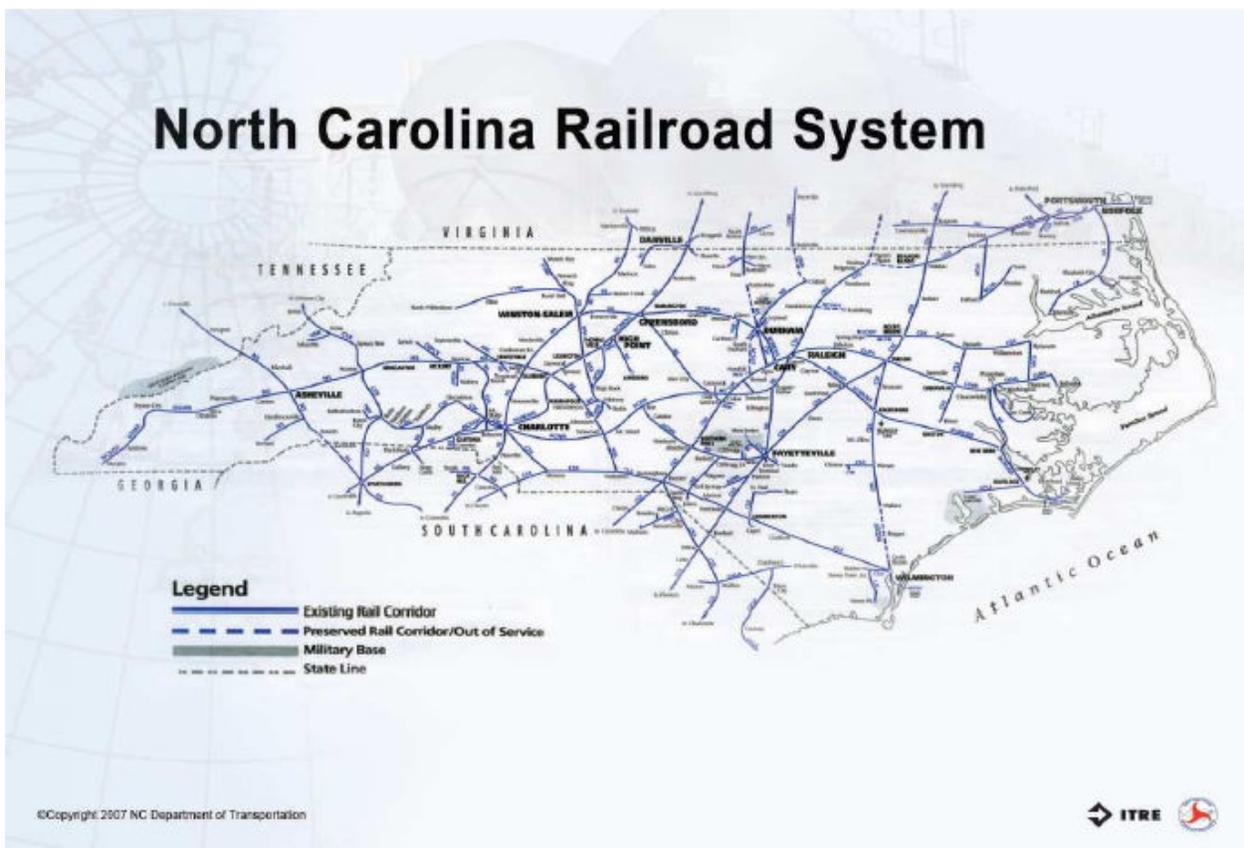


Figure 4.5 North Carolina Railroad System<sup>68</sup>

A major part of the tracks on which Norfolk Southern operates is owned by the North Carolina Railroad (NCR). NCR owns 314 miles of tracks stretching from Charlotte through the Piedmont Crescent to Morehead City. The NCR is a Real Estate Investment Trust whose voting stock is controlled by the State of North Carolina. NCR owns and manages the rail line and properties adjacent to the line. Not only do freight trains operated by Norfolk Southern carry

<sup>68</sup> Source: Rail Division, NC DOT

products on the NCRR, but Amtrak runs two passenger trains, the Piedmont and the Carolinian, along its corridor. Plans for regional mass transit operations along NCRR's rails are also possible in the future.

Formed in 1980, CSX Transportation operates the largest rail network in the eastern United States. CSX Intermodal provides transportation services across the United States and into key markets in Canada and Mexico. CSX freight transportation options range from unit trains of coal to trailer-on-flatcar operations, and provides coast-to-coast service. CSX Transportation owns and operates a 23,000-mile rail network in the eastern United States, connecting with every Class I freight railroad and several short-line partners in North America, Canada and Mexico.

An important part of rail freight business in the State is a vibrant short-line rail system. Table 4.2 lists the short-line services in the State. Assistance to these short-lines is a major program of the Rail Division of the NC DOT. Data on the State's 21 short-line railroads for 2006 includes trackage, 2006 carloads carried, and location/terminal points by county.

**Table 4.2 North Carolina Short Line Railroads<sup>69</sup>**

<b>Railroad Name</b>	<b>Length of Track (miles)</b>	<b>2006 Carloads</b>	<b>Terminals (by county)</b>
Aberdeen and Rockfish Railroad	47	2,650	Moore to Cumberland
Aberdeen, Carolina & Western Railroad	140	14,637	Mecklenburg to Chatham
Alexander Railroad Company	18	3,574	Iredell to Alexander
Atlantic & Western Railway	11	5,102	Lee County
Caldwell County RR Co.	17	N.A.	Catawba to Caldwell
Cape Fear Railway	16	N.A.	Cumberland Co.
Carolina Coastal Railway, Inc.	159	1,215	Washington to Wake
Carolina Southern RR Co.	31	8,683	Columbus Co.
Chesapeake & Albemarle RR	68	8,414	Pasquotank to Chowan
Clinton Terminal RR	4	N.A.	Sampson Co.
Great Smokey Mountain RR	54	400	Jackson to Cherokee
High Point, Thomasville & Denton RR	34	N.A.	Guilford to Davidson
Laurinburg & Southern RR	28	4,400	Scotland Co.
Morehead & South Fork RR	10	N.A.	Carteret Co.
Nash County RR	15	3,500	Nash Co.
North Carolina & Virginia RR	52	22,399	Hertford to Northampton
Thermal Belt Railway	9	147	Rutherford Co.
Virginia Southern	20	None	Granville Co.
Wilmington Terminal RR	18	9,100	New Hanover Co.
Winston-Salem Southbound RR	87	16,600	Forsyth to Anson
Yadkin Valley RR	93	12,479	Forsyth to Wilkes

Figure 4.6 illustrates the total rail freight flows into and out of North Carolina. The highest volume of freight traffic is on the CSX line connecting Charlotte to the Port at Wilmington, the Norfolk Southern/NCRR line from Charlotte through Greensboro to Raleigh, and the CSX line that runs north-south roughly parallel to Interstate Highway 95. Those three corridors handle approximately 20 million tons of freight annually. Table 4.3 shows the total volume of rail shipments statewide in 2002, compared with other states on the Atlantic coast. The primary rail commodity shipped in the Southeast is obviously coal and the 119 million tons originated in West Virginia is almost as much weight as the other four states combined. Chemicals, while not an extremely large commodity originating in North Carolina, is the primary commodity in overall originating rail shipments out of the state.

<sup>69</sup> Source: Railway Association of North Carolina, [www.ncrailways.net](http://www.ncrailways.net)

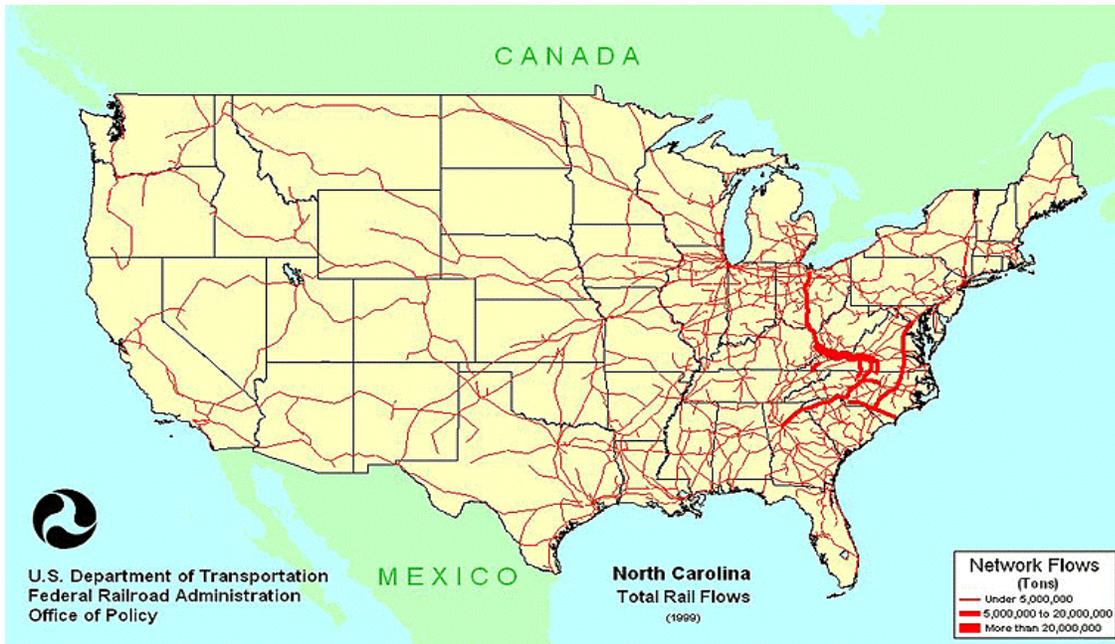


Figure 4.6 North Carolina Total Rail Freight Flows, 2002<sup>70</sup>

Table 4.3 Rail Shipments for 2002, NC compared with other Atlantic States

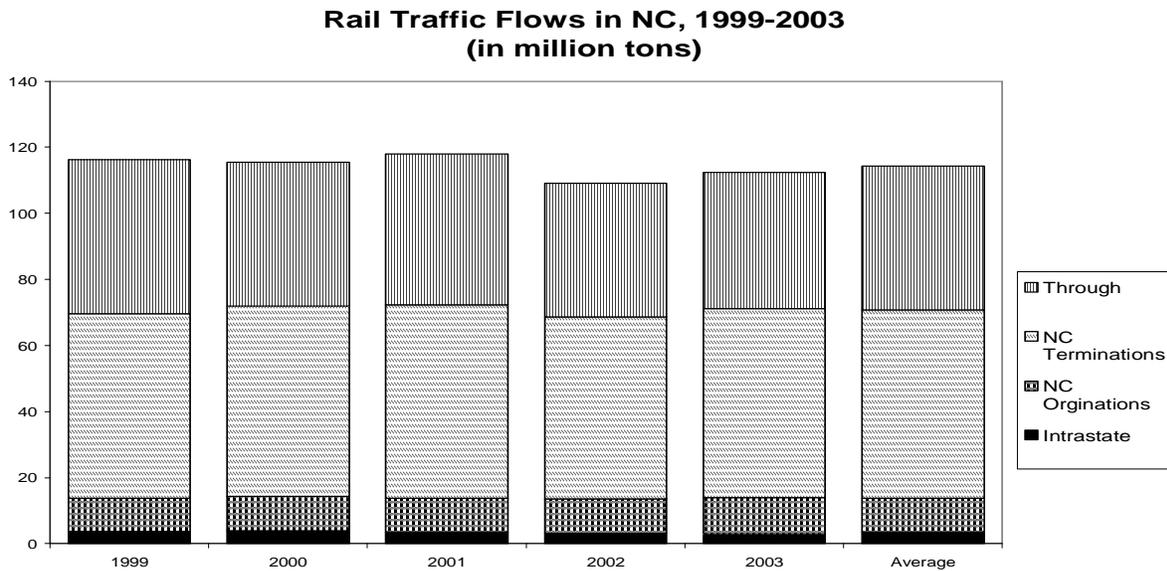
State	Rail Shipments Terminating in the State (Tons)	Top Commodity by Weight	Rail Shipments Originating in the State (Tons)	Top Commodity by Weight
Maryland	24,651,988	Coal	7,740,703	Primary Metals
Virginia	60,490,603	Coal	48,136,599	Coal
North Carolina	58,348,318	Coal	13,398,568	Chemicals
South Carolina	34,316,258	Coal	15,162,271	Lumber & Wood
Georgia	80,214,148	Coal	36,258,990	Glass and Stone
West Virginia	37,221,424	Coal	119,227,237	Coal

In spite of a relatively robust condition of the overall rail freight system in the state, there continues to be a pattern of rail access loss to individual businesses. Over the past three decades, over 700 miles of track have been abandoned in North Carolina. Some of these miles have been adapted to “Rails to Trails” use, but some have created shifts in freight mode and forced industry to ship products by truck where lines were abandoned. The predominant corridor connects the major urban areas of North Carolina with the coal fields of West Virginia and western Virginia.

Noticeable patterns exist in rail corridors. One such corridor parallels Interstate 95 from the South Carolina border north to Virginia; next is the corridor running from west to east from Charlotte to the Port of Wilmington, which is primarily representative of container movements

<sup>70</sup> Source: USDOT, Bureau of Transportation Statistics; 5/13/05  
[http://www.bts.gov/publications/state\\_transportation\\_profiles/state\\_transportation\\_statistics?2004/html](http://www.bts.gov/publications/state_transportation_profiles/state_transportation_statistics?2004/html)

through the port. More recent trends in the latter freight movement, however, have shown that container traffic from Charlotte to the Port of Charleston, SC, has grown over the past decade. According to projections made by Global Insight, Inc., for container growth from 2004 until 2020, the average increase among the 10 largest container ports is approximately 280 percent, up to an average of about 11 billion Twenty-foot Equivalent Units (TEUs) in 2020. The NC Port Authority projects its future growth at the Wilmington port to increase from a current 300,000 TEUs annually to about 500,000 TEUs. While some Trailer on Flat Car (TOFC) and Container on Flat Car (COFC) traffic come to Wilmington, most containers are delivered via truck.



**Figure 4.7 Rail Traffic Flows in NC, 1999 – 2003<sup>71</sup>**

Figure 4.7 shows the relatively flat pattern of rail traffic flows originating and terminating in the State from 1999 through 2003 at about 70 million tons. Adding in through-movement of freight and a small amount of intrastate freight shipped by rail, and the total tonnage moved over these five years was approaching 120 million tons annually. Table 4.4 identifies those sections of the North Carolina Class I rail system that are most likely to have a high level of throughput (and consequently, congestion) in 2020 and 2030.

The two Class I railroads that operate in the State have relatively aggressive plans for future expansion but they have indicated that the success of any major expansion must result from a public private partnership, with state and local support. CSX, for example, has proposed a concept called the “National Gateway,” a network of capacity rail enhancements stretching from New England to Florida, and from Louisiana to Northwest Ohio and Chicago. This intermodal project is proposed to require additional highway truck lanes to connect to their intermodal terminals. The expansion of the Charlotte terminal will open up north-south service to Florida

<sup>71</sup> Source: Surface Transportation Board Carload Waybill Sample for each year.

and the Northeast, and east-west service from Wilmington through Charlotte to the Midwest. For the past decade, Norfolk Southern has promoted its "I-81 Crescent Corridor" initiative that would provide additional intermodal service from northern New Jersey through Virginia's Interstate 81 corridor, through Greensboro and Charlotte through points south and west.

A number of improvements are currently being planned for the State's rail system that are primarily aimed at improving passenger rail service. However, freight service would also be a beneficiary of those improvements. The North Carolina Railroad currently is investing over \$27 million for bridge improvements and over \$32 million for track improvements, a total of eight projects. NC DOT is supporting the effort with a \$15 million investment in one of these projects, the expansion to double track from High Point to Greensboro. NCRR is also currently conducting a study to determine track expansion feasibility, costs, and standards for improving operations on the NCRR corridor. In spite of these investments, other rail corridors with single tracks either need to be restored to double track or developed to accommodate proposed improvements in passenger rail service.

**Table 4.4 Average Annual RR Car-Miles and Thru-Traffic in Ton-Miles, 1999-2003<sup>72</sup>**

Class I Rail Corridors	Railroad	Section Length (Miles)	Range of Avg. Annual Car-Loads per Mile	Through Traffic Level
1. Charlotte to Morehead City	NS	314		
Charlotte to Greensboro	NS	94	1,200-1,890	High (H)
Greensboro to Raleigh	NS	78	130-160	L
Raleigh to Morehead City	NS	142	190-240	L
2. Charlotte to Wilmington	CSX	188		
Charlotte to Monroe	CSX	78	740-1,210	M
Monroe to Pembroke	CSX	33	50-100	H
Pembroke to Wilmington	CSX	77	840-940	L
3. Hamlet to Norlina	CSX	151	130-170**	L
4. Asheville to Salisbury	NS	139	160-410	M
5. Raleigh to Lee Creek	NS	138		
Raleigh to Greenville	NS	87	30-60	L
Greenville to Lee Creek	NS	51	390-470	L
6. Winston-Salem to NC-VA State Line	NS	45	1,500-1,800	L
7. Greensboro to NC-VA State Line	NS	41	20-25	H
8. NC-VA State Line to NC-SC State Line	CSX	180	60-190	H
9. Charlotte to NC-TN State Line	CSX	173	65-110	M/H
Bostic to NC-SC State Line	CSX	13	870-1,330	H
10. Contentnea to Wallace	CSX	71	380-470	L
11. North and South Asheville	NS	87	90-140	M North/ L South
12. Charlotte to Winston-Salem	NS	82	85-110	L
13. Winston-Salem to Greensboro	NS	27	95-140	L
14. Greensboro to Gulf	NS	51	20-210	L
15. Raleigh to Fayetteville	NS	63	45-60	L

Notes on table:

1. Range for 5-year study period for traffic originating or terminating on Corridor, based on carloads originating or terminating at stations on Corridor
2. Traffic Level:
  - a. Low – 0 to 10 M gross ton- Miles/mile
  - b. Medium – 10 to 40 M gross ton-Miles/mile
  - c. High - 40 M or greater gross ton-Mile/mile
3. XXXX – highlighted segments show highest potential for congested rail corridors in the future
4. \*\* - Congestion on this corridor (parallel to I-95) is due to scheduling conflicts with AMTRAC.

**4.1.2.1 Rail Freight Infrastructure Gaps**

Historically, private investment has funded rail infrastructure enhancements. However, as described in the “Rail” appendix, railroads have struggled to earn sufficient profits to afford such investments for much of the last half-century. While this situation has somewhat improved for Class I railroads, it is highly unlikely that the NC short-line railroads will earn sufficient profits

<sup>72</sup> Source: North Carolina Waybill Analysis, prepared by PBS&J and Wilbur Smith Associates for the Rail Division, NC DOT, November 2006

to self-fund needed infrastructure investments anytime in the foreseeable future. Even Class I railroads will only be motivated to invest in those areas where volume is sufficient to make such investment financially viable (see Table 4.4.) It is unlikely that either Class I railroads or short-lines will be motivated to install/expand any significant amount of new rail to expand service without some form of public assistance (in the form of direct infrastructure investment, low cost loans, or other financial incentives). Accordingly, the following are some of the rail issues/areas that North Carolina must consider within the framework of enhancing its transportation infrastructure:

- 1) Retain existing rail corridors and halting track removal;
- 2) Continue direct support for short-line railroad infrastructure improvements;
- 3) Expand capacity in high-use rail corridors, including the expansion into double/triple track configurations;
- 4) Enhance/improve scheduling and coordination with passenger rail service;
- 5) Explore routing options for hazardous materials shipments to avoid highly populated areas;
- 6) Reduce at-grade rail/highway crossings;
- 7) Provide rail access to North Carolina Port Authority inland terminals (currently located in Greensboro and Charlotte – additional information available in the “Ports” section).

#### 4.1.3 **Air Freight**

Although air freight makes up only one or two percent of the weight of cargo shipments in the State, it makes up approximately 10 percent of the value of North Carolina cargo shipments. In terms of air cargo shipped and received, North Carolina's airports are categorized by three tiers. First tier airports are those with service to multiple connecting hubs and origin-destination markets. These airports are all international airports and serve the state's three largest metropolitan areas – Raleigh/Durham, Charlotte, and Piedmont Triad. All three provide international service, and these three provide cargo facilities that handle between 180 million and 360 million total pounds of air freight shipped out or received annually.

North Carolina's second tier of commercial airports in terms of freight includes airports with service by multiple air freight carriers. Second tier airports with some freight business include Asheville, Wilmington/New Hanover County, New Bern/Craven County, and Rocky Mount/Wilson. These four commercial airports ship and receive between one and five million pounds of air freight annually.

The third tier of airports that have a combination of commuter air service and general aviation, as well as air cargo, include two other commercial carrier airports -- Fayetteville and Person County -- and three military air bases -- Seymour Johnson, Cherry Point, and Pope Air Force base.

Over 98 percent of all air cargo originations and destinations in North Carolina are handled by the three Tier 1 airports. The growth of North Carolina's air cargo facilities has been even more

robust than growth nationwide. From 1999 to 2006, originations increased by 242 percent in North Carolina, as compared to 185 percent nationally. From 2000 to 2006, there was a 327 percent growth in NC and only 168 percent growth nationally.

**Table 4.5 Freight Originating at NC Airports, 1999 – 2006 (in thousand pounds)**

Code	Airport	1999	2000	2001	2002	2003	2004	2005	2006
AVL	Asheville Regional	275	846	769	1,141	1,160	976	1,126	1,350
CLT	Charlotte Douglas International	77,416	63,612	50,130	75,691	152,934	165,275	167,056	144,205
EWN	Craven County Regional	0	0	0	369	1,509	1,533	1,545	1,918
FAY	Fayetteville Municipal	81	75	33	8	48	35	27	43
GSB	Seymour Johnson Air Force Base	0	0	0	0	1,663	0	2	160
GSO	Piedmont Triad International	6,489	5,265	10,628	31,236	84,338	82,413	89,309	88,337
ILM	New Hanover County	453	411	359	553	1,238	1,310	1,333	1,230
NKT	Cherry Point MCAS	0	0	0	497	0	351	190	0
POB	Pope Air Force Base	16	0	64	227	103	493	218	95
RDU	Raleigh-Durham International	13,666	8,665	24,883	40,372	93,259	105,183	106,419	98,555
RWI	Rocky Mount-Wilson	0	4	17	4	16	1,960	2,107	969
TDF	Person County	0	0	0	1	16	0	54	45
	All other commercial airports	12	26	12	0	2	14	99	58
<b>Total for NC (in thousand lbs.)</b>		<b>98408</b>	<b>78904</b>	<b>86895</b>	<b>150099</b>	<b>336286</b>	<b>359543</b>	<b>369485</b>	<b>336965</b>
<b>% increase (loss) per year, NC</b>			<b>-19.80%</b>	<b>10.10%</b>	<b>72.70%</b>	<b>124%</b>	<b>6.90%</b>	<b>2.80%</b>	<b>-8.80%</b>
<b>Total US database (in million lbs.)</b>		<b>17,497</b>	<b>18,624</b>	<b>22,286</b>	<b>27,288</b>	<b>38,840</b>	<b>41,816</b>	<b>49,033</b>	<b>49,851</b>
<b>% increase per year, US</b>			<b>6.40%</b>	<b>19.70%</b>	<b>22.40%</b>	<b>42.30%</b>	<b>7.70%</b>	<b>17.20%</b>	<b>1.60%</b>

(Source: <http://www.transtats.bts.gov>; US Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics)

**Table 4.6 Freight Terminating at NC Airports, 1999 – 2006 (in thousand pounds)**

Airport	1999	2000	2001	2002	2003	2004	2005	2006	
Asheville Regional	500	1,154	921	1,137	1,147	709	384	314	
Charlotte Douglas International	82,532	73,145	58,372	86,630	168,852	175,949	195,631	163,615	
Craven County Regional	0	0	3	503	2,070	2,293	2,281	2,295	
Fayetteville Municipal	370	280	121	48	129	118	101	48	
Seymour Johnson Air Force Base	0	0	0	0	4	0	0	0	
Piedmont Triad International	6,846	6,017	15,241	36,917	91,190	93,605	94,275	92,151	
New Hanover County	421	425	425	873	2,366	2,461	2,505	2,392	
Cherry Point MCAS	433	0	0	133	0	510	811	59	
Pope Air Force Base	26	24	0	193	477	205	126	105	
Raleigh-Durham International	15,617	12,129	34,444	56,569	119,249	132,059	122,161	122,858	
Rocky Mount-Wilson	1	1	31	0	0	84	34	76	
Person County	0	0	0	0	0	0	0	0	
All other commercial airports in NC (estimated)	0	0	0	0	0	100	100	100	
<b>Total for NC (in thousand pounds)</b>		<b>106746</b>	<b>93175</b>	<b>109558</b>	<b>183003</b>	<b>385484</b>	<b>408093</b>	<b>418409</b>	<b>384013</b>
<b>% Increase (or loss), NC Airports</b>			<b>-14.80%</b>	<b>17.80%</b>	<b>67%</b>	<b>110.60%</b>	<b>5.90%</b>	<b>2.50%</b>	<b>-8.20%</b>

In 2002, there were 13 air cargo airports in North Carolina (Figure 4.8). However the freight business at small airports is highly volatile, and five of the public airports handling cargo in 2002 (Hickory, Winston-Salem, Southern Pines, Kinston and Greenville) were no longer reporting cargo business in 2006, according to the USDOT database. The 2006 airports that had freight service are in Figure 4.9. In that year, almost 98 percent of air freight originating in the state was handled by the three major airports. Four “second tier” airports combined handled almost two percent of the shipments, with another five airports showing some air freight shipments in 2006.

Much of the success of regional industrial and business expansion initiatives over the past two decades in the three major urban regions in the state has been attributable to the transportation system in the region, and in particular the range of services and amenities found at the region's major air transportation facilities. For example, more than 600 daily departures (serving both passenger travel and in-hold cargo) from Charlotte Douglas provide service to 150 cities nationwide and to several off-shore markets. Commercial airlines and all-cargo carriers combined serving Charlotte carry approximately 200,000 tons (400 million pounds) of domestic and international cargo annually. Twenty cargo carriers and more than 60 freight forwarders service the airport. It is the 36<sup>th</sup> largest cargo airport in the U.S. Other features are direct connections landside to Interstate routes I-77, I-85, and the I-485 circumferential loop around Charlotte.

The following maps and illustrations for North Carolina's three major cargo airports show the potential for growth of air freight in the State. Destinations of all-cargo flights are not projected, but a significant portion of air freight business at Charlotte Douglas, as well as other major airports, is carried in the hold of passenger jets. Projections of air freight into the next decade show the value of air cargo growing from \$29 billion in 1998, to \$72 billion in 2010, and \$126 billion in 2020. Charlotte Douglas in March 2008 announced that the \$320 million third runway is on schedule and should be completed by early 2010. This needed runway addition will provide additional capacity for air freight as well.



Figure 4.8 North Carolina Air Cargo Airports, 2002<sup>73</sup>

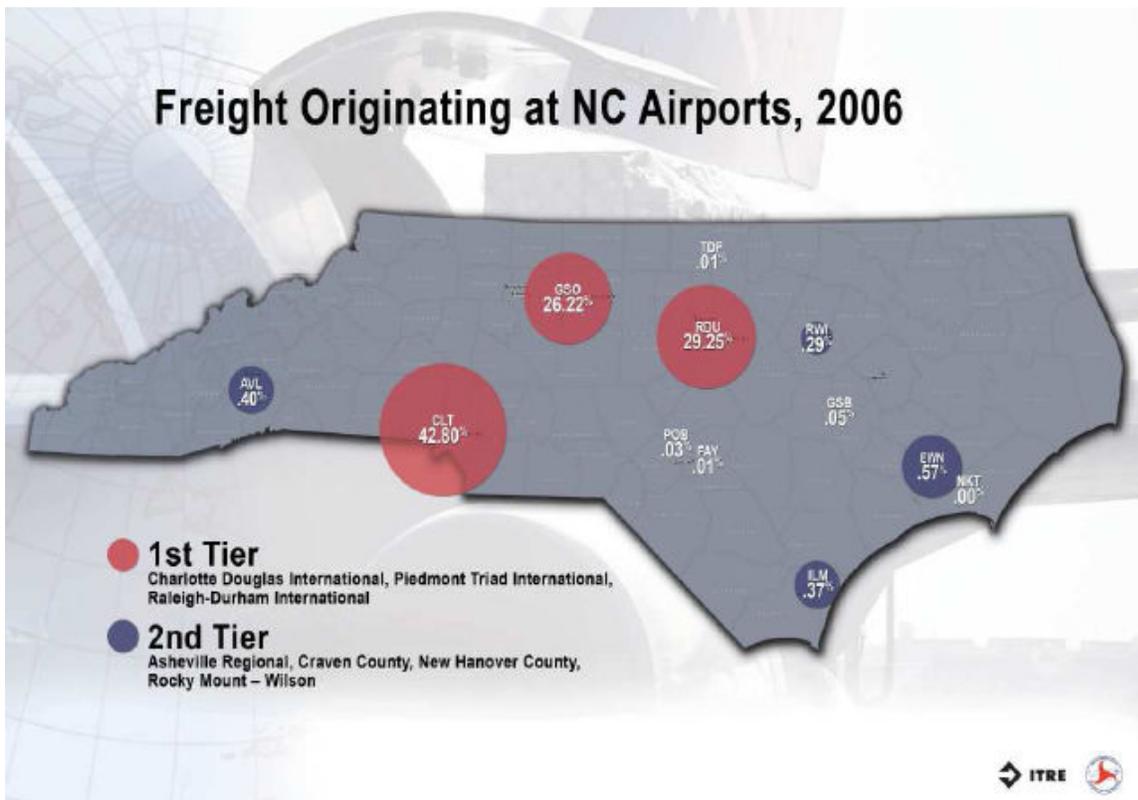
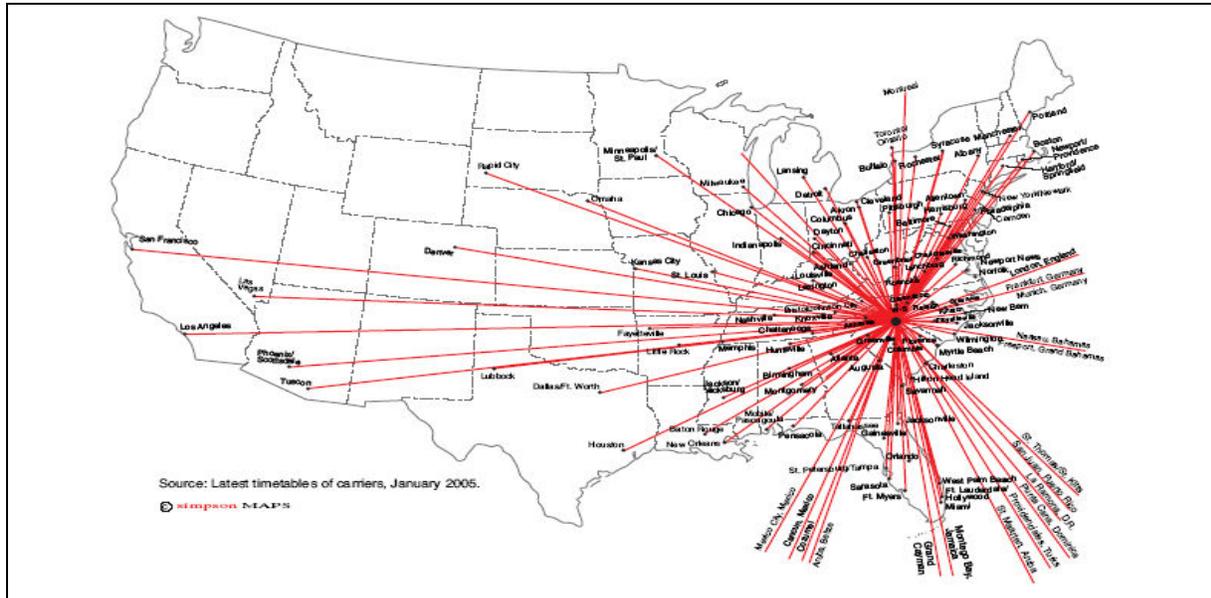


Figure 4.9 North Carolina Air Cargo Airports, 2006

<sup>73</sup> Source: North Carolina Forums on Freight Mobility and Economic Prosperity, Integrated Proceedings, Prepared by UNC Charlotte Center for Transportation Policy Studies for the NC DOT, Rail Division, September 2005.

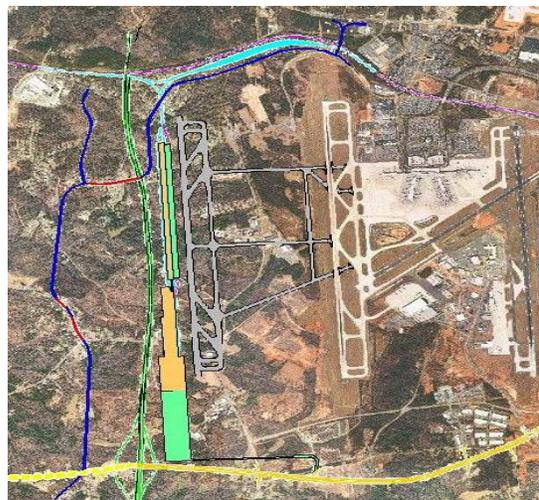


**Figure 4.10 Destinations from Charlotte Douglas International (CLT), 2005**  
 (Source: Charlotte Douglas International Airport Public Information Office)

Charlotte Douglas is currently in a growth mode in terms of air freight operations, and overall is the 18<sup>th</sup> largest air carrier airport as recently as 2003. The City of Charlotte Aviation Department is involved in a planning process to move the airport up as a more prominent national hub for air freight. A new partnership with CSX has been developed over the past several years, and a new intermodal terminal with rail, truck and air interface is currently in the planning stage, as shown in Figure 4.11. This inland port would potentially replace the current facility that is located just north of Charlotte's Uptown area.



Current Intermodal Facility



Future Intermodal Facility

**Figure 4.11 Planned Intermodal Hub at Charlotte-Douglas International Airport**

(Source: Charlotte Douglas International Airport Public Information Office)





**Figure 4.13 Destinations from Piedmont Triad International Airport (GSO), 2008**

(Source: Piedmont Triad International Airport Public Information Office)

In the next year, a major distribution hub being developed by Federal Express (FedEx) at GSO will open. FedEx’s Mid-Atlantic hub at GSO has seen the following milestones:

- Project announced in April 1998;
- Selected URS to do the EIS in July 1998;
- Final EIS released in November 2001;
- ROD issued in December 2001;
- Certification for air quality in August 2003;
- 401 Water Quality Certification issued in November 2003 by NCDENR;
- 404 Wetlands Permit issued in December 2003 by the Army Corps of Engineers;
- Lease began with FedEx in 2006
- Road work completed mid-2008
- Operations expected to begin in July-August 2009

In terms of financing, the State of North Carolina approved funding for the FedEx facility in the amount of \$52 million for road construction in 2001. Federal funding of \$124 million was initially approved for runway and taxiway construction in March 2002.

This “snapshot” of one of the major air freight handling facilities (at GSO) is representative of a projection nationally of significant growth in air freight. In the Atlanta region, for example, overall air cargo is expected to expand by about 150 percent from current levels until 2030. In that same time period, shipments of electrical equipment, which is a major commodity produced in the Atlanta region, is expected to grow by over 500 percent. There is no reason to believe that similar growth would not be experienced at North Carolina’s three major airports.

#### 4.1.3.1 **Air Freight Infrastructure Gaps**

The following are some of the key infrastructure issues/concerns with North Carolina’s air infrastructure:

- Ensuring adequate access between airports and the major highways;
- Protecting facility expansion options;
- Controlling land use in flight path areas.

#### 4.1.4 **Ports**

In 1945 the North Carolina General Assembly created the North Carolina Port Authority. This entity currently controls our two state ports – in Wilmington and Morehead City. Effectively, Morehead City serves as the state’s bulk commodity port while Wilmington serves as the state’s container port. The NC Port Authority also maintains inland terminals in Greensboro and Charlotte to support intermodal trucking operations.

The Ports Authority’s existing expansion plans include the following:

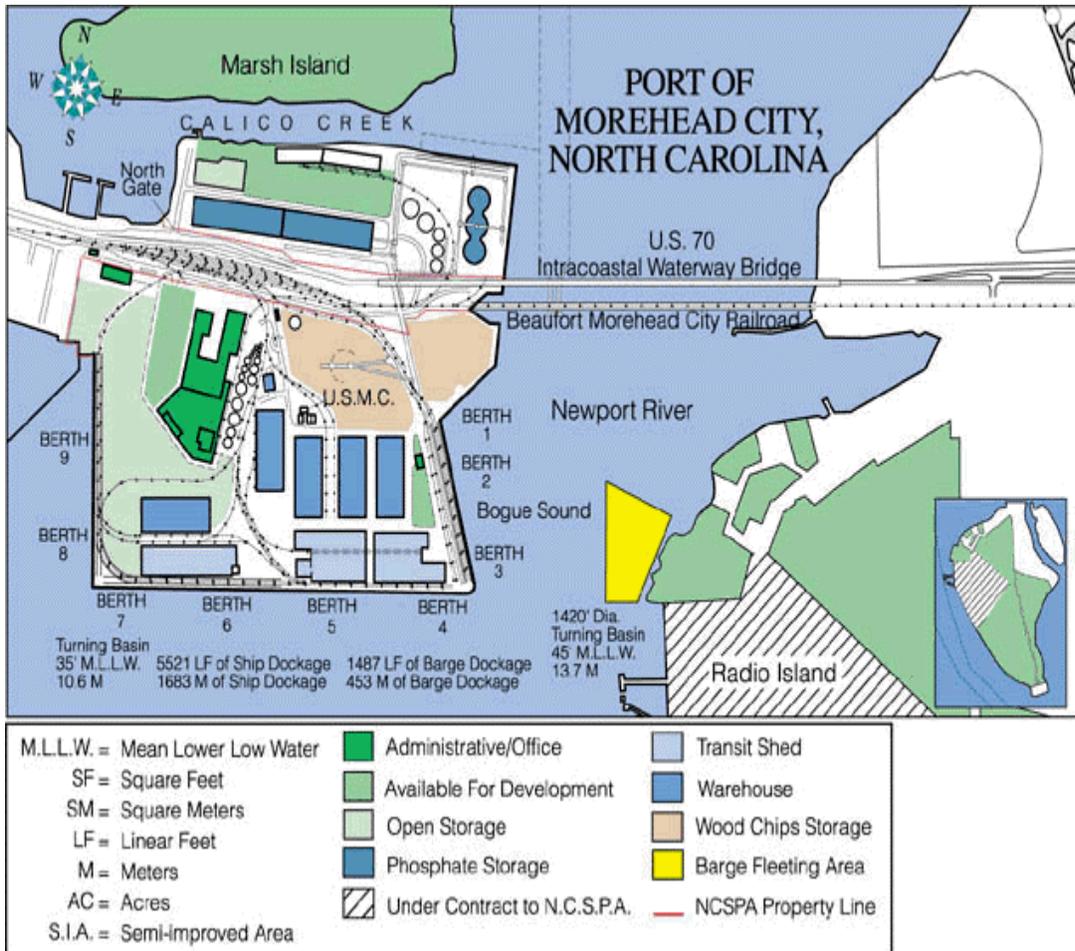
- Development of a new international port in Brunswick County;
- Enhancements to facilities at both existing inland terminal facilities;
- Expansion onto authority-owned property on Radio Island at the Morehead City port.

##### 4.1.4.1 **Port of Morehead City**

*Characteristics:* Figure 4.14 shows a map of the Port of Morehead City. This port is located just four miles from the ocean and has 5,500 linear feet of ship dockage and 1,487 linear feet of barge dockage. Its East turning basin has a diameter of 1,350 feet and a depth of 45 feet, while its West turning basin has a radius of 1,100 feet and a depth of 35 feet. Despite these characteristics it is by far the smaller in terms of capacity and total freight handled when compared to the Wilmington port. The Morehead City port channel depth is 45 feet inside the harbor, and the width of the channel is between 400 and 820 feet. For comparison, the Port of Charleston in South Carolina has a depth of 47 feet at its entrance and 45 feet elsewhere at mean low water level thus allowing very large container ships to use it.<sup>74</sup>

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<sup>74</sup> [http://www.scspace.com/webhelp/Channel\\_depth\\_and\\_width.htm](http://www.scspace.com/webhelp/Channel_depth_and_width.htm) accessed 2/22/2008.



**Figure 4.14 Port of Morehead City**

(Source:

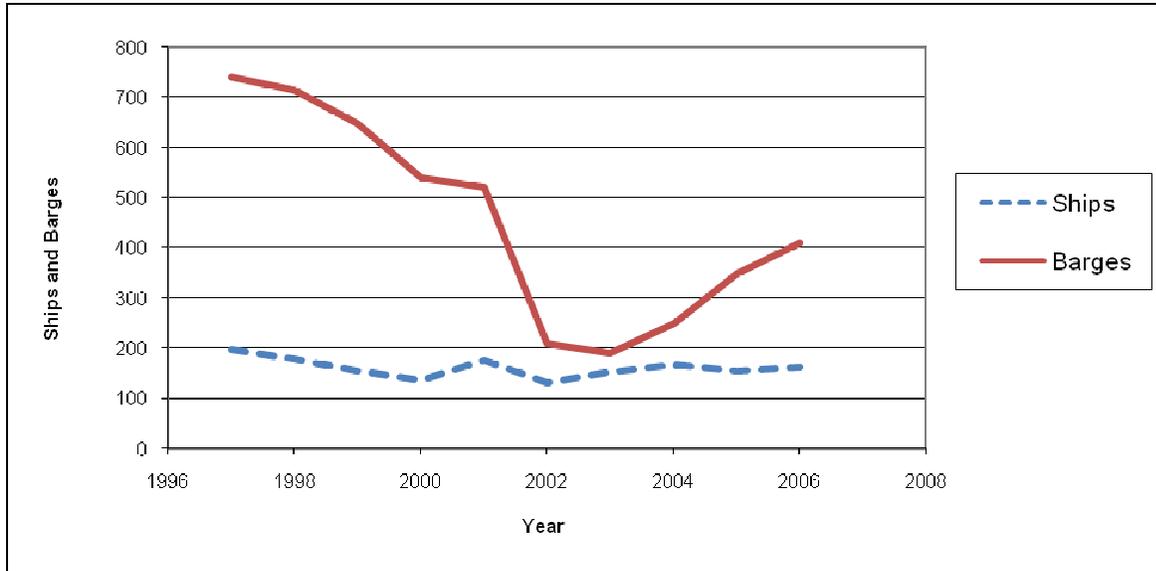
<http://ncports.com/web/ncports.nsf/pages/Map%20of%20Port%20of%20Morehead%20City?OpenDocument>)

The Morehead City port handles dry-bulk and break-bulk shipments. Most imports coming through the port are from Venezuela, Indonesia and Turkey and most of the exports it handles are to China, India and Brazil. (See the Appendix F tables.) It has a warehouse with a capacity of 225,000 tons for dry-bulk, an open storage dry-bulk facility with annual capacity of 2 million tons, a foreign trade zone site with 190,374 square feet of warehouse space and an undeveloped foreign trade zone covering 40 acres. Across the port on Radio Island is a fully-serviced land 150 acres in size, available for industrial purposes.<sup>75</sup> This island is linked to the mainland by a bascule bridge.

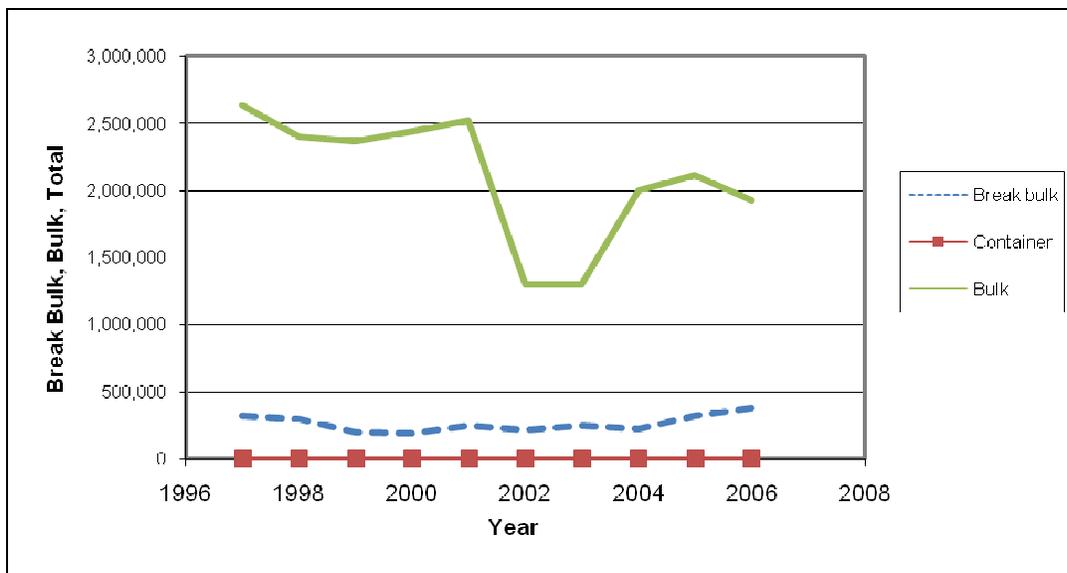
Norfolk Southern provides rail services to the port, and the Morehead and South Fork Railroad provides switching. In addition the port can be accessed by U.S. Highway 70, U.S. Highway 17 and N.C. 24. However, its main access is U.S. 70 to Arendell Street, which is a local road and not designed to interstate standards. A secondary access is by Market Street.

<sup>75</sup> <http://ncports.com/web/ncports.nsf/pages/Port%20of%20Morehead%20City?OpenDocument> accessed 3/3/08.

*Traffic:* Figure 4.15 and Figure 4.16 show 10-year trends in the distribution of total freight movements, break-bulk, bulk and containers. Additionally, the table shows trends in port usage in terms of ships and barges served. Ship movements have remained very low at less than 200 a year and barge movements have steadily declined from a high of 740 in 1997 to a low of 191 in 2003. After 2003 barge movements started increasing. Assuming that ship and barge arrivals are evenly distributed throughout the year the Morehead City Port in 2006 handled about 1.13 and 0.449 barges and ship per day, respectively.

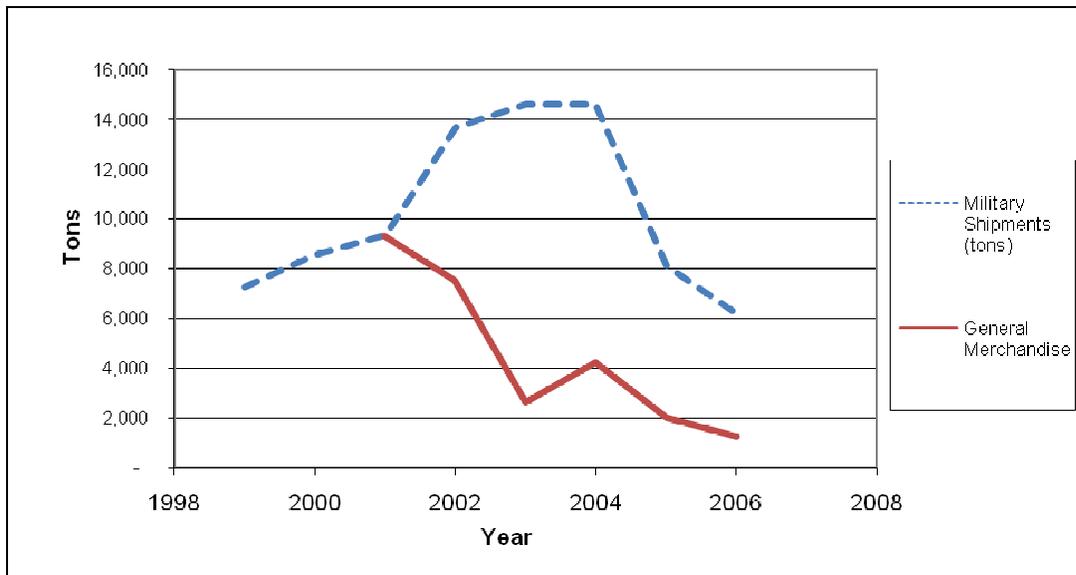


**Figure 4.15 Morehead City Port - Ship and Barge Traffic**



**Figure 4.16 Morehead City Port - Tonnage Handled**

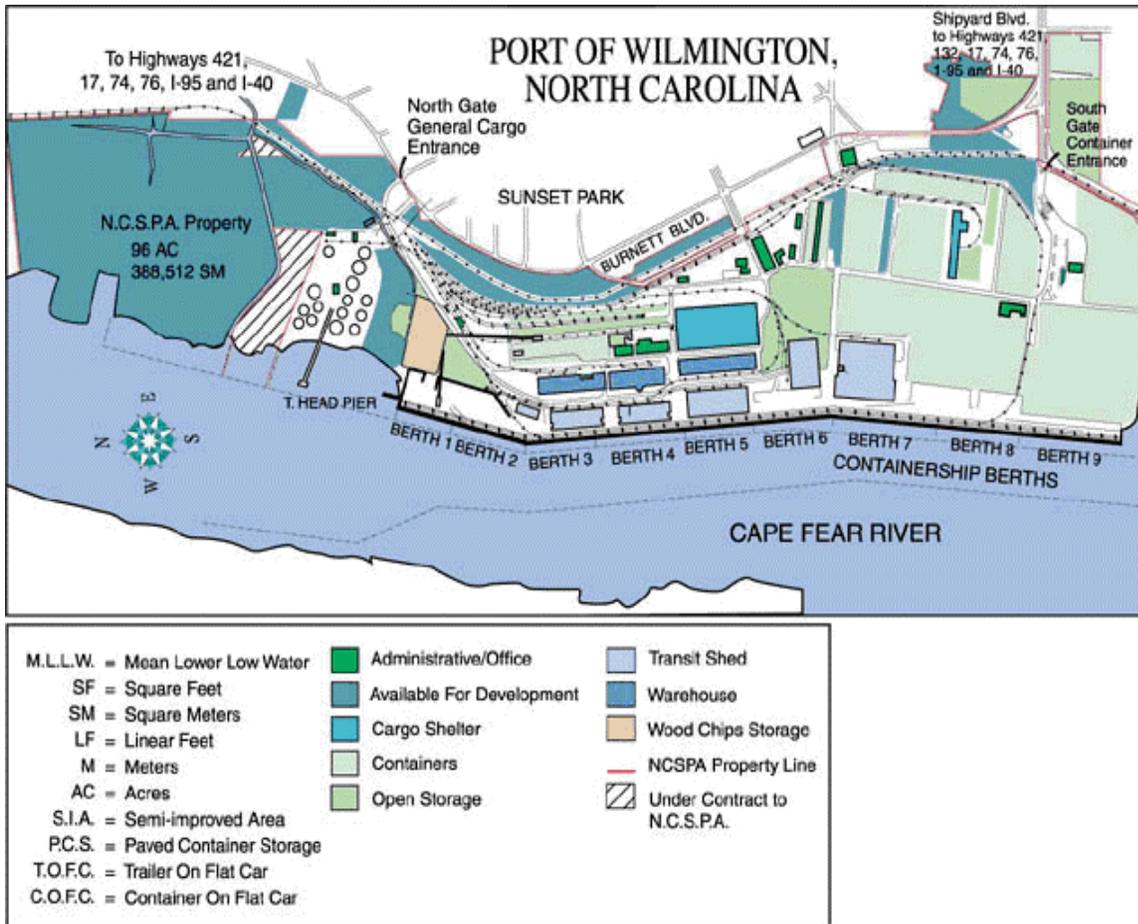
Two of the top five exports from this port are general merchandise and military hardware. Figure 4.17 shows that both exports have been declining. However, military exports increased from 1999 and peaked in 2004 at 14,590 tons. Since then there has been a sharp decline in exported military hardware going through this port by 57.5 percent to 6,199 tons. Comparatively, exports of general merchandise have been declining consistently since 2001. In 2006 the total exports of general merchandise were 1,271 tons, as compared to 7,566 tons in 2001.



**Figure 4.17 Morehead City Port: Exports - Military and General Merchandise**

#### 4.1.4.2 Wilmington Port

*Characteristics:* Figure 4.18 shows an aerial view of the port of Wilmington. The port is 26 miles from the open sea; it has a wharf 6,768 feet long and an ocean bar with a channel that is 44 feet deep at mean low water level and 500 feet wide. The imports handled by this port mostly come from Colombia, Germany, China and Venezuela and the exports are mostly to Italy, China, Korea and the United Kingdom among others.



**Figure 4.18 Port of Wilmington**

(Source: <http://ncports.com/web/ncports.nsf/pages/Map%20of%20Port%20of%20Wilmington?OpenDocument> accessed March 3, 2008.)

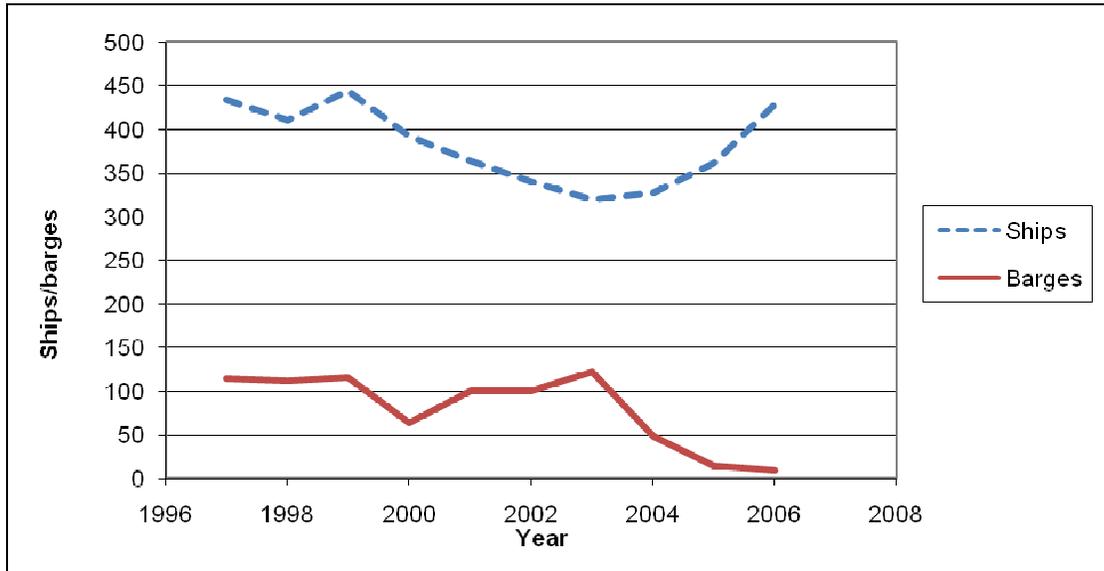
The port has a storage facility with a capacity of 2.5 million cubic feet, and it has 100 acres of developable land for future expansion.

The port of Wilmington is accessible by I-40 and I-95 (via 40), U.S. Highways 17 and 74, State Highway 421 and Burnett Boulevard. The latter boulevard provides direct access to the port and intersects with several city streets. CSX and NS rail services are also available and the Wilmington Terminal Railroad provides switching services inside the port. Also, this port has depressed tracks, transit sheds and facilities to handle double stack rail services.

Recent investments include deepening the port to 42 feet, acquiring four new container cranes and yard handling equipment and rebuilding berths eight and nine. These improvements have increased the capacity of the port from 250,000 to 500,000 TEUs annually.

*Traffic:* Figure 4.19 indicates ship and barge traffic between 1997 and 2006. As this indicates, the total number of ships calling at this port fell from 434 in 1997 to 411 in 1998 and increased

to 445 in 1999; it then declined continuously between 1999 and 2003. By 2003 the total number of ships calling at this port had declined by 35.63 percent from its high 1997 level of 434 to 320. Since 2003, Figure 4.19 also shows that the number of ships calling at this port has increased steadily from 320 in 2003 to 429 in 2006 (i.e. 34.06 percent) to almost equal the number for 1997. On a monthly basis the Port of Wilmington handles 35-40 ships. Only nine barges used the port during 2006.



**Figure 4.19 Ships and Barges Tonnage and Vessel Trends– Wilmington**

Figure 4.20 shows that the total number of containers (measured in twenty feet equivalent units or TEU) that moved through this port declined by 23.52 percent from 1997 to 2002. From 2002 to 2006 the number of containers handled increased by 81.54 percent or an average of 20.39 percent per year with the sharpest increase occurring after 2004. This pattern can be compared to the trend in tonnage shipped by containers in Figure 4.21. Also except for a brief decline in 2003, break-bulk tonnage has increased by 82.94 percent or 10.37 percent per year since 1998.

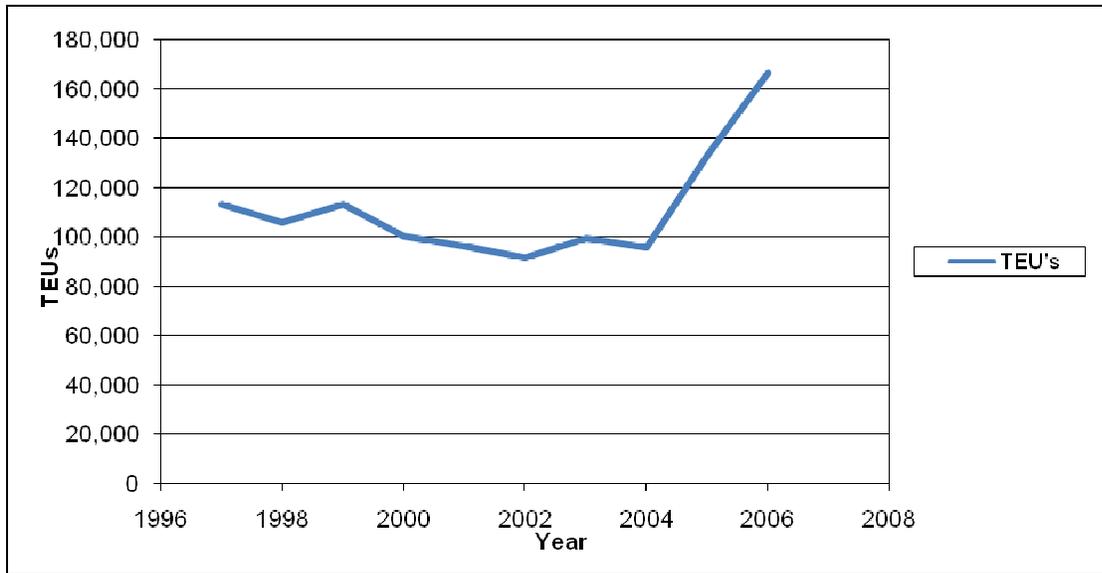


Figure 4.20 Port of Wilmington - T.E.U.

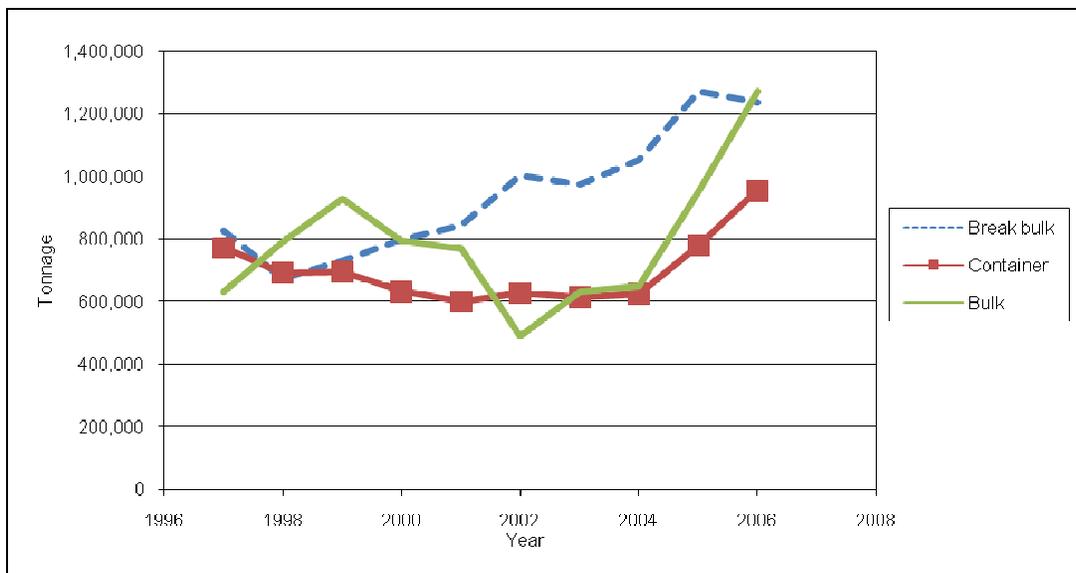


Figure 4.21 Port of Wilmington - Tonnage Handled

#### 4.1.4.3 Inland Terminals

The North Carolina Ports Authority owns and operates inland terminals in two locations – Charlotte and Greensboro. These facilities were the first of their kind nationally and were intended to provide the following benefits:

- Reduce costs and provide improved ease and efficiency of picking up and delivering containers, and

- Provide customers opportunities to improve profitability, expand market area and improve competitiveness.

The Charlotte facility is located at 1301 Exchange Street in Charlotte while the Greensboro facility is located at 505 Chimney Rock Road in Greensboro. Both facilities provide the following features<sup>76</sup>:

- Staging for empty and loaded containers - bonded by U.S. Customs and Border Patrol;
- Maintenance and repair operations allowed on site; and
- Real-time data management through Port of Wilmington Terminal Operating System.

However, neither the Charlotte nor Greensboro facility has onsite rail access.

#### 4.1.4.4 Port Infrastructure Gaps

The following are some of the identified infrastructure issues/concerns with North Carolina's port infrastructure:

##### 4.1.4.4.1 Morehead City Port

1. **Improve rail access.** Although there is rail access to this port the quality of the service may be the reason port usage is low. Inadequate rail access limits the types of shipments that can be handled by the port. Specific rail projects include the following:
  - A. **Construct West lead track:** This is the primary access to the busiest berths in the port and it is in need of replacement and upgrading to heavier rail.
  - B. **Relocate rail on Radio Island:** A single track serves Radio Island. Relocation of this track will improve operations and cargo volumes while increasing distance to nearby residential development. This is consistent with long term plans to reduce traffic congestion on U.S. Highway 70 in this area.
2. **Improve road access.** There is no road of interstate quality serving this port. U.S. 70 is the only direct access by way of the Intracoastal Waterway Bridge over the Newport River. Market Street also provides some access to this port. For the port to be competitive good quality multi-lane roads are needed to link it to other highway systems. Secondary highways with their many traffic lights increase truck trip times and reduce the ability of firms to maintain just-in-time production schedules and rely on the port for regular deliveries. Specific needs include the following:
  - A. **Upgrade U.S.-70 to near interstate standards:** At present there is no interstate or a limited access highway serving Morehead City but secondary roads. And NC DOT has not slated improvements on any road leading to the port "nor (*have*) funds (*been*) designated for a north-south coastal highway extension ... from Raleigh to the Eastern Region's coastal areas".<sup>77</sup> For the port to grow it requires an efficient highway network to pick up and deliver shipments. Therefore, Highway

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<sup>76</sup> "2006 STP Mid-Cycle Update – Technical Report," North Carolina Department of Transportation, page 140.

<sup>77</sup> Market Services Inc. (2004) *Competitive Assessment for North Carolina Eastern Region*. Wilmington, N.C.

70 should be upgraded to interstate standards. This involves building six by-passes including the Carteret and Havelock by-passes.

- B. **Upgrade Market Street:** Consideration should also be given to upgrading Market Street to a limited access highway.
  - **Replace Newport River bascule bridge<sup>78</sup>:** This bridge serves Radio Island. If Radio Island is developed it is foreseen that it would attract heavy truck and rail traffic whose flow will be slowed by operating this bridge. It is, therefore, recommended to build a bridge with enough clearance to allow ships to pass freely under it.

#### 4.1.4.4.2 *Port Of Wilmington*

1. **Improve rail access.** Although CSX provides twice daily service to the port and interlined services with Norfolk Southern and CSX intermodal are also available, some improvements to rail access are needed because of the sharp growth in container services since 2004 and the expected continuation of this growth in the future. Moreover the existing lines of the switching railroad are not grade-separated and cross main city streets therefore increasing delivery times and posing potential safety problems. Additional rail access improvement projects include the following:
  - A. **Build the Pembroke northern bypass rail connecting track:** This provides connection between the CSX north-south and east-west lines to permit a direct east to north rail route. Presently these lines are not linked. If constructed this connection will reduce travel time and improve traffic flow.
  - B. **Ft. Bragg connector:** Rail links between Wilmington and Ft. Bragg must be improved. The improvements include turnouts, track work, grading and drainage, signals and bridge work and will enable the military to move cargo from inland installations to the state ports.
  - C. **Castle Hayne to Wallace Restoration:** This requires replacing 27 miles of track and two bridge crossings. It will allow freight and passenger trains to travel directly from Goldsboro to Wilmington and provide a service currently lacking.
  - D. **Rail Crossings North and South of Shed 4:** All traffic accessing the piers in this zone must pass over these rail crossings which are in need of rehabilitation.
2. **Improve road access.** The only road providing direct access to this port is U.S. Highway 17 which is a four lane divided surface road with limited grade separation in few places. This increases access time and reduces transportation quality of service. Other highway-related projects include the following:
  - A. **Improve truck access:** An important aspect of port operation is truck access. This is especially critical in container shipments because many containers must be delivered or picked up by trucks, so the potential for truck congestion at the port exists, and this could spill onto nearby local access roads. An overturned

<sup>78</sup> A bascule bridge is used to span a short busy waterway width. It can be opened to let ships pass and closed after that.

truck (as happened recently) could result in diverting traffic onto local roads near the port, which in Wilmington means heavy truck traffic through the historic Sunset neighborhood. To avoid this congestion and its spillover effects requires right-of-way acquisition to enable redesigning U.S. Highway 17 to interstate standards, and upgrading some of the port access roads also to near interstate standards with limited access. Already, the Wilmington MPO's transportation improvement program for 2015 includes U.S.17 bypass south of NC 87 in Brunswick County to I-40 in New Haven County that will be a four lane divided freeway.<sup>79</sup>

- B. **Build the Cape Fear Skyway:** Currently, there is a proposal by the North Carolina Turnpike Authority to build the Cape Fear Skyway linking the U.S. 17 Western bypass to the port area.<sup>80</sup>
- C. **I-40 extension to port area:** In the long run I-40 could be extended to the port area and U.S. Highway 74 can be improved to interstate standards from Gastonia to Wilmington. This will open up the port to shippers in Charlotte and its environs.

- 3. **Support efforts by the State Ports Authority to build the proposed North Carolina International Terminal.** The State Ports Authority has begun the process of securing an Environmental Impact Statement (EIS) in support of building a new container port on 600 acres of land in Brunswick County. This new location is south of the existing port of Wilmington and adjacent to the Military Ocean Terminal at Sunny Point. The new port will be closer to the Atlantic Ocean (4 miles from the estuary of the Cape Fear River) and will have deep water depths to handle large container ships and compete with Norfolk, Charleston and Savannah. It also may prove more environmentally-friendly and economically-friendly than further dredging of the Cape Fear River and enlarging the Port of Wilmington footprint. Support efforts include providing rail linkage to the proposed and upgrading highway facilities.

## 4.2 Gap Analysis

The statements below summarize the projections identified in earlier chapters with regards to the major demand drivers of North Carolina's transportation infrastructure needs:

### Freight Patterns:

- Truck traffic is expected to grow throughout the state over the next 20 years. Much of the growth will occur in urban areas and on the Interstate highway system. This pattern is likely to impact both the total needed to transport goods and the reliability of such transit times.
- Foreign trade will become an increasing important aspect of North Carolina's economy.

<sup>79</sup> See [http://www.wmpo.org/pdf/2007-2013\\_MTIP.pdf](http://www.wmpo.org/pdf/2007-2013_MTIP.pdf)

<sup>80</sup> Carlson G. (2008) *The Future of North Carolina State Port Authority*. Presented to the North Carolina Futures Committee, Wilmington N.C., February 29, 2008.

**Population Projections:**

- State population growth will slow from the historic highs of recent years. However, overall growth will remain above the national average but will be unequally distributed.
- Growth will occur in or around urban centers, primarily along the traditional route of the North Carolina Railroad (also referred to as the Piedmont Crescent).
- The Raleigh and Charlotte metro areas will experience the largest absolute growth while Wilmington's will experience a strong proportional surge in growth.
- The Triad Area's growth is projected to be relatively flat and the region continues to adjust from the relative decline in manufacturing and transitions into a more diverse economy.
- Among the next tier of urban areas, Asheville is expected to grow but at a rate somewhat slower than Wilmington.
- Fayetteville and Greenville are projected to grow, primarily due to an increased military-related population presence.
- Growth in smaller urban areas is expected to exceed the rural growth rate but is anticipated to grow significantly slower than the larger urban areas.

**Employment projections:**

- Overall employment will increase at a lower rate less than population, reflecting an aging population (i.e., an increased percentage of retirees in the total population.)
- Job increases will be highest in the service sectors while the *percentage* of the state's population employed in manufacturing will continue to decline. (In absolute terms, employment in manufacturing will remain relatively level.) Regardless, North Carolina's percentage of the population involved in manufacturing-related employment will remain significantly above the national average.
- Manufacturing output is expected to increase in computers and electronics, chemicals, and transportation equipment. Continued declines are expected in the tobacco, textiles, and apparel industries.
- Employment in the construction sector is predicted to be particularly strong.

**Transportation/Logistics Clusters:**

- Trucking firms tend to locate near population centers, in proximity to major transportation interchanges and/or near major freight sources. These firms represent the largest source of freight-based highway transportation infrastructure demand.
- Air cargo providers are located at or near airport facilities. Firms that provide facility or equipment-based support tend to locate in close conjunction to these firms.
- While air cargo providers most directly impact the airport infrastructure, they also add volume on the highway transportation system, especially with respect to those highway facilities that are directly adjacent to air facilities.

- Ports are natural origins and destinations for freight, creating a focal point for both firms that directly perform freight movements as well as firms that arrange for such services.
- While firms that arrange or manage freight logistics often are located near such activities are performed, they often are not. Equally importantly, while such firms often control what firm(s) performs the actual cargo movement, these firms effectively serve as consultants and do not inherently place any greater demand on the transportation infrastructure than a non-logistics firm.

#### 4.2.1 Summary of Infrastructure Needs and Issues

Within the context of the above projections and considerations, we have identified a number of infrastructure needs in this chapter that are summarized below, first by mode and then by time-frame for implementation.

##### **Highways/Trucking:**

- Providing priority status to maintenance and expansion projects for the following roads:
  - Roads identified as belonging to the National Truck Network
  - Urban interstates and interstate connectors that already are experiencing moderate to severe congestion, primarily around North Carolina’s largest metropolitan areas.
  - Roads identified as “High Priority Corridors on National Highway System<sup>81</sup>” (essentially future Interstate highways, ) which include the following:
    - Future I-73 routes.
    - Future I-74 routes.
    - Raleigh-Norfolk Corridor: Raleigh, North Carolina, to Norfolk, Virginia.
    - Route 29 Corridors from Greensboro, North Carolina to Virginia.
- Addressing specific problems/areas identified through interviews and/or surveys with trucking industry stakeholders, including the following:
  - Improving highway links between Charlotte and Wilmington.
  - Providing adequate truck parking.
  - Increasing road access to 53-foot trailers.
- Improving critical “last mile” intermodal connections.

##### **Rail:**

- Retain existing rail corridors and halt track removal;
- Continued direct support for short-line railroad infrastructure improvements;

<sup>81</sup> <http://www.fhwa.dot.gov/planning/nhs/hipricorridors/index.html> , accessed May 4, 2008.

- Expand capacity in high-use rail corridors, including the expansion into double/triple track configurations;
- Enhance/improve scheduling and coordination with passenger rail service;
- Explore routing options for hazardous materials shipments to avoid highly populated areas;
- Reduce at grade rail/highway crossings;
- Provide rail access to North Carolina State Ports Authority inland terminals located in Greensboro and Charlotte.

**Air:**

- Ensure adequate access between airports and the major highways;
- Protect facility expansion options;
- Controlling land use in flight path areas.

**Ports:**

- Improve rail access.
- Improve road access.
- Support efforts by the State Ports Authority to build the proposed North Carolina International Terminal.

**Summary**

The various actions described above are summarized in the Table 5.2 in the implementation strategy chapter along with results from Chapter 3.

## 5 Implementation Strategy

This chapter presents a strategy for increasing the emphasis on freight logistics within North Carolina. Coordinated policies and processes are not in place at this time, and – as has been pointed out elsewhere – some other states are ahead of North Carolina in focusing on the plans, multi-modal systems, infrastructure, and public-private communication that are required in an increasingly competitive southeastern United States, nation, and world.

We first reference “lessons learned” in North Carolina for five major historical public investments in freight and freight-related initiatives. Found in an appendix, the series of transportation and logistics initiatives, while not exhaustive, includes examples that present a sufficiently rich foundation and backdrop for implementation, goal setting, and strategic thinking. The discussion of each example provides a brief history, a synopsis of the major decision factors, an outline of the public and private roles, a summary of the projected versus actual results, and an analysis of the overall impact within North Carolina. The initiatives include the development of the deepwater and inland terminals at Wilmington and Morehead City,<sup>82</sup> the North Carolina Railroad,<sup>83,84</sup> the 1989 Highway Trust Fund,<sup>85</sup> Global TransPark,<sup>86</sup> and the new International Terminal at Southport. This appendix also includes two non-North Carolina examples in the California *Goods Movement Action Plan*<sup>87</sup> and the Alliance Global Logistics Hub<sup>88</sup> in Texas.

Subsequently, this chapter provides an overview of existing publicly-owned companies, committees, advisory councils, and authorities that address freight logistics in North Carolina. This is the setting for suggesting an approach and mechanism for establishing and institutionalizing a much stronger freight logistics presence in the transportation decision-making process in the State. This section includes a brief discussion of impediments to the creation of a statewide freight initiative, a rough timetable for doing so, and legislative changes that may be inferred. Finally, in a separate appendix, we illuminate known funding options that could be applied independently or in combination to build and sustain North Carolina freight logistics projects and operations.

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<sup>82</sup> *NC State Ports*. (2008). North Carolina State Ports Authority. 23 Apr. 2008. See <http://www.ncports.com/>

<sup>83</sup> *North Carolina Railroad*. (2008). North Carolina Railroad Company. 23 Apr. 2008. See <http://www.ncrr.com/>

<sup>84</sup> Trelease, Allen W. (2008). *The North Carolina Railroad, 1849-1871, and the Modernization of North Carolina*. Chapel Hill: The University of North Carolina Press.

<sup>85</sup> Article 14 – *Highway Trust Fund* [as amended on Apr. 2008]. (1989) N.C. General Statutes. Chapter 136 Sections 175-185.

<sup>86</sup> *North Carolina Global TransPark*. (2008). North Carolina Global TransPark. 25 Apr. 2008. See <http://www.ncgtp.com/>

<sup>87</sup> CA Business, Transportation and Housing Agency and CA Environmental Protection Agency. (2007). *Goods Movement Action Plan*. January 2007.

<sup>88</sup> *AllianceTexas*. (2008). Hillwood Development Co. 25 Apr. 2008. See <http://www.alliancetexas.com/>

## 5.1 ***Establish a Freight Logistics Organization***

*We recommend that a freight logistics organization be established.* Based on the vision for a renewed and modernized freight logistics initiative for North Carolina, the demonstrated need for articulated freight policy and improved infrastructure, an increased and more sophisticated outreach to shippers and carriers, more focused freight planning and coordination, less fragmentation, solid decision-making and implementation mechanisms, and a growing sentiment at the federal level for a renewed freight emphasis in the transportation sector. North Carolina needs an intermodal transportation system to respond to changing customer service requirements, both domestically and internationally. This requires an active partnership between government and industry, including carriers, shippers, logisticians, economic development officials, and security interests to:

- Continuously define the emerging issues and trends,
- Translate these into actionable items,
- Prioritize items into a multiyear statewide freight logistics plan,
- Implement those items, and
- Provide accountability to executive leadership.

In the study team’s judgment, these activities should be addressed within a new freight logistics organization, whose success will be critical to North Carolina’s competitiveness in an increasingly global economy and society. This document is a first step in identifying and articulating the freight policy and planning activities that are crucial to the future economy of the State.

### 5.1.1 **Lessons Learned**

There are two key factors for success (or failure) that can be drawn from the review of previous North Carolina freight logistics initiatives (see appendix). First, all policies, strategies, and specific actions must be simultaneously set within and sensitive to the global, statewide, and local contexts. We live in a global economy, and success will depend directly on responsiveness to global realities and trends. A statewide view is essential to building and maintaining support and enthusiasm for taking bold steps forward. A statewide view is equally - if not more - important for ensuring that the developing freight infrastructure system is consistent with and helps achieve a shared vision of North Carolina’s future. Finally, the hopes and desires of individual communities, towns, cities, and regions must be respected and fostered. Maintaining focus and balance across these perspectives will not be easy. However, the rewards will be worth the effort.

The second factor is the need to clearly calculate the costs and make a firm up-front commitment to see strategies and actions through to completion. Albeit, flexibility and re-evaluation are needed; however, all stakeholders, including the tax-paying public, should have a good idea going in what the necessary elements are for any specific initiative and also what it will take to put these elements in place. Without this up-front understanding, there is a significant risk that unrealistic expectations and/or insufficient resources could undermine or delay anticipated

benefits. In the worst case, strategies and actions could be prematurely abandoned, resulting in little or no return on investments already made.

### 5.1.2 Examples of Freight Logistics Organizations in Other States

As reported recently by the American Association of State Highway & Transportation Officials (AASHTO), several states have developed a focus on and/or plan for freight logistics, either as a component of their state DOT or independently, or both. Specifically, the following states have established freight offices and/or oversight groups: California, Maine, Maryland, Minnesota, Oregon, Pennsylvania, New Jersey, Florida, Colorado, Mississippi, and Washington. A high level summary of selected efforts at freight logistics oversight activities follow.

#### 5.1.2.1 Virginia

Under the auspices of the Commonwealth Transportation Board, Phase I of the Virginia Statewide Multimodal Freight Study was completed in March 2008. As reported by the Commonwealth, it primarily addressed tasks related to outreach, data collection, baseline forecasting, system inventory and analysis, and freight improvement opportunities. An *ad-hoc* Freight Advisory Committee was established to provide input and feedback into the study, serve as a link to the freight community, and help convert the study to action. The Phase I final report may be found at [www.vtrans.org](http://www.vtrans.org).

Phase II of the study, now underway, will develop analysis tools, analyze corridor and regional freight needs and alternatives, and evaluate infrastructure and policy alternatives. Part of that initiative will include options regarding institutional and organizational issues to help the Commonwealth best approach freight challenges in the future. In particular, among other objectives, it will examine how the Commonwealth should address freight planning on a consistent institutional basis with its public and private partners. This also will include recommendations for freight planning and programming, roles for other levels of government and the private sector, and expansion of outreach efforts to a full range of public and private stakeholders. The Phase II effort is expected to be completed in early 2009.

From the above four examples (excluding Virginia who has not yet named an permanent oversight committee), all are advisory in nature and serve to influence existing decision-making and transportation investment processes; three of the four have close ties to the state DOT, and one is housed in the Governor's Office of Economic Growth.

#### 5.1.2.2 Oregon

The Oregon Freight Advisory Committee (OFAC) was established in 1998 to provide more visibility in the Oregon DOT policy, planning, and programming processes. The then-Director / CEO enjoyed a national reputation that included a decided focus on freight logistics.

The Oregon legislature formalized the advisory committee in 2001, calling for the Oregon DOT Director to appoint members to advise the department on issues, policies and programs that impact multimodal freight mobility in the state. The enabling statute specifically included the identification of high-priority freight mobility projects to be included in the Statewide Transportation Improvement Program (STIP).

Importantly, in 2003, the legislature further enhanced the focus on freight project investment by requiring that multimodal projects be given funding priority. In fact, \$100 million was targeted for freight mobility projects that:

- Support the safe, reliable and efficient movement of goods between and among local, national and international markets, and/or
- Provide or improve access to industrial land sites and other sites where jobs can be created.

Further, projects that meet the following criteria receive funding priority:

- Located on identified freight routes of statewide or regional significance,
- Remove identified barriers to the safe, reliable and efficient movement of goods, and
- Facilitate public and private investment that creates or sustains jobs.

The influence of the freight logistics initiatives in Oregon was due primarily to a supportive legislature working through the existing mechanisms within the Oregon DOT (Oregon Transportation Commission, STIP, etc.) rather than authority vested in the OFAC or similar group. The latter has played an important role in project identification, stakeholder input, and recommendations to funding entities.

#### 5.1.2.3 **Minnesota**

As reported by the Minnesota Freight Advisory Committee (MFAC) web site, this committee provides a forum for the exchange of ideas and addressing of issues between the Minnesota DOT and the private sector to develop and promote a safe, reliable, efficient and environmentally responsible freight transportation system for the state. The objectives are to:

- Ensure freight transportation needs addressed in planning, investment and operation of Minnesota's transportation system.
- Establish guidelines to measure and manage the state's freight transportation needs.
- Provide input and direction to the Minnesota DOT's freight investment committee on freight transportation policies, needs and issues.
- Recommend program and research areas for Minnesota DOT follow-up and direction.
- Represent the needs and requirements of freight transportation to the public, elected officials and other public agencies and organizations.

#### 5.1.2.4 **Florida**

The Statewide Intermodal Transportation Advisory Council (SITAC) was created by the Florida legislature in 2003 to advise and make recommendations to the legislature and the Florida DOT on policies, planning and funding of intermodal transportation projects. The SITAC provides a statewide forum representing transportation providers, and it is supported and administered by

the Florida DOT through its internal Multimodal Team. The Team includes about 30 individuals from various Florida DOT offices, as well as from Metropolitan Planning Organizations and Regional Councils.

Over an approximate six year period, these groups developed the Strategic Intermodal System (SIS) Plan as well as implementation guidance. Extensive outreach activities were a key part of the process, as has been the support of the Florida legislature in enacting enabling legislation, a basic investment framework, the actual funding of 36 SIS projects, and the identification of additional projects for the 2006-2010 work program. Work is proceeding on specific project identification and priority-setting to support a 20-year investment program. This effort is ongoing in the Florida DOT Office of Policy Planning and in the Seaport Office which has responsibility for seaports, intermodal development, and the planning for freight movement / intermodal connections.

The SITAC is one of the advisory groups to the Florida DOT and State Legislature with regard to policy input and the coordination of planning and programming approaches used by the DOT's public and private partners. (In May 2008, it is reported that the SITAC is "currently inactive," although individual members continue to be involved in freight policy and planning through other venues.)

#### **5.1.2.5 New Jersey**

A recommendation of the New Jersey Comprehensive Statewide Freight Plan is to create a logistics and economic development oversight entity within the New Jersey Office of Economic Growth (in the Office of the Governor) to identify and guide key state-level freight initiatives. An organizational unit in the New Jersey DOT will be established to coordinate freight logistics activities with the oversight entity and other freight initiatives.

From the above four examples, all are advisory in nature and serve to influence existing decision-making and transportation investment processes; three of the four have close ties to the state DOT, and one is housed in the Governor's Office of Economic Growth.

#### **5.1.3 Existing Freight Logistics Organizations in North Carolina**

We begin with the enumeration and understanding of the existing freight-related entities and institutions in North Carolina. The table provides an overview of each organization as it exists today, and the primary mission of each is provided in the notes to the table. As far as is known, it represents a complete list.

**Table 5.1 Existing Public Freight Logistics-related Authorities, Committees, & Companies in North Carolina \***

Existing Entity	Legal Status	Members	Chair	General Statute
1 NC Turnpike Authority	Independent / NC DOT / JLTOC	9	Secretary of Transportation	136-89.182(j) & 136-89.183(a)(10)
2 NC State Ports Authority	Independent	11	Member appointed by the Governor	143B-452
3 NC Global TransPark Authority	Independent / NC DOT	20 (min)	Governor	63-A
4 Various airport authorities	Independent / local government	Varies	By local authority or government	63-2, 63-3, 63-4, 63-56
5 North Carolina Railroad Company	Private corporation with 100% of stock owned by State of NC	13	Elected by Board of Directors	Corporation
6 Rail Advisory Council	NC DOT Staff Advisory	Undefined (21 in 2008)	NC DOT Deputy Secretary	143B-362
7 Aeronautics Council	NC DOT Staff Advisory	15	Member appointed by the Governor	143B-356
8 Ports Advisory Council	NCSPA Advisory	Unlimited	Elected by Members	NA
9 Secondary Roads, Maintenance & Equipment Committee	NC DOT BOT	19	Member appointed by Chairman	NA
10 Transit, Rail, Ferry and Aviation Committee	NC DOT BOT	10	Member appointed by Chairman	NA
11 Motor Vehicles Committee	NC DOT BOT	6	Member appointed by Chairman	NA
12 Safety & Emerging Issues	NC DOT BOT	12	Member appointed by Chairman	NA
13 Environment - Planning & Policy Committee	NC DOT BOT	9	Member appointed by Chairman	NA
14 Statewide Plan Committee	NC DOT BOT	6	Member appointed by Chairman	NA
15 Economic Development Board	NC DOC Planning & Advisory	37	Member appointed by the Governor	143B-434

\* Excludes associations, foundations, and public-interest groups.

**Purposes:**

- (1) North Carolina Turnpike Authority (NCTA) is authorized to study, plan, develop and undertake preliminary design work on up to nine toll roads, bridges, and/or tunnels in the state. The NCTA is authorized to design, establish, purchase, construct, operate, and maintain five highway segments and one bridge. Certain reporting is due to the NC DOT and the Joint Legislative Transportation Oversight Committee of the General Assembly, but otherwise the NCTA exercises its powers independently of the NC DOT.
- (2) North Carolina State Ports Authority (NCSPA) is authorized to promote, develop, construct, equip, maintain, and operate the harbors and seaports within the State, specifically at Wilmington, Morehead City and Southport. Its broad objective is to develop to the utmost the post possibilities for North Carolina. The Secretary of Commerce is a voting member of the Board.
- (3) North Carolina Global TransPark Authority (NCGTA) is a state-owed and operated independent economic development agency (except for coordinating and financial reporting purposes to the NC DOT). Its purpose is to administer the development of the NC Global TransPark, an international facility with transportation links, dedicated intra-facility distribution systems, and state-of-the-art communication systems.
- (4) A municipality or county or any combination thereof in North Carolina may establish an airport authority which is authorized to acquire, establish, construct, own, control, lease, equip, improve, maintain, operate, and regulate airports either within or external to the local governments' jurisdictions.
- (5) The North Carolina Railroad (NCR) actively seeks projects that will improve passenger and freight travel as well as help communities reach their economic potential. The company owns 317 miles of track and other railroad property and leases operations thereupon to others.
- (6) The Rail Advisory Council (RAC) advises the Secretary of Transportation on the preservation and enhancement of the State's rail system, funding sources and levels, distribution of financial assistance for railroad revitalization, acquisition of rail corridors, legislative or other programs, and promotion of access to the NCSPA facilities.
- (7) The Aeronautics Council advises the NC DOT Secretary of Transportation on the issuance of aviation loans and grants and other matters referred to them by the Secretary.
- (8) The Ports Advisory Council meets at least annually, and it offers support and assistance to the NCSPA in the areas of business planning, finance, government relations, marketing, and operations.
- (9) The Secondary Roads, Maintenance and Equipment Committee is appointed at the discretion of the Chairman of the NC DOT Board of Transportation as needed; not established by General Statute. The extent of the committees' involvement in freight logistics is not known.
- (10) Same as (9).
- (11) Same as (9).
- (12) Same as (9).
- (13) Same as (9).
- (14) Same as (9).
- (15) The Economic Development Boards responsibilities are to advise the Secretary of Commerce regarding economic and development planning, recommend economic development policy, recommend budgetary appropriations, and develop an annual comprehensive strategic economic development plan.

5.1.4 **Options for the Freight Logistics Organization in North Carolina**

In this section, various options are provided for housing and / or organizing a freight logistics program. First, it appears that there are two basic approaches that could be taken to implement the primary recommendations of this study:

- 1) **A RELATIVELY STRONG SCENARIO:** *Create / recreate an entity with the authority and responsibility to study, plan and independently implement freight projects* (powers that are available to the authorities numbered 1, 2, and 3 above). The examples of the Turnpike Authority, Global TransPark Authority, and State Ports Authority are viable approaches in this category. The following are not, in our judgment:
  - Entity 4 – The model illustrated by various airport authorities are a remote possibility as an option, but a) they exist primarily for passenger travel, b) they are limited geographically, and c) their allegiance and orientation is decidedly local in nature.
  - Entity 5 – The North Carolina Railroad, a private company whose stock is 100 percent owned by the State of North Carolina, operates along a 317-mile corridor from Charlotte to Morehead City; it thus has no statewide jurisdiction and is uni-modal in nature.
- 2) **RELATIVELY WEAK SCENARIOS:** Focus on shoring up existing, or creating new freight-related entities to plan, advise, and help coordinate freight logistics projects through essentially existing mechanisms (the models represented by entities 6 through 15 above)

Building on these general concepts, in the optional actions described below we provide a hierarchy (from strongest to weakest) of instituting a freight logistics organization somewhere in North Carolina state government (public sector leadership, with public private partnerships for implementation). The primary pros and cons of each approach are denoted in terms of accomplishing the freight vision.

**OPTION A. Create a new cabinet-level department, such as a North Carolina Department of Freight Logistics.**

**PROS:** Highest exposure from a freight logistics perspective; nearly total independence (reporting to Governor) with its own legislative authorization and budget; would study, plan, and implement projects in coordination with but independently from the North Carolina Department of Transportation, the Turnpike Authority, and the Ports Authority, and focus on freight as the top priority; create ‘one-stop shopping’ for shippers and carriers in terms of primary state government interaction; provides substantially more power to implement freight logistics initiatives than any advisory committee structures.

CONS: Highly unlikely politically; duplicative of existing pieces of the freight logistics infrastructure (ports, air, rail, etc., which all have one or more existing stakeholder groups); expensive; possible integration and coordination issues with the North Carolina Department of Transportation and other modal groups; would be seen as creating two transportation capital programs within state government ‘competing’ for stakeholder support, priorities, and funds.

**OPTION B. Create a new, essentially independent authority such as the North Carolina State Ports Authority, the North Carolina Turnpike Authority, or the North Carolina Global TransPark Authority.**

This agency would be analogous to the North Carolina Turnpike Authority, which has a “dotted line” relationship to the North Carolina Department of Transportation for administrative and reporting purposes only; otherwise, it would act as an independent agency.

PROS: Essentially total independence; assume typical powers of an authority, including eminent domain, selling bonds, operating facilities, etc.; could fund and implement projects independently of other state agencies; theoretically self-sustaining financially over the long term, at least for operations; establish its own dedicated staff; allow for high profile board appointments; politically connected.

CONS: Duplicative of existing components of the freight logistics picture; relatively expensive to establish; challenge of coordination with existing agencies and authorities, such as the Board of Transportation; duplication of transportation capital programs within state government.

**OPTION C. Re-orient the North Carolina Department of Transportation Board of Transportation committee structure towards freight logistics.**

This option could include creating a Freight Logistics Committee or merging existing committees to focus on freight and logistics. This would not alter the organization or structure of the Board, but simply attempt through administrative action or enabling legislation to force more attention on freight.

The current committee / subcommittee structure of the Board includes the following related groups which arguably may deal with freight logistics issues and projects:

- Secondary Roads, Maintenance & Equipment Committee
- Transit, Rail, Ferry and Aviation Committee
  - Ferry Subcommittee
  - Rail Subcommittee

- Safety & Emerging Issues Committee
- Statewide Plan Committee

In addition, these and the other eleven Board of Transportation committees consist entirely of Board members, and each committee / subcommittee has an identified “NC DOT staff contact” individual. The committees vary in size from four to thirteen members, and all Board members serve on multiple committees.

PROS: Relatively easy to implement; has the ear of major transportation decision-makers in the existing power structure (essentially the Board of Transportation); staff support is available; the Board is a known decision-making body statewide; very large construction program with some flexibility to spend funds on multi-modal projects; Statewide Transportation Improvement Program mechanisms already in place.

CONS: Board already has 15 committees, a few of which deal with freight logistics issues coordinated at the Board level only; committees and subcommittees have little power except to discuss and advise the larger Board on project investments; unable to implement anything without full Board support; traditional Board concerns have been focused on the highway program and to a *much* lesser extent on the non-highway modes; considerably weaker solution than creation of an authority, but much less controversial to do so. (In other states, this type of approach is the one chosen most often.)

**OPTION D. Create a joint agency task force or committee – such as between the North Carolina Department of Transportation and North Carolina Department of Commerce – to focus on freight logistics.**

This could be a rather autonomous entity as in OPTIONS A or B, but made up essentially of representatives and / or staffs from existing boards and agencies. For example, members could come from the Board of Transportation, the Department of Commerce, the State Ports Authority, NC Railroad, other modal associations, one or more development agencies, etc. As a task force, it would probably have more of an ad-hoc character in that members would be drawn from the membership of the primary boards and commissions to which they were originally appointed. If established as a committee, it could be institutionalized within one of the Departments.

PROS: Would tend to force the NC Department of Commerce and the NC Department of Transportation to work together on freight matters, at least on some level; relatively inexpensive to implement; theoretically large capital revenue from which to draw for project implementation – some combination of the NC DOT STIP, NC DOC budget, and/or special legislative appropriation.

CONS: Agency missions are not sufficiently related to ensure the viability of this option; task force would be neither “fish nor fowl;” which might lead to conflicts

between parent agency objectives or initiatives; would require extensive inter-agency negotiation / agreements to implement projects.

**OPTION E. Create a new “freight logistics” program and advisory council structure either within the Department of Transportation (preferably) or the Department of Commerce, staffed by existing Departmental employees.**

There are no transportation programs within the Department of Commerce, and the agency’s focus is not at all modal or intermodal in nature; rather, its focus is on economic development, recruiting companies, and real estate development, each of which has a transportation component. There is little likelihood that the Department of Commerce would favor creating a transportation program. The Department of Transportation, on the other hand, has active and well-conceived modal programs in aviation, rail, and highways, although the highway program is largely infrastructure, rather than operations, focused. (It also has strong rail, bicycle and pedestrian, transit, and ferry programs, but these are essentially or partially passenger-focused.)

Examples include the North Carolina Bicycle & Pedestrian Committee, the Rail Advisory Council, and the Aeronautics Council. These groups are relatively weak in terms of impact (compared to an independent authority), and they would seem to be advisory primarily to the staff, not to a funding or implementation entity. They are different from the Board of Transportation committees, and they may or may not be codified in legislation.

PROS: Relatively easy to create or configure, building on existing freight modal programs; some modal committees and support staff are in place already; may be established by the Department without legislation.

CONS: Relatively low profile; little or no power to fund and implement projects; challenging intermodal integration issues; existing advisory boards would need to be reoriented and/or reconstituted, perhaps combined in some way, to facilitate the freight logistics component which exists in only a fragmented way. As is, no one committee or process has freight logistics as its core mission.

**5.2 Create a Freight Logistics Authority (Choose OPTION B)**

*We recommend choosing OPTION B, the creation of a new Freight Logistics Authority. For now, Freight Logistics Authority can be used as a label. Freight denotes what is being moved and logistics describes the systems, mechanisms, infrastructure, etc., that must be in place to move the freight. Thus, the terms are not seen as redundant. Put another way, freight refers to goods or materials, and logistics refers to “...the planning and control of the flow of goods and materials through an organization or manufacturing process...” Logistics also means, “...the planning, implementation, and coordination of the details of...an operation...” Since “logistics” also may include the movement of personnel, the defining word “freight” is needed.*

The creation of a new authority is recommended primarily to provide the potential implementation opportunity it entails. None of the advisory groups would reach this potential. Alternately, as part of this consideration, the legislature could consider assigning broad freight logistics planning, design, construction, and operations responsibilities to one of the three existing transportation authorities – the State Ports Authority, the Turnpike Authority, or the Global TransPark Authority, as appropriate.

A classic problem in the public sector is the balancing of transparency and representation, with the authority’s power to make decisions and assure that these decisions are implemented. The problems of “gridlock,” decision paralysis, and lack of accountability and responsibility are frequent criticisms of government agencies. It thus is important, we submit, that the NC DOT consider options for integrating freight and logistics decision-making at the state level into the transportation decision-making processes. Therefore, in addition to the recommended Freight Logistics Authority, we believe that NC DOT should re-orient or re-structure its “stovepipe” modal organizations to create a Division for Intermodal Transportation which would include Freight Logistics. This would establish a standing coordinative arm of the NC DOT to work closely with the Freight Logistics Authority.

The creation of the Freight Logistics Authority and a related intermodal logistics policy and planning organization within the NC DOT provides an opportunity to implement other stakeholder-friendly initiatives such as the following:

- Creation of a logistics operations center that would combine and disseminate historic, near-term, and real time data to support planning and real time decision making regarding goods flows. Such an operations center could be located in a central physical location, but a “virtual” center also may be workable, as it would have an on-line presence, offering users information and “dashboards” as part of a broader decision support system.
- Joint industry promotion and information dissemination from the Departments of Commerce and Transportation so as to improve “plant siting” and transportation decisions for new and existing industry such as manufacturing, warehousing, shipping, and new and growing segments of the economy such as tourism and retirement communities.
- Use of existing and upcoming innovations in information technology to gather and disseminate information on logistics. Of particular interest to the user community is real-time traffic and system condition information (i.e., Traveler Information Systems).
- An on-going forum to achieve efficiencies and synergies in goods movement through sharing of information, planning integration, and action coordination among all the stakeholders in the freight industry.

Also, NC DOT has a long history of distributing funds according to geographic extent, as well as ensuring that representation of every highway division or congressional district, as the case may be, is present on most transportation advisory boards. Freight logistics planning and investment may not mesh with this model too well. Put simply, needs for freight projects may not, and

indeed probably do not, exist on the basis of geographic equity. This realization may have to become a new way of thinking about transportation investment in freight projects for the long term in North Carolina.

### 5.3 **Prepare a Comprehensive Goods Movement Plan**

*We recommend that the “Freight Logistics Authority” be tasked with the development of a Comprehensive Freight Logistics Plan to include specific projects, priorities, funding recommendations, and implementation strategies. Over half dozen other states have already accomplished such an objective, a few starting as much as a decade ago. Efforts have been multi-year in scope, and they have involved establishing outreach mechanisms, stakeholder input on a regular basis, agreement on statewide and regional freight policy, specific project identification, inter-agency coordination, public-private roles, and so forth. All plans explicitly recognize the need for close coordination between the commerce agency(ies) and the transportation agency(ies), and it would appear there are substantial strategic opportunities along these lines in North Carolina.*

In the course of the present effort, we have identified several initiatives that would seem to be clear first steps towards further coalescing freight logistics interests, generating discussion on important goods movement and economic development issues, and raising important implementation matters – including funding, roles, timing, etc. – towards their accomplishment. The proposed initiatives are as follows, along with notations as to whether they tend to be short, medium, or long term in nature:

- 3) Short-term Initiatives (next five years)
  - Conduct detailed study of linkages between transportation and economic development
  - Interstate highway and other limited access corridor enhancement and expansion
  - Data and performance metrics
  - Congestion mitigation strategies (such as for collector/distributor road networks)
  - Support for NCIT EIS process
  - Crescent Rail Corridor
- 4) Mid-term Initiatives (five to fifteen years)
  - Airport access improvements
  - New multimodal corridors, especially military
  - Track federal freight initiatives and participate on multi-state and national basis
  - Support NC DOC initiatives
  - Eliminate freight bottlenecks

- 5) Long-term Initiatives (fifteen to twenty-five years)
  - Freight hubs

**Summary**

The initiatives developed through the vision, infrastructure, and implementation strategies section of this report have been summarized in Table 5.2 on the next page. The recommended actions are organized by mode and time-frame. They are further tagged as either policy-based actions to support decision-making or infrastructure actions.

**Table 5.2 Summary of Recommended Initiatives**

	<b>Short-term (0 – 5 years)</b>	<b>Medium-term (5 – 15 years)</b>	<b>Long-term (15 – 25 years)</b>
<b>Across all modes</b>	<ul style="list-style-type: none"> <li>▪ <u>Create a Freight Logistics Authority</u></li> <li>▪ <u>Study linkages between transportation and economic development</u></li> <li>▪ <u>Develop data and performance metrics</u></li> <li>▪ <u>Support existing and future industries</u></li> <li>▪ <u>Support innovations in transportation infrastructure</u></li> </ul>	<ul style="list-style-type: none"> <li>▪ <u>Track and participate in freight initiatives (federal, multi-state, etc.)</u></li> <li>▪ <u>Support NC DOC initiatives and grow a knowledge-based economy</u></li> <li>▪ <u>Land bank for future freight-related facilities</u></li> <li>▪ <i>Eliminate freight bottlenecks</i></li> <li>▪ <i>Make investments in a few new corridors (multimodal, military)</i></li> </ul>	<ul style="list-style-type: none"> <li>▪ <u>Monitor and support system’s health through Programmatic Initiatives</u></li> <li>▪ <u>Plan for and create freight hubs (public- private cooperation)</u></li> </ul>
<b>Air</b>	<ul style="list-style-type: none"> <li>▪ <u>Control land use in flight path areas</u></li> </ul>	<ul style="list-style-type: none"> <li>▪ <i>Improve access to airports, esp. highways</i></li> </ul>	<ul style="list-style-type: none"> <li>▪ <i>Create ubiquitous air cargo support</i></li> </ul>
<b>Highway</b>	<ul style="list-style-type: none"> <li>▪ <u>Transition NC DOT to an operations-focused agency</u></li> <li>▪ <i>Mitigate moderate to severe congestion in collector/ distributor networks, urban interstates and connectors</i></li> <li>▪ <i>Provide adequate truck parking</i></li> </ul>	<ul style="list-style-type: none"> <li>▪ <i>Make I-95 investments (supports pass-through traffic)</i></li> <li>▪ <i>Create Charlotte to Wilmington multimodal corridor</i></li> <li>▪ <i>Enhance, expand the primary highways of the National Truck Network</i></li> </ul>	
<b>Ports</b>	<ul style="list-style-type: none"> <li>▪ <u>Offer support for NCIT EIS process</u></li> </ul>	<ul style="list-style-type: none"> <li>▪ <i>Support efforts to build NCIT (supports import/export activities)</i></li> </ul>	<ul style="list-style-type: none"> <li>▪ <i>Improve rail and road access to/from (supports import/export activities)</i></li> </ul>
<b>Rail</b>	<ul style="list-style-type: none"> <li>▪ <u>Encourage the Crescent Rail Corridor</u></li> <li>▪ <i>Retain existing rail corridors; halt track removal</i></li> <li>▪ <i>Support short-line infrastructure improvements</i></li> </ul>	<ul style="list-style-type: none"> <li>▪ <u>Coordinate schedules carefully to optimize freight and passenger services</u></li> <li>▪ <i>Create Charlotte to Wilmington multimodal corridor</i></li> <li>▪ <i>Expand high-use corridor capacity</i></li> </ul>	<ul style="list-style-type: none"> <li>▪ <i>Provide rail access to NC SPA inland terminals</i></li> </ul>

Notes:

Underlined text = policy-based actions to support infrastructure decision-making

*Italic text* = infrastructure actions

## 6 Glossary and List of Abbreviations

AAR - Association of American Railroads - Organization, formed in 1934 to keep the railroads of North America safe, fast, efficient, clean, and technologically advanced.<sup>89</sup>

AASHTO – American Association of State Highway and Transportation Officials

ADS-B – Automatic dependent surveillance-broadcast is a cooperative surveillance technique for air traffic control and related applications. An ADS-B-out equipped aircraft determines its own position using a global navigation satellite system and periodically broadcasts this position and other relevant information to potential ground stations and other aircraft with ADS-B-in equipment.<sup>90</sup>

ARTBA – American Road and Transportation Builders Association

BOT – North Carolina Department of Transportation Board of Transportation

BRAC – Base Realignment and Closure activities, an approach by the US Department of Defense included in USDOD 2005 Appropriations act to create a network of more efficient and cost effective military installations, for all branches of the military service

BTH – Business, Transportation, and Housing Agency – a department of state government in California

CAGTC - Coalition for America’s Gateways and Trade Corridors

Class I Railroad - Railroad with annual gross operating revenue of more than \$250 million<sup>91</sup>

CLT - three letter , FAA approved “call sign” for the Charlotte Douglas International Airport

COFC - Container on Flat Car

CSA - Combined Statistical Area, generally composed of more than one MSA

CSX - CSX Transportation, Inc. - Largest railroad on the eastern United States with a 22,000 mile rail-network throughout 23 states, the District of Columbia, and 2 Canadian provinces.<sup>92</sup>

Delaware Economic Development Office (DED)

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<sup>89</sup> Definition from: <http://www.ncrr.com/ncrr-glossary.html>

<sup>90</sup> Definition from: <http://en.wikipedia.org/wiki/ADS-B>

<sup>91</sup> Definition from: <http://www.ncrr.com/ncrr-glossary.html>

<sup>92</sup> Definition from: <http://www.ncrr.com/ncrr-glossary.html>

Double track - Two sets of track side by side, most often used for travel in opposite directions.

EIS – Environmental Impact Study

ESC - Employment Security Commission

FAA – Federal Aviation Administration

FHWA – Federal Highway Administration

Freight - Charges paid for carriage or transportation of goods (cargo) by air, land, or sea. Goods may be transported (shipped) on freight-prepaid or freight-collect basis: (1) If the freight is paid by the consignor (as under C&F and CIF terms) the goods remain the consignor's property until their delivery is taken by the consignee upon their arrival at the destination, and payment of the consignor's invoice. (2) If freight is paid by the consignee (as under FOB terms) the goods become the consignee's property when handed over to the carrier against a bill of lading. Also called freightage, it may be charged on the weight or volume of the shipment (depending upon its nature or density) and also varies according to the mode of shipment, such as bulk, break bulk, containerized.<sup>93</sup>

FTZ – Free Trade Zone - A free trade zone (FTZ) or export processing zone (EPZ) is one or more special areas of a country where some normal trade barriers such as tariffs and quotas are eliminated and bureaucratic requirements are lowered in hopes of attracting new business and foreign investments. Free trade zones can be defined as labor intensive manufacturing centers that involve the import of raw materials or components and the export of factory products.<sup>94</sup>

GARVEE bonds – Since enactment of the National Highway System Designation Act of 1995, a number of States either have issued or are considering project financing that utilizes bond or other debt instrument financing mechanisms involving the payment of future Federal-aid highway funds to retire debt. These new mechanisms are being called Grant Anticipation Revenue Vehicles or "GARVEE" bonds. Some States are designating these financings backed by future Federal funds as Grant Anticipation Notes or GANs.<sup>95</sup>

GDP – Gross Domestic Product

GMAP – California's Goods Movement Action Plan

GSO - three letter , FAA approved “call sign” for the Piedmont Triad International Airport

GSP – Gross State Product

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<sup>93</sup> Definition from: <http://www.businessdictionary.com/definition/freight.html>

<sup>94</sup> Definition from: [http://en.wikipedia.org/wiki/Free\\_trade\\_zone](http://en.wikipedia.org/wiki/Free_trade_zone)

<sup>95</sup> Definition from: <http://www.fhwa.dot.gov/innovativeFinance/garguid1.htm>

GTP – Global TransPark

HOT – High Occupancy Toll

ILS – Instrument Landing System Category III-C airport runway

Intermodal - Movement of truck trailers or containers by rail and at least one other mode of transportation, usually trucks. For example, intermodal combines the door-to-door convenience of trucks with the long-haul economy of railroads.<sup>96</sup>

I-81 Crescent - The rail corridor owned by CSX Transportation that runs from it's location parallel to Interstate 81 in Virginia, southwestern through North Carolina and on to Mississippi and New Orleans

ISTEA – Intermodal Surface Transportation Efficiency Act, the surface transportation authorization act passed in 1991 (newest act is SAFETEA-LU)

IT/L –Industry transport/logistics cluster

ITS - Intelligent Transportation Systems – a federal, statewide, local and international program to utilize advanced technology, particularly communications systems, to improve safety and operations on America's highways

Knowledge-based economy – jobs that are primarily focused on applications of higher education and research, including advanced computational methods, visualization, database management, computer assisted design, multiple communications technologies, and the overall dissemination of knowledge through the popular press as well as academic and research organizations.

LATTS – Latin America Trade and Transportation Study

Logistics – the personnel, material, and facilities that provide the means by which freight is managed, stored, shipped and tracked from origin to destination

Mass Transit Account - the amount of Federal Funds administered by the USDOT and FHWA which is allocated to the Federal Transit Administration for redistribution to local governments to pay for capital expenses on transit improvement projects (e.g., buses, passenger rail, stations, etc.)

MSA - Metropolitan Statistical Area, according to the post-2002 definitions

Multimodal - More than one mode of transportation (road, rail, sea, air, etc.) to move goods or people between an origin and destination.<sup>97</sup>

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<sup>96</sup> Definition from: <http://www.ncrr.com/ncrr-glossary.html>

<sup>97</sup> Definition from: <http://www.ncrr.com/ncrr-glossary.html>

NAICS – North American Industry Classification System

NEPA – National Environmental Protection Act

NC DOC – North Carolina Department of Commerce

NC DOT – North Carolina Department of Transportation

NCHRP - National Cooperative Highway Research Program

NCIT – Proposed North Carolina International Terminal, a proposed project located near Southport on the Lower Cape Fear River, sometimes described as NCIP – NC International Port

NC OSBM – North Carolina Office of State Budget and Management

NCRR – North Carolina Rail Road - a Real Estate Investment Trust whose voting stock is controlled by the State of North Carolina<sup>98</sup>

NS – Norfolk Southern, Major Class I freight railway company operating approximately 21,200 miles of rail in 22 eastern states, the District of Columbia, and Ontario.<sup>99</sup>

OFAC – Oregon Freight Advisory Committee

Pass-through traffic – traffic that does not originate or end in the area of interest but does travel across the area

Piedmont Crescent – the portion of the multimodal corridor running alongside the :”spine” of Interstate routes I-40 and I-85 from Raleigh, through Durham, Burlington, Greensboro, Winston-Salem, Salisbury to Charlotte.

PPP – Public-Private Partnership

POV – Personally Operated Vehicles

RDC – Regional Distribution Center, a strategically located warehousing operation

RDU – three letter, FAA approved “call sign” for the Raleigh-Durham International Airport

RFID – Radio Frequency Identification, a method for tracking items, from packages to vehicles either in place (storage) or while in transit

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<sup>98</sup> Definition from: <http://www.ncrr.com/ncrr-glossary.html>

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RTP – Research Triangle Park, the 5,000 plus acres straddling the Wake County/ Durham County line, created in 1959, and presently housing some 100 companies and public sector employers

SAFETEA-LU - The Safe, Accountable, Flexible, and Efficient Transportation Equity Act: A Legacy for Users. - The U.S. Department of Transportation’s six-year, \$286 billion surface transportation legislation, signed into law on August 10, 2005.<sup>100</sup>

Section 3 - Former Federal Transit Act section that authorizes discretionary grants for capital projects.<sup>101</sup>

SHC – Strategic Highway Corridors

SIS - Strategic Intermodal System

TDM – Transportation Demand Management – a set of actions that can be taken by government, industry, commercial developments, and other employers to reduce the demand for personal vehicles (POVs) on the roadways during the morning and afternoon peak hours

TEA 21 – The Transportation Equity Act for the Twenty-first Century

TEUs - Twenty-foot Equivalent Units

3PL – Third Party Logistics

TIP - .Transportation Improvement Program, Federally mandated state program of projects to be implemented over several years through a Federal, state, and local government partnership

T/L – Transportation and Logistics – and employment “cluster” designated by the US Department of Labor, consisting of employment areas such as aviation, railroad workers, truckers, warehousing, schedulers, etc.

TOFC - Trailer on Flat Car

TOT – Truck Only Toll Lanes, a method of collecting fares from trucks using lanes that are specifically dedicated only to truck traffic

USDOT – United States Department of Transportation

VMT – Vehicle Miles Traveled, a common method of measuring the amount of traffic on a given segment of roadway

Waybill – a record of goods being moved by rail, stating the route, commodity, and schedule

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<sup>100</sup> Definition from: <http://www.ncrr.com/ncrr-glossary.html>

<sup>101</sup> Definition from: <http://www.ncrr.com/ncrr-glossary.html>

WiFi – Wireless High Fidelity audio and visual image transmission