



# North Carolina Eastern Infrastructure Improvement Study

Pursuant to SB 402 Section 34.23  
passed during the  
2013 Session of the General Assembly

Submitted to  
North Carolina General Assembly

Submitted by  
North Carolina Department of Transportation Rail Division

January 2015

# **Eastern Infrastructure Improvement Study: A Report to the North Carolina General Assembly**

January 2015

Pat McCrory, Governor

Anthony J. Tata, Secretary of Transportation

Jeff Mann, Deputy Secretary for Transit

Paul C. Worley, Rail Director

## **Acknowledgements**

The NCDOT Rail Division wishes to acknowledge the contributions of those individuals within the North Carolina Department of Commerce (Susan Fleetwood, Joshua Levy, Zachary Oliver), the North Carolina Department of Agriculture and Consumer Affairs (Robert Hosford, Joy Hicks), the North Carolina Railroad Company (Scott Saylor, Jim Kessler), the NCDOT Statewide Logistics and Global TransPark Authority (Sherman R. Lupton, Rick Barkes), NCDOT Strategic Planning (Susan Pullium, Sebastian Montagne), North Carolina State Ports Authority (Paul Cozza, Jeff Miles, Stephanie Ayers), the General Counsel's Office of the North Carolina Department of Transportation (Shelley Blake, V. Lori Fuller), and the many stakeholders who contributed their time and expertise in interviews and workshops.

Preparers: Dr. Toni Horst (AECOM), Jeff Mann (Parsons Brinckerhoff), Alex King (Parsons Brinckerhoff), Carey Barr (AECOM), Jeffrey Chang (Parsons Brinckerhoff), James Bridges (NCDOT Rail Division), Marc Hamel (NCDOT Rail Division)

# Table of Contents

<b>Executive Summary</b> .....	<b>ES-1</b>
<b>Introduction and Background of the SB 402 Section 34.23, Eastern Infrastructure Improvement Study (EIS) .....</b>	<b>1-1</b>
• Introduction	
• Study Approach	
• The Governor’s 25-Year Vision	
<b>Profile of Eastern North Carolina</b> .....	<b>2-1</b>
• Population and Employment Growth Trend	
• Cost Structure	
• Industrial Structure	
<b>Stakeholder Outreach</b> .....	<b>3-1</b>
• Wallace to Castle Hayne Outreach Summary	
• Global TransPark and Port of Morehead City Outreach	
• Global TransPark and Port of Morehead City Invitations and Outreach Process	
• Outreach Findings: Global TransPark and the Port of Morehead City	
<b>Evaluation of the Wallace to Castle Hayne Rail Restoration .....</b>	<b>4-1</b>
• Introduction	
• Market Assessment	
• W2CH as a Shortcut	
• Technical Assessment and Cost Estimation for Restoration of Wallace to Castle Hayne	
• Strategic Value Assessment	
• Strategies and Next Steps	
• Conclusion	

**Evaluation of Market Opportunities at the Global TransPark ..... 5-1**

- Original Concept and Expectations
- Considerations in the Original Site Selection
- Mission and Expectations
- Budget Trends
- What’s Changed Since GTP Was Established?
- Is There a Case for Developing a Dry or Refrigerated Bulk Inland Terminal at GTP
- Scenarios
- Methodology
- Approach to Identifying Other Opportunities
- GTP Payback Analysis
- Conclusions

**Evaluation of Market and Mobility Opportunities at the Port of Morehead City..... 6-1**

**Funding Considerations..... 7-1**

**Recommendations..... 8-1**

**Appendices**

- Appendix A: Conceptual Plans for Wallace to Castle Hayne Rail Restoration..... **A-1**
- Appendix B: Wallace to Castle Hayne Cost Estimate ..... **B-1**
- Appendix C: Wallace to Castle Hayne Benefit Cost Report..... **C-1**
- Appendix D: Resolutions of Support for the Wallace to Castle Hayne Project..... **D-1**
- Appendix E: Assessing Bulk Shipping Costs at the GTP..... **E-1**

**References ..... R-1**

# Executive Summary



## Senate Bill 402 Legislation

The Eastern Infrastructure Improvement Study (EIIS) assesses how improvements at three points in Eastern North Carolina's transportation network may support the expected growth and greater economic development in the region. The three transportation network locations considered are: 1) the former section of rail line between Wallace and Castle Hayne north of Wilmington (*W2CH*), 2) access improvements on and around the Port of Morehead City (*MHC*), and 3) improvements on and around the Global TransPark (*GTP*). Exhibit ES-1 illustrates the location of each investment or facility considered.

While all three locations are located in Eastern North Carolina, stakes are higher than just economic prosperity for this single region of the state. Eastern North Carolina's success is everyone's success. The Port of Morehead City, a major Class I rail connection to North Carolina's other marine port at Wilmington, and the Global TransPark are major state assets. Shippers elsewhere in the state depend on one or more of these facilities and benefit from their operation. The success of these facilities benefits the economy throughout North Carolina and the Southeast US.

The 2013 Session of the North Carolina General Assembly passed and Governor Pat McCrory signed into law Senate Bill 402 (SB 402), an act that sets budget appropriations for state departments, institutions, and agencies. As part of SB 402 in Section 34.23, the legislation required the Departments of Transportation, Commerce, and Agriculture and Consumer Services to study the Global TransPark Infrastructure and Rail Access.

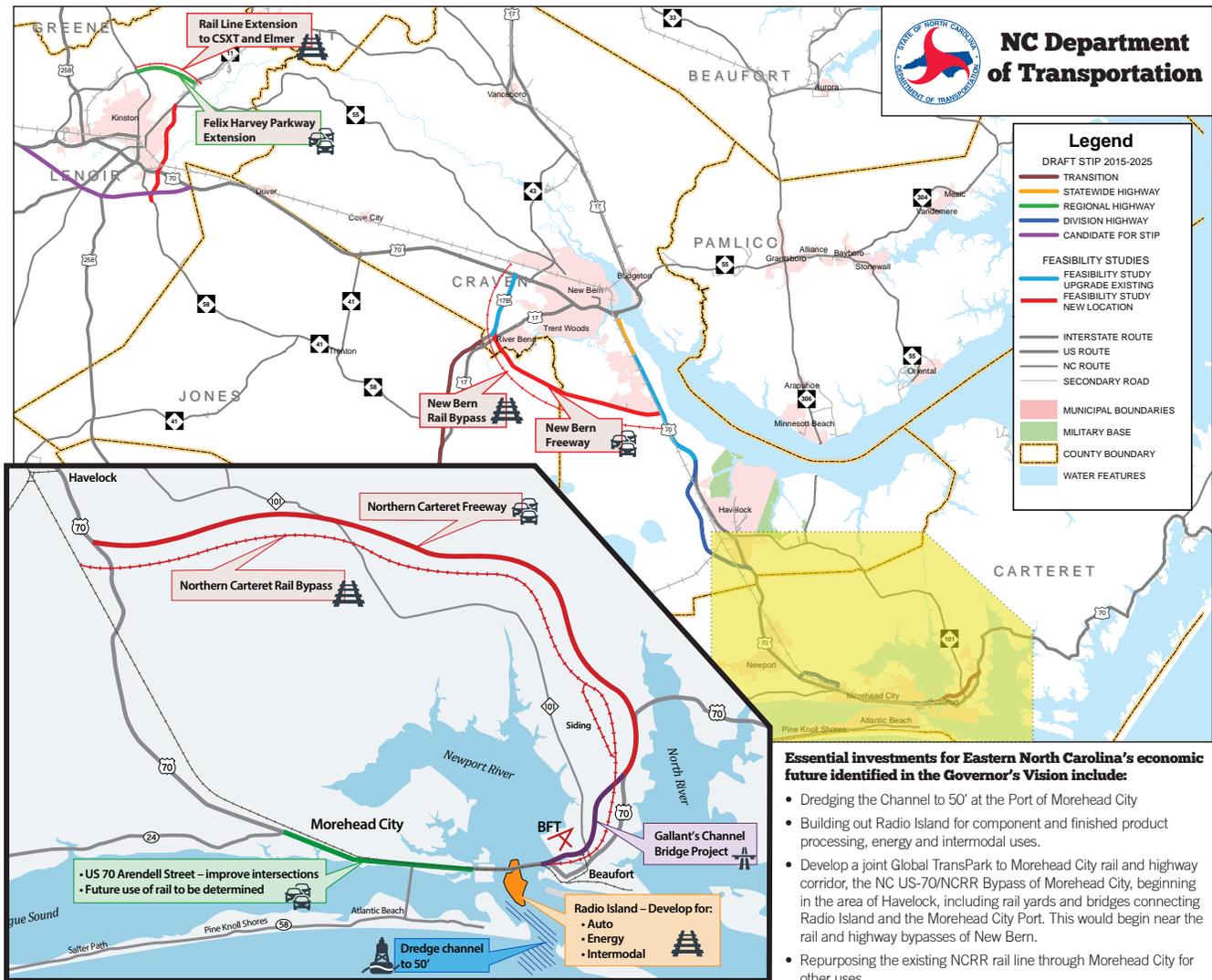
### Exhibit ES-1: Candidate Investment Locations



## Study Approach

In accordance with the General Assembly's directive for this study, the study approach has the following characteristics:

- Addresses facility needs from a systems perspective
- Casts a broad net in considering potential solutions
- Complements the data analysis with expert stakeholder input
- Considers the interdependence of the individual facilities and also between transportation and economic outcomes



## The Governor's 25-Year Vision

North Carolina's statewide transportation network is the result of a long history of thoughtful past investments. The resulting transportation system plays a critical role in attracting and retaining businesses, while connecting North Carolina's residents to jobs, healthcare, education and recreation.

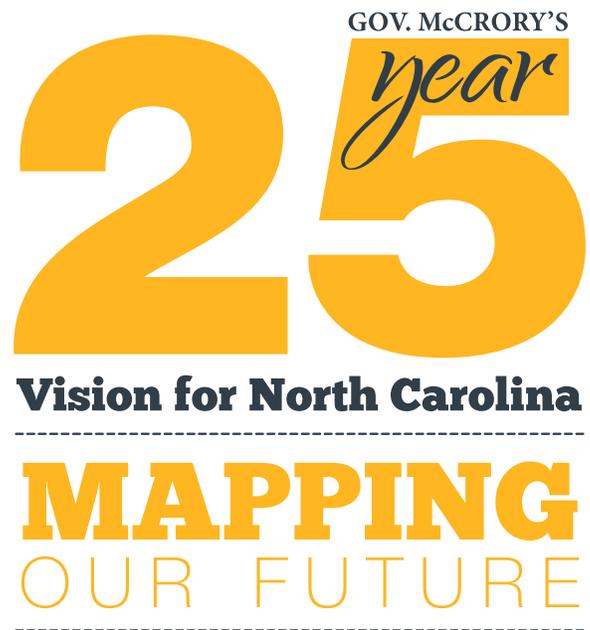
Governor McCrory's 25-Year Vision for North Carolina sets the stage for the next chapter in the state's economic development by articulating a strategic program of transportation investments to catalyze future growth. The productivity of a state or regional economy is influenced by its level of investment. Recognizing that each region of North Carolina is different, the transportation investments identified in the Governor's 25-Year Vision are tailored to each region's own distinctive needs and challenges. The Governor's 25-Year Vision represents an important milestone in North Carolina's transportation planning efforts.

Opportunities particular to Eastern North Carolina, the focus of the SB 402 legislation identified in the Governor's 25 Year Vision include: 1) maintaining support for the region's economic anchors—ports, agriculture and military operations; 2) connecting a region fragmented by multiple rivers, streams and wetlands so that it can attain the critical mass to generate sustained economic growth; and 3) "complete last-mile infrastructure around the Global TransPark to attract and retain businesses." As the Vision narrative observes, there is a cost to doing nothing in terms of missed "opportunities to take advantage of manufacturing jobs returning to the United States, respond to changing agricultural demands and better support military readiness." Essential investments for Eastern North Carolina's economic future identified in the Governor's 25-Year Vision include:

- Dredging the Channel to 50' at the Port of Morehead City,
- Building out Radio Island for component or finished product processing, energy and intermodal uses,
- Develop a joint Global TransPark to Morehead City rail and highway mobility corridor, the NC US-70/ NCRB Bypass of Morehead City, beginning in the area of Havelock, including rail yards and bridges connecting Radio Island and the Morehead City Port. This would begin near the rail and highway bypasses east of Havelock,
- Repurposing the existing North Carolina Railroad Company rail line through Morehead City for other uses, and
- Construct US 70 Bypasses for connection to the Interstate System.

## Economic Development Potential of Candidate Investments

The underlying goal of both the SB 402 Study and the Governor's 25-Year Vision is to guide investments in infrastructure that foster economic growth. In Eastern North Carolina, these investments have the potential to be transformative and foster new growth in the region. The directive of the SB 402 Study is to consider the near term business case and long term strategic value for making the investments outlined in the legislation, based on a data-driven approach. Such quantitative assessments rely on economic models that project future outcomes under the assumption that existing economic relationships are maintained. The quantitative analysis was supplemented with extensive outreach to knowledgeable stakeholders.



All of the subject projects offer some level of long-term strategic benefit. Current market conditions alone do not support immediate investment, when measured by economic return.

Transportation infrastructure investment is one of many production inputs (workers, energy, resources, etc.) used to deliver a good or service. The presence of improved infrastructure by itself does not create demand. Rather, transportation infrastructure acts as a critical component of a broader strategy to realize a region's economic development and growth opportunities. The market analysis identified a number of non-capital factors that collectively challenge the region's economic advancement. Addressing these in the near term supports the region's development for a business case supporting strategic capital investments.

- **The region's growth and future competitiveness will benefit from consensus on priorities and goals.** The Governor's 25-Year Vision is an important milestone in developing this consensus. Investments and initiatives that demonstrate sustained commitment to the region and maintaining the major assets, promotes private investments.
- **Greater public and private sector collaboration will benefit the utilization of the GTP and the Port of Morehead City.** The promotion of the GTP as a logistics and manufacturing hub, and the attraction of new business to the region will likely utilize the Port of Morehead City and/or create greater demand for cargo utilizing the Wallace and Castle Hayne rail line.
- **Improved and timely data better supports expectations and unites stakeholders in addressing key issues and pursuit of new business.** This information allows the GTP and local development organizations to directly address workforce resources when marketing the region to new firms who might use the port, and/or the GTP.
- **A team approach optimizes our ability to execute the strategy.**

The study's findings and recommendations seek to provide some of the lessons learned and suggestions on how to leverage the region's assets to support growth, given the context of the regional economy.



## Findings and Recommendations

### Study Area #1: Restoring Track Between Wallace and Castle Hayne

#### Context

- Restoration of the Wallace to Castle Hayne line has significant strategic value to military and agricultural interests in the state. Restoring the line would also open Pender County to opportunities for rail served shippers.
- Connections to the Wallace to Castle Hayne line would be to the CSXT network, therefore restoration of the line alone would not provide a second rail carrier, or dual access to the area.
- Department of Defense (DoD) identifies restoration of W2CH as a high priority to insure redundancy, but has not identified federal funding to date
- No rail-dependent operators or businesses are currently stranded without a rail connection, however, select shippers may benefit from more direct routing if the line were restored.

#### Findings

The analysis finds that existing, near term market conditions do not support the significant investment of \$150 M+ to restore the track and structures between Wallace and Castle Hayne. However, the strategic value to the military and agriculture interests must be considered in the investment decision process. The Department of Defense identifies the restoration of the W2CH rail segment as a high priority to insure redundancy of rail service to facilities in eastern North Carolina, but has not offered funding support.

#### Recommended Actions

- Continue to preserve right of way and options over the line for the future.
- Seek federal funding for the DoD-supported restoration of the rail line.
- As the market dictates in Pender County, extend the existing CSXT rail line southward from Wallace to serve any new identified industry. The cost-per-mile for this extension is approximately \$3.5 million per mile without crossings or structures.

#### Recommended Actions, Port of Wilmington

- Continue efforts to work with CSXT to identify actions that will lead to regular intermodal (rail) service to the Port of Wilmington.
- Pursue implementation of recommendations from the ongoing Wilmington Traffic Separation Study of rail crossing consolidation and safety upgrades to improve safety and efficiency of rail and vehicular flow into Port of Wilmington.
- Pursue environmental, planning and conceptual design studies for the construction of a highway-railroad grade separated access at the North Gate of the Port of Wilmington. Separated access would improve safety, reduce vehicular congestion, and significantly increase rail capacity.
- As future traffic volumes grow at the Port of Wilmington, investigate the feasibility of a high-lift rail bridge across the Cape Fear River from the port area to connect to the rail network in Brunswick County. This would remove port rail traffic from Wilmington.

## Study Area #2: GTP Inland Terminal for Bulk or Refrigerated Cargo

### Context

- The initial concept for GTP was an aerotropolis, the development of a highly efficient air cargo logistics facility that attracts shippers to Eastern North Carolina.
- The facility's largest success has been the attraction of Spirit AeroSystems and related suppliers.

### Findings

Bulk cargos are low margin commodities that are highly sensitive to changes in transportation costs. Given the comparatively short travel distance from GTP to both the Port of Morehead City and Norfolk, and the economics of rail market-driven rates, a transload facility could actually increase costs.

The greatest volume of refrigerated cargoes would likely be frozen poultry and pork. Meat products transport is evolving to refrigerated containers which are packed at the production site and shipped for export or domestic distribution. This would be in the immediate term a Wilmington port-based business from inbound truck moves.

A bulk or refrigerated transload facility is not recommended at GTP at this time under existing conditions.

### Recommended Actions

Monitor the market for changes but pursue other initiatives to support commerce at GTP in the short run.

## Study Area #3: Other GTP Initiatives

### Context

- Proximity to the region's military installations offers some opportunities and demonstrates the state's commitment to supporting military operations.
- GTP's distinguishing features include the longest runway east of the Mississippi and one that has been strengthened to accommodate heavy loads. It also has comparatively uncongested airspace.
- Businesses that site at the GTP do not pay property taxes to the City of Kinston or to Lenoir County, creating tax savings to businesses.
- Ability to provide a large local/area labor force was cited as an important factor for large employers.
- Availability of local amenities was cited as a potential concern impacting the ability to recruit new industry to the GTP.
- Improved highway access would benefit the GTP. However, transportation was not identified by any business as the chief reason GTP was not selected for potential development.
- Increased rail volumes and market changes would assist in lowering shipping rates through improved line and resource utilization.
- The GTP has managed their operating budget to the point of being close to breaking even, through a combination of efficiencies, budget cuts and expanded businesses.

## Findings

Pursue an incremental approach to growing business at GTP comprised of short-term initiatives to optimize utility of the facility and a longer-term effort to build market share.

## Recommended Actions

### *Short-term*

- Lease the GTP spur (owned by NCDOT) to a private rail operator.
- Continue to compete for a military fueling contract in 2016, including essential incremental investments to support the facility in this effort. This activity would provide GTP with additional revenues.
- Make spot improvements to the overall facility to keep it in a state of good repair.
- Examine GTP's authority to optimize its competitiveness for state and federal grant funds for capital improvement projects.
- Aggressively market the GTP facility and property on a national and international basis.
- Align incentives of development organizations so that a business locating to GTP is a win for the region as a whole.
- Investigate retaining State ownership of the New Bern North Craven Street North Carolina Railroad Company Water Access property as a potential barge transload facility for oversized cargo loads.

### *Longer-term*

- Incrementally upgrade US 70 to interstate standards as noted in Governor McCrory's 25-Year Vision.
- Consider locating a major government facility or cluster of related smaller facilities at GTP.
- Continue to market GTP for long-term opportunities that could be accommodated at the existing facility: aircraft refurbishment, additional aircraft manufacturing, advanced manufacturing, and agricultural research for example.
- Conduct the environmental analysis for a CSXT spur from the GTP to railroad point "Elmer" in Kinston and obtaining the advance right-of-way. Track could be installed quickly once a user was identified, and CSXT is supportive of this direction.
- Initiate an environmental/planning/design for Section C of the Harvey Parkway from NC 58 to NC 11.

## **Study Area #4: Rail and Highway Improvements that Benefit the Port of Morehead City**

### **Context**

- The Port of Morehead City is the state's natural deep water terminal, located four miles from the Atlantic shipping channel.
- Norfolk Southern has an exclusive lease of the entire North Carolina Railroad Company track which does not allow for other operators to serve the port.
- The Port of Morehead City and the Port of Wilmington have been designated as strategic military installations.
- The Port of Morehead City focuses on breakbulk and project cargo and some bulk cargo by barge.

- Existing infrastructure efficiently serves the needs of current volumes, yet expanded rail capacity will be required to accommodate significant growth.
- Recent experience with new business opportunities like the wood pellet distribution facility highlighted the limitations of current rail capacity.

## Findings

The Morehead City Port infrastructure challenge is primarily due to rail and road traffic conflicts through the town. Constraints on the Port's business development include train velocity, efficient handling of unit trains and on-port storage/ facility tracks.

There are rail vertical and horizontal clearance issues identified between the GTP and the Port of Morehead City. Since 2001, the North Carolina Railroad Company has improved the rail line and removed a number of horizontal and vertical obstructions.

## Recommended Actions

- In the short term, pursue a "Super Street"-style advanced and coordinated traffic plan to reduce rail and truck Port traffic conflicts with vehicle and pedestrian traffic on US-70 Arendell Street. This is to include intelligent transportation network signaling to improve traffic flows and user information. Better use of parallel Bridges Street should be fully evaluated.
- Conduct thorough engineering horizontal and vertical clearance review for the rail line between the GTP and the Port of MHC, and identify and remove existing constriction to allow for movement of oversized loads.
- Implement on-Port loop track to build/break unit trains.
- Evaluate Public Private Partnership opportunities for utilizing Radio Island for future development opportunities including component or finished product processing, container terminal and/or staging for energy projects.
- Continue to evaluate a potential Northern Carteret Rail and Highway Bypass. A bypass solution entering from the east will support landside access to future expanding Port volumes, and dramatically improve highway and rail velocity through the area. Also, introduction of new industrial development opportunities such as a container facility or a component or finished product processing site at Radio Island would be an important milestone in supporting this need.
- Share information about the Port operations and benefits with the public and business communities more effectively through news outlets, events, and state-wide marketing efforts, as supported by the Town during this study.

## Study Area #5: Statewide Coordination of Economic Development Pursuits

### Context

- Development of this study identified an ongoing need to plan and interact across multiple agencies and stakeholders.

### Recommended Actions

- Create the Secretary of Transportation's Freight Intermodal Advisory Council – including but not limited to representatives from Boards of NC Department of Transportation, NC Department of Agriculture and Consumer Services, Department of Commerce, the Global TransPark and NC State Ports Authority. Private entities with State interest will be invited to join the Council, such as the North Carolina Railroad Company.
- Support the Governor's 25-Year Vision to leverage strategic infrastructure investments to foster regional and state economic growth and create jobs.

# Introduction and Background of the SB 402 Section 34.23, Eastern Infrastructure Improvement Study (EIIS)

*Transportation connects eastern North Carolina to the national and global economy. When a region's transportation network provides reliable connections and runs efficiently, the market can invest and create jobs to take advantage of the region's strengths and competitive advantages.*

## Introduction

The Eastern Infrastructure Improvement Study (EIIS) assesses how improvements at three points in Eastern North Carolina's transportation network may support the expected growth and greater economic development in the region.<sup>1</sup> The three transportation network locations considered are: 1) the former section of rail line between Wallace and Castle Hayne north of Wilmington (W2CH), 2) improvements on or around the Port of Morehead City (MHC), and 3) access and improvements on and around the Global TransPark (GTP). Exhibit 1-1 illustrates the location of each investment or facility considered.

While all three investment locations are located in eastern North Carolina, the stakes are higher than just economic prosperity for this single region of the state. Eastern North Carolina's success is everyone's success. The Port of Morehead City, a major Class I rail connection to North Carolina's other marine port at Wilmington, and the Global TransPark are major state assets.

**Exhibit 1-1: Candidate Investment Locations**



Shippers elsewhere in the state depend on one or more of these facilities and benefit from their operation. The success of these facilities benefits the economy throughout North Carolina, and the Southeast U.S.

The 2013 Session of the North Carolina General Assembly passed and Governor Pat McCrory signed into law Senate Bill 402 (SB 402)<sup>2</sup>, an act that sets budget appropriations for state departments, institutions, and agencies. As part of SB 402 in Section 34.23, the legislation required the Departments of Transportation, Commerce, and Agriculture and Consumer Services to study the Global TransPark Infrastructure and Rail Access. The study has several components, as described below.

<sup>1</sup> SB 402 does not specify a particular definition of the eastern region. For the purposes of this study, the eastern region was defined as those counties generally east of I-95 that include: Beaufort, Bertie, Bladen, Brunswick, Camden, Carteret, Chowan, Columbus, Craven, Cumberland, Currituck, Dare, Duplin, Edgecombe, Gates, Greene, Halifax, Harnett, Hertford, Hoke, Hyde, Johnston, Jones, Lenoir, Martin, Nash, New Hanover, Northampton, Onslow, Pamlico, Pasquotank, Pender, Perquimans, Pitt, Robeson, Sampson, Scotland, Tyrell, Washington, Wayne, and Wilson County. Hoke and Scotland Counties are not east of I-95 but these counties are part of the North Carolina Southeast Commission, which is primarily east of I-95, so they are included here.

<sup>2</sup> General Assembly of North Carolina Session 2013, Session Law 2013-360, Senate Bill 402-Ratified, Approved July 26, 2013

### **Study Global TransPark Infrastructure and Rail Access**

SECTION 34.23. The Department of Transportation, in collaboration with the Department of Commerce and the Department of Agriculture and Consumer Services, shall study the feasibility of infrastructure and access improvements for the Global TransPark and the North Carolina State Port Authority. As part of its study, the Department shall undertake the following:

1. Evaluate infrastructure improvements which will promote job creation and commerce and advance development of the Global TransPark as an inland terminal, including, at a minimum, specialized transloading equipment, refrigerated and dry storage facilities, and site improvements in support of co-located manufacturing facilities on property owned by the Global TransPark Authority.
2. Perform financial feasibility analyses for each infrastructure improvement evaluated under subdivision (1) of this section, including the following components:
  - a) Project scope and development time line.
  - b) Assessment of technical feasibility.
  - c) Estimates of preconstruction, construction, maintenance, and operating costs.
  - d) Market scenarios, including identification of target industries and commodities and assessments of market demand, impacts on cargo throughput, utilization of Authority facilities, and other associated outputs.
  - e) Return on investment, including direct financial return to the Authority or state as well as local and regional economic impact attributable to each project.
  - f) Alternatives for project financing.
  - g) Assess highway and rail infrastructure improvements or service scenarios that improve access and throughput to the Global TransPark and North Carolina State Port Authority Morehead City Terminal, addressing at a minimum the relative benefits and costs of each highway or rail project, as well as the impacts on freight movements for the highway system and connecting rail corridors. As part of this assessment, the Department shall, in collaboration with the North Carolina Railroad Company, evaluate alternate routes to improve rail capacity and access to the Morehead City Terminal and Radio Island site.
3. In addition, the Department shall perform a financial feasibility analysis of the Wallace to Castle Hayne and Wilmington track restoration project that includes the following components:
  - a) Project scope and development time line.
  - b) Assessment of technical feasibility, including traffic flow analysis and railroad capacity modeling.
  - c) Service models addressing operating scenarios over the line segment and connections to other rail lines, as well as rate implications.
  - d) Preliminary engineering, construction, maintenance, and operating cost.
  - e) Service and market demand for rail service, identifying projected utilization by industry and impacts to alternate rail routes.
  - f) Strategic value assessment, including return on investment; direct financial return to the state; and state, regional, and local economic impact.

- g) Strategic value of the corridor to military installations and as a connection to national and regional railroad corridors.
- h) Inventory of commercial and industrial sites or terminals benefitting from restored rail service or improved connectivity.
- i) Alternatives for project financing.

The Department shall provide a preliminary report of its findings to the Joint Legislative Transportation Oversight Committee no later than March 1, 2014, and a final report, including any recommended legislation, no later than January 1, 2015.

In working through the Wallace to Castle Hayne rail line investigation, a high level assessment of the Port of Wilmington was completed as an important potential economic end-user and beneficiary of the restoration of the rail line. As a consequence, infrastructure concepts were developed with potential to benefit the Port of Wilmington. These are described in Chapter 4.

## Study Approach

In accordance with the General Assembly's directive for this study, the approach has the following characteristics:

- Addresses facility needs from a systems perspective
- Casts a broad net in considering potential solutions
- Complements the data analysis with expert stakeholder input
- Considers the interdependence of the individual facilities and also between transportation and economic outcomes

Each of these characteristics is described below.

### Systems Approach

The Wallace to Castle Hayne track alignment, the Port of Morehead City, and the Global TransPark are not isolated facilities; they are integral parts of North Carolina's intermodal transportation system and connect the state to the global economy. In considering strategies to leverage these assets to capture market opportunities, the operation of the broader network was assessed. For example, in considering alternative rail routes from the Global TransPark to Atlantic ports (in North Carolina and elsewhere), physical clearance issues, the ability for trains of all types to pass on sidings, and the available capacity by segments of alternative routing were considered.

### Policy and Non-Capital Improvements

Transportation facilities operate within a broader context, or system, of social, environmental, and economic issues. Recognizing the importance of non-capital factors, the study has also considered carefully those policy strategies and program investments needed to realize the potential development outcomes associated with recommended capital investments.

### Expert Stakeholder Opinion

The first two elements of the Study Approach described above reflect the complexity of economic regions within which transportation facilities are situated. Numerous stakeholders in the public and private sectors bring a wide variety of perspectives

to these challenges. Many disciplines—engineering, economics, and law and public policy, to name a few—must be involved in understanding economic development and finding solutions. The study team acknowledged this complexity in its data gathering process by supplementing traditional data analysis and modeling with focused outreach to knowledgeable experts and industry leaders. Data models and forecasts take existing economic relationships and extrapolate these into the future. As long as the existing relationships hold, the resulting analysis is reliable. By definition, data models and forecasts are less able to capture economic turning points and to anticipate how economic relationships will evolve. Here, expert opinion is a valuable supplement to the data analysis, helping the study team to anticipate how and why the economy might change and identifying possible new trends and opportunities.

### **Recognition of Interdependencies**

The connection between transportation and economic development is two-way. Transportation facilities both enable economic growth and are influenced by the region's broader growth trends—for example, the development of residential and conflicting uses in proximity to a facility can impact the facility's operation. A vision for guiding growth for the surrounding areas is a theme across all three of the facilities studied.

While there are market opportunities that can be pursued independently at each of the three locations, there are also interdependencies. For example, if the track is restored between Wallace and Castle Hayne in order to support grain flows, decision-makers must also consider investments to pursue grain market opportunities at the Ports of Morehead City or Wilmington as well.

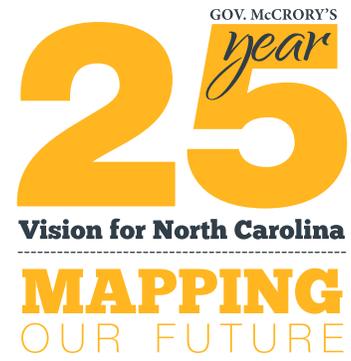
## The Governor's 25-Year Vision

North Carolina's statewide transportation network is the result of a long history of thoughtful past investments. The resulting transportation system plays a critical role in attracting and retaining businesses, while connecting North Carolina's residents to jobs, healthcare, education and recreation.

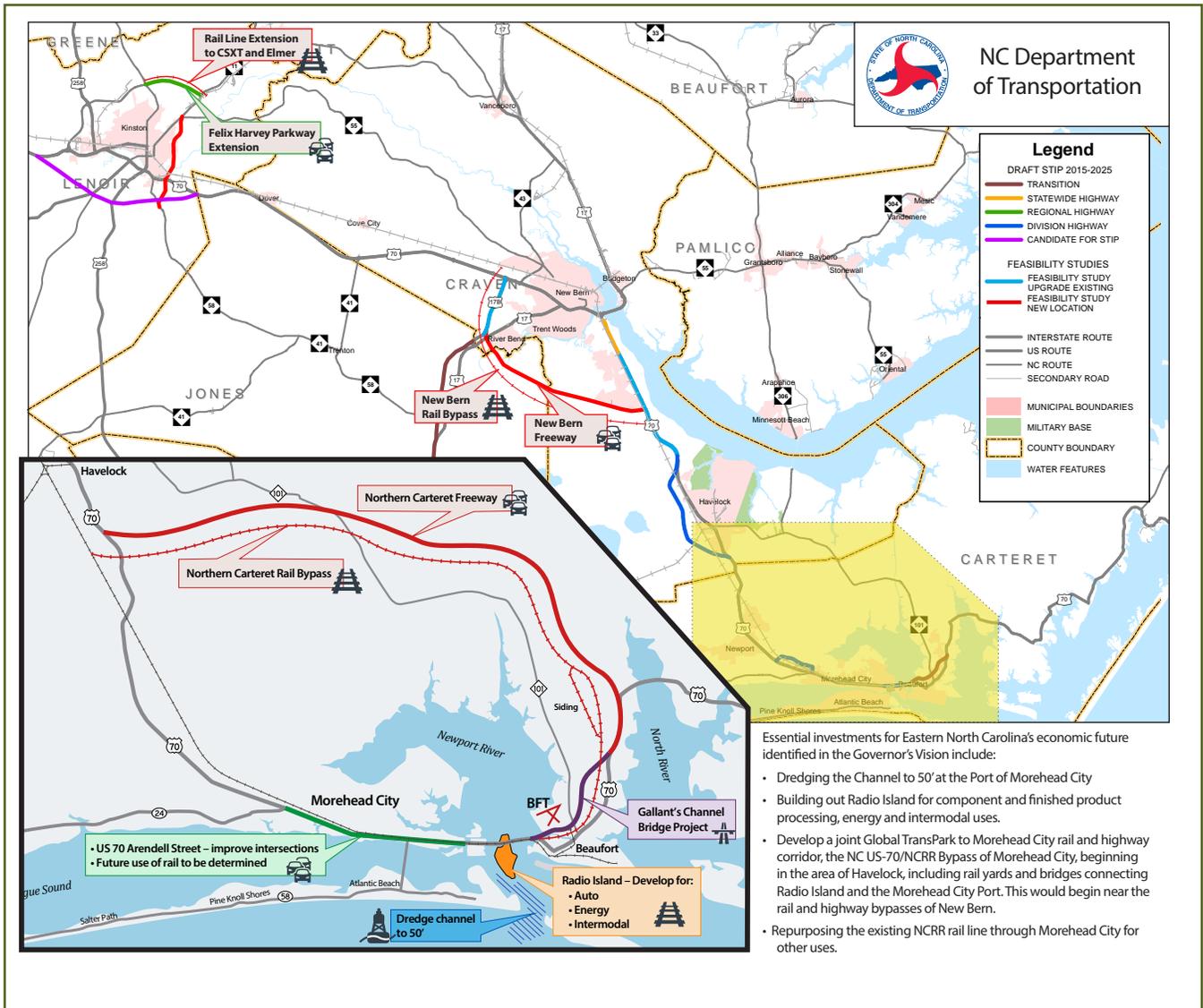
Governor McCrory's 25-Year Vision for North Carolina sets the stage for the next chapter in the state's economic development by articulating a strategic program of transportation investments to catalyze future growth. The productivity of a state or regional economy is influenced by its level of investment. Recognizing that each region of North Carolina is different, the transportation investments identified in the Governor's 25-Year Vision are tailored to each region's own distinctive needs and challenges. The Governor's 25-Year Vision represents an important milestone in North Carolina's transportation planning efforts.

Opportunities particular to Eastern North Carolina, the focus of the SB 402 legislation identified in the Governor's 25 Year Vision include: 1) maintaining support for the region's economic anchors—ports, agriculture and military operations; 2) connecting a region fragmented by multiple rivers, streams and wetlands so that it can attain the critical mass to generate sustained economic growth; and 3) “complete last-mile infrastructure around the Global TransPark to attract and retain businesses.” As the Vision narrative observes, there is a cost to doing nothing in terms of missed “opportunities to take advantage of manufacturing jobs returning to the United States, respond to changing agricultural demands and better support military readiness.” Essential investments for Eastern North Carolina's economic future identified in the Governor's 25-Year Vision include:

- Dredging the Channel to 50' at the Port of Morehead City,
- Building out Radio Island for component or finished product processing, energy and intermodal uses,
- Develop a joint Global TransPark to Morehead City rail and highway mobility corridor, the NC US-70/ NCRB Bypass of Morehead City, beginning in the area of Havelock, including rail yards and bridges connecting Radio Island and the Morehead City Port. This would begin near the rail and highway bypasses east of Havelock,
- Repurposing the existing North Carolina Railroad Company rail line through Morehead City for other uses, and
- Construct US 70 Bypasses for connection to the Interstate System.



Global TransPark to Morehead City Mobility Corridor



## Profile of Eastern North Carolina

*The objective of the SB 402 Study is to identify strategic infrastructure investments that will support the creation of jobs and other favorable economic impacts for the region and the state. The purpose of this section is to describe some of the key trends and features that will shape how the market capitalizes on public infrastructure investment. By itself, transportation investment has minimal effect on economic development. Rather, the investment fosters economic development by improving access to a region's advantages—shaped by costs, resources, and technical capabilities and allowing the global economy to capitalize on those strengths.*

Eastern North Carolina was once the state's most prosperous region. It maintains a firm foundation on which to build new opportunities. This includes a skilled and eager labor force that is attractive for a variety of manufacturing and aviation related firms, low business costs, world-class universities, a high quality community college system, a developing medical services industry, and abundant natural amenities that make the region attractive for business—as well as retirement and tourism.

### Population and Employment Growth Trend

North Carolina is one of the fastest growing states in the U.S. With recent gains, North Carolina has surpassed Michigan as the nation's tenth largest state. This growth has been highly concentrated with over 90 percent of that growth occurring in its metropolitan and micropolitan areas. North Carolina was the third most popular state destination for households relocating within the U.S. after Texas and Florida last year, and has some of the most favorable business costs in the nation for expanding businesses. This economic success is built in part on the state's transportation network—the cumulative result of a long history of thoughtful past investments. The resulting transportation system plays a critical role in attracting and retaining businesses, while connecting North Carolina's residents to jobs, healthcare, education, and recreation.

*Economic development results from the favorable convergence of a variety of advantages that extend beyond adequate road, rail, and port connections. A location with access to quality education, great rail access, sufficient labor force, reliable power and favorable cost structure are the most attractive to large employers.*

As with the state overall, Eastern North Carolina's urban areas are growth drivers for the broader region.<sup>3</sup> The urban areas of the region (defined as the region's metropolitan counties) fare comparatively well because of their coastal amenities and the resulting attraction for retirees, tourists, and others seeking locations with abundant natural recreational opportunities. For Johnston and Wayne Counties, the military presence and proximity to the Triangle region also play a role.

Eastern North Carolina hosts the majority of the state's large military presence; nine of the state's thirteen military installations are located here. This adds a unique dynamic to the region's population trends. These include:

- Marine Corps Base Camp Lejeune
- Seymour Johnson Air Force Base

<sup>3</sup> SB 402 does not specify a particular definition of the eastern region. For the purposes of this study, the eastern region was defined as those counties generally east of I-95 that include: Beaufort, Bertie, Bladen, Brunswick, Camden, Carteret, Chowan, Columbus, Craven, Cumberland, Currituck, Dare, Duplin, Edgecombe, Gates, Greene, Halifax, Harnett, Hertford, Hoke, Hyde, Johnston, Jones, Lenoir, Martin, Nash, New Hanover, Northampton, Onslow, Pamlico, Pasquotank, Pender, Perquimans, Pitt, Robeson, Sampson, Scotland, Tyrell, Washington, Wayne, and Wilson County. Hoke and Scotland Counties are not east of I-95 but these counties are part of the North Carolina Southeast Commission, which is primarily east of I-95, so they are included here.

- Fort Bragg
- Coast Guard Air Station, Elizabeth City
- Marine Corps Air Station (MCAS) Cherry Point and Fleet Readiness Center East
- Marine Corps Air Station New River
- Wilmington District, Army Corps of Engineers
- US Coast Guard Sector North Carolina
- Military Ocean Terminal Sunny Point

There is a natural turnover in a portion of the population as troops are relocated to other bases within the US or are deployed for duties overseas. It also means that as uniformed personnel exit local military bases each year they are available to join the civilian labor force. Estimates of exiting military personnel are not currently visible in civilian workforce reporting tools such as NC Works ([www.ncworks.gov](http://www.ncworks.gov)) but these workers are an important asset for the region and one that has the potential to create a competitive advantage in recruiting certain types of employers. This regional strength is an asset in marketing GTP to aviation, logistics, precision manufacturing, and other employers seeking trained workers. As a result, economic developers in the region are tracking and reporting on the number of military staff returning to civilian life. Exhibit 2-1 summarizes the number and type of military personnel exiting from Camp Lejeune and MCAS New River, for example.

*Eastern North Carolina hosts the majority of the state's large military presence; nine of the state's thirteen military installations are located here. This adds a unique dynamic to the region's population trends and brings opportunity.*

**Exhibit 2-1: Exiting Military Personnel by Military Occupational Specialty by Year from Camp Lejeune and MCAS New River, 2011 to 2013**

Military Occupational Specialty	2011	2012	2013	3-Year Total
Administration	236	321	258	815
Intelligence Analyst	79	225	177	481
Infantry Combat	2,381	3,381	2,391	8,153
Logistics	212	344	224	780
Planning Specialist	13	18	12	43
Command & Control Systems	836	1,065	834	2,735
Field Artillery	409	429	285	1,123
Utilities	159	237	167	563
Engineering	544	780	491	1,815
Tanks and Amphibian Assault Vehicles	270	291	212	773
Ordnance/Armorer	320	360	264	944
Explosive Ordnance Disposal	113	150	113	376
Signals Intelligence/ Ground Electronic Warf	69	112	125	306
Data/ Communications Maintenance	207	273	140	620
Nurse	1	5	11	17
Supply Administration	368	549	357	1,274

*Exhibit 2-1: Exiting Military Personnel by Military Occupational Specialty by Year from Camp Lejeune and MCAS New River, 2011 to 2013 (cont'd)*

<b>Military Occupational Specialty</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>3-Year Total</b>
Traffic Management	23	33	33	89
Food Service	100	185	111	396
Financial Management	61	79	40	180
Motor Transport	1,042	1,255	833	3,130
Public Affairs	3	15	8	26
Legal Services	19	33	32	84
Basic Combat Camera Marine	16	21	20	57
Music	5	16	13	34
Nuclear, Biological, Chemical Defense	45	49	26	120
Military Police and Corrections	157	296	227	680
Electronics Maintenance	1	3	2	6
Aircraft Mechanics	9	7	9	25
Aviation Electronics	6	7	9	22
Aviation Ordnance Technician	4	7	5	16
Meteorological Technician	1	5	7	13
Airfield Technician	2	6	6	14
Pilot VMA FRS Basic A-4M	0	9	23	32
Hospital Corpsman/Field Nurse	256	178	162	596
<b>Total</b>	<b>7,967</b>	<b>10,744</b>	<b>7,627</b>	<b>26,338</b>

*Source: Compiled by Jacksonville Onslow Economic Development from the Military Occupational Specialty (MOS) Database.*

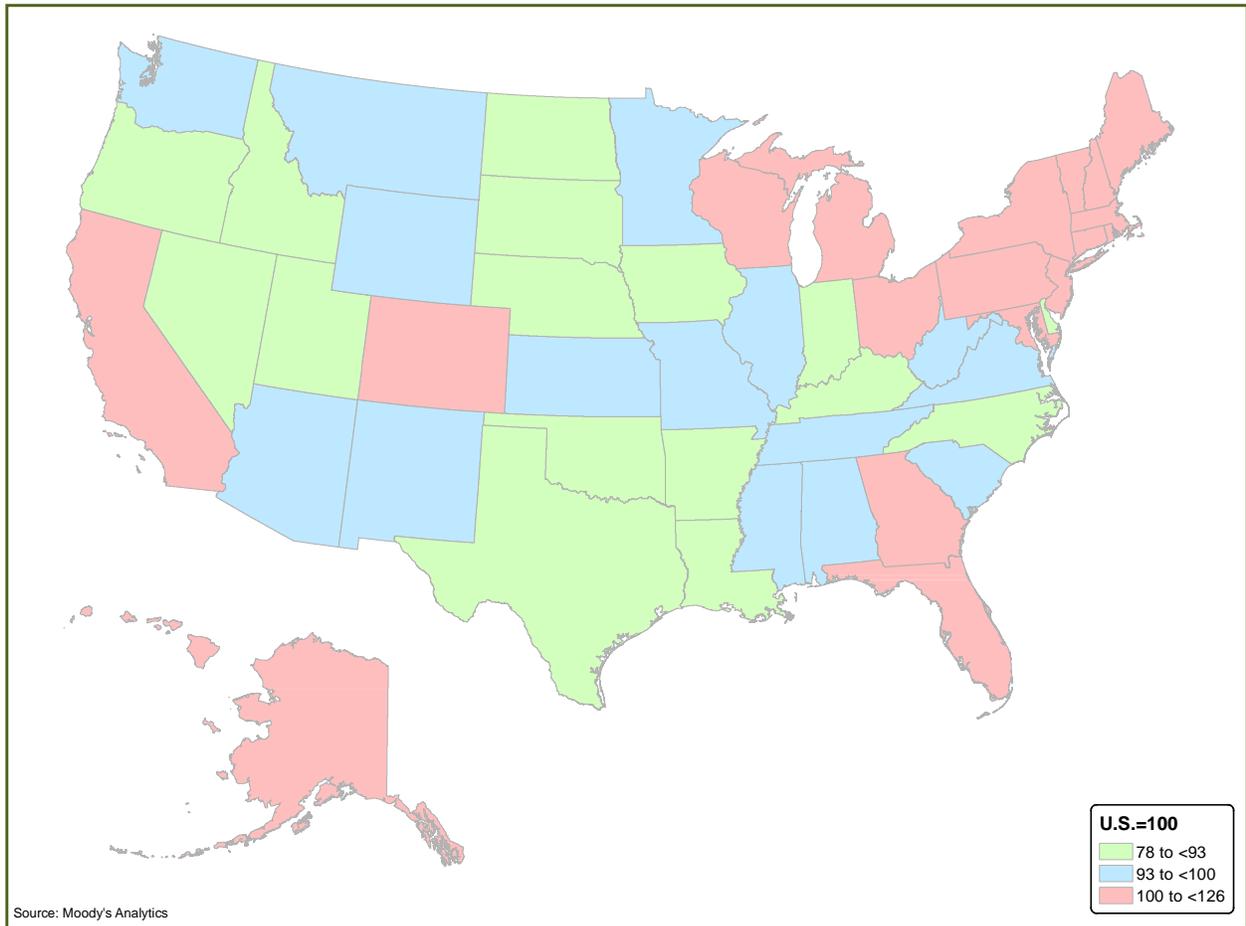
## Cost Structure

An important element in identifying industries that might prosper in Eastern North Carolina is the cost structure of the region relative to competing regions. Investments in rail, the GTP or maritime infrastructure will improve access between the region and the global economy, but if the area has a high cost of doing business, businesses will still select other locations and the investment will not foster the desired economic development. The table below (Exhibit 2-3) provides a summary of North Carolina’s business costs relative to other states in the region, as developed by Moody’s Analytics, a nationally known economic firm. The total business cost for a state is comprised of three components: unit labor costs, energy costs, and tax burden. Total business costs for a metro area are comprised of four elements - the same three components in the state index plus office space costs. Unit labor costs are a measure of labor compensation per dollar of output—wage costs adjusted for productivity. This is an important adjustment as firms are willing to pay higher costs for more productive labor, all else held equal. The energy cost component compares the average commercial and industrial electricity cost to the national average. Tax burden is measured as the total tax revenue as a percent of total income, indexed to the national effective tax rate. The metropolitan cost index adds one other factor, a cost of office space as a barometer for real estate costs.<sup>4</sup> An index value of 100 means the cost is equal to the US average cost. An index value of 105 by comparison means that the state’s cost is 5 percent greater than the US average. An index value of 92 means the state’s cost is 8 percent lower than the US average; that is, a producer in that state saves 8 cents for every dollar of production cost relative to other producers in the nation.<sup>5</sup>

<sup>4</sup> A cost index that incorporates an industrial real estate cost would be preferable for this application but this is not available.

<sup>5</sup> The full methodological description of the Cost of Doing Business Index is provided in “2011 Cost of Doing Business Review,” Moody’s Analytics, updated annu-

**Exhibit 2-2: North Carolina has Some of the Most Favorable Business Costs on the Atlantic Coast**



As Exhibits 2-2 and 2-3 show, North Carolina and especially the Eastern Region has very favorable business costs; in this ranking, low is good as it indicates low costs. The state has the lowest business costs of nearly all states along the Atlantic Coast. North Carolina ranks 48 out of 51 (50 states plus the District of Columbia) in terms of overall business costs. Only South Dakota, Nevada and Delaware have lower overall business costs. Of particular note, North Carolina has a significant percentage point cost advantage relative to its southeastern coastal peers – 22 percentage points over Maryland, 15 over Georgia, 13 better than South Carolina and 12 better than Virginia. The Eastern Region has some of the state’s most favorable costs—20 percentage points below the US average in each urban area except Fayetteville, which has a still low index value of 83.

*North Carolina has the lowest business costs of nearly all states along the Atlantic Coast. The state ranks 48 out of 51 (50 states plus the District of Columbia) in terms of overall business costs.*

Looking at the individual components, both labor and energy costs are low relative to North Carolina’s neighbors—these are particularly important costs for manufacturers of capital goods and agricultural processors who are likely port and rail users.

ally, last updated April 2011 using the most recent available data as of December 2010. The index has been continuously published for 16 years and is used in Forbes' annual Best States for Business report, as well as numerous other studies.

## Industrial Structure

In 2011, the Seven Portals Study<sup>6</sup> took a careful look at the industrial composition of the Eastern Region with several interesting findings relative to the SB 402 work.

- Cost structure of the region’s economy is not an impediment to attracting the economic development that would benefit from candidate investments.
- Key industries for the region include agriculture and related food processing/agri-industry, tourism, military/defense, and marine/port-related trades. The region also has a nucleus of aviation-related firms.
- Target industries identified by the region include many of the local economy’s existing strengths as well as biotech/pharmaceuticals/life science and entertainment.
- The report observes that one consequence of the retirement-fueled growth in the urban areas of the Eastern Region is the increasing need for distribution center space (p. 72).

The region’s competitive industries are a barometer of Eastern North Carolina’s resource and technical advantages; these are industries that are sources of particular strength for the region’s economy and future job creation. One consideration in identifying candidate investments is ensuring that new infrastructure supports the needs of its most competitive logistics-dependent industries. Shift share analysis is applied to identify the state’s competitive industries, defined as one that outperforms the

*Cost structure of the region’s economy is not an impediment to attracting the economic development that would benefit from candidate investments.*

national average performance for that industry.

*Exhibit 2-3: Summary of North Carolina’s and the Eastern Region’s Business Costs Relative to Nearby Locations (Low Rank Means Low Costs)*

State	Cost of Doing Business		Unit Labor Cost		Energy Cost		State and Local Tax Burden		Office Rent	
	Index	Rank	Index	Rank	Index	Rank	Index	Rank	Index	Rank
North Carolina	85	48	84	49	84	36	95	22	N/A	N/A
Georgia	100	20	103	14	93	26	93	34	N/A	N/A
Maryland	107	10	107	4	119	13	91	37	N/A	N/A
South Carolina	98	26	102	18	89	27	84	44	N/A	N/A
Virginia	97	28	100	27	85	34	86	41	N/A	N/A
<b>Metropolitan Areas</b>										
<b>Eastern North Carolina</b>										
Fayetteville, NC	83	281	88	325	89	253	86	193	71	143
Goldsboro, NC	78	336	84	355	89	253	87	185	61	245
Greenville, NC	80	311	84	354	89	253	86	190	69	167
Jacksonville, NC	79	328	79	371	89	253	84	218	74	114

<sup>6</sup> George F. List and Robert S. Foyle. 2011. Seven Portals Study: An Investigation of How Economic Development Can be Encouraged in North Carolina Through Infrastructure Investment – Master Report. Prepared for the North Carolina Department of Transportation by North Carolina State University. Report number FHWA/NC/2010-34-0.

**Exhibit 2-3: Summary of North Carolina's and the Eastern Region's Business Costs Relative to Nearby Locations (Low Rank Means Low Costs) (cont'd)**

	Cost of Doing Business		Unit Labor Cost		Energy Cost		State and Local Tax Burden		Office Rent	
Wilmington, NC	79	324	81	367	89	253	87	181	71	136
<b>North Carolina</b>										
Charlotte, NC	86	223	98	165	76	342	86	191	67	184
Durham, NC	92	122	89	302	76	342	87	184	104	11
Greensboro, NC	78	341	78	374	76	342	88	176	75	102
Raleigh, NC	82	285	89	307	89	253	86	188	68	180
<b>East Coast Regional Competitors</b>										
Baltimore, MD	104	27	107	33	130	69	83	235	94	27
Brunswick, GA	88	184	89	296	92	221	77	282	87	45
Charleston, SC	92	114	104	72	82	300	96	104	70	161
Danville, VA	83	269	99	159	81	311	76	286	52	345
Myrtle Beach, SC	83	270	93	240	88	271	79	268	58	290
Savannah, GA	87	211	100	143	92	221	74	301	65	211
Virginia Beach, VA	91	134	105	58	81	311	75	294	68	175

*Source: Moody's Analytics 2014 Cost of Doing Business: An Update. Updated May 2014 using the most recent available data as of December 2012. Rankings are out of 51 (50 states plus the District of Columbia). A rank of 51 indicates a location has the lowest cost; a rank of 1 indicates a location has the highest cost. Values are rounded; locations with identical scores receive the same rank. For example, the Eastern North Carolina metro areas have the same cost for energy and thus the same rank for energy costs.*

The intuition behind shift share analysis is that the growth of a candidate industry is comprised of three components: the national share, the industry mix, and the regional shift. The national share measures how much employment in a local area increased because of growth in the national economy. The industry mix effect measures the amount of growth attributable to the mix of industries in the economy—an industry in an economy with a higher proportion of fast-growing industries would be likely to grow more quickly because of the favorable mix, all else held equal. Finally, the regional shift (sometimes known as the competitive effect) measures the regional industry's growth relative to the same industry in the nation. If it outperforms the national pace, it is competitive; if it lags the national pace, it is less competitive. The sum of the national share, the industry mix, and the regional shift equals the actual growth that has been observed.<sup>7</sup>

The shift share analysis is complemented by the addition of a location quotient. The location quotient compares an industry's share of the local economy in Eastern North Carolina to the same industry's share of the national economy. When the location quotient equals 1.0 the local share and national share are exactly equal—the local share is what one would expect for a typical economy. When the local share is greater than the national share, the industry's presence in the local economy is greater than one would expect—a signal that the industry is producing more than what is needed for local consumption and is exporting to domestic or foreign locations outside the region. A location quotient greater than 1.0 is a sign of strength. By contrast, a location quotient less than one signals that the industry is producing less than what is needed for local consumption and is importing from outside the region.

<sup>7</sup> Landis, John D. (1985) 'Planner's Notebook: Electronic Spreadsheets in Planning The Case of Shiftshare Analysis', *Journal of the American Planning Association*, 51: 2, 216-224.

Together, the regional shift factor and the location quotient identify the sources of industrial strength in Eastern North Carolina's economy. In order to perform shift share analysis, the data for the U.S. and Eastern North Carolina (defined as the aggregate of the counties identified previously) are collected for two time frames. Employment data are the most commonly used indicator of economic performance; the analysis uses data from the Bureau of Economic Analysis (BEA). For this analysis, 2001 and 2009 were selected as reference points due to these years coinciding with the end of a recession. Thus, the analysis spans a full business cycle measured trough to trough. Using times with similar economic climates creates consistency in the analysis.

The industries in the table above having positive regional shifts (once the national and industry mix effects are factored in) outperform the national average. The strongest industries are those with both a positive regional shift factor and a location quotient above 1.0. These are followed by industries with a positive regional shift factor and smaller location quotient. Also of interest are those industries with large location quotients and low or negative regional shift factors as this signifies large industry anchors for the state's economy that are losing competitive position and would benefit from support.

Using the criteria outlined above, the most competitive industries (a positive regional shift and a very high location quotient that has risen over the analysis period) within the region are:

- Crop production
- Food manufacturing
- Textile product mills (not textile mills)
- Chemical manufacturing
- Non-metallic mineral product manufacturing
- Amusements, gambling, and recreation (LQ below 1.0 but rising)
- Food and beverage services
- Real estate
- Repair and maintenance
- Government
- Military

By contrast, industries that appear to be softening include:

- Animal production (the location quotient remains very high as some of the state's largest farms are located in the region)
- Forestry and logging
- Apparel manufacturing
- Wood product manufacturing
- Warehousing and storage
- Truck transportation

Exhibit 2-4: Shift Share and Location Quotient Analysis of North Carolina's Economy, 2001-2012

	Eastern North Carolina 2001	Eastern North Carolina 2009	Eastern North Carolina 2012	United States 2001	United States 2009	United States 2012	Regional Economic Growth Factor 2001-2009	Regional Economic Growth Factor 2001-2012	National Economic Growth Factor 2001-2009	National Economic Growth Factor 2001-2012	Industry Mix 2001-2009	Industry Mix 2001-2012	Regional Shift 2001-2009	Regional Shift 2001-2012	Location Quotient 2001	Location Quotient 2012
111 Crop production	7,822	7,957	8,131	564,162	531,609	543,593	0.03	0.04	-0.01	0.02	-0.05	-0.05	0.07	0.08	2.71	2.85
112 Animal production	6,873	6,398	5,506	202,607	226,392	236,887	0.03	0.04	-0.01	0.02	0.13	0.15	-0.19	-0.37	6.63	4.44
113 Forestry and logging	1,987	1,139	1,126	82,526	58,767	58,744	0.03	0.04	-0.01	0.02	-0.28	-0.30	-0.14	-0.15	4.70	3.66
114 Fishing, hunting and trapping	6	4	12	11,239	8,101	8,214	0.03	0.04	-0.01	0.02	-0.27	-0.29	-0.05	1.27	0.10	0.28
115 Agriculture and forestry support activities	1,271	1,449	1,036	317,768	323,936	348,789	0.03	0.04	-0.01	0.02	0.03	0.08	0.12	-0.28	0.78	0.57
211 Oil and gas extraction	-	-	-	123,599	160,688	188,003	0.03	0.04	-0.01	0.02	0.31	0.51	na	na	0.00	0.00
212 Mining, except oil and gas	11	-	95	220,484	207,118	218,350	0.03	0.04	-0.01	0.02	-0.05	-0.03	-0.94	7.65	0.01	0.08
213 Support activities for mining	-	-	10	191,106	273,910	392,069	0.03	0.04	-0.01	0.02	0.44	1.04	na	na	0.00	0.00
221 Utilities	2,352	2,110	2,396	842,104	821,449	803,992	0.03	0.04	-0.01	0.02	-0.02	-0.06	-0.08	0.06	0.55	0.57
236 Construction of buildings	12,760	9,533	9,178	1,568,343	1,337,305	1,230,280	0.03	0.04	-0.01	0.02	-0.14	-0.23	-0.11	-0.07	1.59	1.42
237 Heavy and civil engineering construction	8,046	5,948	6,142	1,146,570	1,034,580	1,022,784	0.03	0.04	-0.01	0.02	-0.09	-0.12	-0.16	-0.13	1.37	1.15
238 Specialty trade contractors	31,819	29,930	25,971	4,256,047	3,764,216	3,510,046	0.03	0.04	-0.01	0.02	-0.11	-0.19	0.06	-0.01	1.46	1.41
311 Food manufacturing	15,272	16,527	18,927	1,554,927	1,449,318	1,460,031	0.03	0.04	-0.01	0.02	-0.06	-0.08	0.15	0.30	1.92	2.47
312 Beverage and tobacco product manufacturing	1,663	1,142	1,231	207,285	187,033	191,271	0.03	0.04	-0.01	0.02	-0.09	-0.09	-0.22	-0.18	1.57	1.23
313 Textile mills	9,691	1,310	958	330,072	123,904	117,933	0.03	0.04	-0.01	0.02	-0.62	-0.66	-0.24	-0.26	5.74	1.55
314 Textile product mills	973	721	738	203,341	126,096	115,462	0.03	0.04	-0.01	0.02	-0.37	-0.45	0.12	0.19	0.93	1.22
315 Apparel manufacturing	2,772	185	201	426,027	167,737	148,309	0.03	0.04	-0.01	0.02	-0.60	-0.67	-0.33	-0.28	1.27	0.26
316 Leather and allied product manufacturing	-	-	-	59,571	29,323	29,437	0.03	0.04	-0.01	0.02	-0.50	-0.52	na	na	0.00	0.00
321 Wood product manufacturing	6,205	2,719	1,568	571,108	359,532	339,708	0.03	0.04	-0.01	0.02	-0.36	-0.42	-0.19	-0.34	2.12	0.88
322 Paper manufacturing	1,053	581	394	577,030	405,438	379,519	0.03	0.04	-0.01	0.02	-0.29	-0.36	-0.15	-0.28	0.36	0.20
323 Printing and related support activities	1,257	962	694	770,583	525,724	462,398	0.03	0.04	-0.01	0.02	-0.31	-0.42	0.08	-0.05	0.32	0.29
324 Petroleum and coal products manufacturing	-	-	-	120,967	114,506	111,436	0.03	0.04	-0.01	0.02	-0.05	-0.09	na	na	0.00	0.00
325 Chemical manufacturing	5,478	7,707	6,339	955,330	800,851	785,529	0.03	0.04	-0.01	0.02	-0.15	-0.19	0.57	0.33	1.12	1.54
326 Plastics and rubber products manufacturing	3,736	2,918	2,660	894,801	625,532	644,816	0.03	0.04	-0.01	0.02	-0.29	-0.30	0.08	-0.01	0.82	0.79
327 Nonmetallic mineral product manufacturing	2,108	2,581	2,581	543,042	390,115	366,052	0.03	0.04	-0.01	0.02	-0.27	-0.34	0.51	0.55	0.76	1.35
331 Primary metal manufacturing	296	3	-	569,917	363,744	399,980	0.03	0.04	-0.01	0.02	-0.35	-0.31	-0.63	-0.70	0.10	0.00
332 Fabricated metal product manufacturing	7,310	5,879	6,541	1,679,755	1,310,375	1,409,218	0.03	0.04	-0.01	0.02	-0.21	-0.18	0.02	0.06	0.85	0.89
333 Machinery manufacturing	4,846	2,996	2,289	1,360,793	1,020,994	1,097,739	0.03	0.04	-0.01	0.02	-0.24	-0.21	-0.13	-0.33	0.70	0.40
334 Computer and electronic product manufacturing	1,666	1,048	514	1,748,552	1,132,789	1,091,274	0.03	0.04	-0.01	0.02	-0.34	-0.39	-0.02	-0.32	0.19	0.09
335 Electrical equipment and appliance mfg.	2,444	1,347	1,286	552,013	371,712	372,725	0.03	0.04	-0.01	0.02	-0.32	-0.34	-0.12	-0.15	0.86	0.66
336 Transportation equipment manufacturing	4,868	3,818	3,330	1,953,788	1,384,257	1,498,303	0.03	0.04	-0.01	0.02	-0.28	-0.25	0.08	-0.08	0.49	0.42
337 Furniture and related product manufacturing	2,624	1,084	751	643,151	383,492	350,994	0.03	0.04	-0.01	0.02	-0.40	-0.47	-0.18	-0.26	0.80	0.41
339 Miscellaneous manufacturing	1,402	1,422	2,042	714,764	580,794	578,069	0.03	0.04	-0.01	0.02	-0.18	-0.21	0.20	0.65	0.38	0.67
423 Merchant wholesalers, durable goods	11,325	11,801	11,732	3,107,851	2,794,620	2,824,641	0.03	0.04	-0.01	0.02	-0.09	-0.11	0.14	0.13	0.71	0.79

Subsector NAICS 516: Internet Publishing and Broadcasting has been discontinued in NAICS 2007 and industries have been reclassified under NAICS 519: Other Information Services.

Exhibit 2-4: Shift Share and Location Quotient Analysis of North Carolina's Economy, 2001-2012

	Eastern North Carolina 2001	Eastern North Carolina 2009	Eastern North Carolina 2012	United States 2001	United States 2009	United States 2012	Regional Economic Growth Factor 2001-2009	Regional Economic Growth Factor 2001-2012	National Economic Growth Factor 2001-2009	National Economic Growth Factor 2001-2012	Industry Mix 2001-2009	Industry Mix 2001-2012	Regional Shift 2001-2009	Regional Shift 2001-2012	Location Quotient 2001	Location Quotient 2012
424 Merchant wholesalers, nondurable goods	12,820	13,661	12,143	2,016,043	1,962,542	1,957,412	0.03	0.04	-0.01	0.02	-0.02	-0.05	0.09	-0.02	1.24	1.18
425 Electronic markets and agents and brokers	2,456	2,490	2,159	606,658	805,163	875,010	0.03	0.04	-0.01	0.02	0.34	0.43	-0.31	-0.56	0.79	0.47
441 Motor vehicle and parts dealers	15,491	14,594	15,866	1,856,064	1,632,614	1,735,421	0.03	0.04	-0.01	0.02	-0.11	-0.08	0.06	0.09	1.63	1.74
442 Furniture and home furnishings stores	4,388	3,626	3,354	537,966	445,552	439,520	0.03	0.04	-0.01	0.02	-0.16	-0.20	0.00	-0.05	1.59	1.46
443 Electronics and appliance stores	2,565	2,784	2,589	556,650	489,618	508,566	0.03	0.04	-0.01	0.02	-0.11	-0.10	0.21	0.10	0.90	0.97
444 Building material and garden supply stores	9,604	9,849	9,607	1,140,023	1,159,127	1,161,080	0.03	0.04	-0.01	0.02	0.02	0.00	0.01	-0.02	1.65	1.58
445 Food and beverage stores	23,797	19,955	21,892	2,958,649	2,854,909	2,887,554	0.03	0.04	-0.01	0.02	-0.03	-0.04	-0.13	-0.06	1.57	1.45
446 Health and personal care stores	6,521	7,776	8,411	938,324	983,151	998,409	0.03	0.04	-0.01	0.02	0.06	0.05	0.14	0.23	1.36	1.61
447 Gasoline stations	9,547	9,259	9,264	920,344	824,261	842,942	0.03	0.04	-0.01	0.02	-0.10	-0.10	0.07	0.05	2.03	2.10
448 Clothing and clothing accessories stores	8,664	8,231	8,473	1,324,023	1,358,764	1,391,584	0.03	0.04	-0.01	0.02	0.03	0.04	-0.08	-0.07	1.28	1.16
451 Sporting goods, hobby, book and music stores	3,994	3,327	3,274	682,118	614,928	584,700	0.03	0.04	-0.01	0.02	-0.09	-0.16	-0.07	-0.04	1.14	1.07
452 General merchandise stores	27,094	29,816	30,364	2,864,582	3,044,291	3,142,092	0.03	0.04	-0.01	0.02	0.07	0.08	0.04	0.02	1.85	1.84
453 Miscellaneous store retailers	7,298	5,345	5,181	991,399	788,276	797,144	0.03	0.04	-0.01	0.02	-0.20	-0.21	-0.06	-0.09	1.44	1.24
454 Nonstore retailers	3,059	1,874	1,943	475,676	415,839	442,178	0.03	0.04	-0.01	0.02	-0.12	-0.09	-0.26	-0.29	1.26	0.84
481 Air transportation	93	76	79	615,994	461,754	458,828	0.03	0.04	-0.01	0.02	-0.24	-0.27	0.07	0.10	0.03	0.03
482 Rail transportation	-	-	-	318	590	675	0.03	0.04	-0.01	0.02	0.86	1.11	na	na	0.00	0.00
483 Water transportation	-	-	32	54,885	64,685	66,762	0.03	0.04	-0.01	0.02	0.19	0.20	na	na	0.00	0.09
484 Truck transportation	8,870	7,487	7,342	1,383,016	1,260,991	1,341,456	0.03	0.04	-0.01	0.02	-0.08	-0.05	-0.07	-0.14	1.25	1.04
485 Transit and ground passenger transportation	645	666	567	591,110	663,380	680,529	0.03	0.04	-0.01	0.02	0.13	0.14	-0.09	-0.27	0.21	0.16
486 Pipeline transportation	-	-	-	46,665	42,285	44,575	0.03	0.04	-0.01	0.02	-0.09	-0.06	na	na	0.00	0.00
487 Scenic and sightseeing transportation	174	171	149	32,097	27,612	29,691	0.03	0.04	-0.01	0.02	-0.13	-0.09	0.12	-0.07	1.06	0.96
488 Support activities for transportation	2,559	2,715	2,882	625,566	622,174	654,267	0.03	0.04	-0.01	0.02	0.00	0.03	0.07	0.08	0.80	0.84
491 Postal service	5,514	4,600	4,156	871,707	707,506	616,204	0.03	0.04	-0.01	0.02	-0.18	-0.31	0.02	0.05	1.24	1.29
492 Couriers and messengers	1,151	1,095	1,490	596,899	534,490	526,028	0.03	0.04	-0.01	0.02	-0.10	-0.13	0.06	0.41	0.38	0.54
493 Warehousing and storage	2,349	2,295	2,688	517,631	642,318	684,163	0.03	0.04	-0.01	0.02	0.25	0.31	-0.26	-0.18	0.89	0.75
511 Publishing industries, except Internet	1,111	1,517	1,199	1,014,499	793,870	734,895	0.03	0.04	-0.01	0.02	-0.21	-0.29	0.58	0.35	0.21	0.31
512 Motion picture and sound recording industries	319	551	370	367,320	360,327	371,827	0.03	0.04	-0.01	0.02	-0.01	0.00	0.75	0.15	0.17	0.19
515 Broadcasting, except Internet	1,766	1,325	790	344,218	303,273	288,495	0.03	0.04	-0.01	0.02	-0.11	-0.18	-0.13	-0.39	1.00	0.52
516 Internet publishing and broadcasting	7	-	-	43,625	-	-	0.03	0.04	-0.01	0.02	-0.99	-1.02	0.00	0.00	0.03	na
517 Telecommunications	4,089	5,062	4,220	1,293,380	975,292	856,487	0.03	0.04	-0.01	0.02	-0.24	-0.35	0.48	0.37	0.62	0.94
518 Data processing, hosting and related services	358	16	216	491,001	251,655	258,682	0.03	0.04	-0.01	0.02	-0.48	-0.49	-0.47	0.08	0.14	0.16
519 Other information services	82	115	169	175,362	272,307	308,060	0.03	0.04	-0.01	0.02	0.56	0.74	-0.15	0.30	0.09	0.10
521 Monetary authorities - central bank	-	-	-	22,965	21,368	17,286	0.03	0.04	-0.01	0.02	-0.06	-0.26	na	na	0.00	0.00
522 Credit intermediation and related activities	13,942	14,144	12,965	2,602,350	2,600,877	2,593,698	0.03	0.04	-0.01	0.02	0.01	-0.02	0.02	-0.07	1.05	0.95
523 Securities, commodity contracts, investments	278	864	761	834,520	815,239	814,552	0.03	0.04	-0.01	0.02	-0.02	-0.04	2.13	1.76	0.07	0.18

Subsector NAICS 516: Internet Publishing and Broadcasting has been discontinued in NAICS 2007 and industries have been reclassified under NAICS 519: Other Information Services.

Exhibit 2-4: Shift Share and Location Quotient Analysis of North Carolina's Economy, 2001-2012

	Eastern North Carolina 2001	Eastern North Carolina 2009	Eastern North Carolina 2012	United States 2001	United States 2009	United States 2012	Regional Economic Growth Factor 2001-2009	Regional Economic Growth Factor 2001-2012	National Economic Growth Factor 2001-2009	National Economic Growth Factor 2001-2012	Industry Mix 2001-2009	Industry Mix 2001-2012	Regional Shift 2001-2009	Regional Shift 2001-2012	Location Quotient 2001	Location Quotient 2012
524 Insurance carriers and related activities	4,149	4,650	4,396	2,118,147	2,119,505	2,077,653	0.03	0.04	-0.01	0.02	0.01	-0.04	0.12	0.08	0.38	0.40
525 Funds, trusts, and other financial vehicles	6	-	36	92,029	92,995	93,866	0.03	0.04	-0.01	0.02	0.02	0.00	-1.01	4.98	0.01	0.07
531 Real estate	7,673	9,564	8,721	1,388,063	1,445,034	1,455,303	0.03	0.04	-0.01	0.02	0.05	0.03	0.21	0.09	1.08	1.14
532 Rental and leasing services	2,519	1,975	2,283	671,202	546,319	508,616	0.03	0.04	-0.01	0.02	-0.18	-0.26	-0.03	0.15	0.73	0.86
533 Lessors of nonfinancial intangible assets	-	-	11	29,410	26,094	24,325	0.03	0.04	-0.01	0.02	-0.10	-0.19	na	na	0.00	0.09
541 Professional and Technical Services	19,415	27,458	26,638	6,966,068	7,586,118	8,005,877	0.03	0.04	-0.01	0.02	0.10	0.13	0.33	0.22	0.54	0.63
551 Management of companies and enterprises	4,614	6,001	7,647	1,716,130	1,855,139	2,003,075	0.03	0.04	-0.01	0.02	0.09	0.15	0.22	0.49	0.53	0.73
561 Administrative and support services	30,176	34,551	37,594	7,464,018	6,857,389	7,665,779	0.03	0.04	-0.01	0.02	-0.07	0.01	0.23	0.22	0.79	0.94
562 Waste management and remediation services	1,202	1,566	1,634	350,964	382,210	404,467	0.03	0.04	-0.01	0.02	0.10	0.14	0.21	0.21	0.67	0.77
611 Educational services	27,734	25,592	33,772	10,867,485	12,171,846	12,083,991	0.03	0.04	-0.01	0.02	0.13	0.10	-0.20	0.11	0.50	0.53
621 Ambulatory health care services	37,441	54,225	51,688	4,540,427	5,886,454	6,423,647	0.03	0.04	-0.01	0.02	0.30	0.40	0.15	-0.03	1.61	1.54
622 Hospitals	6,285	8,575	9,492	5,172,680	5,927,741	6,031,210	0.03	0.04	-0.01	0.02	0.15	0.15	0.22	0.34	0.24	0.30
623 Nursing and residential care facilities	21,787	25,852	22,717	2,876,435	3,299,597	3,399,684	0.03	0.04	-0.01	0.02	0.15	0.17	0.04	-0.14	1.48	1.28
624 Social assistance	5,946	9,199	8,062	2,065,026	2,651,188	2,818,018	0.03	0.04	-0.01	0.02	0.29	0.35	0.26	-0.01	0.56	0.55
711 Performing arts and spectator sports	812	540	568	391,524	410,562	421,776	0.03	0.04	-0.01	0.02	0.06	0.06	-0.38	-0.38	0.41	0.26
712 Museums, historical sites, zoos, and parks	236	293	314	195,641	216,343	224,659	0.03	0.04	-0.01	0.02	0.11	0.13	0.14	0.18	0.24	0.27
713 Amusements, gambling, and recreation	6,951	7,926	8,157	1,545,220	1,696,318	1,720,535	0.03	0.04	-0.01	0.02	0.11	0.10	0.04	0.06	0.88	0.90
721 Accommodation	9,349	8,554	9,060	1,849,630	1,808,004	1,881,099	0.03	0.04	-0.01	0.02	-0.01	0.00	-0.06	-0.05	0.99	0.92
722 Food services and drinking places	69,012	80,330	83,265	8,287,912	9,350,047	9,966,139	0.03	0.04	-0.01	0.02	0.14	0.19	0.04	0.00	1.63	1.59
811 Repair and maintenance	8,228	8,331	8,284	1,264,567	1,158,726	1,199,583	0.03	0.04	-0.01	0.02	-0.08	-0.07	0.10	0.06	1.27	1.32
812 Personal and laundry services	7,545	6,567	6,402	1,250,579	1,286,334	1,320,411	0.03	0.04	-0.01	0.02	0.04	0.04	-0.16	-0.21	1.18	0.93
813 Membership associations and organizations	4,453	4,106	3,789	1,306,063	1,359,560	1,343,828	0.03	0.04	-0.01	0.02	0.05	0.01	-0.12	-0.18	0.67	0.54
814 Private households	2,022	1,289	1,649	433,690	620,500	723,936	0.03	0.04	-0.01	0.02	0.44	0.65	-0.79	-0.85	0.91	0.43
921 Executive, legislative and general government	20,562	27,765	31,830	3,081,611	3,128,942	2,985,127	0.03	0.04	-0.01	0.02	0.02	-0.05	0.33	0.58	1.30	2.03
922 Justice, public order, and safety activities	6,230	4,856	4,097	1,659,184	1,911,535	1,870,978	0.03	0.04	-0.01	0.02	0.16	0.11	-0.37	-0.47	0.73	0.42
923 Administration of human resource programs	879	406	446	763,630	767,997	767,864	0.03	0.04	-0.01	0.02	0.01	-0.01	-0.54	-0.50	0.22	0.11
924 Administration of environmental programs	1,884	723	595	328,514	326,881	320,312	0.03	0.04	-0.01	0.02	0.00	-0.04	-0.61	-0.66	1.12	0.35
925 Community and housing program administration	283	323	282	95,728	88,511	85,023	0.03	0.04	-0.01	0.02	-0.07	-0.13	0.22	0.11	0.58	0.63
926 Administration of economic programs	2,268	3,063	2,596	529,284	652,014	612,014	0.03	0.04	-0.01	0.02	0.24	0.14	0.12	-0.01	0.84	0.81
927 Space research and technology	-	-	-	17,608	18,448	18,092	0.03	0.04	-0.01	0.02	0.06	0.01	na	na	0.00	0.00
928 National security and international affairs	13,293	13,581	15,082	565,517	568,725	601,288	0.03	0.04	-0.01	0.02	0.01	0.05	0.02	0.07	4.59	4.79
999 Unclassified	-	1,108	15	254,603	174,050	172,213	0.03	0.04	-0.01	0.02	-0.31	-0.34	na	na	0.00	0.02
<b>Grand Total</b>	<b>663,495</b>	<b>685,474</b>	<b>690,096</b>	<b>129,603,459</b>	<b>128,588,111</b>	<b>131,677,755</b>										

Subsector NAICS 516: Internet Publishing and Broadcasting has been discontinued in NAICS 2007 and industries have been reclassified under NAICS 519: Other Information Services.

The region's most competitive industries that are freight-using include crop production and food manufacturing, chemical and non-metallic mineral product manufacturing and the military. By contrast, some of the region's core freight-using industries show some signs of softening: animal production, forestry and logging, apparel manufacturing, wood product manufacturing, warehousing and storage.

Collectively, the pattern of industrial strengths and weaknesses suggests that within the region's large agriculture sector there is greater strength in crop production (although the strength of this industry is tied to animal production) than in animal production and forestry. Several types of manufacturing are thriving in the region, as is skilled maintenance and repair. Food and hospitality, real estate, as well as the recreational sector are strengthening with the expansion of the region's tourism and retiree sectors. The region's warehousing and trucking industries, by contrast, are facing challenges. Though the region has several features that would suggest a healthier logistics sector such as two marine ports, a major logistics center, and several healthy manufacturing sectors, the contraction of two core industries—textiles and tobacco—have dampened demand for storage and trucking compared with the start of the analysis period.

North Carolina's production agriculture industry remains on a growth trajectory, with on farm cash receipts continuing to mature. Throughout the report, the analysis has been constructed to be "forward looking," noting emerging industries that complement agriculture, and noting places where greater volumes or changed market conditions could warrant a re-evaluation of the findings here. Many of the industry's modal moves, especially in the eastern part of the state are via truck due the relatively short distances, but as global demand for food and fiber grows, export opportunities for North Carolina producers will expand and possibly require different infrastructure to support this activity. This study offers an opportunity for this industry to illustrate agriculture's current needs and prospective opportunities.

*North Carolina's production agriculture industry remains on a growth trajectory, with on farm cash receipts continuing to mature. Throughout the report, the analysis has been constructed to be "forward looking," noting emerging industries that complement agriculture, and noting places where greater volumes or changed market conditions could warrant a re-evaluation of the findings here.*

## Stakeholder Outreach

*Focused discussions with industry stakeholders are a key component to identifying the infrastructure needs of all three candidate locations: restoration of track between Wallace and Castle Hayne, the Global TransPark (GTP) and the Port of Morehead City. In order to gain this understanding, the team used a combination of interviews and a series of interactive workshops to involve regional planners and key stakeholders from some of the region's core industries throughout the development of the study. The information obtained from industry representatives was critical to accomplishing the objectives of this study. In this section, the process and takeaways of the stakeholder outreach efforts are described.*

### Wallace to Castle Hayne Outreach Summary

Stakeholder outreach was an important task used to understand the market feasibility and strategic value of restoring the Wallace to Castle Hayne rail segment. Stakeholder groups included military, shippers of a variety of products, public officials familiar with freight demand, transportation, and economic development in the region, and rail operators. The information obtained from industry representatives was critical to accomplishing the objectives of this study.

Stakeholder outreach primarily consisted of phone interviews and in-person meetings. Input was solicited from a variety of stakeholders to understand current and future shipping volumes, economic development needs in the region, logistics trends, the needs of key shipper groups such as agriculture and military. Potential stakeholders to contact were identified by referral from other stakeholders, identification from a database of shipping establishments called Freight Finder, and from NCDOT industry contacts. While a number of stakeholders along the corridor support the return of the Wallace to Castle Hayne railroad segment to use, few could identify an immediate measurable level of freight or need to sustain service on the line. Some state agricultural interests thought it might be used for grain import moves (such as those that took place in 2012).

*While a number of stakeholders support the return of the Wallace to Castle Hayne railroad segment to use, few could identify an immediate measurable level of freight or need to sustain service on the line.*

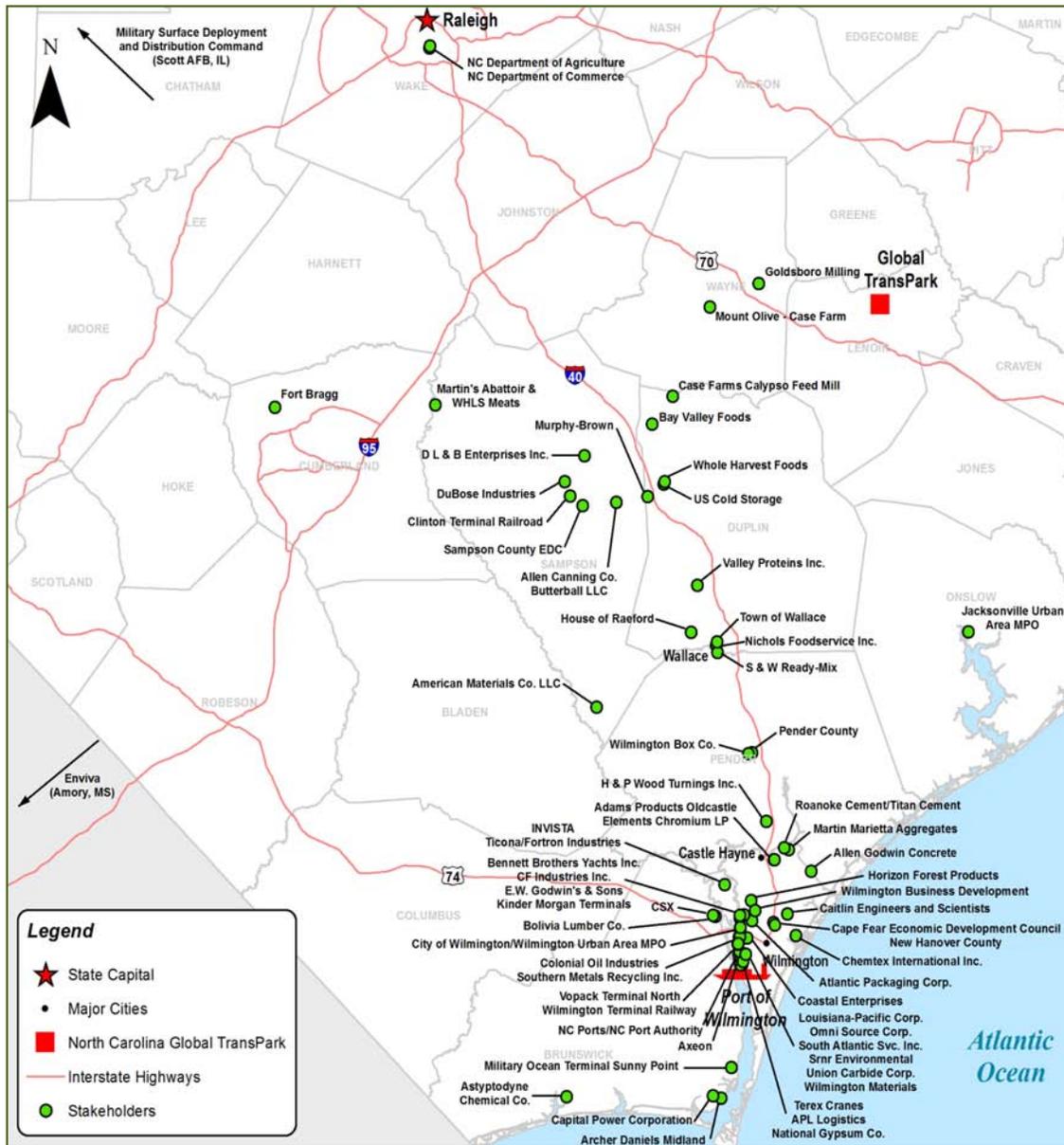
Stakeholders were representative of a variety of groups, public and private. Stakeholders from public or non-profit groups included the Departments of Commerce and Agriculture, NC Ports Authority, local MPOs, Counties, Cities, military facilities, and business groups. Stakeholders from private industries that were interviewed or invited to meetings included shippers of the following products: construction materials, wood products and pellets, sand and gravel, animal products including pork and poultry production, chemicals and chemical products, scrap and waste materials, groceries, plastic materials, pesticides and agricultural chemicals, petroleum refining, farm supplies, military munitions, and freight rail services.

The list of stakeholders contacted about the Wallace to Castle Hayne project is presented below. A map of the locations of the companies or contacts is shown in Exhibit 3-1.

- Adams Products
- Allen-Godwin Concrete Inc
- Allen Canning Co
- American Materials Co LLC
- APL Logistics
- Archer Daniels Midland Company
- Astyptodyne Chemical Co
- Atlantic Packaging Corp
- Axeon Specialty Products
- Bay Valley Foods LLC
- Bolivia Lumber Company LLC
- Butterball LLC
- Cape Fear Economic Development Council
- Capital Power Corporation
- Case Farms Chicken
- Catlin Equipment & Science
- Celanese Corporation
- CF Industries Holding Inc
- Chemtex Group
- City of Wilmington
- Clinton Terminal Railroad Co
- Coastal Enterprises Inc
- Colonial Group Inc
- CSX Corporation Inc
- D L & B Enterprises Inc
- DuBose Industries
- E.W. Godwin's Sons
- Elementis PLC
- Enviva LP
- Fort Bragg
- Goldsboro Milling Company
- H&P Wood Turnings Inc
- Horizon Forest Products
- House of Raeford
- INVISTA
- Jacksonville Urban Area MPO
- Kinder Morgan
- Louisiana-Pacific Corporation
- Martin Marietta Materials Inc
- Martin's Abattoir & Whls Meats
- Military Ocean Terminal Sunny Point
- Military Surface Deployment and Distribution Command
- Murphy-Brown LLC
- National Gypsum Company
- NC Department of Agriculture and Consumer Services
- NC Department of Commerce
- NC State Ports Authority
- New Hanover County
- Nichols Foodservice Inc
- OmniSource Corporation
- Pender County
- Roanoke Cement Company LLC
- S&W Ready Mix Concrete
- Sampson County Economic Development Commission
- South Atlantic Services
- Southern Metals Recycling Inc
- SR&R Inc
- Terex Corporation
- Titan America LLC
- Town of Wallace
- Union Carbide Corp
- United States Cold Storage
- Valley Proteins Inc

- Vopak
- Whole Harvest Foods LLC
- Wilmington Box Company
- Wilmington Business Development
- Wilmington Materials
- Wilmington Terminal Railroad
- Wilmington Urban Area MPO

**Exhibit 3-1: Locations of Study Contacts**



**Source: PB, AECOM GIS**

## Global TransPark and Port of Morehead City Outreach

In order to understand the key uses of the Global TransPark and the Port of Morehead City as well as the infrastructure needs of the facilities, a series of workshops and interviews were conducted, primarily in Kinston, Morehead City, and Raleigh. A variety of stakeholders were invited to participate in an effort to collect information on how the facilities can be improved and any other experiences or thoughts that could inform the study. This section summarizes the process, the attendees, the main takeaway points from discussions, and the supplemental information provided by the attendees.

Five workshops were conducted to obtain input from a variety of industries. Having five workshops organized by stakeholder type allowed the project team to present information on the study to all groups while customizing the questions and discussions to specific stakeholders. Supplemental interviews were conducted in cases where an invited stakeholder wanted to share information for the study, but could not attend the workshop at the scheduled time. Interviews were held in person and by phone as schedules permitted. A total of 10 interviews were conducted in addition to the workshops. Attendees represented the following stakeholder groups:

- **Economic development professionals and regional planning officials:** These attendees represented their constituents in regards to the facilities, as well as identified businesses that have shown interest in locating in the region and possibly utilizing the facilities.
- **Agriculture industry:** The second workshop included representatives from North Carolina's agriculture industry including commodity association representatives and individual growers.
- **Manufacturing industry:** The third workshop invited representatives from North Carolina's manufacturing industry including manufacturing industry representatives and individual firms.
- **Aviation and Military industries:** The two groups were combined because of the overlapping nature of their industry needs.
- **Manufacturing industry relevant to the Port of Morehead City:** The fifth workshop included representatives from portions of the manufacturing industry that depend on the Port of Morehead City.

In the following sections, the process of inviting attendees and the methodology behind selecting the invitees is discussed.

## Global TransPark and Port of Morehead City Invitations and Outreach Process

Invitations included a letter introducing the project and explaining the purpose of the study. Follow up emails provided more detailed information about the specific workshop. Stakeholders were also invited to share the invitation and project background information with others in their agency, company, or firm who would be valuable to the discussions at the workshop. Follow up emails responded to invitees' questions.

The next sections describe the methodology followed when compiling the lists of potential stakeholders to invite to the workshops. The section concludes with a map showing the locations of the workshop attendees in Exhibit 3-2.

### Economic Development Professionals

The list of stakeholders invited to the first of the workshops was compiled primarily from the regional agencies' online directories. Invitees included members of the immediate and neighboring counties' planning organizations, economic development commissions or agencies, and groups representing special coalitions. Representatives from the following counties, coalitions, and agencies were invited:

Metropolitan Planning Organizations	Rural Planning Organizations
Greenville MPO	Albemarle Commission
New Bern MPO	Eastern Carolina Council of Governments
Jacksonville MPO	Cape Fear Council of Governments
Wilmington MPO	Mid-East Commission
Other Agencies or Coalitions	Economic Development Agencies
Carolinas Gateway Partnership	Brunswick County Carteret County
Carteret County Transportation Committee	Craven County Duplin County
City of Jacksonville	Greene County Hertford County
NC East Alliance	Jacksonville Onslow Jones County
North Carolina Global TransPark	Lenoir County Pamlico County
US 70 Corridor Commission	Pitt County Wayne County

### Agriculture Industry

The list of agriculture industry representatives was compiled primarily from online directories and company websites. The goal in selecting the industry representatives was to have a variety of agricultural products and thereby potentially varying handling needs, volumes, and destinations. This would ensure that all needs are considered when compiling infrastructure investment recommendations.

The North Carolina Department of Agriculture and Consumer Services assisted in identifying stakeholders and representatives who participated in a workshop. Invitations were sent to:

- Butterball
- North Carolina Peanut Growers Association
- Corn Growers Association of North Carolina
- North Carolina Potato Association
- Cotton Growers Cooperative
- North Carolina Small Grain Growers Association
- Corn Products International, Inc.
- North Carolina Soybean Producers Association
- North Carolina Certified Sweet Potato Seed Growers Association
- North Carolina Sweet Potato Commission
- North Carolina Commercial Flower Growers Association
- North Carolina Winegrowers Association
- North Carolina Cotton Producers Association
- Southern Textile Association
- North Carolina Growers Association
- Tobacco Growers Association of North Carolina
- North Carolina Nursery and Landscape Association

### **Manufacturing Industry - GTP**

The list of manufacturing industry representatives was compiled primarily from online directories and company websites, as well as from recommendations of large companies from the Economic Developers Workshop. The invitees were industry association representatives as well as large regional companies that would have a need for large shipments of goods potentially by rail to the Port of Morehead City. Companies that specialize in 3D printing and pharmaceuticals were invited because these industries could be strong candidates for locating at the GTP. In addition, larger companies located near the Kinston area were invited with the goal of understanding why they located in the region, what works well for them, and whether they would consider expanding or potentially using the GTP. Invitations were sent to:

- 3D Systems
- Advanced Machine & Fabrication, Inc.
- Best Diamond Packaging
- CompMillennia
- Corning Incorporated
- Manufacturers and Chemical Industry Council of NC
- Moen
- Moroil Technologies
- CRP USA
- Douglas Fabrication & Machine, Inc.
- Electrolux
- Norag Technology, LLC
- North Carolina Retail Merchants Association
- Ferree Trailers
- Fiberline
- NCSU Laboratory for Additive Manufacturing and Logistics
- Field Controls LLC
- Foothills Bio-Energies
- General Electric
- National Association for the Sewn Products Industry
- Southern Textile Association
- The Heavy Duty Manufacturers Association
- Sulzer
- Keihin Carolina Systems Technology, Inc.
- West Pharmaceutical Services, Inc

### **Aviation/Military Industry**

The list of aviation and military industry representatives was compiled primarily from online directories and company websites. Large aerospace companies from across the state were invited in case they were considering expanding or operating out of another location like the GTP. The defense industry was also included and representatives were invited from a number of military-related interest groups. In addition, contacts that the client team recommended and those suggested by economic developers were included. Invitations were sent to:

#### **Aerospace Companies and Associations**

- AAR
- Purolator Advanced Filtration
- Carolina Aviation Professionals Association

- Raytheon
- Cessna
- Spirit AeroSystems, Inc.
- Commerce Overseas Corporation
- TIMCO Aviation Services, Inc
- General Electric
- Triumph Actuation Systems
- Honda Aircraft Company
- NC Space Grant
- UTC Aerospace Systems

#### **Military Associations**

- Institute for Defense and Business
- North Carolina Aerospace Alliance
- North Carolina Defense Business Association
- North Carolina Aerospace Initiative
- North Carolina Military Business Center
- North Carolina Agricultural Aviation Association
- North Carolina Airports Association
- North Carolina Military Foundation
- Partnership for Defense Innovation
- UNC Partnership for National Security

#### **Manufacturing Industry, Port of Morehead City**

The list of manufacturing industry representatives for the Port of Morehead City was compiled primarily from online directories and company websites and known Port users. The invitees were local shippers that are within close proximity to the Port. Invitees did not necessarily have a connection to the GTP. Invitations were sent to:

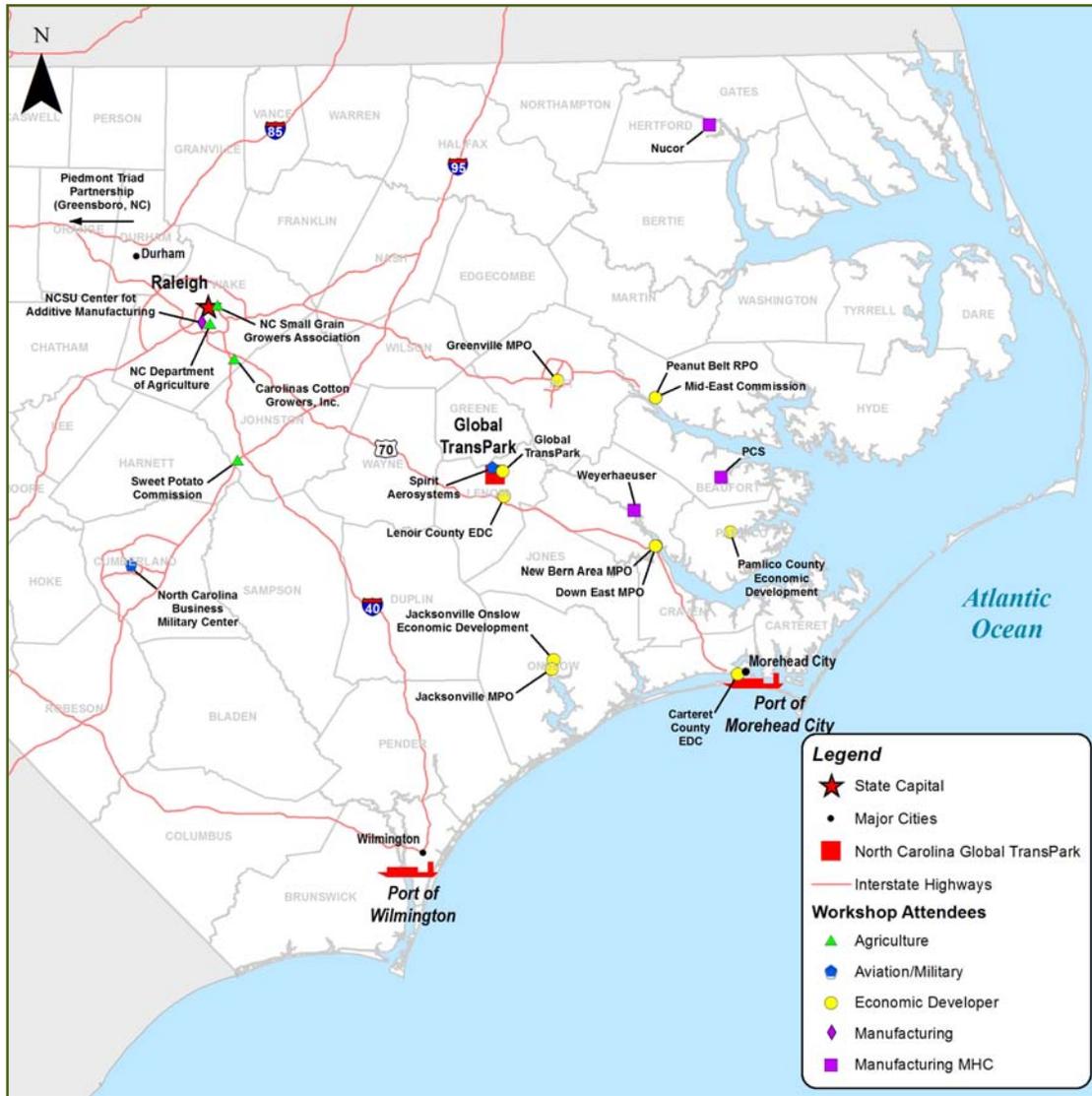
- Archer Daniels Midland Company
- Cargill
- International Paper
- Kimberly-Clark Corporation
- North Carolina Chamber of Commerce
- Nucor Steel

- PotashCorp (PCS)
- Weyerhaeuser

**Workshop Attendees**

Exhibit 3-2 below shows the spatial distribution by location of the workshop attendees and the workshop they attended.

*Exhibit 3-2: Workshop Attendees by Location*



Source: AECOM GIS

Workshops began with introductions of the client and consultant teams and then the participants. A short PowerPoint presentation was given to highlight the history of the studies and region as well as some information on how the assets have been underperforming versus expectations. From there, the main topics were covered, including:

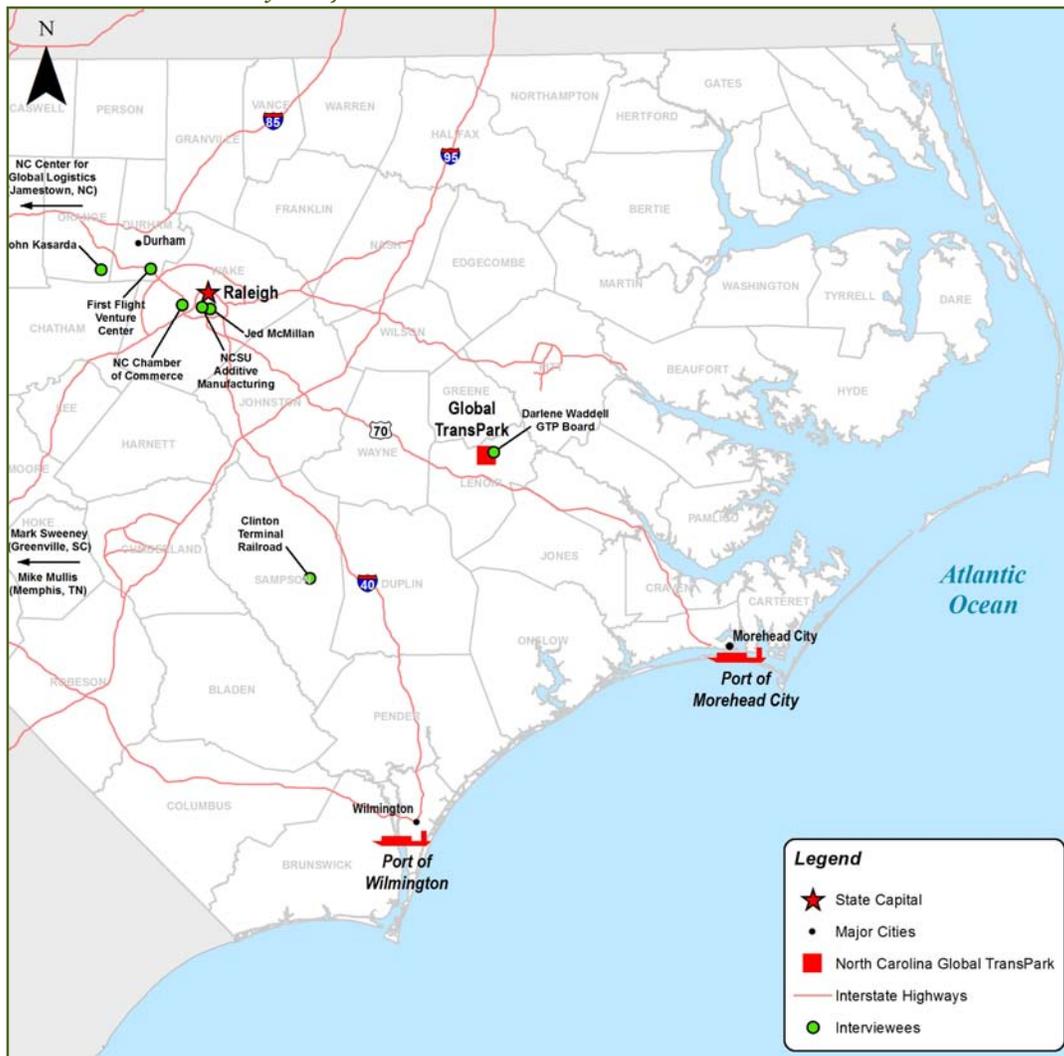
- Client/customer/firm/agency/business needs

- Current conditions facing businesses
- Attractive qualities of GTP and the Port
- Impediments to growth

The discussion was structured to allow attendees to share individual experiences, concerns, business needs and any other relevant issues pertaining to the facilities' use. In addition, they recommended documents that would inform the study and other stakeholders who would be ideal interviewees. In addition, many workshop attendees took the opportunity to network with others in their industry and exchange contact information.

In addition, a total of 10 interviews were conducted for the study in-person or through conference calls. Most of the interviewees were recommended by the client group or referred by workshop attendees or other interviewees. A map of the locations of the interviewees is shown in Exhibit 3-3.

**Exhibit 3-3: Locations of Study Interviewees**



Source: AECOM GIS

## Outreach Findings: Global TransPark and the Port of Morehead City

A number of themes emerged through the workshops and interview conversations. The findings concern the economic context surrounding the two facilities—the Global TransPark and the Port of Morehead City—as much as they do the individual facilities themselves. These findings can be broadly broken down into seven topics, as discussed below.

**Capacity.** No immediate specific capacity need was identified through the outreach. No stakeholder group reported that “but for investment in a particular asset, they would locate or expand at the Global TransPark or locate in North Carolina and utilize the Port of Morehead City.” Rail costs were identified as a constraint at the GTP, but the costs were not driven by congestion but rather low volumes that make the location costly to serve.

**Labor force.** The size of the available labor force is a challenge for prospective employers and those considering expansion, but can be overcome. The skillset of the labor force and training facilities in the region are well regarded and not an impediment to growth. The labor force concern is simply tied to the number of potential workers.

The state and local Jacksonville Onslow Economic Development agency are independently developing information to address the “sufficient workforce” concern that prospective employers have. They have each begun to document the number of military personnel serving in Eastern North Carolina who are leaving military service and entering the civilian workforce. Standard labor counts that are often used by site selection firms do not account for these potential highly trained employees. Currently, most military personnel transitioning to civilian jobs leave the region. The data developed by the state and local development agency allow GTP and local development organizations to directly address the workforce size issue.

**Location.** The GTP was located in Eastern North Carolina, in part to draw economic activity to this part of the state. As the region has a smaller population base than the central part of the state, the potential development gains at this location may be slower to be realized and be scaled to size of the overall region’s available labor resources.

The role of incentives in attracting new businesses to this region of the state was mentioned in multiple interviews. Several people interviewed for this study mentioned that during past selection processes, the GTP site has made it to the short list of candidate sites (demonstrating that it has competitive strengths) but not ultimately selected because other states offered greater financial incentives or conducted research that permitted them to offer more tailored proposals. For example, Caterpillar established operations in Georgia, and Boeing chose to stay in Washington and to additionally locate in South Carolina.

**Timing.** The master plan for the Global TransPark has not been fully realized. Rail and highway infrastructure was not planned and designed from the start. The addition of the rail spur and highway supports future opportunities, but its early absence in the GTP’s history has tempered past growth opportunities. Other industrial parks, including the RTP, developed over time to become successful after strategic investments were made. While RTP has a research focus, rather than a logistics one, it is also an example of a successful state development initiative and it is useful that it took time to realize this success. GTP was beginning to gain momentum prior to the recession, but the long national contraction in 2009, from which the U.S. is still recovering in 2014, reduced industrial investment and associated expansion opportunities nationally, in turn reducing potential pursuits for the GTP.

**Marketing.** Public perception of the GTP and the Ports came up in discussions in two contexts—visitors’ perception of the physical condition of the facilities and the public’s broader understanding of the role of the two facilities.

- **Global TransPark.** Although the facility is currently in a state of good repair, with recent budget cuts, keeping the facility in a state of good repair will be challenging. The physical condition of the facility is an important part of visiting executives’ first impression when considering relocation. Potential relocating firms are sensitive about their firm’s image and will seek locations for investment that align with the firm’s image and brand.

GTP would benefit from marketing resources that address two audiences: the broader business community seeking a site for expansion or relocation, and one internal to North Carolina. The facility’s staff is skilled and energetic. Additional marketing resources will increase the number of leads that can be pursued. A marketing or public information campaign within North Carolina would offer the opportunity to clarify its role within the state’s broader economic development initiatives and highlight that it has attained several notable successes.

- **Port of Morehead City.** The physical condition of the Port has improved in recent years. The Port has invested several million dollars to replace the entrance gate to facilitate additional queuing, helping to remove trucks from the roadway and improve relations with residents of nearby condominiums. Continued investments are required to maintain buildings and bulkheads in a state of good repair.

Local stakeholders contacted for the study expressed a continued desire for information about operations at the Port and how these benefit Morehead City. For example, there was interest in knowing what ships visited the Port week to week and other information that would allow the local community to understand and feel more connected to the Port’s activities. Tenants expressed a desire for more frequent information about operations at the port and activities of other tenants.

# Evaluation of the Wallace to Castle Hayne Rail Restoration

*When CSXT discontinued service between Wallace and Castle Hayne, it removed all track, structures, and ballast except for the Cape Fear River Bridge. The right-of-way (ROW) was acquired by NCDOT in 1994 and has been maintained since. While market conditions do not support restoration of rail service at this time, the project has strategic value to the military and agriculture interests. Moreover, logistics markets change frequently. Future developments along the corridor should be monitored as market conditions could evolve to where trade flows justify the W2CH restoration.*

## Introduction

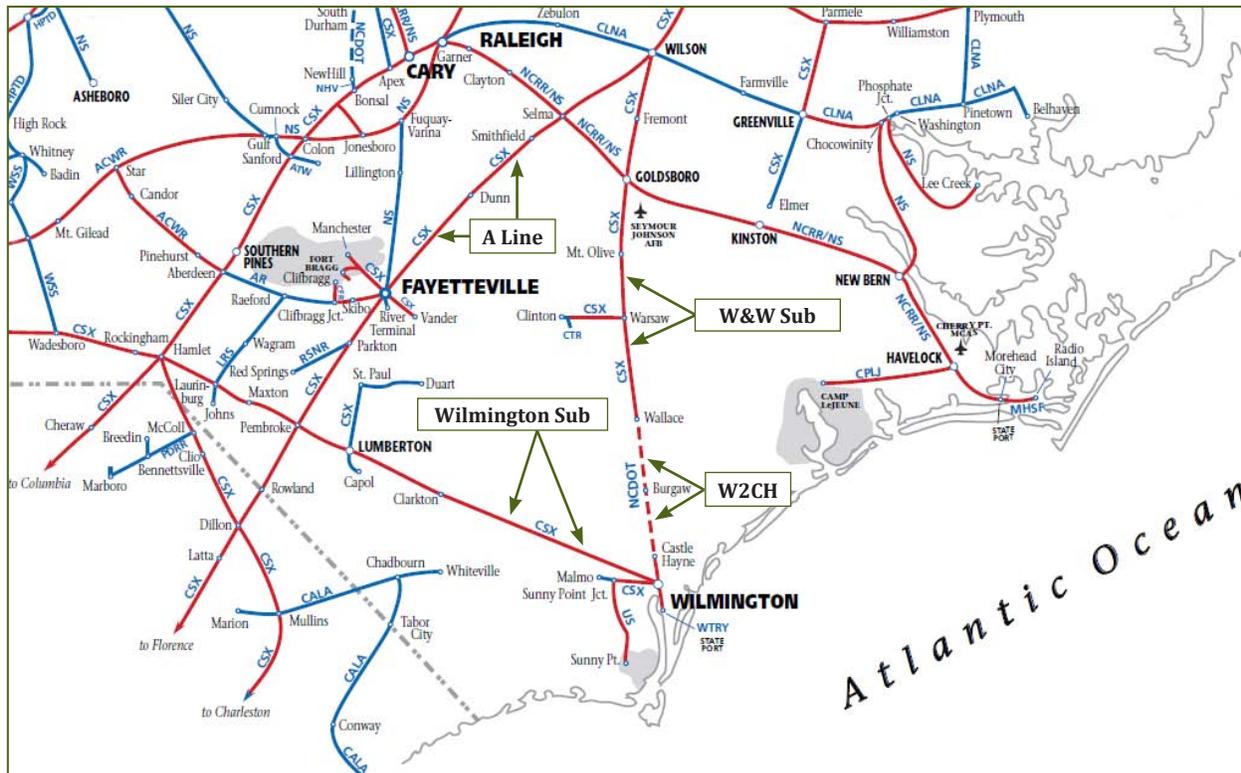
For more than 125 years, railroading was one of Wilmington's chief industries. In 1840 the Wilmington & Weldon Railroad (W&W) was completed. At the time it was the longest continuous rail line in the world at 161 miles. During the Civil War, the W&W was a critical rail link along the Atlantic coast, playing a vital role transporting war materials brought into the Port of Wilmington through the Union blockade. A large portion of the supplies that reached Confederate forces in Virginia traveled over the W&W. For this reason, the railroad became known as the "lifeline of the Confederacy." The capture of Fort Fisher and Wilmington closed this essential supply route and hastened the end of the war. In the late 1800s several railroads on the eastern seaboard (including the W&W) merged to become the Atlantic Coast Line Railroad (ACL), which was headquartered in Wilmington. During this time the Atlantic Coast Line's north-south main line went from Weldon to Wilmington. Because competition had developed from shorter, more direct routes to the south, the extra miles to Wilmington were increasingly viewed as an impediment to growth. A new direct line was planned from Wilson (at Contentnea) to Florence, South Carolina, passing through Fayetteville. This "Fayetteville Cutoff" was finished in 1892, in spite of opposition from the town of Wilmington and provided a route that was 61 miles shorter to points south compared to the W&W. This eventually became known as the "A-Line." Over time, the more circuitous W&W route experienced significant traffic reductions. CSXT Transportation, the eventual successor to the ACL, consolidated the traffic to and from Wilmington to a single line, the Wilmington Subdivision, which accesses Wilmington via Pembroke and Hamlet. By the last year of active operations on the W2CH segment, 1984, only 160 carloads moved over the line. In 1986, CSXT discontinued service along the 27 miles of the W&W from Wallace to Castle Hayne (W2CH), although the remaining line north of W2CH between Wilson and Wallace is still known as the W&W Subdivision. When CSXT discontinued service along the W2CH segment, it removed all track, structures, and ballast except for the Cape Fear River Bridge. Today, only the right-of-way (ROW) remains intact. In 1994 the North Carolina Department of Transportation (NCDOT) acquired the rail corridor and has maintained the right-of-way since.

While service on the W2CH line has been discontinued, the W&W Subdivision north of W2CH remains an important component of the CSXT rail network. The line is primarily used for shipments of grain from the Midwest to hog and poultry producers in Duplin, Wayne, and Sampson Counties, although CSXT handles manifest freight (trains of mixed freight) in the area as well. In 2013–2014, CSXT invested approximately \$1.5 million on the Rose Hill Bridge on the W&W subdivision to accommodate these grain movements.<sup>8</sup> The largest shipper near Castle Hayne is an aggregates plant, which is accessed by the remaining 13 mile CSXT rail line between Wilmington and Castle Hayne.

*When CSXT abandoned the right-of-way, the company removed all track and structures, except for the Northeast Cape Fear River Bridge.*

<sup>8</sup> Comments of CSXT Transportation, Inc., June 26, 2014, STB Ex. Parte 661 (Sub-No. 1), Rail Transportation of Grain Rate Regulation Review.

**Exhibit 4-1: Rail Network of Eastern North Carolina**



**Source: PB annotation of NCDOT Rail Division map**

In 2004, NCDOT Rail Division published the *Economic Feasibility Study for the Restoration of Wallace to Castle Hayne Rail Corridor and Associated Port/Rail Improvements*. The purpose of the study was to assess the technical and economic feasibility of restoring the W2CH segment as part of a study to extend rail passenger service from Raleigh to Wilmington.

**Overview and Study Objectives**

The restoration and reactivation portion of this study for the Wallace to Castle Hayne corridor seeks to meet the requirements set forth by SB 402. The focus of this study is to evaluate the technical feasibility of the W2CH restoration, the likely demand for freight rail service over the corridor, and the strategic value of the project to the state and to specific stakeholders.

The analysis of market demand estimates the volume of freight rail traffic the W2CH would handle following the restoration. It serves to determine the economic basis of the project. The market analysis identified three uses of the W2CH: (1) by shippers located on the corridor, (2) as a shortcut between Wilmington and points north on CSXT, (3) as a reserve rail line for the U.S. military and Wilmington area shippers in case of service outage on the Wilmington Subdivision. Future traffic levels were forecast for each of the three uses listed above. Traffic forecasts were developed using freight flow databases, commodity supply and demand forecasts, as well as numerous stakeholder interviews.

The process to evaluate the technical feasibility of the corridor included physical inspections, reviewing previous studies and records, and determining the relevant performance standard by which the rail line would be rebuilt. A field inspection was conducted to acquire details about the current conditions of the W2CH corridor. The findings were used to develop a conceptual layout of the corridor. Based on the conceptual layout and existing conditions, project costs were estimated. In addition,

likely operating scenarios were explored to investigate the implementation issues that would likely need to be addressed for service to be reactivated, and therefore impacts to the rail network in Eastern North Carolina.

Using the findings of the market demand analysis and cost estimation, the strategic value of the project was assessed. A benefit-cost analysis and estimation of economic impacts were conducted. The benefit/cost analysis gauged whether expected benefits exceed the projects' costs. Other non-quantifiable benefits as well as advantages of the project to specific stakeholders that would not be considered "benefits" for a benefit/cost analysis were also identified and described. The final step of the W2CH assessment explored various funding alternatives that could be leveraged in support of the project.

*W2CH alone will not increase railroad competition in the Wilmington area.*

## Market Assessment

In assessing the impact of restoring the Wallace to Castle Hayne (W2CH) segment on freight traffic in eastern North Carolina, it is important to consider the potential benefits that the segment could provide to shippers and other stakeholders. Benefits would vary by shipper geography and shipping/receiving patterns. Logically, these would fall into several categories.

- **Local Rail Service.** For those shippers that are physically located on the 27-mile inactive W2CH corridor, the reactivation of the rail line could enable shippers that had not had the option before to use rail service to do so.
- **Shortcut.** For those shippers that receive or ship goods between the Wilmington area and points north and northeast, the W2CH could enable a more direct rail connection than would otherwise be possible.
- **Redundancy.** For all current Wilmington area rail shippers, the W2CH segment would enable a second access line between the Wilmington area and the remainder of the U.S. rail network. This could benefit shippers in case of an outage on the Wilmington Subdivision due to a weather event, train derailment, or other blockage.

As shipment patterns in eastern North Carolina are constantly changing, it is useful to assess existing freight as well as emerging opportunities. It is also worthwhile to consider what the W2CH project would not accomplish. Connections to the W2CH line would be to the CSXT network. Line restoration alone would not provide a second rail carrier or dual access.

### Local Rail Service

In order to assess potential locations that could benefit from the W2CH restoration, the North Carolina Department of Transportation (NCDOT) purchased the Freight Locator database by IHS Global Insight. The Freight Locator database provides estimates of freight tonnage generated and consumed by specific establishments. The estimates are based on the employment, square footage, industry classification, and estimated revenues of each establishment. Establishments were assessed for their proximity to the W2CH corridor and the likelihood that these establishments would use freight rail transportation. Exhibit 4-2 below displays those establishments that generate/consume significant volumes of freight and for which the W2CH is the closest rail corridor.

*Exhibit 4-2: Establishments for which W2CH is the Closest Rail Corridor*

Company	Industry	Town	Inbound Tons	Outbound Tons	Total Tons	Distance to W2CH
S & W Ready-Mix	Lumber and Other Building Materials Dealers	Wallace	547	58,707	59,254	0.00
W R Rayson Co	Converted Paper and Paperboard Products, NEC	Burgaw	1,427	2,688	4,115	0.06
Wilmington Box Co	Corrugated and Solid Fiber Boxes	Burgaw	1,199	7,150	8,350	0.11
H & P Wood Turnings Inc	Wood Products, NEC	Rocky Point	447	864	1,310	0.12
D & H Marketing Inc	Groceries, General Line	Burgaw	3,312	43,317	46,629	0.46
Lewis Sausage Co	Meat Packing Plants	Burgaw	27,070	2,885	29,954	0.46
American Skin LLC	Food Preparations, NEC	Burgaw	10,683	12,253	22,937	0.46
White Tractor Co Inc	Farm and Garden Machinery and Equipment	Burgaw	2,676	13,923	16,599	0.46
Johnson Nursery Corp	Flowers, Nursery Stock, and Florists' Supplies	Willard	5,739	854	6,593	0.80
Nash Equipment Co	Farm and Garden Machinery and Equipment	Burgaw	1,791	101	1,892	0.81
LL Building Products Inc	Asphalt Felts and Coatings	Burgaw	134,396	57,913	192,310	1.71
Burgaw Creek Nursery & Turf	Flowers, Nursery Stock, and Florists' Supplies	Burgaw	1,931	109	2,040	2.33
International Paper Co	Paper Mills (except newsprint mills)	Burgaw	10,958	10,842	21,800	2.64
Lewis Nursery & Farms	Fresh Fruits and Vegetables	Rocky Point	18,891	3,358	22,250	3.24
North American Nursery Inc	Flowers, Nursery Stock, and Florists' Supplies	Burgaw	1,267	14,679	15,946	3.57
Pender Packing Co Inc	Meats and Meat Products (boxed beef)	Rocky Point	3,330	34,443	37,773	3.98
Clark's Sausage & Pork Outlet	Meat Packing Plants	Rocky Point	6,739	1,464	8,203	4.22
Robbins Nursery	Flowers, Nursery Stock, and Florists' Supplies	Willard	1,959	145	2,104	4.51
Tri State Land & Timber LLC	Lumber, Plywood, Millwork, and Wood Panels	Watha	1,572	13,758	15,331	9.17
Inter-Continental Hardwoods	Lumber, Plywood, Millwork, and Wood Panels	Currie	3,782	520	4,302	9.40
Shelter Creek Quarry LLC	Construction Sand and Gravel	Maple Hill	2,456	455	2,911	11.80

Source: Freight Locator Database

*Optimistically, existing shippers on the W2CH corridor diverting to rail would generate about 5,000 tons of freight per year.*

In reviewing these establishments as potential users of the W2CH, ideally the establishments should be located in very close proximity to W2CH. Otherwise, it would be costly to build a rail spur, or secondary rail line, into the location. While some of

the freight volumes shown in Exhibit 4-2 are significant, these volumes would generally not justify building a long rail spur. The savings that shippers would derive from using rail would not justify a very costly capital expenditure. Therefore, only those businesses within 0.25 miles of the W2CH segment are considered likely to use the W2CH segment. Furthermore, not all establishments would be likely to make use of rail for inbound or outbound shipments. Rail is generally used for shipping dense, low value commodities, and/or used for long distances. Of the establishments listed above, only S&W Ready Mix, Wilmington Box Co, and H&P Turnings were considered potential users of the W2CH segment. The study team attempted to contact each of these establishments. One indicated that the company would not use rail in its existing supply chain but could use rail for potential new businesses. Optimistically, these new opportunities would generate around 5,000 tons of freight per year. No other opportunities were uncovered as the other two rely solely on truck transportation.

New businesses could also locate on the W2CH segment. According to the North Carolina Department of Commerce, the agency only markets sites that already have rail access to prospective employers that need rail access. Therefore, developable sites along the corridor have not been marketed to companies in need of rail services. The study team spoke with local economic development experts, including a representative of Pender County Planning, as well as Wilmington Business Development, which represents New Hanover and Pender Counties. No specific sites or opportunities were identified on the W2CH corridor. Several major regional industrial projects are underway or planned, but these are not located on the W2CH corridor.

*No specific industrial opportunities were identified for the W2CH corridor.*

For the purpose of this study, 5,000 tons per year provides a base year optimistic scenario. Under a pessimistic scenario, there is no local freight traffic on the 27-mile W2CH segment. Under a medium scenario, local traffic on W2CH is 2,500 tons per year. To forecast increases in local traffic, projections from the U.S. Federal Highway Administration’s Freight Analysis Framework (FAF-3) were used; this process utilizes Commodity Flow Survey data and additional sources to provide a comprehensive model of freight movement among states and metropolitan areas. Local traffic is assumed to grow at the same rate as overall rail traffic to and from North Carolina, excluding coal traffic.

**Exhibit 4-3: Forecast Tonnage of Local Freight under High, Medium, Low Scenarios**

Year	Scenario		
	Low	Medium	High
2014	0	2,500	5,000
2020	0	2,777	5,553
2025	0	2,969	5,938
2030	0	3,157	6,182
2035	0	3,202	6,403
2040	0	3,334	6,668

Source: PB forecast of utilizing FAF-3 data

**W2CH as a Shortcut**

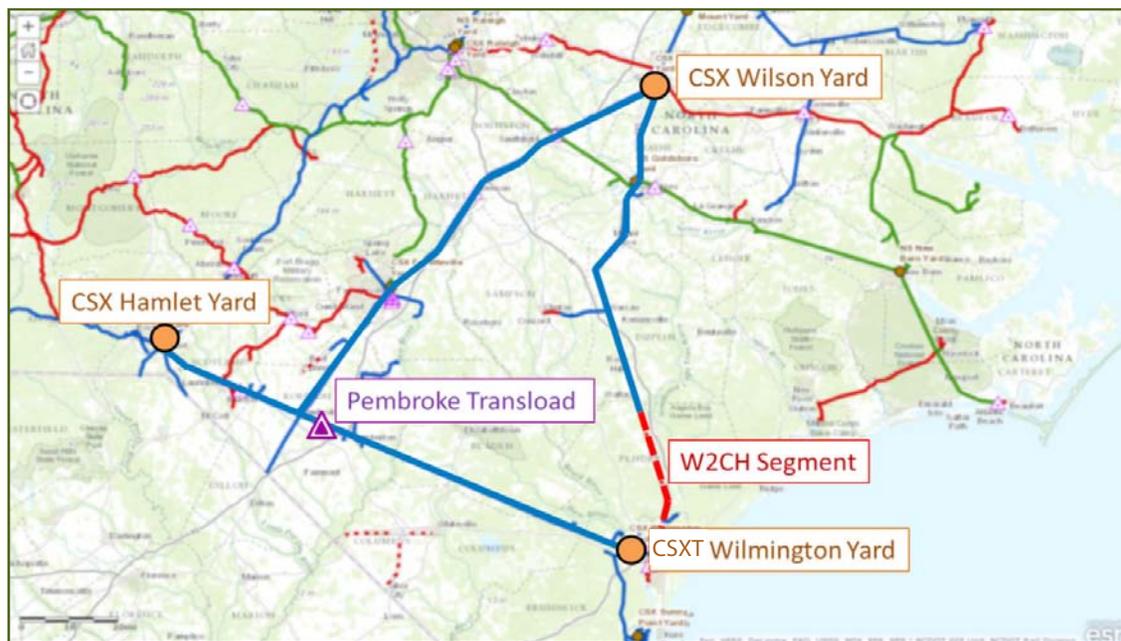
Theoretically, the W2CH segment could provide a more direct routing between Wilmington and points north and northeast. For any freight that would travel between Wilson/Contentnea and the Wilmington area, routing freight directly over the W&W Subdivision (including W2CH) is about 68 miles shorter than routing freight between the Wilson/Contentnea and the Wilmington area via Pembroke. W2CH allows freight to travel along the hypotenuse of a triangle rather than along two shorter legs.

Much of the freight between the Wilmington area and points north and east today currently flows through Hamlet. Freight travels between Wilson/Contentnea and Pembroke, then travels westward to Hamlet, and then back through Pembroke to Wilmington. If this circuitous routing were avoided, the distance savings would be about 141 miles.

Freight trains in which all cars proceed from the same origin to the same destination without being stored or split up are referred to as “unit trains,” while trains that consist of a mixture of car types and cargoes with different origins/destinations are referred to as “manifest” trains. During meetings with CSXT, the company asserted that most manifest traffic to and from the Wilmington area is necessarily handled by the classification yard in Hamlet to the west. Therefore, Wilmington freight that would likely cross the W2CH segment would be unit train movements that would not travel to Hamlet. Manifest freight proceeds to or from the Hamlet Yard on the Wilmington Subdivision. Exhibit 4-4 displays CSXT yards in eastern North Carolina.

*The W2CH corridor saves 68 or 141 miles, depending on the current routing of freight.*

**Exhibit 4-4: Rail Network of Eastern North Carolina**



Source: NCDOT

*Historically, most freight moving to or from Wilmington in unit trains was coal.*

**Potential of Existing Freight to Use W2CH as a Shortcut – STB Waybill**

The U.S. Surface Transportation Board (STB) Carload Waybill Sample was used to assess freight traffic that would likely be impacted by W2CH. The Waybill Sample is a stratified sample of carload waybills for all U.S. rail traffic submitted by those rail carriers terminating 4,500 or more revenue carloads annually. This confidential file was provided by the STB to NCDOT, which in turn made it available to the consulting team. Information in this report is presented at a level of aggregation that maintains confidentiality. The most recently available version of the Waybill Sample was from 2011, although the NCDOT also provided earlier year versions of the Waybill Sample going back to 2004.

Theoretically, the W2CH project would impact freight between the Wilmington area and those origins/destinations whereby the route between the Wilmington and Goldsboro (W&W Subdivision), including W2CH, would be the shortest route. For the purposes of this analysis, the Wilmington area is defined as New Hanover, Brunswick, and Columbus Counties.<sup>9</sup>

One logical question to ask is whether the Wilmington area is currently served by unit trains. During the drought of 2012, grain ships were unloaded at the Port of Wilmington and shipped inland in trainload quantities. A review of the 2010 and 2011 STB Waybill Samples reveals that the overwhelming majority of unit train movements to and from the Wilmington area during those two years were coal. Eighty percent of these were associated with the Duke Energy L.V. Sutton coal fired power plant, which was decommissioned and converted to natural gas power in 2013. Much of the other 20 percent was associated with the Capitol Power plant in Southport. This plant has largely converted to wood residuals and tire-derived fuel sources, although it still receives coal shipments. However, the coal origins are in the Appalachian region, and these shipments would not be impacted by the W2CH rehabilitation. The Waybill Sample also records several unit trains of crushed stone terminating in the area, but these originated near Hamlet, so would be unlikely to use the W&W Subdivision. While new agricultural shipments could create new unit train opportunities, the usage of unit trains based on historic traffic patterns is minimal. Emerging trends in agricultural transportation and how this will impact W2CH will be discussed in a subsequent section.

Although most manifest freight is handled through Hamlet, it is the study team’s understanding that this is not necessarily universal. Some manifest freight between Wilmington and points northward may move between Wilmington and the “A-Line” through Pembroke without being handled at Hamlet. Also, CSXT provides local manifest service to shippers on the W&W Subdivision north of W2CH by trains that bring cars to/from the Rocky Mount Yard. The W2CH segment could provide a more direct connection for a portion of manifest freight that travels between Wilmington and points northeast, such as along the CSXT “I-95 Corridor.” The STB Waybill Sample was analyzed in order to assess freight that travels between the Wilmington area and the I-95 Corridor. Of the 25,456 carloads that originated in the Wilmington area in 2011 and the 35,834 carloads that terminated in the Wilmington area that year, a relatively small portion originated or terminated along the I-95 corridor north of Goldsboro.

**Exhibit 4-5: Destinations of Freight from the Wilmington Area to the I-95 Corridor**

BEA	Carloads	Tons
Bangor, ME	120	11,640
Boston-Worcester-Lawrence-Lowell-Brockton, MA-NH-RI-VT	120	10,480
New York-No. New Jersey-Long Island, NY-NJ-CT-PA-MA-VT	680	52,800
Philadelphia-Wilmington-Atlantic City, PA-NJ-DE-MD	680	54,000
Washington-Baltimore, DC-MD-VA-WV-PA	640	51,200
Greensboro, NC	200	20,520
<b>Total</b>	<b>2,440</b>	<b>200,640</b>

Source: PB analysis of STB Waybill data

<sup>9</sup> Lines of the Carolina Southern (CALA) Railroad also enter Columbus County and are accessed from South Carolina, but no freight associated with this railroad is recorded in the Waybill Sample.

**Exhibit 4-6: Origins of Freight to the Wilmington Area from the I-95 Corridor**

BEA	Carloads	Tons
Boston-Worcester-Lawrence-Lowell-Brockton, MA-NH-RI-VT	80	400
Philadelphia-Wilmington-Atlantic City, PA-NJ-DE-MD	40	3,920
Richmond-Petersburg, VA	120	11,200
Raleigh-Durham-Chapel Hill, NC	36	816
<b>Total</b>	<b>276</b>	<b>16,336</b>

Source: PB analysis of STB Waybill data

Combining the results of Exhibits 4-5 and 4-6, a total of 216,976 tons could have been carried over the W2CH segment in 2011 as a shortcut. As mentioned previously, most manifest freight to/from the Wilmington area currently flows through the Hamlet Yard and would probably not use W2CH even if the W&W Subdivision were a more direct route. Therefore, under a pessimistic scenario, none of this freight would divert to the W2CH segment. Under an optimistic scenario, CSXT operations in eastern North Carolina fundamentally change as a result of the W2CH restoration, and freight between Wilmington area and points northeast is handled by another yard, such as in Rocky Mount. Thus, all freight with more direct routing would utilize the W2CH segment. Under a medium scenario, half of the freight between Wilmington and the I-95 Corridor diverts to the W2CH corridor. FHWA FAF-3 forecasts suggest that rail freight between North Carolina and areas on the I-95 Corridor will likely decline rather than increase in the future. This forecast is applied to 2011 traffic levels. The resulting forecasts are shown in Exhibit 4-7.

**Exhibit 4-7: Forecast Rail Tonnage between Wilmington Area and I-95 Corridor under High, Medium, Low Scenarios**

Year	Low	Medium	High
2014	0	102,400	204,800
2020	0	105,188	210,376
2025	0	105,305	210,610
2030	0	102,475	204,949
2035	0	99,833	199,666
2040	0	96,196	192,391

Source: PB forecast of utilizing FAF-3 data

In conclusion, there is some uncertainty over whether any manifest freight would use the W2CH segment even if it were the most direct routing, given that most manifest freight to/from Wilmington is classified at Hamlet. But if W2CH were restored, CSXT operations in the area could change. Sections of the W&W Subdivision north of W2CH are served by trains that take cars to and from the Rocky Mount Yard. The territory covered by these trains could theoretically be extended to Wilmington if the W2CH were restored. Due to the uncertainty, a range of possible alternatives have been presented.

**Potential of Existing Military Shipments to Use W2CH as a Shortcut**

Military installations in eastern North Carolina include Fort Bragg, Camp LeJeune, Seymour-Johnson AFB, Camp Mackall, Pope AFB, MCAS's at Cherry Point and New River, as well as Coast Guard facilities in Elizabeth City. These bases provide vital assets to the North Carolina economy.

Of these bases, the most direct potential user of a restored W2CH rail line would be the Military Ocean Terminal Sunny Point (MOTSU) along the west bank of the Cape Fear River in Brunswick County. Four hundred containers of ordnance are listed as inbound to MOTSU in the 2011 STB Waybill, but this does not include all MOTSU shipments. The STB is required to only release as much information on military shipments as the Military Transportation Management Command (MTMC) consents to. MOTSU supplies ordnance to military depots around the nation. According to representatives of the military, an average 5,000 containers and 1,550 carloads of freight move between MOTSU and U.S. Military depots per year. Of these, 95 percent move in unit trains, while 5 percent move in manifest trains. Of the 10 depots around the nation, 2 (Letterkenny Army Depot, PA, and Tobyhanna Army Depot, PA) are located in the Northeast. If all 10 depots were shipped the same volume ordnance, then theoretically about 1,000 containers and 310 carloads would be impacted by the W2CH project. From individuals familiar with shipments through the Port of Wilmington, existing usage of the port by the Department of Defense is minimal. Data from the STB Waybill Sample for North Carolina suggests that the typical container of military hardware weighs around 14 tons, while the typical railcar weighs around 85 tons. Applying these average weights to the 1,000 containers and 310 carloads listed above, the total expected tonnage is about 40,350. MOTSU tonnage is expected to remain constant and be the same under high, medium, and low scenarios. Additionally, the Department of the Army's Military Surface Deployment and Distribution Command (SDDC) Transportation Engineering Agency (TEA) places significant importance on the restoration of W2CH. The significance of W2CH to the U.S. Military is further discussed in the strategic value section of the report.

*If all 10 depots served by MOTSU were sent the same volumes, then theoretically, about 1,000 containers and 310 carloads per year would be impacted by W2CH.*

#### **Potential Usage of W2CH by Shippers in Sampson, Wayne and Duplin Counties**

The potential rehabilitation of the W2CH corridor has aroused significant interest in shippers in Sampson, Wayne, and Duplin Counties as a more direct route to the Port of Wilmington. But these locations are in relatively close proximity to Wilmington, only about 40 miles between Wallace and Wilmington and 109 miles between Wilson/Contentnea and Wilmington. The relative economics between rail and trucking improve for rail over longer distances. According to the Association of American Railroads, the average railroad length of haul in 2012 was about 973 miles. A number of the cost components of rail moves relate to neither tonnage nor distance shipped, but are incurred at the outset of a rail move, whether a railcar is moved 10 or 1,000 miles.

Rail transportation is also subject to the economics of shipment volumes. It is far less expensive per ton to ship an entire trainload of a given commodity than to ship a single carload. In order to ship a carload, a railroad must gather each individual car, consolidate cars into a train. Trains are then broken down and reassembled at intermediate classification yards. Then, individual carloads are delivered to an industry. If the same train consist (i.e., the individual train makeup of locomotive(s), cars, and equipment) can travel back and forth between two locations as a unit, costs are much lower and transit time is significantly reduced.

The U.S. Surface Transportation Board (STB) maintains the Uniform Rail Costing System (URCS), a software package that is used to determine whether the STB has jurisdiction over railroad rates. The inputs for this software package are derived from detailed reports supplied by all Class I railroads operating in the United States. Below are a series of cost estimates derived

from the URCS software package using CSXT data for 2012. One column includes the variable cost of shipping a single carload, assumed to contain 108 tons of grain in railroad-owned equipment. Another column shows the variable cost of shipping a 90-car unit train of grain with each car being railroad-owned and containing 108 tons of grain. Additional columns provide the cost per ton-mile of the same carload and unit train shipments.

As reference, the right-hand column provides the average marginal cost per ton-mile shipping by truck. This is derived from a report by the American Transportation Research Institute (ATRI), the research arm of the American Trucking Associations (ATA). This report estimates that on average the marginal cost of operating a truck per mile in 2012 was \$1.599 in the Southeast region.<sup>10</sup> Analysis conducted in developing the Freight Analysis Framework (FAF) by the Oak Ridge National Laboratory estimated that the typical truck payload is about 22.7 tons.<sup>11</sup> Dividing average payload per truck suggests that the typical truck cost, rounded to the nearest penny, is about \$0.07 per ton-mile. But rail costs in URCS include the cost of empty movements embedded within the variable cost per loaded revenue ton-mile figures. Estimates in developing FAF suggest that total truck trips are approximately 128 percent of loaded truck trips. Therefore, accounting for empty trips, average truck cost per ton-mile would be around \$0.09 per ton-mile. To simplify, marginal and variable costs are assumed to be roughly equivalent measures, although URCS variable costs are those that vary by volume of freight shipped, while ATRI marginal costs represent the average incremental cost of operating a truck one mile.

**Exhibit 4-8: Comparison of Moving Covered Hoppers of Grain by Carload and Unit Train Service, Truck Variable Cost per Ton-Mile**

Mileage	Single Car		90 Car Unit Train		Truck Marginal Cost per Ton-Mile
	Variable Cost	VC per Ton-Mile	Variable Cost	VC per Ton-Mile	
20	\$917	\$0.42	\$17,188	\$0.09	\$0.09
40	\$982	\$0.23	\$20,888	\$0.05	\$0.09
60	\$1,046	\$0.16	\$24,587	\$0.04	\$0.09
80	\$1,111	\$0.13	\$28,287	\$0.04	\$0.09
100	\$1,175	\$0.11	\$31,986	\$0.03	\$0.09

Source: URCS data

The results shown in Exhibit 4-8 suggest that individual carload shipments between points on the W&W Subdivision and the Port of Wilmington would not be cost competitive with trucking. Shipping single railcars these distances would cost at least \$0.11 per ton-mile, while using trucking would cost \$0.09 per ton-mile. If freight were to be shipped by rail over the W2CH segment between Sampson, Duplin, Wayne or Pender Counties and the Port of Wilmington, these shipments would likely need to be shipped in unit train quantities to justify using rail over such a short distance. Therefore the potential market to/from Duplin, Pender, and Sampson and Wayne Counties for the W2CH segment is limited to those shippers that can ship/receive unit train quantities, even if the location of the CSXT classification yard in Hamlet were not an issue. Unit train shipments, on the other hand, may be competitive with truck transportation even over these short distances. Although the rail fig-

<sup>10</sup> American Trucking Associations, An Analysis of the Operational Costs of Trucking: A 2013 Update, September 2013.

<sup>11</sup> Oak Ridge National Laboratory, FAF<sup>3</sup> Freight Traffic Analysis, March 23, 2011, [http://faf.ornl.gov/fafweb/Data/Freight\\_Traffic\\_Analysis/faf\\_fta.pdf](http://faf.ornl.gov/fafweb/Data/Freight_Traffic_Analysis/faf_fta.pdf).

ures only reflect a single commodity shipped in a single car type, the relationships between unit train and carload rail service can be expected to be consistent across other commodities and car types as well.

A number of caveats apply to the relative economics shown in Exhibit 4-8:

*Rail service over the W2CH segment between the Wilmington area and shippers in Sampson, Duplin, Wayne or Pender Counties would be uneconomical for those that ship in carload quantities, but may be economical for those that ship in unit train quantities.*

- Exhibit 4-8 reflects relative costs, but shippers do not pay transportation costs. They pay transportation rates. If CSXT does not prefer to provide short haul service on the W2CH segment between Pender, Duplin, and Sampson Counties and the Wilmington area, the relative economics of truck and rail may become unhinged from the relative costs of truck and rail. The modal cost relationship could break down because trucking tends to be subject to higher competition between firms relative to railroad transportation, particularly in situations where an area is served by a single rail carrier, as is the case for the Wilmington area. According to the 2011 STB Waybill Sample for North Carolina, the average ratio of revenue to variable cost for shipments to, from, within, and through North Carolina was 216 percent. Trucking companies often operate at margins of only 5 or 10 percent between operating revenues and operating expenses, so the revenue to variable cost for truck transportation would be closer to 100 percent. In other words, rail rates may be much higher than a cost of service comparison would suggest, since railroads compete directly with each other less than do trucking firms.
- Furthermore, equipment availability may be an issue with railroad transportation. As an example, it may be unlikely for CSXT to hold a fleet of covered hopper grain cars available for a rail move in eastern North Carolina that is less than 100 miles.
- On the other hand, trucking economics are heavily driven by the availability of backhauls. If a trucking company can find freight in the opposite direction of a delivery, rates will be significantly lower relative to a situation where a truck makes a delivery and returns to a home base empty.

All of this adds significant uncertainty as to what would or would not be expected to divert to the W2CH corridor if it were reactivated. While this uncertainty is a factor, for the purposes of this study, the addressable market for shipments between the Wilmington area and Pender, Duplin, Wayne and Sampson County is assumed to include shippers that could ship in trainload quantities. Unless a shipper is prepared to ship in unit train volumes, rail will not be competitive with trucks over these short distances.

*Although the cost of providing rail service over the W2CH corridor may be competitive with trucking for unit train agricultural movements, this does not mean that the rate quoted for the service will necessarily be competitive.*

#### **Potential Usage of W2CH by Shippers in Sampson, Duplin, Wayne Counties – Agricultural Shippers**

Just to the north of the W2CH segment, Sampson, Duplin and Wayne Counties are large rail markets. As a member of the North Carolina Department of Agriculture and Consumer Services informed the study team, if North Carolina were a country, it would be the sixth largest grain importer in the world. Sampson, Duplin, and Wayne counties are centers of animal production within North Carolina. Typically, about 70 percent of the feed ration of these animals is grain, mostly corn. Another

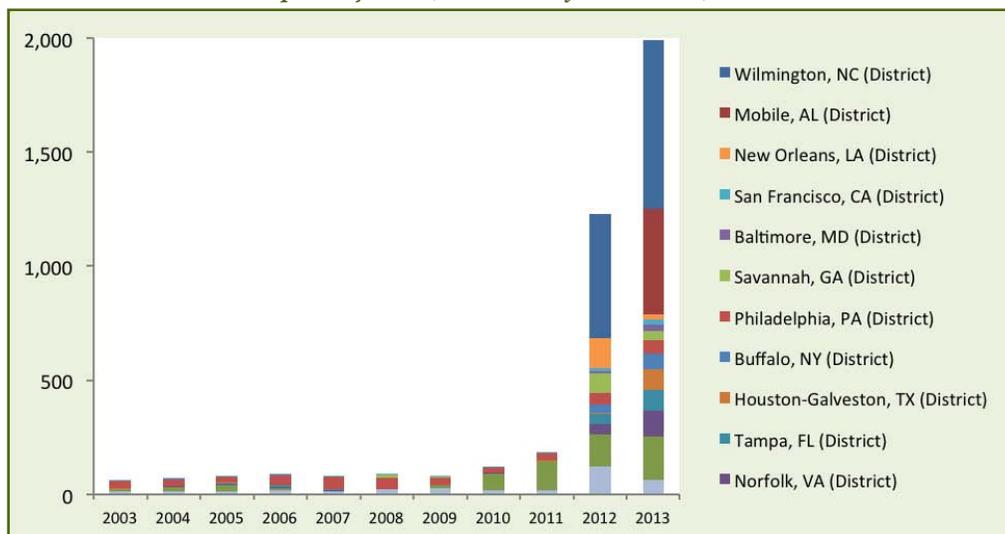
15–20 percent consists of soybeans or soybean meal, while the remaining 10–15 percent consists of various other ingredients. Traditionally, grain, soybeans, soybean meal, and other agricultural products to feed animal production in eastern North Carolina have been shipped by rail in unit trains from the Midwest. But in 2003, a grain handling terminal was constructed at the Port of Wilmington, a joint venture between the North Carolina State Ports Authority and three private companies: Nash Johnson & Sons Farms of Rose Hill, Murphy-Brown of Warsaw, and Prestage Farms of Clinton. The facility is named Wilmington Bulk Terminal. In part because of a major drought that occurred in 2012, 55 million bushels of South American grain were imported through the Port of Wilmington. In 2014/2015, Wilmington Bulk Terminal expects to handle soyben products and phosphate.

Wilmington Bulk Terminal has the capability of simultaneously unloading grain into trucks and railcars. It is more economical to unload into both truck and rail at the same time in order to avoid detaining ship loads and incurring daily dock fees. As of early 2014, this typical demurrage charge, or cost of additional wait time, on a bulk ship load unloading in harbor is about \$21,000 per day. The necessity to unload ship loads as quickly as possible would provide an incentive to use rail, even in cases where quoted rail and trucking rates are comparable.

Some of the imported soybean shipments from the Port of Wilmington would likely be destined for the Cargill soybean processing facility in Fayetteville, but much of the remaining grain, soybean, and soybean meal shipments would terminate on the W&W Subdivision or the Clinton Branch in the area between Wallace, Goldsboro, Warsaw and Clinton. The most direct rail route would be over the W2CH segment. These could move by unit train, so that the operating cost may be competitive with trucking despite the short distance, although the quoted railroad transportation rate (including “what the market will bear” profit) may not necessarily be competitive. One issue is whether grain and soybeans will continue to be imported through the Port of Wilmington or whether the 2012 grain shipments and the 2014 soybean, soy meal, and phosphate shipments represent “one off” occurrences. The United States is a major exporter of soybean and corn, and the recent importation is unprecedented.

After years of tiny volumes, U.S. corn imports grew to 2 million metric tons in calendar year 2013 with the largest volumes moving through Wilmington, NC, in 2012 and 2013 and Mobile, AL in 2013.

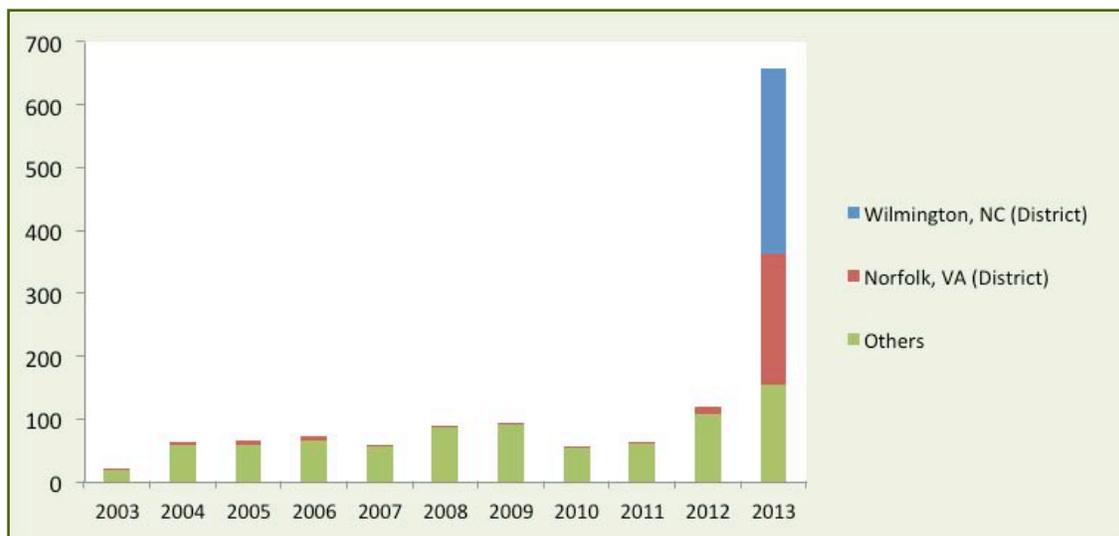
**Exhibit 4-9: U.S. Corn Imports by Port (thousands of metric tons)**



Source: U.S. Census Bureau

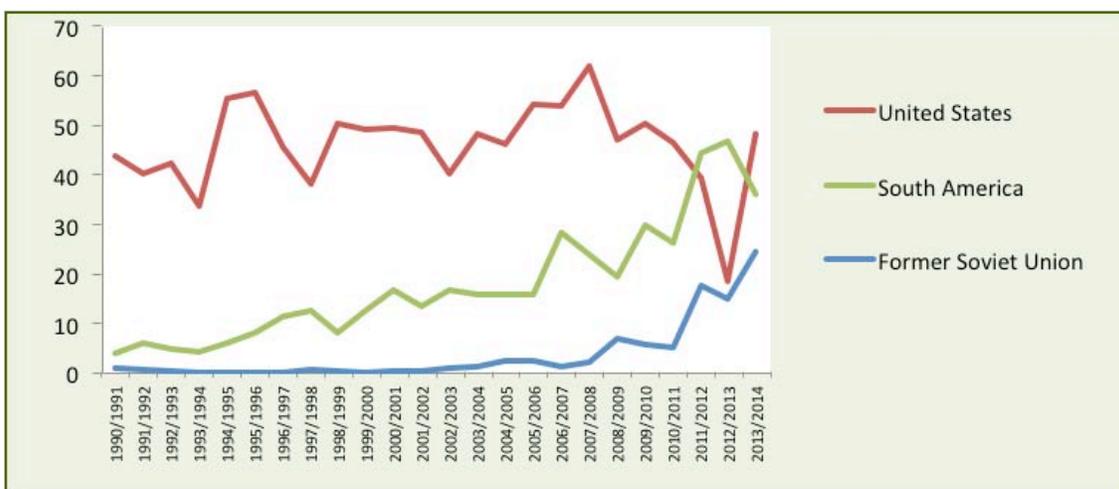
Similar to the case for corn in Exhibit 4-9, Exhibit 4-10 shows a small uptick in U.S. imports of soybeans in 2012/13. However, that relatively small increase in imports was concentrated in just two ports in 2013, Wilmington, NC, and Norfolk, VA as shown in Exhibit 4-10 below. A representative of one of the top turkey producer and processors in the state with whom the study team spoke contends that agricultural markets are undergoing a fundamental shift toward internationalization. According to this individual, one cannot assume that because the U.S. is an exporter of grain and soybeans, shippers will not import the same crops in the future. In one year, commodities may flow both ways, as exports and imports, depending upon prices as well as seasonal production and consumption trends. Consumers of agriculture may decide to import rather than store grain during winter and spring months.

**Exhibit 4-10: U.S. Imports of Soybeans (thousands of metric tons)**



Source: U.S. Census Bureau

**Exhibit 4-11: Top Global Corn Exporting Regions (millions of Metrics tons)**



Source: U.S. Census Bureau

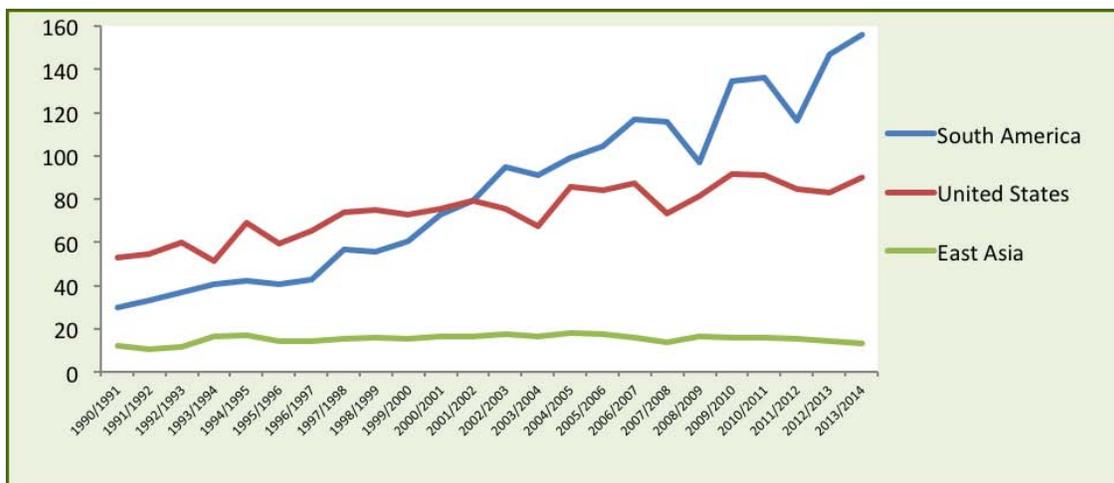
Other worldwide sources of grain have become more prominent. The U.S. has for decades been the top global exporter of corn, as shown in Exhibit 4-11. However, exports dropped precipitously in 2011/12 and 2012/13, while exports from South America grew sharply during those years. As a result, South American exports exceeded those of the U.S. over that two-year period.

As shown in Exhibit 4-12 below, South America is the largest and fastest growing regional producer and exporter of soybeans with over half of total world production, followed by the U.S. in second place. While East Asia is the third largest global producer of soybeans, it is the principal world importer with over 70 percent of world total imports. The volatility of production for all three major producing regions is in the 12-13 percent range.

While these trends may point to a growing role of international corn and soybean sources, the U.S. Department of Agriculture (USDA) predicts that U.S. imports of grain and soybeans will return to low levels. Forecasts released in February 2014 project corn imports declining from 162 million bushels in the 2012/2013 crop year to 25 million bushels for the remaining years to 2023/2024. Soybean imports are forecasted to decline from 36 million bushels in 2012/2013, to 15 million the remaining years to 2023/2024.

*The W2CH segment would likely be used to carry agricultural imports from the Port of Wilmington during some years but not others.*

**Exhibit 4-12: Top Global Soybean Producing Regions (millions of metric tons)**



**Source: U.S. Census Bureau**

It is not really possible to predict imported flows of grain, soybeans, or soybean meal through the Port of Wilmington and hence, over the W2CH segment for any given year. It is unlikely that these products will be imported through the terminal every year. The U.S. Midwest remains the dominant source of grain and soybeans for animal producers in Sampson, Duplin, and Wayne Counties. On the other hand, it is also unlikely that the terminal would remain permanently idle. Most likely, imports will flow through the terminal some years and not others. Potential usage of the W2CH segment for agricultural imports would depend on the volatility of agricultural markets. If prices are extraordinarily high and grain stocks low in the U.S. in a

given year, imports could be likely to flow through the Port of Wilmington and over the W2CH segment were it reactivated. In 2012, about 1.5 million tons of grain were imported through the Port of Wilmington. If rail carried half that amount, so that ship loads could be unloaded as quickly as possible relying on both rail and truck, the total volume would have been around 750,000 tons. As an order of magnitude, the expected volume in any given year would be the 750,000 tons multiplied by the probability of the 2012 event recurring that year. For the purposes of this study, the high, medium, and low probabilities are assumed to be 33 percent, 10 percent, and 5 percent probability. Because W2CH is on the most direct route (though not the only route) to the animal producing areas around Warsaw, Goldsboro, and Clinton, all of the 750,000 tons carried by rail is assumed to travel over W2CH. The resulting volumes are shown in Exhibit 4-13.

**Exhibit 4-13: Agricultural Imports Carried over the W2CH Segment under High, Medium, and Low Probabilities, 2012 Traffic Levels**

	High	Medium	Low
Probability	33%	10%	5%
Expected Value	250,000	75,000	37,500

Source: U.S. Census Bureau

The statistics above reflect 2012 freight levels. But the animal production industry in North Carolina has been growing and is expected to continue to grow, as will shipments of feed for these animals. FAF forecasts predict that agricultural shipments by rail to North Carolina will increase by 74 percent between 2012 and 2040. Imports through the Port of Wilmington are assumed to grow at the same rate as the rail shipments to North Carolina for which the imports are a substitute. Estimated usage of the W2CH for agricultural imports through the Port of Wilmington is displayed in Exhibit 4-14.

**Exhibit 4-14: Forecasted Agricultural Imports Carried over the W2CH Segment under High, Medium, and Low Probabilities**

Year	Low	Medium	High
2014	41,385	82,770	275,900
2020	48,445	96,890	322,968
2025	53,446	106,892	356,307
2030	58,289	116,579	388,596
2035	62,549	125,097	416,992
2040	65,164	130,328	434,427

Source: U.S. Census Bureau

### Potential Usage of W2CH – Wood Pellets

Wood pellets are a significant growth cargo for the Port of Wilmington and could potentially be shipped over the W2CH segment. The European Union and Great Britain have adopted targets for reducing greenhouse gas emissions that contribute to global warming. British and European electric utilities are expected to reduce their usage of coal and other fossil fuels and provide 20 percent of all energy needs by renewable sources by 2020. Wood and other biomass is seen as carbon neutral, since trees remove carbon dioxide from the atmosphere as they grow. European and British utilities expect to fulfill much of their

renewable requirements by burning imported wood pellets. The prime U.S. sources of wood chips for pellets to meet European demand are fast-growing forests in the Southeast. A location in close proximity to a seaport is a further benefit for producers near the Port of Wilmington.

*The nation's largest pellet manufacturer expects to export 1.5 million tons of pellets per year through the Port of Wilmington.*

The nation's largest pellet maker, Enviva, has been opening pellet mills in North Carolina and expects to export 1.5 million tons of pellets per year out of its planned \$40-million terminal in the Port of Wilmington, starting in the first quarter, 2015. The company plans to construct a pellet mill near Exit 355 on Interstate 40, Faison, NC, which will produce 500,000 metric tons of pellets per year. All pellets will be shipped for export out of the Port of Wilmington once the Wilmington terminal is complete. While the planned mill in Faison will be in reasonably close proximity to the W&W Subdivision, it is solely served by truck. The company had considered rail, but perceived the location sufficiently close (73 miles) to the Port of Wilmington that rail was unnecessary. Another rail-served site had been considered, but the site was not selected, since railroad rates would have been comparable to trucking, given the circuitry to the Port of Wilmington, and also other aspects made the site less desirable.

**Exhibit 4-15: Establishments in Duplin, Pender, New Hanover, or Sampson Counties that Receive or Ship over 250,000 Tons of Freight per Year**

Company	Industry	Town	Inbound Tons	Outbound Tons	Total Tons	Miles to Nearest Rail Line
National Gypsum Co	Gypsum Products	Wilmington	2,551,296	13,289	2,564,586	0.01
Union Carbide Corp	Chemicals and Chemical Preparations, NEC	Wilmington	1,220,645	55,469	1,276,114	0.02
Omni Source Corp	Chemicals and Chemical Preparations, NEC	Wilmington	505,955	5,955	511,910	0.02
Southern Metals Recycling Inc	Scrap and Waste Materials	Wilmington	1,042,383	201,250	1,243,633	0.02
Louisiana-Pacific Corp	Lumber and Other Building Materials Dealers	Wilmington	351,196	29,509	380,705	0.02
South Atlantic Svc Inc	Pesticides and Agricultural Chemicals, NEC	Wilmington	457,665	26,383	484,048	0.06
INVISTA	Manmade Organic Fibers, Except Cellulosic	Wilmington	1,835,726	122,151	1,957,878	0.10
Ticona/Fortron Industries	Plastics Materials, Synthetic and Resins, and Nonvulcanizable Elastomers	Wilmington	499,937	47,147	547,084	0.10
Martin Marietta Aggregates	Construction Sand and Gravel	Castle Hayne	898,350	658,400	1,556,750	0.15
Wilmington Materials	Brick, Stone, and Related Construction Materials	Wilmington	1,420,445	2,230,547	3,650,992	0.18
SR&R Environmental	Petroleum Refining	Wilmington	255,041	176,485	431,526	0.35
Valley Proteins Inc	Animal and Marine Fats and Oils	Rose Hill	1,264,491	69,292	1,333,784	0.72
Elementis Chromium LP	Chemicals and Allied Products, NEC	Castle Hayne	899,821	34,344	934,165	0.98

Source: U.S. Census Bureau

The site is approximately 3.5 miles from the W&W subdivision. While encouraging a modal switch from truck to rail may produce benefits, such as reduced useage wear to I-40, roadways in Wilmington, reduced roadway congestion, in addition to fuel savings, emissions savings, and safety benefits, these benefits would be unlikely to outweigh the cost of building new rail access to serve the facility. Given that the cost of rebuilding the W2CH is estimated to be \$3.5 million per mile without crossings and structures, or \$5.7 million a mile (including crossings and structures), if the cost of building a siding to the Enviva were the same cost per mile, this would total just under \$20 million. But the W2CH is a preexisting right-of-way. Acquiring the land and obtaining necessary permits would further add cost and disruption, given the difficulty of building a spur to the site, the wood pellet facility in Faison would continue to be served by truck whether the W2CH segment is restored or not.

*Due the cost of building a siding, the wood pellet facility in Faison would probably not use the W2CH segment, but the restoration of W2CH could increase the likelihood that other new pellet facilities would use rail.*

#### **Potential Usage of W2CH – Other Major Shippers**

The potential usage of the W2CH segment by other major shippers in Sampson, Duplin, Pender, and New Hanover Counties was assessed as well. Because manifest traffic would not necessarily use the W2CH segment even if it were the most direct routing, this assessment focused on those shippers that could potentially generate unit train shipments. Specifically, the assessment focused on those establishments that ship at least 250,000 tons of material per year, either inbound or outbound, and are located within a mile of a rail line. The 250,000-ton threshold is based roughly on a minimum of one 60-car unit train of 80-ton railcars, once a week for 52 weeks per year, although this still does not guarantee that unit train shipments would be feasible from these establishments, since unit trains would need to be shipped to and from specific origins and destinations. In contrast, some high-volume establishments may have dispersed origins/destinations. Establishments that meet these criteria are listed in Exhibit 4-15.

The study team attempted to reach each of these establishments. Of these, four provided a response. Of the four companies that did respond, one indicated that supply chain managers had considered using rail in the past, while the remaining three indicated that usage of rail was impractical to their needs. None indicated definitively that they would use the W2CH segment if it were reactivated.

The remaining establishments surveyed that did not respond generally ship chemicals or nonmetallic minerals. Most rail shipments of chemicals to or from the Wilmington area originate or terminate either in the Southeast or in the Midwest and therefore would probably not use the W2CH segment. Furthermore, chemical shipments tend to be dispersed. If all shipments to/from Wilmington had a single origin or destination, unit train operations may be possible. But chemical shipments are instead scattered among a multitude of origins/destinations, so may pass through Hamlet, even if the W2CH segment were the most direct routing.

A large portion of inbound nonmetallic mineral shipments originates in Sanford, NC, and routing over the W2CH segment would be no shorter than shipping through Hamlet. Most nonmetallic mineral shipments, whether by rail or truck, originate or terminate in North Carolina and would be unlikely to use the W2CH segment.

#### **Combined Freight Assessment for the W2CH Segment as a Shortcut**

Combining data of estimated trade within the I-95 Corridor in Exhibit 4-7 and agricultural shipments from Exhibit 4-14, and the expected military freight to/from MOTSU yields a total freight forecast as shown in Exhibit 4-16.

**Exhibit 4-16: Combined Forecast of Freight that Would Benefit from W2CH as a Shortcut**

Year	Low	Medium	High
2014	81,735	225,520	521,049
2020	88,795	242,428	573,693
2025	93,796	252,547	607,267
2030	98,639	259,403	633,895
2035	102,899	265,281	657,008
2040	105,514	266,874	667,168

**Source: U.S. Census Bureau**

**Freight that Would Benefit from W2CH Redundancy**

As mentioned previously, for all current Wilmington area shippers, the W2CH segment would enable a second access point between the Wilmington area and the remainder of the U.S. rail network. This could benefit shippers in case of an outage on the Wilmington Subdivision due to a weather event, train derailment, or other blockage. Under normal circumstances, most of this freight would not use the W2CH segment. According to the STB Waybill Sample, total 2011 tonnage into and out of Brunswick, New Hanover, and Columbus Counties was 5,311,565. FAF forecasts of rail traffic to and from North Carolina predict a significant drop in rail tonnage between 2012 and 2015, into 2020. Rail freight volumes afterward slowly increase to 2040. Much of the initial drop is driven by forecasted declines in coal shipments. Forecasts with coal-related declines are reasonable for the Wilmington area, since Wilmington coal shipments have also declined due to conversion of the L.V. Sutton power plant to natural gas and the partial conversion of the Capitol Power plant to biomass fuel. Exhibit 4-17 displays forecasted total rail tonnage to/from the Wilmington area. Most of this freight would rarely if ever divert to W2CH under normal circumstances. But this freight would use W2CH if there were an outage on the Wilmington Subdivision.

**Exhibit 4-17: Forecast of Rail Tonnage to/from the Wilmington Area**

Year	Rail Tonnage
2014	4,727,752
2020	4,601,157
2025	4,732,303
2030	4,894,390
2035	5,028,707
2040	5,166,059

## Technical Assessment and Cost Estimation for Restoration of Wallace to Castle Hayne

As discussed previously, when CSXT abandoned the rail line between Wallace and Castle Hayne, the company removed all trackage and structures in the corridor. All rail, ties, and ballast were removed. Rail was removed from highway/rail crossings, which were then paved over. One exception is the swing bridge on the Cape Fear River. Much of the structure remains and could potentially be rehabilitated, although order-of-magnitude estimates below suggest that rehabilitating the bridge would be about \$700,000 more expensive than simply replacing it. To restore service on the line, nearly all rail infrastructure on the corridor would need to be rebuilt.

### Condition of the Right-of-Way

The limits of the of the project corridor are as follows: the northern limit is located at Main Street in Wallace, milepost AC-208.1, and the southern limit is located at the connection of the Wallace-Castle Hayne line of the Wilmington Subdivision, milepost AC-235.8. The length of the line is 27.7 miles. Based on valuation maps, the right-of-way (ROW) is 130 feet wide along the majority of the corridor, and was purchased by the North Carolina Department of Transportation soon after CSXT Transportation abandoned the track in the 1980s.

Vegetation has been cleared on limited portions of the ROW, while trees and brush have grown over other parts of the ROW. Based upon site inspection and a review of satellite imagery 24.8 miles of the ROW would require heavy vegetation clearing, while 2.9 miles would require only light clearing.

The width of the NCDOT-owned ROW was deemed adequate to resume rail operations. Most of the ROW passes through rural areas. Adjacent land uses are predominantly agricultural; however, the line passes in close proximity to residential properties at the southern end near Castle Hayne. The ROW also passes through the center of Burgaw.

### Encroachments

#### *Exhibit 4-18: Growth of Vegetation on the Right-of-way*



The NCDOT Rail Division's Operations and Facilities Branch maintains an inventory of encroachments and agreements. The state sometimes grants licenses to individuals or organizations that would like to use and have access to state-owned property. In some cases, the licensees pay fees for access, while in other cases they may not. Encroachments may include the following types:

- Utilities and drainage (power, water, gas, communication, cable, sewage)
- Lease of land (parking, hunting, gardening)
- Lease of building and depot

- Roadway crossings (public, private, access, driveway, highway overpass)
- Other various encroachments (sidewalk, fencing, wooden bridge, etc.)

*Exhibit 4-19: Existing Rail, Wooden Ties, Ballast, and Right-of-way without Track*



*Exhibit 4-20: Rockfish Creek with Remaining Masonry Abutment and Adjacent Highway Bridge*



The database (last updated in September 2009) identifies 138 encroachments on the W2CH. At least 18 of the listings did not reach any agreement, are included in another agreement, were temporary, or have been terminated. The remaining 120 items have signed agreements dating back to 1928 and may contain multiple encroachments in individual agreements.

These encroachments would need to be addressed before W2CH could be placed back into service, but would not be expected to materially impact the feasibility of restoring the rail line.

### **Existing Track and Ballast**

While the majority of rail infrastructure has been removed, approximately one mile of track still exists comprised of segments at Wallace, Burgaw, and Castle Hayne. Minor improvements will most likely be required to remove unsuitable roadbed material and be replaced with sufficient subballast to support an overlying layer of track ballast to support new rail and ties in these segments of remaining track.

### **Bridges**

When the W2CH line was operational in the 1980s, seven bridges were located on the line, each of which crossed a stream or river. Three bridges were inspected for the current study, while four were reviewed using satellite imagery and valuation maps. The field team made the following observations on the three inspected bridges:

*Exhibit 4-21: Northeast Cape Fear River Bridge and Deck*



- Overhead utility lines will likely conflict with bridge construction at some sites.
- Private property adjacent to the corridor could conflict with bridge construction.
- A boat launch ramp (Castle Hayne Ramp) is adjacent to the crossing of the Northeast Cape Fear River, which handles a substantial volume of recreational boat traffic.

A seven-span bridge over the Northeast Cape Fear River (refer to the images above) is the most significant structure on the corridor. The bridge consists of six fixed steel deck plate girder spans that are with open-deck track work. The seventh span is a steel deck plate girder swing span that is currently locked in the open position to allow the free flow of water traffic. According to a historical plan sheet, the clear width of the existing navigation channel is 52 feet. The existing swing span was constructed around 1947 with the superstructure salvaged from another bridge site and installed at the current location. The plan sheet also shows the abutments and Pier 2, to be concrete structures on spread footings. The remaining interior piers are concrete caps on pile foundations. Much of the electrical and mechanical equipment associated with the moveable span appears to have been removed from the bridge. The existing fender system is timber and is considerably weathered.

### **Environmental Process**

The National Environmental Policy Act (NEPA) requires that all projects receiving federal funding must consider environmental impacts of the proposed construction. It is anticipated that to complete the W2CH restoration, NCDOT would need to prepare an Environmental Assessment (EA), which would assess whether the project would have significant environmental impacts. Because the W2CH was previously used for rail service, the EA may not uncover significant environmental impacts that would require the state to prepare an Environmental Impact Statement (EIS). The NEPA environmental evaluation would not be expected to be a barrier to the project's completion, except for a possible determination that ditches parallel to the right-of-way are considered to be wetlands. When the line was first built in the mid-1800s, construction crews excavated drainage ditches on each side of the railroad centerline and built up a central berm to provide enough vertical elevation to accommodate the railroad roadbed and keep it above the water table. During site visits, the original construction ditches along the abandoned rail line and within the right-of-way were discovered to be in place and predominantly filled with water. These would most likely be designated as jurisdictional wetlands, and would require early and close coordination with the U.S. Army Corps of Engineers (USACE) to assure a positive outcome for both parties. The project would require approval and permitting by the U.S. Army Corps of Engineers (USACE) and North Carolina Department of Environment and Natural Resources (NCDENR) Division of Coastal Management and Division of Water Resources. As the Wallace to Castle Hayne corridor is located in the coastal plains region of eastern North Carolina, both USACE and Division of Coastal Management regulations may apply.

### **Conceptual Layout, Site Improvements, and Cost Estimate**

The conceptual plan for proposed track alignment is provided as Appendix A. This layout was designed to follow the existing ROW. The proposed track geometry follows CSXT Track Design Standards, as well as NCDOT policies for state-funded, newly built rail segments. As designed, the line would conform to FRA Class 3 track standards, which would permit a maximum freight train speed of 40 miles per hour. This train speed would facilitate efficient freight movements. If passenger rail service were ever contemplated over the W2CH segment, the segment would already be able to accommodate up to 60-mile-per-hour passenger operations. As such, extensive upgrade would not be required for reasonable conventional passenger service. At the outset, the restored segment would not be signalized and would be operated by manual dispatch control. The forecast level of traffic would not warrant more sophisticated control systems, such as automatic block signaling.

The majority of the proposed track alignment is straight (tangent track) except for two curved sections near Rocky Point and north of Castle Hayne. These curves generally match the existing track curves to utilize the existing NCDOT-owned W2CH right-of-way.

To further facilitate efficient freight operations, a 10,000-foot passing siding is included in the layout with turnouts that would enable trains to pass into and out of the sidings without slowing down (No. 20 turnouts). This siding is planned to be located just south of St. Helena, as seen in Sheets 7 and 8 in Appendix A.

### **Guideway**

Due to the preexistence of the rail corridor, rough grading was assumed to be unnecessary and earthwork preparation should be minimal once clearing and grubbing have been completed. The track would consist of 136-pound continuously welded rail on wooden ties. This was considered appropriate for FRA Class 3 track and operations and to ensure that the track would not need to be upgraded in the near future. This study does not assess the cost of additional land acquisition which might arise due to incompatible land uses. In most areas along the line, this should not be a problem, since the line passes through rural areas. But in a few locations, the line passes in close proximity to residential areas.

No new-location realignments of the railroad were studied. Such realignments in a predominantly straight railroad would incur right-of-way costs, negative environmental impacts, and permitting challenges.

### **Crossings**

Sixty roadway crossings were identified. Of these crossings, 30 are public, while the other 30 provide access to private property. It was assumed that all preexisting crossings on the W2CH segment would need to be included in cost estimates. All but four of the public crossings will have asphalt crossing surfaces. Two crossings in Burgaw would be concrete, as would one in Watha and another at Rocky Point. Per NCDOT policy, all public crossings were assumed to be built with train-activated protection, including gates and flashers. One crossing in Wallace and two in Burgaw are assumed to require cantilevered crossing signals. All private crossings would be crossbuck sign protected only. State Route 117 passes over the line at what had been milepost AC-230.8. Crash walls would need to be added to protect the roadway bridge.

### **Turnouts**

Five existing turnouts were identified on the line. Four turnouts are used to make connections at the ends of the line. Double tracks north of Wallace connect to the line by two turnouts, and two turnouts are south of Castle Hayne, where there is an existing crossover. A fifth turnout in Burgaw would also be replaced. Each of the turnouts is No. 10 with the replacement

turnouts assumed to be the same. These would facilitate train speeds through the turnouts of 15 miles per hour. In addition to the five replacement turnouts, two No. 20 turnouts are also assumed to connect with the 10,000-foot passing siding. These would allow trains to exit and enter the siding at up to 40-miles-per-hour.

### **Drainage**

All existing drainage culverts along the original CSXT roadbed between Wallace and Castle Hayne are assumed to be replaced. Track valuation maps along with recent surveys were used to develop an inventory of drainage structures along the corridor. Culvert lengths were derived from existing known lengths or based on field assessments. The NCDOT bid tabulation list prices were used to develop unit prices for the drainage culvert costs. Additionally, removal costs for outdated/damaged drainage features were also included in the estimate. All drainage structures would require coordination with the USACE for permitting.

### **Bridges**

The structural design of new bridges on the corridor is based on CSXT's Undergrade Bridge Criteria and the Manual for Railway Engineering published by the American Railway Engineering and Maintenance of Way Association (AREMA). The bearing capacity is based on Cooper E-80 and alternate live loading. The resultant design can accommodate 286,000-pound axle loads. All bridges will require coordination with the USACE for permitting.

### **Stream Crossings**

It has been assumed that all stream crossings will be typical CSXT single-track steel deck plate girder bridges with ballasted decks and reinforced concrete deck slabs. Other bridge types may be found to be more economical, but that determination as to whether these alternate designs could be feasible could not be made until the preliminary engineering design phase of the project is under way. Each of the stream crossings (5 sites) will require hydraulic analyses and geotechnical analyses to allow bridge engineers to set the required abutment and pier locations and set span lengths. Scour analyses will also be required to ascertain foundation depth requirements and stream bank protection needs. For span length assumptions, refer to Exhibit 4-22.

### **Bridge over Rockfish Creek**

Similar to the other stream crossings, hydraulic analyses, scour analyses, and geotechnical investigations will be required in order to set abutment, and pier locations, and to set bridge span lengths for the bridge over Rockfish Creek. It is assumed that the new bridge over Rockfish Creek will be a 6-span, single track, steel deck plate girder bridge with ballasted deck and reinforced concrete deck slab. Deep foundations will be required and it is anticipated that pile bents (trestle bents) or post-and-beam bents supported on drilled pier foundations would be feasible. Based on current-day AREMA design loadings, particularly the longitudinal design forces attributed to equipment braking and traction, it is unlikely that any of the abandoned existing substructure or foundation elements could be reused to support the new bridge. Therefore, it has been assumed for the purposes of this report and the cost estimates herein that all new bridge substructures and foundations will be required at this site.

### **Assumptions for Order-of-Magnitude Bridge Cost Estimating**

A number of assumptions have been made to arrive at planning-level cost estimates contained in this report that are associated with the bridge design and construction in the corridor. The following Exhibit 4-22 summarizes the assumptions made for the water crossings excluding the bridge over Northeast Cape Fear River. The superstructure type for each bridge listed in Exhibit 4-22 consists of a single-track steel deck plate girder bridge with a ballasted deck and a reinforced concrete deck slab. The

substructure type for each bridge listed in Exhibit 4-22 consists of a reinforced concrete substructure unit supported on deep foundations.

**Exhibit 4-22: Stream Crossing and Rockfish Design Assumptions**

Bridge Location	No. of Spans	Total Bridge Length (ft.)	Single-Track Bridge Width* (ft.)	Deck Area (sf)
Stream Crossing 1 @ AC-208.9	3	90	22	1,980
Stream Crossing 2 @ AC-220.2	3	90	22	1,980
Stream Crossing 3 @ AC-228.8	3	60	22	1,320
Stream Crossing 4 @ AC-229.2	3	60	22	1,320
Stream Crossing 5 @ AC-231.2	1	30	22	660
Rockfish Creek Crossing @ AC-209.3	6	350	22	7,700

*\* Note: Single track bridge width is based on a tangent track bridge and providing 10 feet of horizontal clearance from centerline of track to the ballast stop and 1-foot-wide parapets.*

### Northeast Cape Fear River Crossing

Three potentially feasible alternatives to restore a crossing of the Northeast Cape Fear River are worth studying. They include:

- **Alternative 1:** Rehabilitate existing fixed spans and replace existing swing span
- **Alternative 2:** Total replacement of the existing bridge (low-level crossing with moveable span)
- **Alternative 3:** Total replacement of the existing bridge (high-level crossing – all fixed spans)

To ascertain the design and cost feasibility of each of the alternatives, a number of evaluations will need to be performed during the preliminary engineering phase of the project. The following steps will determine the feasibility of the bridge rehabilitation alternatives:

**Step 1:** Perform a detailed, hands-on bridge inspection. This would include inspection of all bridge components, including an underwater inspection to identify foundation condition and scour concerns. The electrical and mechanical components associated with the existing swing span also would be inspected. The findings of the bridge inspection will allow bridge designers to better define the scope of the potential structural repair work required by each of the bridge rehabilitation alternatives.

**Step 2:** If the findings from the detailed bridge inspection conclude that bridge rehabilitation is feasible, the next required engineering task would be to perform load ratings (Normal and Maximum Ratings per AREMA) and a fatigue investigation. This task will allow for specific strengthening measures to be identified and quantified. Concurrent with the load rating analyses, foundation and substructure analyses should be performed to study the viability of the existing foundations and substructure units. Studying vessel collision and pier protection would be part of this assessment.

After Steps 1 and 2 are complete, more detailed cost estimates could be developed of Alternative 1, along with preliminary concept plans.

Preliminary design would need to be undertaken to reasonably estimate member sizes, foundation sizes, etc. As such, an initial subsurface investigation would be required such that preliminary foundation size and type could be determined. Similarly,

an initial scour evaluation would be required to estimate foundation depths. This information would allow for comparisons to be made between replacement alternatives and rehabilitation alternative(s) while considering future maintenance and inspection needs for each.

The following list of assumptions have been used in developing the cost estimates for the Northeast Cape Fear River bridge rehabilitation alternative (Alternatives 1) :

- Strengthening of existing structural steel is required.
- Strengthening will be based on Cooper's E80 loading and the alternate live load.
- Cleaning and painting of the existing structural steel is required.
- Existing paint is lead-based and will require enclosures and contaminated material removal, handling, and disposal.
- All bearings require replacement.
- Existing interior bent caps and abutments will require concrete repairs.
- Foundation retrofitting is not required.
- Construction of new dolphins for pier protection against vessel collision is required.
- Retrofitting the existing fender system is required.

For Alternative 2, the low level replacement bridge over the Northeast Cape Fear River, the following has been assumed: The new fixed spans of the bridge will consist of a single-track steel deck plate girder bridge with a ballasted deck and a reinforced concrete deck slab.

- The moveable span would be replaced in-kind with an open deck to reduce dead loads.
- An operator's house will be added to the structure. The bridge would likely be radio controlled.
- The existing pivot pier and existing rest piers will be reused. All other piers and abutments will be replaced.
- Foundation retrofitting is not required for existing pivot pier or rest piers.
- Construction of new dolphins for pier protection against vessel collision is required.
- Retrofitting the existing fender system is required.

For Alternative 3, the high level replacement bridge over the Northeast Cape Fear River, the following has been assumed:

- United States Coast Guard (USCG) will require a minimum vertical clearance that aligns with the height of the I-40 bridge.
- A single steel through-plate girder span would be used over the navigation channel to minimize structure depth and the amount that the track profile will need to be raised.
- Steel deck plate girder spans will be used at all other spans.

- Retaining walls will be required at the bridge approaches to prevent embankment slopes from spilling outside of the railroad right-of-way.
- Note that this alternative would have long approach grades to either end of the bridge to allow for safe and economical railroad operations. These grades would increase the impacts to the natural environment, as well as the human environment south of the river in Rocky Point. Permitting challenges would be greatly increased by a high-level bridge, especially north of the river.

### Cost Estimate Summary

Exhibit 4-23 provides the preliminary cost estimates for guideway, systems, drainage, structures, and other services associated with the reconstruction of the rail corridor with bridge alternatives. All design specifications, associated costs, and percentage factors are detailed in Appendix B.

**Exhibit 4-23: Capital Cost Estimates for Corridor Reconstruction**

I. Guideway	\$63,451,302		
II. Systems	\$5,480,774		
III. Drainage	\$581,446		
IV. Stream Crossing Structures	\$12,703,200		
V. Northeast Cape Fear River Crossing Structure	<b>Bridge Alt 1</b>	<b>Bridge Alt 2</b>	<b>Bridge Alt 3</b>
	\$11,508,000	\$11,070,000	\$75,396,000
VI. Miscellaneous	\$8,766,250	\$8,722,450	\$15,155,050
VII. Professional Services	\$20,619,439	\$20,523,079	\$34,674,799
VIII. Project Contingency	\$30,777,602	\$30,633,062	\$51,860,642
<b>PROJECT TOTAL</b>	<b>\$153,888,012</b>	<b>\$153,165,312</b>	<b>\$259,303,212</b>

Source: PB

### Operating Plan

As shown in Exhibit 4-3 and Exhibit 4-16, as well as expected reroutes during Wilmington Subdivision outages, the restored W2CH segment is expected to carry relatively few trains. Per the CSXT 2013 R-1 Annual Report filed with the U.S. Surface Transportation Board, the average CSXT train carries 2,715 tons of cargo. Based upon the average CSXT train size and the forecasted tonnage, expected trains counts would be less than one per week in the low traffic scenario and less than one per day on the high traffic scenario. However, it may be necessary to operate smaller trains at least daily or several days per week to provide reasonable service to industries.

**Exhibit 4-24: Forecast Annual Train Counts over the W2CH Segment**

Year	Low	Medium	High
2014	33	87	197
2020	36	93	216
2025	38	97	229
2030	40	100	239
2035	41	102	248
2040	42	103	252

Source: PB analysis of STB R-1 Annual Report

## Network Impacts

The network impact of the restored line would be relatively minor. The CSXT A-Line between Pembroke and Wilson carries over 45 trains per day<sup>12</sup>, so even under a relatively high traffic scenario, the restoration of the W2CH subdivision would divert no more than about 2.2 percent of trains from the A-Line. This would not have a material impact on any capacity constraints of the A-Line.

In detailed discussions with CSXT, it was determined that most manifest freight originating in the Wilmington area travels westbound out of Wilmington on CSXT's former Seaboard Air Line alignment through Pembroke and then to the Hamlet Yard for sorting. It is then sent to various points on the CSXT system. Unit trains would not necessarily travel to Hamlet, as sorting of cars all headed for the same destination is not needed. Any potential intermodal container train would currently travel west to the CSXT A-Line at Pembroke, and then south to Savannah for sorting.

Except for Pender County, CSXT is able to serve customers on existing trackage, although transportation between Wilmington and the Wallace area under the current network configuration is circuitous. In discussions with CSXT, the company indicated that when it halted service on the W2CH segment in the 1980s, it did so because continued operation of the segment did not meet a market need, and continued maintenance of the segment made its operation financially untenable. The railroad also noted that while financially viable service over a restored W2CH by CSXT is a possibility, it is improbable that such a service would be financially viable, given the CSXT network and operations.

Railroad transportation is most economical over long distances. Industry rules of thumb sometimes point to 750 miles as a "sweet spot" in railroad economics where railroad transportation cost savings create an advantage compared to other modes. The short distance between Wilmington and Pender County would lessen much of the railroad cost advantage. As discussed previously, a significant portion of the cost of railroad moves occurs at origin and destination and does not vary by distance. Therefore, the railroad may not quote a substantially better rate for access to Pender County via W2CH versus a Pembroke-Wilson-Wallace routing.

## Parameters of Operations over W2CH

The operation of W2CH would depend upon CSXT's interest in operating the segment. Because CSXT owns connecting trackage on both ends of W2CH, the railroad would be the most efficient operator of the segment. Local manifest freight service on the CSXT W&W Subdivision is currently provided between Warsaw or Wallace and Rocky Mount. The local trains are generally "turn jobs," meaning that the crews leave and return to Warsaw or Rocky Mount in one shift. If CSXT were to assume service over W2CH, a new train schedule would need to be established. Crews that had previously worked "turn shifts" between the W&W Subdivision and Rocky Mount may do single direction shifts between Wilmington and Rocky Mount.

*Because CSXT owns connecting trackage on both ends of W2CH, the railroad would be the most efficient operator of the segment.*

<sup>12</sup> North Carolina Department of Transportation, NC Maritime Strategy: Existing and Planned Railroad Infrastructure, May 31, 2012.

Railroads by law have a common carrier obligation to provide service on their systems upon reasonable request. But W2CH is not on the CSXT system and is instead owned by NCDOT. Therefore, CSXT would be under no obligation to operate over the line. CSXT would, however, have a common carrier obligation to interchange traffic with the W2CH operator at each end of the line, at Wallace or in Castle Hayne.

If CSXT were to decline to provide service over W2CH, the next best option would be for a small rail carrier (short line) to provide service between Wilmington and Wallace, though CSXT has indicated that the company intends to maintain all current customers on the trackage. The logical operator of possible short line service would be the Wilmington Terminal Railroad (WTRY), a 17-mile short line freight railroad serving the North Carolina Port Authority. This type of service, however, would be subject to authorization by CSXT, since CSXT owns the 13 miles of rail line between Wilmington and Castle Hayne. A less attractive option would be for a short line to operate only over W2CH, interchanging at both ends with CSXT. When asked to comment on a hypothetical scenario whereby WTRY would operate over W2CH, representatives of the railroad indicated that it would probably not be feasible to operate a stand-alone rail service only on the W2CH. The railroad would need to operate continuously over at least the entire line between Wilmington and Wallace. The WTRY would not necessarily serve existing CSXT customers. Rather, WTRY could be granted overhead trackage rights, whereby WTRY trains could access W2CH but not serve any of the industries on the 13-mile CSXT line segment Wilmington to Castle Hayne.

Interchanging between railroads increases transit time and cost. Exhibit 4-25 compares the 2012 URCS variable cost of shipping a unit grain train between Wilmington and Wilson under three scenarios. Similar to the figures that appear in Exhibit 4-8, this analysis assumes a 90-car unit train carrying 108 tons per car in railroad-owned covered hoppers. Under the first scenario, CSXT handles the entire move. Under the second, another carrier handles the move between Wilmington and Wallace and then interchanges with CSXT, which carries the load to Wilson. Under the third, CSXT handles the short 13-mile move between Wilmington and Castle Hayne, interchanges with another carrier, and then receives the same shipment at Wallace to bring the train to Wilson. As shown, the variable costs of the scenario where an independent carrier interchanges at both Wallace and Castle Hayne are about 43 percent higher than the case where CSXT carries this shipment all 109 miles between Wilmington and Wilson. The need to interchange between multiple carriers would significantly add to costs, as well as shipment transit times.

**Exhibit 4-25: Comparison of the Variable Cost of Unit Grain Train Service under Operating Scenarios**

Scenario	Variable Cost
CSXT carries the shipment 109 miles from Wilmington to Wilson	\$33,650
Another carrier carries the shipment 40 miles from Wilmington to Wallace and delivers to CSXT CSXT interchanges and brings the shipment 69 miles from Wallace to Wilson	\$41,088
CSXT carries the shipment 13 miles and interchanges with another carrier at Castle Hayne The other carrier takes the shipment 27 miles to Wallace and delivers back to CSXT CSXT receives the shipment at Wallace and carries it 69 miles from Wallace to Wilson	\$48,248

**Costs of Maintaining/Operating W2CH**

If W2CH were restored, North Carolina could continue to own W2CH but lease the segment to a private rail carrier. W2CH would likely be leased. The state may be required to pay the cost of maintaining and operating the line. Reducing maintenance would be the fact that all track and structures would be new. Given forecasted traffic levels, no rail would likely need

to be replaced for several decades. Likewise, newly installed railroad ties would last several decades before any significant tie replacement programs would be necessary. But even with low traffic levels and new infrastructure, certain maintenance and inspection activities would be required, namely:

- Per FRA requirements, the line would be inspected weekly, requiring an estimated 16 hours of inspectors’ time per week.
- Bridges would be inspected annually. The detail of inspections would vary over a five-year cycle, with verification inspections occurring in years 1 and 3, routine inspections occurring in years 2 and 4, and in-depth inspections occurring in year 5.
- The right-of-way would be sprayed for weeds, and brush cut back.
- Ditching and surfacing may occur on a 10-year cycle, regardless of the W2CH usage. Ditching would likely cost about \$10,000 per mile, so the annualized cost would be around \$1,000 per mile. Similarly, the surfacing would cost around \$9,240 per mile, so the annualized cost would be around \$924 per mile.
- Public crossings would be resurfaced at an estimated interval of every 15 years, while crossing countermeasures would require ongoing maintenance. The cost of resurfacing rural 2-lane crossings would be about \$30,000 each, so the annualized cost would be about \$2,000 per crossing. The cost of resurfacing the more major 4 lane crossings on busier roads would be \$300,000 per crossing or \$20,000 annualized per crossing.
- The moveable bridge on the Cape Fear River would need to be staffed, maintained, and powered. It would remain to be determined if the bridge would be operated remotely or staffed on site. Operating the bridge remotely would likely be less expensive than if an operator were required to be on site. Either way, the bridge would not be staffed all the time as traffic levels would be relatively low. The cost figure that appears in Exhibit 4-26 assumes that the bridge would only be staffed and available for operation 16 hours per week. The remainder of the time, the bridge would be left in an open position.

*Adding these costs together, it is estimated that the total cost of maintaining and operating W2CH over the two or three decades after restoration would total around \$400,000 to \$500,000 per year.*

**Exhibit 4-26: Order of Magnitude Annual Cost to Maintain and Operate W2CH by Item**

	Unit Cost	Units	Unit Quantity	Cost
Weekly Inspection of track	\$43	Hours	832	\$35,776
Yearly Inspection of bridges				\$112,800
Operator, power, maintenance for moveable bridge	\$44,667	Bridge	1	\$44,667
Vegetation management				\$56,000
Ditching every 10 years, annualized	\$1,000	Miles	27	\$27,000
Surfacing every 10 years, annualized	\$924	Miles	27	\$24,948
Resurface rural 2 lane public crossings every 15 years	\$2,000	Crossing	28	\$56,000
Resurface 4-lane public crossings every 15 years	\$20,000	Crossing	2	\$40,000
Maintain crossing gates, signals	\$830	Crossing	27	\$22,410
Maintain crossing gates, signals, cantilever	\$895	Crossing	3	\$2,685
			<b>Total</b>	<b>\$422,286</b>

## Strategic Value Assessment

This strategic value assessment considers the value of the project from a number of different perspectives. These include:

- An economic impact analysis, which considers the changes to the economy of North Carolina during the construction of the W2CH segment;
- A benefit/cost analysis, which compares the extent to which North Carolina is better off as a result of the project compared to the costs of the project's construction; and
- The value of the project to specific stakeholder groups, including agriculture and the military.

### Economic Impact Analysis

The economic impacts of the rail line reactivation are associated directly with the construction spending deployed in the region. Assuming total expenditures are \$153,165,312 in 2014 with disbursements made in line with the project schedule, the reactivation will produce 2,245 jobs by 2016. The average amount of yearly jobs produced is expected to be about 1,212. The expected contribution to gross state product is estimated to be approximately \$212,208,106 by 2016. Exhibit 4-27 below details of employment impacts by category.

*Exhibit 4-27: Employment Impacts of W2CH Construction*

	Direct	Indirect	Induced	Total
Employment 2016	846	576	823	2,245
Employment 2015	68	46	66	179

*Source: PB analysis*

To quantify the annual economic impacts, this analysis relies on input-output multipliers from MIG Inc., the developers of IMPLAN.<sup>13</sup> The analysis uses the U.S. National data economic profile and multiplier set.

### Benefit/Cost Analysis

Benefits represent the dollar measure of the extent to which people are made better off by the project, the amount that all people in the society would jointly be willing to pay to carry out the project and feel as if they had generated enough benefits to justify the project's costs. Benefit/cost analyses compare the benefits and costs of two scenarios:

- a build scenario whereby the project is built, and
- a no-build scenario whereby the project is not built.

The benefits represent the difference between the build and no-build scenarios.

The benefit/cost analysis estimates benefits and costs over a study period. In this case, the project analysis period is 30 years, starting at the assumed first year that W2CH is placed into operation, 2017, and continuing to 2046. The design and environmental work for the W2CH are expected to occur in 2015, while the construction of the W2CH segment is assumed to occur

<sup>13</sup> <http://implan.com/V4/Index.php>

in 2016. All costs and benefits are discounted to 2014 using a 7 percent discount rate per federal guidelines.<sup>14</sup> The residual value represents the remaining value of the rail line at the end of the 30-year analysis period. This has been calculated using straight line depreciation rates for major investment categories, such as trackwork, bridges, and crossings. As mentioned in the market assessment above, three primary groups of benefits are expected to be associated with different types of anticipated freight traffic.

- **Local Rail Service.** Because the restoration of W2CH restores rail service back to the 27-mile segment between Wallace to Castle Hayne, shippers along this corridor could now use rail, whereas they had previously only had access to truck freight transportation. This could bring about a number of benefits, not just associated with transportation along the W2CH segment, but also with the entire rail move enabled by the restoration of service to W2CH.
  - a) Reduced shipper costs. Railroad unit-train transportation rates are generally less expensive than truck transportation rates. Balanced against the transportation cost savings from rail is the fact that rail service, particularly shipments of carload freight in less than trainload quantities, tends to be slower and less reliable than truck transportation. Nevertheless, for certain commodities and lengths of haul, rail is a favorable option. Shippers can save money by having access to railroad transportation.
  - b) Reduced emissions. Rail is significantly more fuel efficient relative to trucking. Because rail is more fuel efficient, railroad transportation produces lower emissions of not only greenhouse gases (CO<sub>2</sub>), but also other harmful pollutants, such as nitrous oxides (NO<sub>x</sub>), particulate matter (PM), and volatile organic compounds (VOC).
  - c) Improved safety. Rail is also a relatively safe mode of transportation. Few fatalities, injuries, and property damage accidents result from rail.
- **Shortcut.** The benefits of W2CH as a shortcut vary by type of freight. For freight that moves in unit trains, W2CH saves operating expense. Because W2CH is a more direct routing for these trains, they consume less fuel, cause less wear and tear on the track infrastructure and equipment, and depending upon train crew districts, require less time of train crews. While rail is relatively environmentally efficient and safe when compared to trucking, it still generates emissions. Because W2CH would enable a more direct routing for some freight, it would reduce emissions.
- For manifest freight, the W2CH may not necessarily reduce the costs of train operations. Hamlet is currently the yard that handles most manifest freight to and from the Wilmington area. CSXT provides some existing local manifest freight service on the W&W Subdivision between Wallace and Rocky Mount. This local service could presumably be extended to provide service into the Wilmington region. But the volume of manifest freight flowing over the W2CH would be considerably less than the volume of freight that currently flows between Hamlet and the Wilmington region. Trains may need to be smaller and/or less frequent. Manifest freight over the W2CH would not benefit from the same economics of density as the existing service through Hamlet. For manifest freight, the W2CH segment could provide benefits in terms of reduced crossings and emissions savings, but not necessarily any reduction in train operating costs.
- **Redundancy.** The study team spoke with a railroader with significant long-term institutional knowledge of rail in the Wilmington region. According to this individual, about five outages of the Wilmington Subdivision have occurred over the past 15 years. Each outage lasted on average about two

---

<sup>14</sup> White House Office of Management and Budget, Circular A-94, Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs (October 29, 1992). ([http://www.whitehouse.gov/omb/circulars\\_a094](http://www.whitehouse.gov/omb/circulars_a094)).

days. This would equate to one outage every three years, or an expected period of outage of 48 hours divided by 3 years between outages equals 16 hours per year. Because rail is rarely a time-sensitive mode of transportation, most rail shippers would be expected to keep over 2 days of inventory. Therefore, an outage of service for 2 days would be inconvenient but would not cripple these shippers' operations. Shippers would not be forced to change modes, such as switch to truck, but they would need to hold inventory for an extra 2 additional days due to a service outage.

The same individual mentioned that in the early 1980s or 1970s there was a much more significant outage of the Wilmington Subdivision: A train derailed on a bridge. Service was not restored to the Wilmington Subdivision for three weeks. At the time, it was not considered critical to quickly restore service because the W2CH segment was still in service. Wilmington area traffic was simply routed over the W&W Subdivision while the bridge on the Wilmington Subdivision was repaired. Today, the impacts of a derailment with a prolonged outage would be much more severe, since only one rail line provides access to or from the Wilmington area. Unfortunately, there is no basis for estimating the risk of this type of event occurring again, so the benefits of avoiding this type of scenario are not included in this benefits calculation. A separate analysis has been prepared that assumes a 30-year recurrence interval for this type of event, but the results yielded benefits of about \$2 million, which would not materially alter the conclusions of this benefit/cost analysis.

The benefit/cost calculation is described in more detail in Appendix C, but a summary of the calculations is below.

- **Reduction in rail emissions.** Forecasted tonnages as shown in Exhibit 4-16 were multiplied by 68 mile savings for military unit train traffic, 167 miles for agricultural unit train traffic (compares direct move between Wilmington and Warsaw to Wilmington – Pembroke – Wilson –Warsaw move), 141 mile savings for manifest freight in order to derive the total ton-miles saved. Ton-miles saved were then divided by an estimated fuel consumption rate of 470 ton-miles per gallon per CSXT to derive gallons saved. Gallons saved were multiplied by emissions factors for CO<sub>2</sub>, NO<sub>x</sub>, PM, and VOC per the U.S. EPA<sup>15</sup> to derive the quantity of harmful emissions avoided. The annual quantity of emissions avoided was the multiplied by a cost per ton or pound of harmful emissions per U.S. Department of Transportation (USDOT) guidance.<sup>16</sup> The reduction in rail emissions was netted against the increase in rail emissions from freight diverting from truck to rail.
- **Reduction in truck emissions.** Estimated ton-miles diverted from truck to rail were derived by multiplying forecasted diverted tonnage as shown in Exhibit 4-3 by an assumed average haul of 570 miles per the average distance of rail moves to/from the Wilmington region per the 2011 STB Waybill Sample. Ton-miles were converted to equivalent truck vehicle miles traveled (VMT) by dividing ton-miles by an assumed payload of 22.7 tons per truck per the U.S. Federal Highway Administration (FHWA) Freight Analysis Framework (FAF) documentation.<sup>17</sup> Truck VMTs were multiplied by the average truck emissions factors for CO<sub>2</sub>, NO<sub>x</sub>, PM, and VOCs per the USEPA to derive the tonnage of

<sup>15</sup> USEPA 2009 projected averages 2016-2025

<sup>16</sup> [http://www.dot.gov/sites/dot.gov/files/docs/TIGER\\_BCARG\\_2014.pdf](http://www.dot.gov/sites/dot.gov/files/docs/TIGER_BCARG_2014.pdf)

<sup>17</sup> <http://faf.ornl.gov/fafweb/Documentation.aspx>.

avoided truck emissions. The annual quantity of emissions avoided was the multiplied by a cost per ton or pound of harmful emissions per U.S. Department of Transportation (USDOT) guidance.<sup>18</sup>

- **Inventory carrying cost savings.** The inventory carrying cost was derived by multiplying the value of goods in transit by an annual 13 percent carrying cost per the FHWA Intermodal Transportation and Inventory Cost Model (ITIC).<sup>19</sup> Carrying costs were then converted to an hourly savings by dividing by 8,760 hours per year. Time savings were derived by dividing the 68 mile savings by an estimated 20 miles per hour speed for rail movements. The value of goods shipped was estimated by multiplying agricultural unit train tonnage as shown in Exhibit 4-14 and estimated MOTSU unit train shipments by \$245.84 dollars shipment value per ton from the U.S. Census Commodity Flow Survey.<sup>20</sup>
- **Reduction in operating expense for shortcut traffic.** Savings per ton-mile for military unit train traffic were estimated by comparing the STB 2012 CSXT URCS model variable cost for a 177-mile move between Wilson and Wilmington via Pembroke to a 109-mile move between Wilson and Wilmington over W2CH. For agricultural movements, a 59-mile move from Wilmington to Warsaw was compared to a 226.5-mile move by which a train would travel from Wilmington, to Pembroke, to Wilson and then south again to Warsaw. The difference in total variable costs was divided by the difference in total ton-miles. In both cases, the variable cost savings per ton-mile saved were found to be about \$0.015. Ton-miles for military traffic were derived by multiplying the 40,350 annual expected tonnage by the 68 mileage savings. For agricultural traffic the tonnage volumes shown in Exhibit 4-14 were multiplied by the estimated 167 in mileage savings. The assumed car type, car ownership, cars per train, car weight, commodity were the same as used for the unit train variable cost figures that appear in Exhibit 4-8.
- **Reduction in operating expense switching from truck to rail.** Estimated ton-miles diverted from truck to rail were derived by multiplying forecasted diverted tonnage as shown in Exhibit 4-3 by an assumed average haul of 570 miles per the average distance of rail moves to/from the Wilmington region per the 2011 STB Waybill Sample. An average variable cost per ton-mile for Wilmington rail traffic was estimated using the 2011 STB Waybill Sample. When indexed to fourth quarter 2014 using the STB's Railroad Cost Adjustment Factor – Unadjusted (RCAF-U), this was found to be \$0.034. The cost per ton-mile for trucking was estimated to be \$0.09 as shown in Exhibit 4-8. The difference between the railroad and truck variable cost per ton-mile was multiplied by the estimated ton-miles.
- **Increase in system redundancy.** The savings due to redundancy were assumed to equal the savings in inventory carrying cost associated with avoiding an average of 16 hours of delay per year due to CSXT outages on the Wilmington Subdivision.

The primary factors that drive the unfavorable benefit/cost ratio are as follows:

- **The cost.** If the restoration of W2CH were solely a matter of refurbishing an existing rail line, the benefit/cost ratio may exceed 1, but only the right-of-way remains. All rail and structures would need to be built anew.

<sup>18</sup> [http://www.dot.gov/sites/dot.gov/files/docs/TIGER\\_BCARG\\_2014.pdf](http://www.dot.gov/sites/dot.gov/files/docs/TIGER_BCARG_2014.pdf)

<sup>19</sup> [http://www.fhwa.dot.gov/policy/otps/061012/iticst\\_info.htm](http://www.fhwa.dot.gov/policy/otps/061012/iticst_info.htm).

<sup>20</sup> [http://www.rita.dot.gov/bts/sites/rita.dot.gov/bts/files/publications/commodity\\_flow\\_survey/2012/united\\_states/index.html](http://www.rita.dot.gov/bts/sites/rita.dot.gov/bts/files/publications/commodity_flow_survey/2012/united_states/index.html).

- **Low levels of freight.** For most freight to and from the Wilmington area, W2CH would not be the most direct routing. There is also a question as to whether manifest freight would use the segment, since most manifest freight on the CSXT network is currently handled by the CSXT yard in Hamlet. CSXT has indicated that this pattern of traffic would remain.
- **Shortcut rather than enabler of rail transportation.** The Wilmington region has existing rail access over the Wilmington Subdivision. For most shippers in the Wilmington area, W2CH would not dramatically alter the relative economics of truck and rail transportation. The average length of haul to/from the Wilmington area is 570 miles. Even if the routing is shorter using the W2CH segment, saving 68 miles will not dramatically change the economics of a rail move. Thus, the relative modal economics between truck and rail would not be transformed so as to cause a significant modal shift to rail.
- **Lack of local traffic.** Ideally, it would be best to have an anchor user for a project such as W2CH. This could be an existing or prospective shipper on the 27-mile segment. Unfortunately, no major existing shippers or economic development projects have been identified. To some extent, this may represent a “chicken and egg” problem. No projects have been proposed due to lack of rail access, but in evaluating W2CH, no existing rail users can be identified to justify the segment’s restoration. If the W2CH were tied to a major economic development initiative, the economics would be easier to justify.

*The results of the benefit/cost analysis suggest that the benefits of restoring the W2CH would not justify the costs at this time. Even under the most optimistic traffic scenario, the benefits resulting from the project would amount to only one seventeenth of the costs. However, strategic value to the military and agricultural interests must be considered in the investment decision process.*

- **Lack of identified vulnerability.** Per Exhibit 4-28, among the greatest benefits of W2CH are in providing redundancy in rail access to the Wilmington region. Estimated benefits of this redundancy would be higher if the existing rail access were shown to be vulnerable in some manner. Typically, risks would be documented through a history of costly disruptions.

**Exhibit 4-28: Results of Benefit/Cost Analysis of the Wallace – Castle Hayne Restoration Project**

Category	Mid scenario 2014 \$	High scenario 2014 \$	Low scenario 2014 \$
Reduced emissions	1,940,390	5,338,682	802,436
Reduced inventory carrying costs	38,951	120,606	23,098
Reduction in accidents	607,983	1,525,896	174,429
Reduction in operating expense	4,404,975	12,313,112	1,899,409
Increase in system redundancy	3,040,407	3,040,407	3,040,407
Total PV of benefits	<b>10,032,706</b>	<b>22,338,703</b>	<b>5,939,779</b>
Total PV of costs	<b>134,464,950</b>	<b>134,464,950</b>	<b>134,464,950</b>
Residual Value	<b>-3,865,548</b>	<b>-3,865,548</b>	<b>-3,865,548</b>
NPV	<b>-120,566,696</b>	<b>-108,260,699</b>	<b>-124,659,623</b>
BCR *	<b>0.08</b>	<b>0.17</b>	<b>0.05</b>

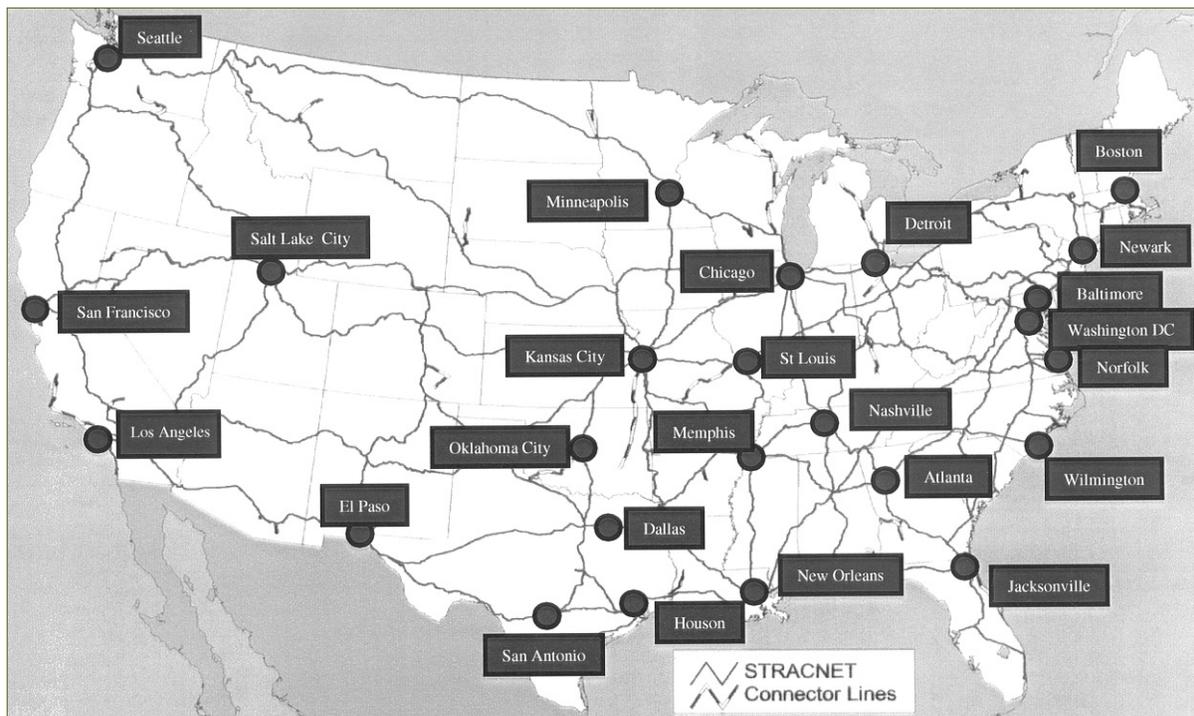
Source: PB analysis

The estimated benefits above are driven by expected usage of the W2CH segment. The greater the tonnage and ton-miles associated with rail traffic on the W2CH segment, the greater the calculated benefits. But some benefits may be impossible to calculate. Stakeholders may value W2CH without necessarily intending to use it. Others may place value on the segment beyond what would be considered “benefits” in the context of a benefit/cost calculation. The sections that follow discuss the value of W2CH to two specific stakeholders, the U.S. Military and the Eastern North Carolina agriculture industry.

**Strategic Importance to the Department of Defense**

The Department of the Army’s Military Surface Deployment and Distribution Command (SDDC) Transportation Engineering Agency (TEA) identifies civil-sector rail service needs for the U.S. Military. The effort under the Railroads for National Defense Program is to integrate military requirements into civil-sector plans. SDDC-TEA works with the Federal Railroad Administration (FRA), state transportation agencies, military installations, and commercial rail carriers to develop and coordinate the Strategic Rail Corridor Network (STRACNET) and connecting lines. The U.S. Military is very supportive of restoring Wallace to Castle Hayne (W2CH) rail infrastructure and operations. In discussions at the Military Ocean Terminal Sunny Point (MOTSU) and with SDDC-TEA, representatives expressed W2CH to be of high priority to STRACNET. They observed that “[n]o other civil-sector infrastructure project shortens a key rail deployment route (Camp Lejeune – Wilmington) by about 100 miles while also improving the robustness of the rail access to two Strategic Seaports (Wilmington and Military Ocean Terminal Sunny Point) by creating a detour option if their primary rail route is out of service.”

*Exhibit 4-29: Strategic Rail Corridor Network and Connecting Lines*



*Source: U.S. DOD*

Nevertheless, the U.S. Department of Defense (DoD) has indicated that it would not fund the restoration of the 27-mile corridor between Wallace and Castle Hayne. On the other hand, private commercial traffic and civilian public benefits may not be sufficient to justify the restoration of the line on their own. The U.S. Military has cited three reasons why it places strategic importance on the W2CH restoration: (1) to shorten the deployment route between Marine Corps Base Camp Lejeune and

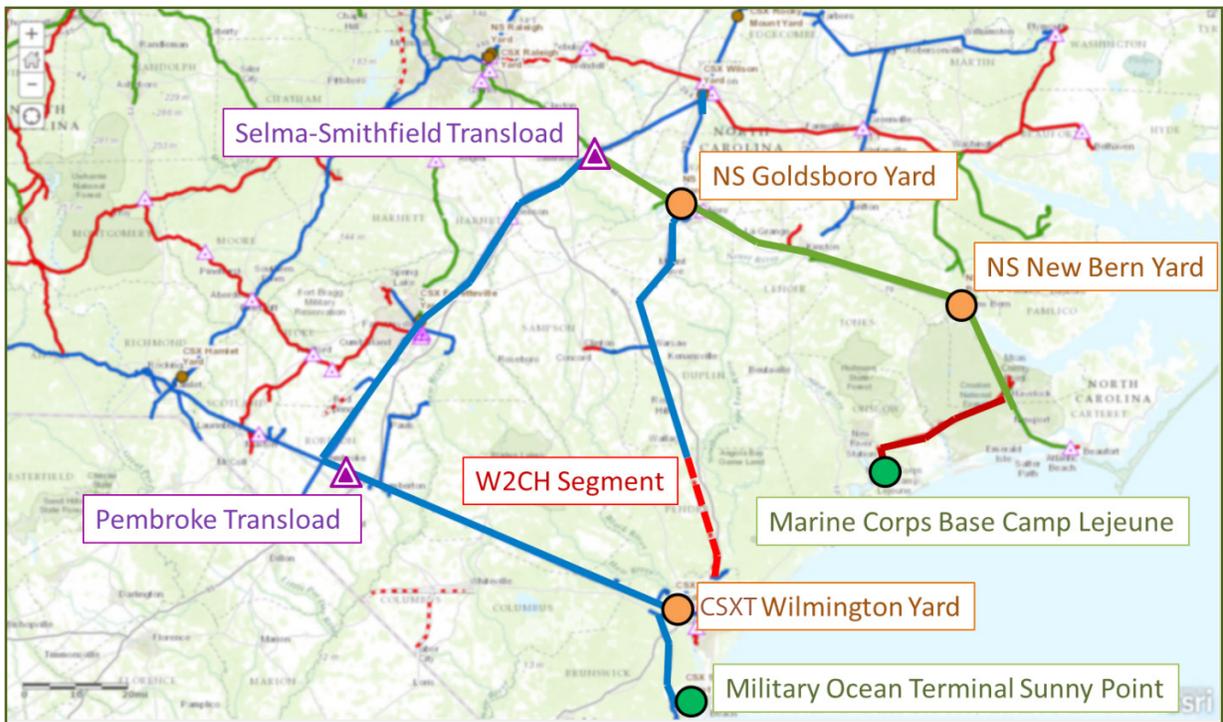
Wilmington; (2) improve access to the Port of Wilmington and the Military Ocean Terminal Sunny Point, and, (3) reduce the risk of any blockage in accessing the Port of Wilmington and MOTSU.

### Shortcut: Camp Lejeune – Wilmington

The route between Marine Corps Base Camp Lejeune and Wilmington is served by the Camp Lejeune Railroad (solid red in the accompanying map), Norfolk Southern (solid green), and CSXT (solid blue). Currently, rail shipments must pass through Goldsboro, transfer at Selma-Smithfield, and turn at Pembroke to complete a 279-mile end-to-end journey. The restoration of W2CH would still require at least three operators, but would reduce the connection between Goldsboro and Wilmington by 68 miles. SDDC-TEA expects that routing unit trains between Camp Lejeune and Wilmington through Wallace could reduce travel times by at least 4 hours and even by an entire day for carload freight. While these types of savings may not be particularly remarkable in peacetime, in wartime the implications could be more significant.

### Access and Resilience: Military Ocean Terminal Sunny Point

When the Military constructed MOTSU in the 1950s, a new rail line running north-south between Wilmington and MOTSU was also installed. The U.S. Military operates trains on the line, and switches onto CSXT track at Leland. A letter and questionnaire were sent to SDDC-TEA regarding the restoration of the rail line and freight operations between Wallace and Castle Hayne. The content primarily pertained to the importance of the W2CH corridor for the Military Ocean Terminal Sunny



Source: PB

Point. MOTSU is the largest military terminal in the world, importing and exporting weapons, ammunition, explosives, and military equipment for the Department of Defense. It is estimated that 90 percent of U.S. Military munitions pass through MOTSU for inventorying, inspections, testing, and transit storage before being passed on to the final destinations.

SDDC-TEA's response to inquiries regarding W2CH stated that the project and subsequent operation of W2CH would reduce national security transportation risks by opening an additional access point into and out of the Port of Wilmington.

The most beneficial aspect of W2CH to MOTSU is the redundancy of rail lines to Wilmington. The second most important benefit is the shorter routing distance to and from the north (e.g. Letterkenny Army Depot). The Department of Defense relies heavily on the rail network, and suggests trucking to be partially sufficient to its logistical needs. In wartime, both truck and rail would be heavily used to move cargo to MOTSU. For some military installations, shifting all rail cargo to truck would be problematic due to capacity issues. While light vehicles can move either by truck or rail for deployment, heavy armory such as M1 tanks must be moved by rail. Rail is the preferred mode of cargo originating more than 400 miles from Wilmington. Therefore, redundant rail access to military installations in eastern North Carolina is a high priority. It is important to note that the DoD is potentially constrained in describing the specific benefits of the W2CH project, since any vulnerabilities that the project would potentially alleviate may be classified.

### **The U.S. Department of Defense and the Economy of Eastern North Carolina**

According to the Bureau of Economic Analysis, the U.S. military employment totaled 120,614 or about 10 percent of total employment in eastern North Carolina in 2012. Compared to the broader United States economy, the concentration of military employment in eastern North Carolina is about 800 percent higher than the U.S. as a whole.

According to a report by the North Carolina Department of Commerce<sup>21</sup>, over 100,000 active duty personnel were assigned to military bases in North Carolina in 2013. The report estimated that the industry has supported approximately 10 percent of the State's economy, supporting 540,000 jobs, \$30 billion in personal income, and \$48 billion in gross state product. Additionally, the study determined that about 37 percent of defense contracting is performed by the state's eastern region.

The state is currently home to the third largest military population in the United States (including U.S. Coast Guard). Among the military facilities located within the state are:

- Fort Bragg
- Camp Lejeune Marine Corps Base
- Cherry Point Marine Corps Air Station
- New River Marine Corps Air Station
- Seymour Johnson Air Force Base
- Sunny Point Military Ocean Terminal
- U.S. Coast Guard Base Elizabeth City

Of the military facilities mentioned above, all are located in the eastern region. Moreover, the region is also home to other military facilities including the U.S. Coast Guard Sector in Wilmington.

As the military supports over 10 percent of gross state product, it is an important factor when considering transportation improvements.

<sup>21</sup> <http://www.nccommerce.com/Portals/47/Publications/Industry%20Reports/The%20Economic%20Impact%20of%20the%20Military%20on%20North%20Carolina.pdf>

### **Conclusion Regarding Strategic Importance to the Military**

The benefits of the W2CH to the military as identified in the benefit/cost analysis are minor because ongoing military traffic over W2CH would be light. Some freight to and from MOTSU would use the line, but the freight volumes would not be high. Currently military usage of the Port of Wilmington is low, and for some military installations, such as Fort Bragg, the Wilmington Subdivision would be a better routing than the W2CH.

But other benefits to the military may exist that cannot be quantified. For example, the restoration of W2CH may alleviate vulnerabilities that are classified. Others may relate to the value of W2CH during wartime or periods of national emergency. Military installations such as MOTSU are not built for peacetime volumes. Most of the time, much of the infrastructure at MOTSU is idle, with the facility handling far lower volumes than it was designed to handle. Rather, the facility was designed for a contingency, an event that would cause large volumes of ordinance to be shipped through the port.<sup>22</sup>

*W2CH may provide benefits to the military that are not quantifiable, such as improved readiness in case of national emergency.*

The military would need to ensure that MOTSU and the transportation networks supporting MOTSU can support this contingency. But it is uncertain what the bottlenecks in such a contingency would be, for example whether the Wilmington Subdivision limits MOTSU's throughput, or whether MOTSU internal operations would limit throughput? Unfortunately, it is impossible to identify the contingency and what the military sees as bottlenecks. To include this into a benefit/cost analysis, it would be necessary to calculate the probability of national emergencies and the specific impact of the rail line's restoration on the outcomes of such an event. This type of information is unavailable.

The importance of the military to the economy of eastern North Carolina could also be a consideration regarding the restoration of W2CH.

### **Strategic Importance to Agriculture**

According to the Bureau of Economic Analysis, farm employment in the region totaled 21,124 or about 2 percent of all eastern North Carolina regional employment in 2012. Forestry, fishing, and related activities totaled 7,248 or about 1 percent of all regional employment.

According to a report by the North Carolina State University Department of Agricultural and Resource Economics<sup>23</sup>, the farm, agriculture and forestry industry contributes over \$16.3 billion dollars to gross state product. In addition, the report estimates that the broader economic impact of the sector is roughly \$78 billion and that a total of about 640,000 jobs are supported by the industry. The state currently has over 50,000 farms, according to the Department of Agriculture.<sup>24</sup> The state's main commodities are poultry and eggs, and hogs and pigs. Together these two product groups account for nearly 62 percent of all agri-

<sup>22</sup> The fact that facilities such as MOTSU are built on a contingency has implications to budgeting within the military. Ideally, users of a facility would pay the variable costs of providing that service, while fixed costs of meeting military readiness requirements would be covered by fixed appropriations. A discussion of these types of budgeting implications appears in a recent report by RAND Corporation, Technical Report: Funding Ammunition Ports, 2012, [http://www.rand.org/pubs/technical\\_reports/TR1204.html](http://www.rand.org/pubs/technical_reports/TR1204.html).

<sup>23</sup> <http://ag-econ.ncsu.edu/>

<sup>24</sup> [http://www.agcensus.usda.gov/Publications/2012/Full\\_Report/Volume\\_1,\\_Chapter\\_2\\_County\\_Level/North\\_Carolina/st37\\_2\\_002\\_002.pdf](http://www.agcensus.usda.gov/Publications/2012/Full_Report/Volume_1,_Chapter_2_County_Level/North_Carolina/st37_2_002_002.pdf)

cultural output in the state.<sup>25</sup> Within the eastern region of the state, total agricultural output exceeds \$7.9 billion. The region's output accounts for almost two thirds of the state's output.<sup>26</sup>

Since 1997, environmental legislation has limited the growth of the hog industry. A moratorium was established, which prohibited the construction of new large hog farms with traditional methods of handling waste, i.e. lagoons. This moratorium, which became law in 2007, has reduced the growth rate of the industry. But, on the other hand, industry representatives are confident about the industry's long-term prospects. Developing countries such as China are adding additional protein to their diets. They demand more meat, including pork, than they currently can produce domestically.

*Even relatively minor changes to the costs of poultry and hog production can have major implications to the competitiveness of the industry in eastern North Carolina compared to other areas of the U.S.*

This could lead global consumers such as China to increase their imports of meats from areas like Eastern North Carolina. The largest integrator of pork products in North Carolina, Murphy Brown, is now owned by a Chinese company. There is speculation that this company was bought by a Chinese firm in order to meet Chinese demand for pork.

But North Carolina competes with other parts of the United States for hog production. The pork industry has become national. Hogs can be raised anywhere and shipped to any part of the country competitively. North Carolina has traditionally been a center of hog farming, but has faced competition with producers in the Midwest. North Carolina grows 100 million bushels of corn on average per year, but the state's consumption is 400 million bushels of corn. Therefore, corn must be brought to North Carolina from the major corn production areas in the Midwest. Animal producers in the Midwest are at an advantage, since they do not need to pay to transport grain long distances to feed animals. For example, the average hog consumes about 3 – 4 times the weight in feed over its lifetime compared to meat produced.<sup>27</sup> North Carolina is closer to East Coast consumer markets, but this transportation advantage is not very significant. The transportation of pork is relatively cheap, but the transportation of grain to feed the animals is expensive. Therefore, if the industry in North Carolina is to remain competitive, it is imperative that transportation costs not become excessive. Even small changes in the cost of production can have major impacts on the competitiveness of North Carolina hog and poultry farming compared to that in other parts of the country.

CSXT is the only rail carrier to serve many of the top hog and poultry areas in North Carolina. According to industry representatives, CSXT previously was able to increase transportation rates on inbound grain for hog and poultry producers prior to 2012, increasing rates as much as 7 percent per year. In the Market Assessment section of this study, there was discussion of the Wilmington Bulk Terminal handling 55 million bushels of grain in 2012. The importation of grain through the Port of Wilmington in 2012 represented a loss of business for CSXT. Instead of grain traveling by a CSXT rail move of at least 750 miles from the Midwest, grain instead traveled around 60 miles from the Port of Wilmington to Duplin County. According to hog and poultry industry representatives, this modal diversion served as a challenge to CSXT. CSXT lowered its transportation rates on grain from the Midwest to Eastern North Carolina. The CSXT transportation rate increases that reportedly had been routine before grain was imported ceased. Other animal producers beyond the owners of the Wilmington Bulk Terminal benefited as well, since the supply of grain to the region increased, as did the perceived competition in transportation markets.

<sup>25</sup> [http://www.agcensus.usda.gov/Publications/2012/Online\\_Resources/Rankings\\_of\\_Market\\_Value/North\\_Carolina/](http://www.agcensus.usda.gov/Publications/2012/Online_Resources/Rankings_of_Market_Value/North_Carolina/)

<sup>26</sup> [http://www.agcensus.usda.gov/Publications/2012/Full\\_Report/Volume\\_1,\\_Chapter\\_2\\_County\\_Level/North\\_Carolina/st37\\_2\\_002\\_002.pdf](http://www.agcensus.usda.gov/Publications/2012/Full_Report/Volume_1,_Chapter_2_County_Level/North_Carolina/st37_2_002_002.pdf)

<sup>27</sup> U.S. Department of Agriculture

Hog and poultry industry representatives believe that the W2CH project will improve rail access between animal production areas in Pender, Duplin, Sampson, and Wayne Counties and the Port of Wilmington. This improved connection provides these shippers with additional transportation options, which were addressed in the benefit/cost analysis. But this more direct connection also has the potential to improve negotiating leverage of these shippers with CSXT, which was not addressed in the benefit/cost analysis. For the purposes of a benefit/cost analysis, a reduction in transportation rates cannot be considered a “benefit” per se. Rather, a reduction in transportation rates represents a transfer from one party, in this case, CSXT, to another party, the shippers. The transportation network is made no more efficient as a result of shippers’ increased negotiating leverage. One party is made better off at the expense of another.

The North Carolina Department of Agriculture reports the current preferred method of shipping export meat products to foreign customers such as China is via refrigerated containers. This minimizes handling, thereby minimizing costs and any potential contamination. These cargoes could theoretically be shipped from the Port of Wilmington, since it is the port closest to eastern North Carolina’s major poultry and hog producing areas. If the Port of Wilmington had rail regular intermodal service, which it currently does not, the distances to the agribusiness operations are too short to justify intermodal service. Intermodal service typically can compete effectively with trucking at distances of at least 250 miles.

But the strategic value to North Carolina hog and poultry producers of reduced transportation rates on inbound grain shipments is significant. According to data from the 2011 Waybill Sample, railroad revenues associated with rail movements of corn and soybean shipments to Pender, Duplin, Sampson, and Wayne counties totaled about \$78 million in 2011. If shippers were to limit the increase in transportation rates to the level of inflation at 2.3 percent per year, instead of 7 percent per year, the total savings over 10 years would be about \$267 million. The present value of these savings, discounted by 7 percent to the beginning of the 10 years of these savings would be about \$166 million.

*Changes to railroad transportation rates can have major cost implications for hog and poultry producers, but the impact of W2CH on these rates is uncertain.*

What is unknown is the relationship between the W2CH restoration and any decrease in railroad transportation rates would be. The reduction in rates that occurred in 2012 mostly resulted from modal competition associated with grains imported to the Port of Wilmington and then shipped by truck to hog producers. These were movements over which CSXT maintained no control. But CSXT would control imported grain movements through the Port of Wilmington and over the W2CH segment if the rail was chosen over the truck mode. CSXT owns the rail line between Wilmington and Castle Hayne, as well as the W&W Subdivision north of Castle Hayne. If a railroad believed that one portion of existing business could be hurt by another, it could adjust and market rate accordingly. Furthermore, agricultural shippers have an alternate, albeit more circuitous rail route between the Port of Wilmington and Pender, Duplin, Sampson, and Wayne Counties via Pembroke. In conclusion, the W2CH restoration would provide agricultural shippers with a reserve transportation option and may have some limited impact on rail rates, but this impact would be limited.

### **Passenger Rail**

It is beyond the scope of this study to assess the feasibility of intercity passenger rail service between the Raleigh-Durham area and the Wilmington area, but the restoration of the W2CH segment would augment the feasibility of such a service. The W&W Subdivision is the most direct routing between Wilmington and the Raleigh-Durham area.

## Strategies and Next Steps

Although the W2CH assessment did not identify sufficient benefits of restoring the line to outweigh the costs, a number of actions could nevertheless be taken to support the project or to generally support the freight rail network in eastern North Carolina.

Communications with the DoD have indicated that they have a great interest in seeing the W2CH rail line restored, but do not have funding to contribute. Projects to support national security would more appropriately be funded through federal military appropriation, rather than North Carolina civil sector funding. Therefore, it is recommended to seek federal funding support.

*While the identifiable and quantifiable benefits of the W2CH project to the military are small relative to the costs, some benefits are not quantifiable and may be much more substantial. These could include increased readiness in case of war or other national emergency.*

Also, logistics markets change frequently. Future developments in trade flows could justify the W2CH restoration. The benefits and costs of W2CH could be reevaluated if market conditions evolve to be dramatically different from today. As noted by representatives from the Department of Agriculture and Consumer Services, there is a possibility that South American grain could become attractive to import under certain market conditions. If this change occurs, unit grain trains from offloading ships at the Port of Wilmington could become a favorable method to reduce docking fees and turn ships around faster. This type of scenario would warrant a reevaluation as noted above.

No existing shipper in need of freight rail capability is currently “stranded” by the missing segment Wallace to Castle Hayne. However, if a major industry need for freight rail develops in Pender County in the future, a transload facility could be constructed on the existing active CSXT-served W&W Subdivision rail line (near Magnolia).

Another possible scenario could be to restore the W2CH incrementally north-to-south from the active rail at Wallace, but without incurring the cost of restoring the entire 27-mile segment. If a new industry with need for rail service were to locate along the W2CH right-of-way, it is possible to extend the line only as far to the south as needed to provide service. The cost of construction (without crossings or structures) would run approximately \$3.5 million per mile.

### Strategies and Next Steps - Wilmington

During discussions with stakeholders for the W2CH study, a number of issues and needs were uncovered regarding rail access to the Port of Wilmington. When the original rail lines were built as part of a larger system (now used as the sole rail access to the Port) was built, the urban footprint of the City of Wilmington was much smaller than it is today. The line bypassed built up areas and passed through regions that were undeveloped, while providing access to the now-removed rail line from Wilmington to Jacksonville along US-17. The City of Wilmington has grown so that these previously undeveloped areas now have a dense mixture of commercial and residential land uses. Trains must pass through numerous, often badly skewed, highway/rail crossings to reach the Port of Wilmington. Local residents voice complaints, particularly regarding blocked crossings and the train horn noise required at highway/rail crossings. Similar to Morehead City, these crossings issues revolve more around quality-of-life and safety than capacity or congestion constraints.

One strategy to address these conflicts is to adopt the findings of the currently ongoing Wilmington Traffic Separation Study between the City and the NC Department of Transportation Rail Division. A traffic separation study (TSS) is an engineering and safety evaluation of crossings and rail/highway interactions in a particular municipality. The results of the TSS are presented as short-, mid-, and long-term recommendations for crossing upgrades, closures, consolidations, improved access, safety enhancements and grade separations for the benefit of the public. It is recommended that implementation of the Wilmington TSS findings/projects be pursued as quickly as feasible within this economic climate. These resulting improvements would alleviate many of the concerns of the local citizens and facilitate movements to and from the Port.

Another recommendation is to pursue environmental, planning and conceptual design studies for a grade-separated bridge at the North Gate of the Port of Wilmington complex. The current configuration at the North Gate allows for conflicts between vehicles (particularly trucks) and trains, which creates delays and reduces the number of “turn around” trains daily between the Port and Davis Yard. A grade separation would eliminate this conflict.

A more major, long-term recommendation is to pursue the feasibility of a high-lift rail bridge across over the Cape Fear River near the Port. A second rail crossing of the river would provide more immediate access to the Port, while removing the majority of traffic from the CSXT Beltline, thereby increasing flows, improving safety, and providing the access infrastructure to support Governor McCrory’s 25-Year vision for an expanded and thriving Port of Wilmington. There are several conceptual design options for this bridge and approaches, and designs will have to weigh efficiency, costs, environmental, access and public input as the potential project proceeds forward. A new rail bridge crossing is supported by many stakeholders in the Wilmington area. Though not specifically costed due to the various design possibilities, based on other similar lift bridges constructed in the United States, a Cape Fear River rail bridge could cost in the \$250 million to \$350 million range.

Another issue of significance is the lack of intermodal rail service to the Port of Wilmington. Currently, intermodal service to/from the Port is by truck and primarily serves the areas around and between Raleigh/Durham and Charlotte. Because the Port does not currently have intermodal rail service, the Port of Wilmington serves few intermodal customers outside of easy trucking distance. CSXT is the only railroad that provides rail service to the Port of Wilmington. But CSXT has indicated that for the carrier to be able to economically serve the Port, freight volumes would need to be at least 100 containers in each direction per week. Representatives from the Port do not believe that this level of freight would be feasible immediately if intermodal rail service were initiated due to current container shipping lines that are contracted with CSXT. Rather, freight volumes would build over time. One of the steamship lines that serves the Port has expressed interest in intermodal rail service, but by itself could not generate 100 containers per week at the outset. One possibility could be to evaluate the possibility of a pilot program which would utilize manifest train movements to also include rail intermodal service at the Port for a period of time. If threshold volumes were not reached within a given amount of time, the program would be dropped. If threshold container volumes were reached the intermodal service would continue. An evaluation of such a program would assess the likelihood that the program would ultimately be successful, and would assess the benefits and the probable cost.

## Conclusions

The U.S. military has expressed interest in the line's restoration because it provides redundant rail capability, and there may be strategic value to the military beyond what could be evaluated for this study. Likewise, agricultural interests in the state support restoration of W2CH. The findings of this study suggest that the restoration of the W2CH is not warranted based upon current market conditions as the expected usage of the line is too low to justify the cost. Because market conditions can change, these findings should be re-evaluated as the market evolves.

It is recommended that the following projects be considered. These recommendations consider both W2CH and the Port of Wilmington.

- Continue to preserve right of way and options over the line for the future.
- Seek federal funding for the DoD-supported restoration of the rail line.
- As the market dictates in Pender County, extend the existing CSXT rail line southward from Wallace to serve any new identified industry. The cost-per-mile for this extension is approximately \$3.5 million per mile without crossings or structures.
- Continue efforts to work with CSXT to identify actions that will lead to regular intermodal (rail) service to the Port of Wilmington.
- Pursue implementation of recommendations from the ongoing Wilmington Traffic Separation Study of rail crossing consolidation and safety upgrades to improve safety and efficiency of rail and vehicular flow into Port of Wilmington.
- Pursue environmental, planning and conceptual design studies for the construction of a highway-railroad grade separated access at the North Gate of the Port of Wilmington. Separated access would improve safety, reduce vehicular congestion, and significantly increase rail capacity.
- As future traffic volumes grow at the Port of Wilmington, investigate the feasibility of a high-lift rail bridge across the Cape Fear River from the port area to connect to the rail network in Brunswick County. This would remove port rail traffic from Wilmington.

# Evaluation of Market Opportunities at the Global TransPark

*The Global TransPark is one of North Carolina's most successful general aviation airports. It ranked third in terms of total payroll, and third in terms of total state and local sales taxes paid. There are currently 10 tenants at the GTP; combined private employment accounts for about 490 jobs as of September 2014; these job figures are anticipated to rise in the near term with the ramp up of production at Spirit AeroSystems. With the operating budget on the cusp of breaking even, the facility's risks are on the upside.*

## Original Concept and Expectations

The idea for the Global TransPark was introduced in Governor Jim Martin's 1991 State of the State address. Conceived as an industrial park at the hub of a multimodal transportation network that had a cargo airport at its core (or "Aerotropolis"), the idea was developed by John Kasarda, a professor at the University of North Carolina. As envisioned, the facility would integrate just-in-time manufacturing with air freight systems. The facility was anticipated to have direct connections to rail lines, access to the Port of Morehead City, and multiple connections to interstate highways. The idea advanced rapidly from idea to reality; the General Assembly created the GTP Authority as an independent state government agency in 1991; Kinston was selected as the site; a master plan was completed for the Kinston site in 1994; and, the first tenant, Mountain Air Cargo, opened for business in 1996.

**Exhibit 5-1: Map of the Global TransPark**



## Considerations in the Original Site Selection

The Kinston site was selected through a competitive RFP process. Evaluation criteria included:

- Size of the site, number of runways constructed, and available land for industrial development
- Cost of available property
- Availability of land
- Topography, environmental, and geotechnical considerations
- Population density within a five-mile radius for noise abatement issues
- Utilities
- Trucking distances to the Port of Morehead City, Wilmington and Sunny Point
- Railway lines serving the tract or distance to existing lines if not directly served
- Airports in the vicinity of the proposed site
- Distance and routes to existing or proposed four-lane, divided, controlled access state or interstate highways

- Number of potential workers and average wage in 50-mile commuting distance
- Availability of training facilities in vicinity of proposed site
- Quality of life and amenities in the vicinity of the site
- Presence of similar industrial/distribution facilities already established in the area

### Today's Tenants and Activities

Today, there are ten (10) tenants at GTP including Mountain Air Cargo, its first tenant. These include: Spirit AeroSystems, Crate Tech, Inc., DB Schenker, MJE Telestructure (DC Power), Henley Aviation, Kinston Jet Center (the fixed base operator—also basing charter jets at GTP) and three public agencies (North Carolina Emergency Management, the North Carolina Forest Service, and North Carolina's Eastern Alliance economic development organization). Of these, Spirit is the by far the largest employer; Crate Tech located at GTP to have proximity to Spirit. All but one of the private companies at the facility has a tie to aviation manufacturing or air logistics. Logistics, aerospace, and energy are all target industries identified in North Carolina's Jobs Plan.<sup>28</sup> As part of a 2010 MOU, the Global TransPark can be utilized by N.C. Emergency Management as a staging area during emergencies and natural disasters. Collectively, the private employers account for about 490 jobs in September 2014. Spirit AeroSystems alone is expected to create over 1,000 jobs at full employment levels.

A location at GTP offers tenants:

- Access to an 11,500-foot runway, with an Instrument Landing System (ILS) being upgraded to Category III
- Cargo facility/warehouses with runway access
- Building/hangar sites offering airfield and highway access
- Special construction financing options available for qualifying buildings
- FTZ #214 provides exemptions or reductions in customs duties
- Access to a 33,000-square-foot training/conference center

### Mission and Expectations

GTP does not have a statutory mission; its adopted mission is economic development: 1) increase skilled, well-paying jobs in Eastern North Carolina, 2) support education, research and development efforts related to the creation of new economic opportunity, and 3) to attract economic investment from identified, targeted industries.

There is an inherent tension between the facility's economic development mandate to spark growth in North Carolina and to be economically self sustaining. For example, favorable rents offered to attract new business investment and jobs to the State temper gains in operating revenues that would help the facility break even on an operating basis. The Global TransPark is on the cusp of breaking even on an operating basis. Numerous stakeholders interviewed for this study felt that GTP's successes needed to be better communicated and that it needed a more positive image.

*On an operating basis, the Global TransPark is on the cusp of breaking even.*

<sup>28</sup>North Carolina Economic Development Board, "North Carolina Jobs Plan: Recommended Strategies for Economic Growth, 2014-2024," December 2013, page 10.

## Budget Trends

Exhibit 5-2 summarizes revenues and expenses over the three most recent years. Miscellaneous revenue is generated from a variety of sources: maintenance services provided to customers at the park, fuel flowage fees from the FBO (for every gallon sold, GTP receives a percentage of the sale), and revenue from the solar panels on the roof of the training center (annual payment back). There are other minor revenues, but those three comprise the majority of miscellaneous revenues. Maintenance projects for the runway qualify for FAA grant funds.

In May 2014, GTP had approximately \$37M in debt; as of the end of 2014 that debt has been reduced to about \$8M. The debt payments were a combination of the General Assembly's approval of paying off the Escheat fund debt and payments for other long-term debt that had been incurred in a higher-interest environment. By repaying those, GTP has saved significant interest.

Had Spirit's employment growth not been delayed by changes in aircraft orders, the Program Evaluation Division of the NCGA concluded that GTP would have been on track to break even on its capital investment in 2025, measured as a comparison of North Carolina investments in GTP to sales and income tax revenues received by the General Fund from direct private sector employment.<sup>29</sup> Recent capital investments push this date out into the future, assuming current employment does not change. The attraction of new tenants accelerates progress toward breaking even and enjoying a positive ROI going forward. Any near-term initiative that supports recruitment or additional sources of revenue accelerates the breakeven year.

*Exhibit 5-2: The Global TransPark is Close to Breaking Even on an Operating Basis*

Year		2013	2014	2015
Revenues	State Appropriations	\$1,000,000	\$1,000,000	\$750,000
	Aviation Grants	\$157,383	\$8,400	\$478,438
	Rents	\$1,456,057	\$1,215,211	\$1,205,341
	Interest Income	\$24,151	\$19,257	\$14,000
	FBO Settlement	\$0	\$954,254	\$0
	Miscellaneous	\$473,309	\$403,335	\$336,033
	<b>Total</b>	<b>\$3,110,900</b>	<b>\$3,600,457</b>	<b>\$2,783,812</b>
Expenses	Projects	\$1,362,163	\$0	\$0
	AF Maintenance	\$0	\$145,441	\$579,545
	Principal Debt	\$807,436	\$618,020	\$4,292,531
	Interest	\$453,932	\$444,141	\$204,785
	Salaries and Benefits	\$849,030	\$941,119	\$936,167
	Contracted Services	\$347,970	\$374,927	\$78,784
	Utilities	\$279,492	\$308,743	\$219,750
	Repairs/Supplies	\$393,380	\$107,901	\$92,986
	Other	\$260,986	\$306,212	\$240,737
	<b>Total</b>	<b>\$4,754,389</b>	<b>\$3,246,504</b>	<b>\$6,645,285</b>
Cash Draw Down	<b>\$0</b>	<b>\$0</b>	<b>\$3,861,608</b>	
Net Income	<b>-\$1,643,489</b>	<b>\$353,953</b>	<b>\$135</b>	

Source: Global TransPark Authority

<sup>29</sup>North Carolina General Assembly Program Evaluation Oversight Committee. "North Carolina Should Weigh Continued Investment in the Global TransPark Authority and Consider How to Repay the Escheat Fund Loan," Report Number 2011-02, April 19, 2011, page 14. Estimate excludes corporate and local tax receipts as they are difficult to estimate reliably. Estimate also excludes tax receipts generated by indirect and induced job creation. Thus, the estimate is a conservative estimate.

## What's Changed Since GTP Was Established?

Global TransPark differs from its original vision in that the network of supporting transportation infrastructure is less dense than planned at the time of the facility's inception. At the same time, market conditions and its role in the broader economy have changed from the 1990s when GTP's development began. Some of the key changes are:

**Containerization.** The size of ship loads and variety of commodities that travel via container has increased rapidly over the past 25 years, increasing the capacity of sea routings, making it much easier to utilize maritime transportation than anticipated when GTP was first envisioned, and maintaining a wide gap in cost between the two modes. Air cargo remains concentrated on high valued-added commodities.

**Ongoing Consolidation of the National Freight Network.** Significant investment over the past decade along key rail corridors to permit double-stacking and address other choke points by both Norfolk Southern and CSXT Transportation have served to "lock in" freight corridors as the railroads seek to maximize the utilization of these investments. The more that freight is consolidated along common routings, the greater the efficiency of the network's performance and the greater the profitability of the railroad's operation along that corridor. By extension, those areas "off" the dominant routings are finding it more difficult to compete for freight operations. A recent study by the Brookings Institution found that just 10 percent of the nation's trade corridors move 79 percent of all goods. The key distinguishing feature for GTP is its aviation capability, and this has been a major feature in nearly all of its successful firm relocations to date. For traditional bulk commodities, however, the outlook is more guarded.

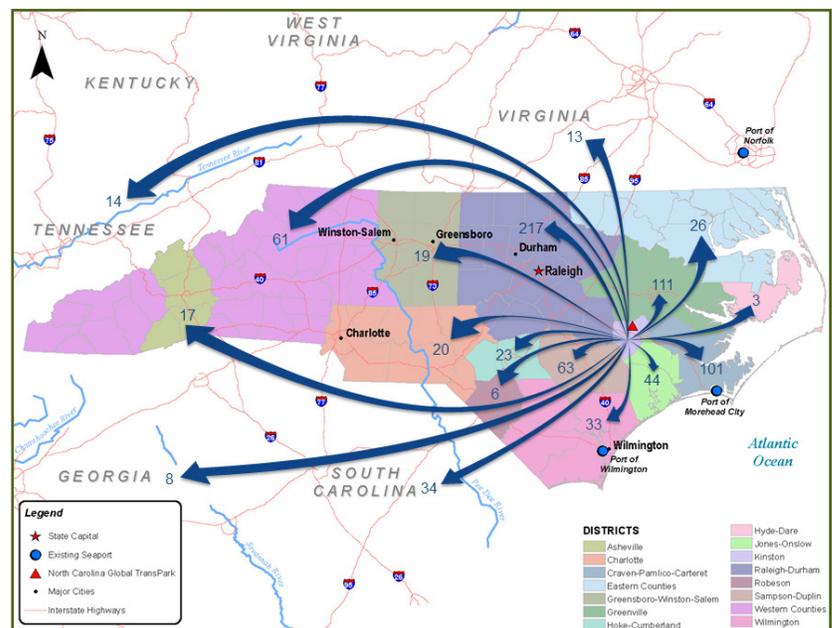
## Is There a Case for Developing a Dry or Refrigerated Bulk Inland Terminal at GTP?

The SB 402 legislation directs an investigation into three related questions concerning the Global TransPark:

- The first is whether a dry or refrigerated bulk inland terminal is viable at the GTP.
- The second is where there are other manufacturing opportunities that should be pursued at GTP.
- And closely related is the third question, whether there are transportation or related handling equipment investments that should be made in order to foster further development at the GTP site.

While the first question is an evaluation of a specific investment scenario, the other two questions are more open ended. These questions are taken sequentially. The following discussion assesses whether local shippers would realize savings from a dry or refriger-

*Exhibit 5-3: Truck Flows from the Kinston Region*



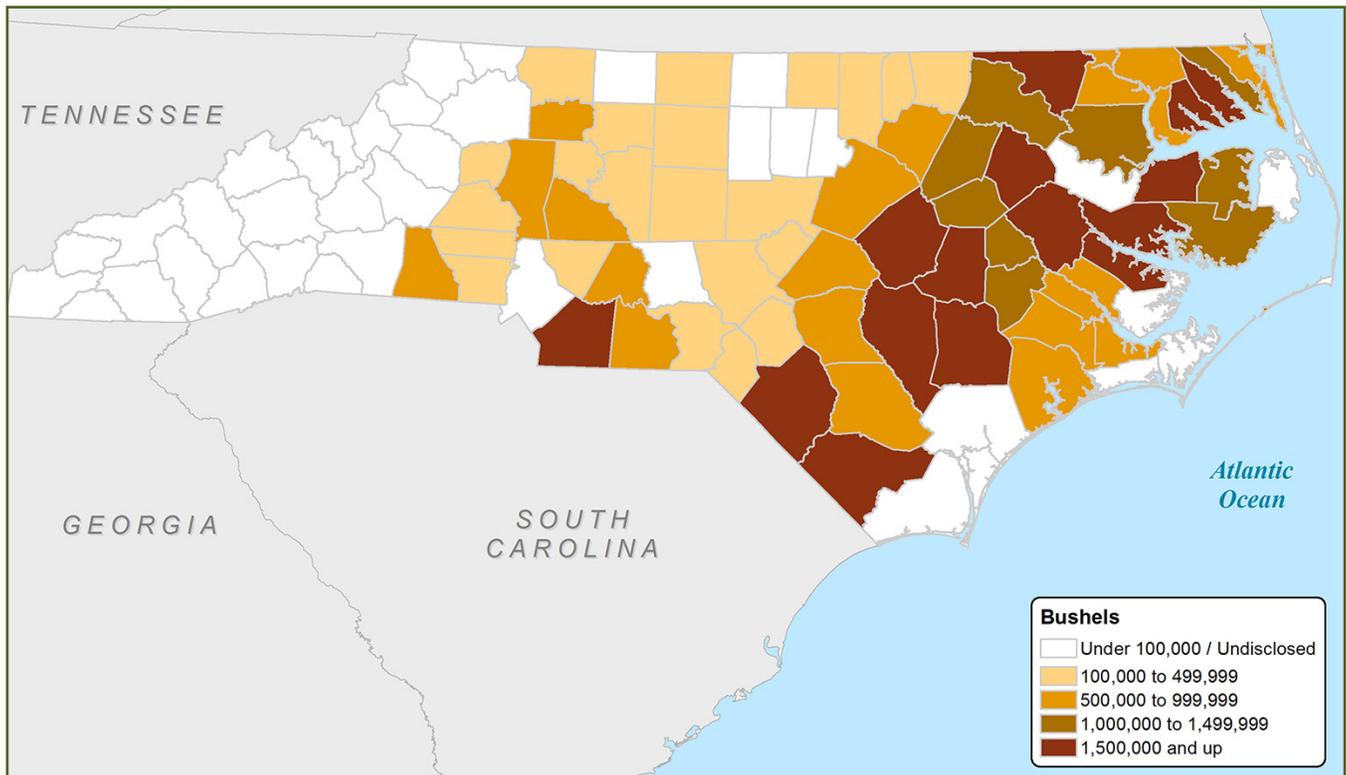
ated bulk terminal at the GTP. The balance of the section considers whether there are other opportunities for the site. Exhibit 5-3 illustrates the flow of truck traffic from the region surrounding GTP, based on the North Carolina statewide travel model. Volumes are not large and the heaviest flows are by manufacturers outside of the GTP, as well as flows to grain elevators in the nearby regions.

In order to examine the feasibility of establishing a bulk terminal at GTP, four types of facilities have been proposed for construction at the Global TransPark to handle dry bulk/grain and refrigerated goods. The analysis is conducted in two parts.

- The first question examines whether agricultural producers could save transportation costs by utilizing a facility at GTP—if there is no savings, shippers will not use the facility and additional analysis is not informative.
- If the answer to the first question is yes, and the analysis finds that shippers would save transportation costs and would use the facility, the second question is whether the aggregate shipper savings and related public benefits exceed the capital and operating cost over the evaluation period—assumed to be 30 years.

Given the agricultural industry in the region, the dry bulk resource would likely be wood pellets or soybeans or another type of grain. This is the working assumption in framing the scenarios for evaluation. Soybean production is concentrated in the eastern part of the state. Refrigerated goods could be sweet potatoes—such capability would extend the shelf-life and/or market reach of North Carolina’s growers who export to the European market. Exhibit 5-4 highlights the state’s concentrated sweet potato production region.

**Exhibit 5-4: Sweet Potato Production by County, 2012**



Source: USDA and North Carolina Department of Agriculture & Consumer Services

The assumptions included in the analysis are outlined in the following sections, including the scenarios tested, methodology, and the conclusions.

## Scenarios

The SB 402 legislation specifically requires analysis of an inland terminal, transload equipment, and refrigerated and dry storage. These four facilities define the three scenarios,<sup>30</sup> which are described below in terms of assumptions used in the calculations for the baseline and the build scenarios. All scenarios are analyzed over 30 years (2020-2049) and discounted to the present using a 7% interest rate. The baseline scenario considers trucking goods from their origin to their destination port, bypassing GTP. The improvement case considers whether there is a savings to shippers by loading goods onto rail at GTP.

### Baseline and Scenario Assumptions

The baseline assumes a volume equivalent to that of 90 rail cars per day, approximately equivalent to a unit train. The scenario assumes that shippers operate year-round as a way of smoothing seasonal peaks and troughs, resulting in an annualization factor of 365 days per year. One rail car can hold the equivalent of approximately four truckloads,<sup>31</sup> and soybeans are used as an example commodity for the analysis.<sup>32</sup> There are three likely destinations: the Port of Morehead City, Port of Wilmington, and the Port of Norfolk. The distance traveled per truck is 71 miles to the Port of Morehead City<sup>33</sup> in Scenario 1, and 89 miles to the Port of Wilmington and 152 miles to the Port of Norfolk in Scenario 2. The numbers of trucks are expected to conservatively grow by 1% per year and carry 6.75 tons on average.<sup>34</sup> The per ton mile cost to ship by truck and train is shown in Exhibit 5-5 below.

In addition to shipping costs based on distance and tonnage, there are lift/handling fees and interchange fees that shippers incur. A lift/handling fee is charged at each end of a trip for handling the goods and is estimated at \$90 per truckload.<sup>35</sup> This assumption is tested in the sensitivity analysis when a much lower \$10 fee is modeled to see if it changes the outcome. Goods are transferred from trucks to rail under the three scenarios, and because each rail car must connect with a Class I at the juncture of the spur, an interchange fee is incurred in addition to handling fees.<sup>36</sup> The interchange fee is charged by rail operators per carload for shipments transferring between rail lines and is estimated to be \$228 per train car.<sup>37</sup> Because a variety of agreements and operating arrangements could alter the interchange fee, the sensitivity analysis also considers a \$0 fee.

### *Exhibit 5-5: Truck and Train Shipping Costs, \$2014*

Cost per Ton Mile			
Destination	Truck	Single Car Train	Unit Train
Morehead City	\$0.19	\$0.432	\$0.132
Norfolk (container)	\$0.19	\$0.998	
Wilmington (container)	\$0.19	\$1.415	

Sources:

\*Rypinski, Arthur. "Trucks and Federal Policy." RFF Workshop: Energy Use and Policy in the Trucking Sector. U.S. Department of Transportation. 10 Oct. 2012. Web. <[http://www.rff.org/Documents/Events/121010\\_trucking\\_event/Rypinski-presentation.pdf](http://www.rff.org/Documents/Events/121010_trucking_event/Rypinski-presentation.pdf)>.

\*\*URCS Database: assumes NS is operator, 27 tons per rail car, "hopper-open top general" car type for bulk and "flat car – general service" for container, commodity types include "food & kindred products" and "lumber & wood products," shipment charge set to 0, 90 cars per unit train and 1 car per single car train, segment type parameter set to "originate and terminate"

<sup>30</sup>Transload and dry storage facilities serve the same products

<sup>31</sup>ICLEI: Local Governments for Sustainability. Environment and Economy Working Together: Holyoke's Partnership with Freight Rail. Rep. ICLEI: Local Governments for Sustainability, n.d. Web. Nov. 2014. <[http://www.icleiusa.org/action-center/learn-from-others/Freight\\_Case\\_Study.pdf](http://www.icleiusa.org/action-center/learn-from-others/Freight_Case_Study.pdf)>.

<sup>32</sup>Informa Economics, "Heavier Semis: A Good Idea?" June 2009.

<sup>33</sup>Because the distance from the origin to GTP is unknown, only the distance between GTP and the Port of Morehead City is considered in the analysis. It is assumed that it is economical to truck from the origin to the Port of Morehead City.

<sup>34</sup>A trainload of soybeans is approximately 27 tons, and there are four trucks per railcar, resulting in 6.75 tons per truck.

<sup>35</sup>Some shippers will pay more, some will pay less based on contractual agreements, but \$90 is an assumed average based on AECOM analysis.

<sup>36</sup>Under Scenario 1, one interchange fee is incurred per rail car. In Scenario 2, two interchange fees are incurred per rail car.

<sup>37</sup>URCS Database, output line 623 for interchange operating costs based on NS; however, the \$228 fee per train car is assumed to be equal among the different rail operators: spur operator, NS, and CSXT.

### **Scenario 1: Dry Bulk/Grain Facility**

Scenario 1 considers constructing a dry bulk/grain storage facility at GTP. The facility would be capable of transloading and storing goods such as wood pellets or soybeans with the goal of removing trucks from the region's roads and consolidating trips to the Port of Morehead City through rail. The facility at GTP would provide trucks with a centralized location to bring bulk shipments to be combined onto Norfolk Southern trains for final shipment to the port. The analysis considers whether the investment costs less than the baseline or existing conditions, which is trucking the goods directly to the Port of Morehead City. Contractual requirements add further complexity. For example, for soybeans much of the Eastern North Carolina crop comes to Selma and Raleigh Cargill facilities and is then shipped to Georgia in unit trains. The CLNA has some business that goes to CSX and on to the port at Norfolk. Scenario 1 has two alternatives that are compared to the baseline, as described below. The key difference is the cost per ton mile for shipping by single car train or by unit trains.

- 1A (Baseline) – ship product to Port by truck
- 1B (single car train) – ship product to GTP by truck, unload, store, and load onto train of mixed freight (not a unit train) to Port of Morehead City
- 1C (unit train) – ship product to GTP by truck, unload, store, and load onto unit train to Port of Morehead City

### **Scenario 2: Container Facility**

Scenario 2 considers constructing a facility that handles containers at GTP, much like an inland port. The goal of the facility would be to remove trucks from the region's roads, and consolidate trips to ports through rail. Another purpose of the facility would be to provide a centralized distribution center in eastern North Carolina for containerized goods, particularly for bulk products. Some soybean growers export via container to deliver a higher quality product and earn a higher rate. Also, the development of identity-preserved crops (high value, premium or niche market grains produced with a specific end use in mind) and food safety requirements are supporting a greater use of shipping agricultural products in containers, especially for the export market. The analysis considers whether shippers using a container facility at GTP would pay more or less than the baseline shipping cost, which is defined as trucking the goods directly to the Port of Wilmington or Norfolk (as Morehead City is not equipped to handle large-scale containerized operations). As a result, there are two alternatives to Scenario 2 that are compared to the baselines. The scenarios vary in the distance goods would travel to their respective ports.

- 2A (two Baselines) – ship containers to Port (Norfolk/Wilmington) by truck
- 2B (Norfolk) – ship containers to GTP by truck, unload and repack container, and load on train to Port of Norfolk
- 2C (Wilmington) – ship containers to GTP by truck, unload and repack container, and load on train to Port of Wilmington

### **Scenario 3: Refrigerated Goods**

If there were a refrigerated packing and warehouse distribution facility at GTP, the goods could be transported in and out three ways: (1) by rail to the Ports of Wilmington or Norfolk (as Morehead City does not have the capability to handle refrigerated containers); (2) by cargo plane; (3) trucked in, repackaged and consolidated, and trucked to port. The feasibility of the three scenarios is qualitatively discussed in the paragraphs below.

In order to ship by rail, goods would need to be loaded at GTP and onto the NCDOT rail spur and transferred to NS, thereby incurring a fee per rail car for the interchange if NS does not operate the rail line. Norfolk Southern's recently quoted rates at the spur are not truck competitive due to traffic on the line, and this is detrimental to the shippers' bottom lines. And, as the bulk analysis above suggests, the handling and interchange fees are also high. In addition, the shipments would incur a time cost as it would take longer to divert to GTP than to travel the relatively short distance to the Port directly by truck. Continuing to the Norfolk or Wilmington ports will cost travel time and interchange with CSXT. If a CSXT rail spur were constructed at GTP, CSXT could carry to Portsmouth and Wilmington over a circuitous route, and the interchange between the GTP spur and the CSXT would remain. If a refrigerated facility were to be constructed in the region, it would not likely locate at GTP because of the interchange costs and inconvenience of reaching a compatible port by rail.

With rail a less desirable option, shipping the refrigerated goods by air is another possibility. The Raleigh-Durham International Airport (RDU) is a nearby competitor with existing air cargo services and is only 95 miles from GTP. Currently there is no demand for air cargo into or out of GTP. If there were demand, it would be priced at double the cost due to the lack of a backhaul opportunity. As a result, using air cargo services at RDU is a more feasible opportunity than utilizing air service at GTP.

Because shipping refrigerated cargo by rail and air are financially infeasible, trucking is the preferable mode of transport. Trucks could move the goods more efficiently to Wilmington and Norfolk than rail or air, and at a more affordable cost in a shorter time.

## Methodology

The following methodology was used to compare between the baseline and the two "build" scenarios in the analysis.

### Costs to Shippers

There are three primary costs that shippers bear with moving goods: shipping costs, lift/handling fees, and interchange fees. Each cost places an additional pressure on shippers' bottom lines and comes into consideration when deciding on modes for transport.

### Shipping Costs

Shipping costs are the cost per ton mile to move the product. In the baseline, the annual number of trucks is multiplied by the tons per truck, the average cost per ton mile to transport by truck, or \$0.19,<sup>38</sup> and the distance to the Port of Morehead City. The build compares the cost of shipping by rail to the baseline of truck.

- Scenario 1  
Scenario 1 considers shipping by rail from GTP to the Port of Morehead City by mixed freight trains or unit trains. In order to estimate the scenarios' shipping costs, the number of trucks was converted to rail cars.<sup>39</sup> The rail cars were then multiplied by the applicable cost per ton mile as shown in Exhibit 5-5, the distance to the Port, and the tons per rail car.<sup>40</sup>
- Scenario 2  
The cost of shipping in Scenario 2 was estimated in the same methodology as Scenario 1, but the destination ports were different. The containers would be shipped by rail to the Port of Norfolk at a distance of 152 miles from GTP, or to Wilmington which is 89 miles from GTP. Both routes used the cost for a single car train.

<sup>38</sup>Rypinski, Arthur. "Trucks and Federal Policy." RFF Workshop: Energy Use and Policy in the Trucking Sector. U.S. Department of Transportation. 10 Oct. 2012. Web. <[http://www.rff.org/Documents/Events/121010\\_trucking\\_event/Rypinski-presentation.pdf](http://www.rff.org/Documents/Events/121010_trucking_event/Rypinski-presentation.pdf)>.

<sup>39</sup>One rail car can hold approximately 4 truckloads

<sup>40</sup>27 tons per rail car, per the Soy Transportation Coalition and the United Soybean Board, 2009

### Lift/Handling Fees

Handling fees are applied to the truck and trainloads at each transition point and therefore mean that the more handling that a product needs in transport, the more it will cost to move. The cost per lift for trucks and containers was assumed to be a market rate of \$90. The handling in the baseline for both scenarios assumes that the trucks are loaded at the origin and unloaded at the destination, resulting in two lifts for the whole trip.

- Scenario 1  
The trucks arriving at GTP have already experienced one lift at the origin. Once at GTP, the goods are offloaded to a storage facility, resulting in another move. Loading onto the train for the trip to the Port is a third move, and unloading at the Port is the fourth and final movement of goods. Four fees are applied in Scenario 1: two to trucks and two to rail cars.
- Scenario 2  
Trucks bring the containers to GTP where they are unloaded, stuffed, and loaded onto trains to Norfolk or Wilmington. Four fees are applied in Scenario 2: two to trucks and two to rail cars.

### Interchange Fees

Railroads charge fees for interchanging trains between carriers for the right to travel over another railroad's track or to switch the cars to another carrier's locomotive. Because truck is the only mode used in the baseline, no interchange fees are incurred. Interchange fees are charged on a per-car basis, so the number of train cars is constant across Scenarios 1 and 2. However, the number of interchanges varies based on the existing Class I networks between GTP and the destination ports.

- Scenario 1  
In Scenario 1, the trains would interchange once between the GTP spur and NS, who operates the mainline that the spur connects to. One interchange fee of \$228 is charged per rail car in Scenario 1.
- Scenario 2  
In Scenario 2, there are two interchanges for each of the destinations. Trains from GTP destined for the Port of Wilmington will incur two interchanges: one from the GTP spur to the NS mainline, and again from NS to southbound CSXT at Goldsboro. The containers going to the Port of Norfolk experience the same interchanges, though the trains head northbound at Goldsboro on CSXT. Each interchange incurs a \$228 fee per car.

None of the scenarios considered yielded a savings relative to shipping directly by truck. Sensitivity analyses were performed to determine whether key assumptions would change this result. This included reducing the handling fee from \$90 to \$10 per move, testing a range of truck to rail car ratios to reflect the variations across possible commodities handled, and eliminating the interchange costs. While the size of the penalty varied, the cost penalty of the shipping, additional handling, and interchanges could not be overcome given the comparatively short distance to the Ports.

**Exhibit 5-6: Summary of Scenario Cost Penalty Compared to Trucking**

Summary in \$2014M	Scenario 1: Dry Grain/Dry Bulk		Scenario 2: Containerized Bulk	
	1B: Grain comes to GTP by truck, goes to MHC by rail	1C: Grain comes to GTP by truck, goes to MHC by unit train	2B: Unload truck and re-stuff at GTP and ship to Norfolk by rail	2C: Unload truck and re-stuff at GTP and ship to Wilmington by rail
<b>Discounted Net Shipping + \$90 Handling + Interchange Costs</b>	\$ (282.6)	\$ (97.9)	\$ (1,275.4)	\$ (1,153.2)
<b>Discounted Net Shipping + \$10 Handling + Interchange</b>	\$ (231.2)	\$ (46.5)	\$ (1,224.0)	\$ (1,101.8)
<b>Discounted Net Shipping + \$90 Handling + Interchange (using 7 trucks per rail car)</b>	\$ (196.7)	\$ (12.0)	\$ (1,091.5)	\$ (1,045.5)
<b>Discounted Net Shipping + \$90 Handling + Interchange (using 2 trucks per rail car)</b>	\$ (339.9)	\$ (155.2)	\$ (1,398.0)	\$ (1,225.0)
<b>Discounted Net Shipping + \$90 Handling + \$0 Interchange</b>	\$ (209.1)	\$ (24.5)	\$ (1,128.5)	\$ (1,006.3)

**Note: All scenarios are compared to trucking the goods to the destination**

By moving goods from truck to rail with the bulk/dry transload and container interchange at GTP, there are public benefits realized by other users of the state’s roads. Additional analysis considered whether the public benefits were sufficiently large to cancel the shipping penalty. The reduction of truck traffic would result in pavement and congestion savings.<sup>41</sup> However, as shown in Exhibit 5-5 the per ton mile cost to shippers to use rail is greater than truck unless a unit train is used. As a result, only Scenario 1C could ever overcome the shipping, interchange, and handling costs. The public benefits from a bulk facility serving unit trains at GTP would only overcome the costs if it were 215 miles or more from the Port of Morehead City. Thus, the benefits to the public of taking trucks off the road do not offset the costs to shippers of using a bulk facility at GTP. It is important to note that the public benefits are not likely to influence the mode by which a shipper sends goods; the costs incurred by the shipper will determine whether truck or rail is the more economical choice.

**Summary and Conclusions**

As seen in Exhibit 5-6, none of the movements provide benefits to users compared to shipping by truck. Moreover, in addition to the facility costs at GTP, other infrastructure investments would be required to handle the dry bulk shipments at the Port of Morehead City. Further, the region already has a number of established dry bulk handling facilities.

The unit train option comes closest to breaking even. Were market conditions to evolve to support this option, a spur off of the current spur would need to be constructed, in addition to the facility itself. There is not sufficient room to accommodate a unit train at the location of the current spur without disrupting the flow of traffic for other tenants at the GTP. Finally, there are

<sup>41</sup>The methodologies of the pavement and congestion savings are described in Appendix 2E and are based on the reduction of vehicle miles traveled by truck.

numerous available sites outside of GTP that would readily accommodate a bulk terminal if needs change; a location directly on the mainline would save considerable handling cost relative to the GTP site. For these reasons, a bulk terminal at GTP is not recommended as a candidate investment. Likewise, the GTP's original intent, as well as success to date, has been in the aviation and technology fields. However, if the market dictates a need, a bulk site on the North Carolina Railroad Company (NCRR) mainline would reduce shipping costs for other shippers in the area, including those located at the GTP.

A bulk handling facility at the Port of Morehead City was recommended by the state's Maritime Strategy. While it is unlikely that the facility would attract grain shipments from the Midwest, it could serve the state's own agricultural producers, saving those that export the transportation cost of shipping to more distant ports. Such a facility would draw from a much wider share of the state's agricultural producers and permit significant shipping cost savings relative to the next best option currently available. The Maritime Strategy report also noted that North Carolina producers often receive a higher price for exported commodities than when sold in the domestic market, supporting the profitability of North Carolina farmers.

## Approach to Identifying Other Opportunities

Beyond the direction to assess the feasibility of establishing a bulk facility at GTP, the SB 402 legislation also directs that other opportunities or investments that could support development at GTP also be considered. This latter charge is a much more open-ended inquiry. Possible ideas were identified through industry research and extensive interviews with knowledgeable experts who could advise on emerging market opportunities. Opportunities that overlapped and supported existing regional industries or built on existing state programs/facilities were of particular interest.

*The market research found that market opportunities at GTP are not precluded by physical road or rail capacity.*

Rail costs along the existing line between GTP and the Port of Morehead City were cited as a concern, but this is due to lack of volumes to support cost-effective service, not insufficient capacity under existing lease structures. Improvements to the road connections between Eastern North Carolina and I-95 and the Triangle would support growth in the region as described in the US 70 Corridor Commission's report, but again, no specific industry group or employer indicated that "but for improved road access, we would locate our business at the GTP."

In the absence of a specific market opportunity to evaluate, the market study broadened in scope to identify actions that could incrementally build market and position the GTP for long-term success. In order to structure the inquiry, a two-stage approach was developed. One part of the search focused on identifying comparatively short-term initiatives that could help bolster operating revenues at GTP. The second part of the search focused on longer-term development initiatives.

These are included here to illustrate the range of opportunities that could utilize a location at GTP to generate economic development in Eastern North Carolina. None of these opportunities are immediate. Economic development cannot be scheduled—there are many factors that are outside the control of GTP staff or the state—the volume of potential leads varies over time with the state of the economy and trends in particular industries. Chapter 3 underscores that many of the major themes identified in workshops and interviews describe the economic region surrounding the GTP and the Port of Morehead City, rather than deficiencies of the assets themselves. The market opportunities are suggested here as an illustration that GTP

could be attractive to a variety of industries and to show that there is upside potential for the facility. In the near term, there are a number of policy changes that could make it easier for GTP to reach its potential: 1) clarify that it is a state asset and its funding status, 2) acknowledge that incentives giving tenants below market rents are important to attracting business to this region of the state, but undermine the facility's ability to break even on its operating costs; 3) clarify its role in the state's broader economic development initiatives so that economic marketing organizations are helping to market it; 4) support the facility to keep it in a state of good repair; 5) acknowledge that the GTP has had success in terms of economic development and reset expectation from those initial estimates of job creation.

## GTP Payback Analysis

There are several ways that GTP's return on investment can be considered. These include the economic impact activity generated by the facility relative to the state's investment, a comparison of the operating revenue to the operating support cost incurred by the state, and comparison of state tax revenues relative to total capital and operating funds invested in the facility.

Given its mandate to generate economic development, the first consideration is a comparison of the economic impact of the facility relative to the capital and operating investment that has been made by the state in the facility.

### State Investment

The expenditures used in the payback analysis include those from the General Fund and Highway Fund, as well as the costs of the Harvey Parkway and Rail Spur projects. All costs were converted to 2014 dollars using the GDP deflator from the Office of Management and Budget. The expenditures were spread evenly over the years during which the funds were used. The General and Highway Fund expenditures were spent from 1995-2010, while the Harvey Parkway was constructed from 1999-2014 in four phases. Finally, the rail spur was constructed from 2010-2012. In addition to the capital and construction costs, operating expenses were collected from GTP annual reports from 2004-2013. All other years in the analysis were assumed to have O&M expenses of \$1.43 million, to be consistent with "North Carolina Should Weigh Continued Investment in the Global TransPark Authority and Consider How to Repay the Escheat Fund Loan," hereafter called "Report 2011-12".<sup>42</sup> The individual expenses per year were totaled annually and discounted at a 2.4% rate, starting in 1995. The cumulative total of the expenses equals \$350 million, from the facility's inception through 2014. This value is applied in both the economic impact comparison and the total financial return assessment.

### Economic Impact

In 2013, the North Carolina Division of Aviation assessed the economic contribution of all airports in the state.<sup>43</sup> The report considered all commercial and general aviation airports in terms of Output, Employment Payroll Income, and Total State and Local Taxes. Among the state's 63 general aviation airports, the GTP (listed as Kinston Regional Jetport at Stallings Field in the report) was the second largest economic contributor after Mount Airy/Surry County Airport. It ranked fourth in terms of total employment impact, third in terms of total payroll, and third in terms of total state and local sales taxes paid. The GTP's annual economic contribution is estimated at \$219.4 million in output (a broad measure of economic activity), \$46.3 million in total wages and salaries, and \$5.8 million in state and local taxes. **The GTP is one of the state's most successful general aviation airports.** Given that these estimates were made in 2012 prior to the ramp up of production at Spirit Aerosystems, there is considerable upside to these estimates going forward.

<sup>42</sup>Final Report to the Joint Legislative Program Evaluation Oversight Committee, Report Number 2011-02, April 19, 2011, [http://www.ncleg.net/PED/Reports/documents/GTP/GTP\\_Report.pdf](http://www.ncleg.net/PED/Reports/documents/GTP/GTP_Report.pdf)

<sup>43</sup>Division of Aviation, "2012 Economic Contribution of Airports in North Carolina," Raleigh, North Carolina.

## Operating Impact

Annual operating revenues at the GTP are on pace to cover annual operating expenses, with a small surplus anticipated in 2015. As with the economic impact comparison, there is considerable upside as current tenants are expected to expand and new tenants could be secured in the future with additional marketing.

## Full Capital and Operating Payback Analysis

Although infrastructure assets are often evaluated on a benefit cost basis, the scope of benefits typically considers things such as emissions avoided, travel time saved, and accidents avoided—a mix of user and public benefits. Very few, if any, public infrastructure investments are evaluated based on whether the asset individually generates sufficient job growth to support taxable earning that repay the public entity that made the investment. The state's return is generally gauged by the economic activity induced by the asset. This is a very high bar for a piece of infrastructure to cross.

While the GTP is close to breaking even on an operating basis, the payback analysis examines the total of capital and operating investment put in place to determine whether/or when the Global TransPark revenues and tax receipts generated by activities at the GTP equal or exceed the sum of investment put in place. Various scenarios were then developed to test when, and under which circumstances, the facility will return a profit for the state. This analysis considers the timing of when investments were made and revenues received over time—discounting to a net present value for comparison. Thus, the analysis differs from one that simply scales up from the \$5.8 million estimate generated by the economic impact analysis.

## Methodology

The methodology followed closely to that which was conducted in 2011 for the document “Report 2011-02”<sup>44</sup> A return on investment was conducted and this payback analysis used the same inputs and methodology.

## Revenues

Revenues for the facility were estimated in a similar methodology as in Report 2011-02. First, facility employees were calculated based on Spirit AeroSystem's growth over time. Spirit expected 1,031 employees by 2014, and as of 2010 had 162. The years in between were interpolated linearly, and because there were existing tenants before Spirit arrived, the employees from 1996 through 2009 were held constant at 10 to be conservative. The annual salary of each employee was held constant at \$51,156<sup>45</sup> from 1995 through 2014. Starting in 2015 the salary was increased by a conservative 2% per year.

The effective income tax was applied to the annual salaries using a 3-year average of 2010-2012 from the North Carolina Statistical Abstract.<sup>46</sup> The income tax was subtracted from the total salaries to yield after-tax salaries. The after-tax salaries were factored by 47.2%<sup>47</sup> to represent the portion of salaries that could be spent on items subject to sales tax. The portion of after tax salaries that could be spent on items subject to sales tax was multiplied by the sales tax collection as a percent of personal income according to the U.S. Census Bureau, or 1.87% in North Carolina. The resulting sales tax revenues and income taxes were totaled to yield the tax revenues available to the state that result from employees at GTP. The annual revenues were also discounted at the 2.4% rate.

<sup>44</sup> North Carolina Railroad Company. 2007. “Track Relocation Feasibility Study: Havelock to Morehead City”

<sup>45</sup> The 2013 GTP Annual Report has the average salary at GTP to be \$50,402 (\$2013). The \$2013 was converted to \$2014 using the GDP deflator.

<sup>46</sup> 2012 North Carolina Statistical Abstract, Department of Revenue, <http://www.dor.state.nc.us/publications/abstract/2012/part3.html>

<sup>47</sup> From Table 1800 of the 2013 Consumer Expenditure Survey. Expenditures in the South, as a share of after tax income. Goods totaled to include: food; alcoholic beverages; maintenance, repairs, insurance, other expenses; household operations; housekeeping supplies; household furnishings and equipment; apparel and services; transportation; drugs; medical supplies; entertainment; personal care products and services; reading; tobacco products and smoking supplies; and miscellaneous.

## Net

The annual discounted expenditures were netted with the annual discounted revenues, resulting in a net annual cash flow, which varies from negative (more expenditures than revenues 1995-2014) to positive (more revenues than expenditures 2014 into the future) to over time.

*The GTP can yield a positive return on investment, if the State remains a patient investor as anticipated when GTP was established.*

The results indicate that the State of North Carolina can recoup its investment to date in GTP—the speed with which this happens depends critically on the pace with which new employment comes on line in intervening years. **Allowing the facility to fall out of a state of good repair or inefficient marketing of the facility work against this eventual positive return on investment.** For example, if employment ramps up to just 10,000 and never grows beyond this total, just 20 percent of that projected at GTP's inception by 2030, the facility returns a positive return on investment to the state by 2043 by conservative estimates.<sup>48</sup> This includes all expenses for GTP as well as the Harvey Parkway. Hitting that 10,000 job threshold earlier, or continuing to add jobs subsequent to 2030, speeds the payback as one would expect.

Through the team's own work and the extensive stakeholder analysis that included conversations with GTP staff, a number of market opportunities were identified. Given the length of time that GTP has been in operation, the team cast a wide net to capture all suggestions for supporting further development here—these include policy changes that permit GTP to compete effectively, small near-term investments to support revenue growth and incremental job growth, to ideas on how to position GTP for emerging longer-term opportunities. A common element throughout is that the team looked for opportunities to advance GTP in partnership with other state programs or assets so that the investment was leveraged across more than one state interest.

<sup>48</sup> The estimated timing is conservative because it only considers personal income and retail taxes paid by employees. Corporate taxes and retail taxes paid by the establishments are not factored in as they are difficult to measure well in the scenario (as noted in the initial analysis conducted by the Program Office) and also because the state might choose to waive some of these as an inducement to locate in North Carolina as an incentive.

## Class I Railroads & Dual Access

- Private corporations own railroads; they are not public rights-of-way.
- Class 1 and short line railroads have long-term investments in their single access to facilities and customers.
- Railroad haulage rates are based upon:
  - *Crew costs*
  - *Capital costs*
  - *Operating costs, switching and distance*
  - *Origin and destination*
  - *Track and equipment maintenance*
  - *Volume from other shippers on the line*
  - *Minimum profit required*
  - *Market conditions*
- Asking a Class 1 railroad to allow another railroad across their line is equivalent to asking a business to host their competitor.
- Railroads have set agreements with shipping lines, overland carriers and customers. There are also Federal regulations involving rates and access that are governed by the Surface Transportation Board (STB).
- Trucks are competitors to railroads, and increased revenue will likely come from diversions from truck to rail.
- Railroads often maintain long-standing agreements on trackage rights and leases. For example, Norfolk Southern's 1999 lease with the North Carolina Railroad Company is for 15 years, plus two 15-year renewal options - thus a 45-year arrangement.
- The condition of the track, and lateral/vertical clearances will determine the types, size and weight of traffic the railroad can accommodate.

*A common element throughout is that the team looked for opportunities to advance GTP in partnership with other state programs or assets so that the investment was leveraged across more than one state interest.*

**Exhibit 5-7: Market Opportunities for GTP**

Illustrative Future Market Opportunities for GTP	Summary
<b>Near-Term</b>	
<p><b>Military Aircraft Fueling at GTP</b></p>	<ul style="list-style-type: none"> <li>• <b>Description:</b> A Defense Logistics Agency (DLA) Military Fueling Contract would expand the services available at GTP and support greater utilization of the airstrip and existing fuel tanks on the property.</li> <li>• <b>Implementation Considerations:</b> This market opportunity would support the defense and aviation industries in the state and save the government time and money by having a more efficient location for fueling. Revenues can be generated through leases from fixed base operators and/or a cent(s) per gallon fee. However, risks include demonstrating existing demand (a condition of competing for the contract), competition from other locations for a government fueling contract, fuel price volatility, and, depending on the condition of the fuel tanks and capacity requirements, upgrades to existing infrastructure or constructing larger fuel tanks may be needed.</li> </ul>
<p><b>Partnership with Research Triangle Park</b></p>	<ul style="list-style-type: none"> <li>• <b>Description:</b> A partnership with the Research Triangle Park (RTP) would utilize portion of GTP’s available facilities for startup manufacturing as research from RTP develops into production.</li> <li>• <b>Implementation Considerations:</b> The partnership could benefit both parties and would keep jobs and economic activity in North Carolina for little initial capital. North Carolina has a strong research and development industry, but large economic gains are possible when innovations move from the lab to the production floor. There is no established relationship between RTP and GTP and some startups are currently looking out-of-state as they grow. While it would not immediately create large rent revenues, it would support marketing of the GTP, and increase the level of activity at the site.</li> </ul>
<p><b>3D Printing</b></p>	<ul style="list-style-type: none"> <li>• <b>Description:</b> 3D printing, also known as additive manufacturing, is the process of using a computer or machine to successively lay down layers of a material to create a 3-dimensional object. Additive manufacturing provides benefits for the manufacturing sector because it allows for just-in-time manufacturing rather than having to keep large stocks of inventory. 3D printing is also in the early stages of implementation within the medical field.</li> <li>• <b>Implementation Considerations:</b> 3D printing has the potential to generate revenue for GTP through leasing opportunities. Partnerships with the State’s educational institutions could allow for shared labor, technical support, training, and work opportunities—many of which are already active in this emerging field. There is a large initial outlay of capital needed, and there are risks in the supply chain including a high demand for printers, a long timeframe for output, regulations for transporting powders (supply), and difficulty in obtaining ideal raw products. In addition, FDA approvals for medical goods will likely take six to ten years and stringent hygiene and clean room operations require dedicated facilities.</li> </ul>
<b>Long-Term</b>	
<p><b>Wind Turbine Manufacturing</b></p>	<ul style="list-style-type: none"> <li>• <b>Description:</b> This opportunity makes sense if an offshore wind farm is constructed, using the Port of Morehead City as a service port. The wind turbines, once manufactured at GTP, could be delivered to the Port of Morehead City for partial assembly and shipped to the offshore wind farm for final construction.</li> <li>• <b>Implementation Considerations:</b> A wind turbine manufacturing facility could result in offshore wind power that would support the state’s renewable energy goals, provide skilled jobs in the region, allow GTP to earn lease revenues, and diversify the services and commodities handled at the Port. However, there is competition from neighboring states for this opportunity.</li> </ul>

**Exhibit 5-7: Market Opportunities for GTP (Cont'd)**

Illustrative Future Market Opportunities for GTP	Summary
<b>Emergency Management</b>	<ul style="list-style-type: none"> <li>• <b>Description:</b> GTP could operate as a base for state and local emergency management/disaster relief, including having a base for the Federal Emergency Management Agency (FEMA).</li> <li>• <b>Implementation Considerations:</b> Revenue generation would occur through leasing of space at GTP. However, to make operations feasible, warehouses and large covered parking spaces would be needed. Operating emergency management services at GTP would create a steady base for skilled labor, leveraging the assets of and complimenting the local military/defense and aviation industries in the region.</li> </ul>
<b>Reset of Military Equipment/ Aircraft Maintenance and Overhaul</b>	<ul style="list-style-type: none"> <li>• <b>Description:</b> The maintenance and overhaul of private and commercial aircraft, as well as the reset of military equipment fit with the capabilities of GTP's location.</li> <li>• <b>Implementation Considerations:</b> There are few downside risks to the opportunity. It is a growing private industry and GTP has available land, an airstrip, fueling for test flights, and a surrounding labor force with an attractive skill set. The primary downside risk is competition from other locations for the same relocating or expanding firms. In addition, North Carolina would need DOD approval to have a military equipment reset facility when there are established reset facilities in other states and the budget for investment and equipment reset has been shrinking. While this opportunity has been pursued in the past, it remains a good fit for GTP and future military actions may yield new opportunities to revisit this idea.</li> </ul>
<b>Refrigerated Rail Service for a National Network</b>	<ul style="list-style-type: none"> <li>• <b>Description:</b> This market opportunity would provide shipping and storage for any perishable food items that would be processed at GTP, thus allowing the processing of agriculture products to be a feasible, long-term sustainable industry. The potential to move biological material produced through additive manufacturing, as well as pharmaceutical products, would be additional sources of demand for refrigerated service operations.</li> <li>• <b>Implementation Considerations:</b> This market opportunity will be able to generate revenues through rental of GTP property. As the bulk analysis demonstrates, the GTP site does not work for local production given the short distance to the coast. The opportunity outlined here is for an intermediate location in a national distribution network for refrigerated goods. This is an emerging segment of the logistics industry, and Eastern North Carolina's location on the coast, mid-way between the Northeast and Southeast makes it a candidate location for a business with a national network.</li> </ul>

**Global TransPark Infrastructure Improvements**

A number of ideas for improving access to the Global TransPark were identified through the conduct of this study, as well as select investments on the site itself. No physical rail or road capacity constraints were identified. However, infrastructure improvements could help the GTP to realize a higher utilization of existing facilities and encourage further development at the GTP. Such investments would support the Governor's 25-Year Vision to improve transportation to Eastern North Carolina and to improve landside access to the Port of Morehead City.

**Invest to Maintain GTP in a State of Good Repair**

The Global TransPark has been operating on a declining budget recently. Because of this, maintenance staff has been reduced. It is important to keep the facility in a state of good repair as it is marketed to prospective tenants. In the past, GTP staff has proposed that GTP be eligible to apply for grants for economic development purposes, but to this date no permission has been granted. For example, GTP had a prospective tenant interested in building space, but the space would require refurbishing. GTP outlined why they should be permitted to apply for grants under the North Carolina Commerce Building Reuse Program, demonstrating their authority as both a body politic and corporate.

### **Rail Operator at GTP**

Rail service on the GTP spur (which is owned by NCDOT) has not yet been negotiated and assigned to an operator. Having an established rail operator for the GTP spur would aid businesses at the facility to ship goods via rail to the Port of Morehead City, or elsewhere. A variety of arrangements could be negotiated, ranging from NS to shortline operators, yielding a variety of service and price options. Currently, low volumes, oversize requirements that require special handling, and infrequent shipments from GTP to the Port of Morehead City translate into high price quotations for potential rail shipments along this corridor. Identification of an operator at the GTP could support marketing efforts at the facility, if the operator sought to identify other shippers in the area, thereby building volumes along the corridor and reducing the Class I's costs to serve the corridor. The cost of securing an operator at GTP is estimated to be small, covering the cost of staff and professional services to support the negotiation and the possible cost for a small trailer and paved parking lot if the operator were to maintain an office or staff at the facility.

### **Kinston Bypass<sup>49</sup>**

The purpose of the Kinston Bypass is to improve regional mobility, connectivity and capacity on US 70 from LaGrange to Dover to ease existing traffic congestion and delays, with standards now meeting the intent of the North Carolina Strategic Highway Corridors (SHC) Plan. This means that this portion of US 70 would be classified as a freeway. In addition to the bypass, upgrading the existing US 70 and US 70 bypass is also being considered. The most recent action of the project has been the introduction of the new Southern Bypass Alternative and the removal of the northern bypass alternatives from further consideration. The estimated cost is \$181 million (\$2014).

### **Provide CSXT Connection to GTP**

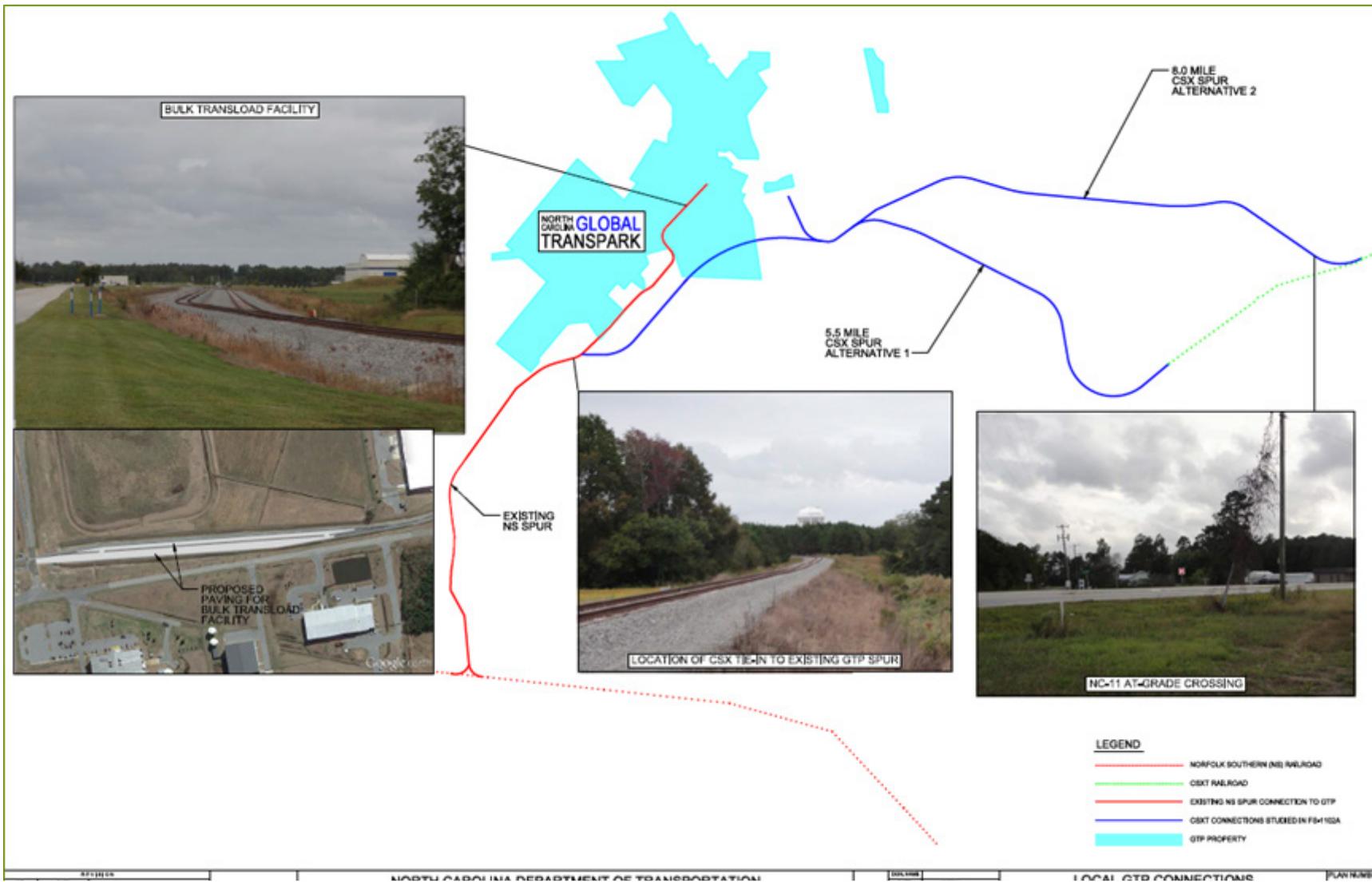
The CSXT connection at GTP will provide GTP with dual rail carrier access by extending the existing CSXT rail alignment from railroad point "Elmer" to the GTP property. There are two proposed alternatives for the rail spur that vary in length. The first alternative commences at the end of the existing CSXT alignment for an additional distance of 5.5 miles to connect with the existing NS-served GTP rail spur. The second alternative breaks off the existing CSXT alignment at an earlier stage and connects with the existing NS-served GTP rail spur for a total distance of 8 miles. These two alternatives can be seen in Exhibit 5-8. Alternative 1 and Alternative 2 are estimated to cost \$27.4 million and \$36.8 million respectively (\$2014). This price includes a 25% contingency. At this time, the low volumes at GTP do not necessitate a second rail operator serving the facility, but the planning, environmental, and conceptual design studies can be completed, and right-of-way can be secured to prepare the project in the event that it is constructed. CSXT is supportive of this direction.

The CSXT rail spur will allow operators to load and unload goods. This will allow for additional access to GTP, and therefore origin or destination of the shipment will be less of a hindrance as to whether an operator can access GTP. This means that manufacturers can have a wider geographic supply-chain and customer base. This would increase the attractiveness of GTP as a manufacturing hub.

---

<sup>49</sup>NCDOT Kinston Bypass, <http://www.ncdot.gov/projects/kinstonbypass/>

Exhibit 5-8: CSXT Connection at GTP



Source: AECOM

## Conclusions

Of the projects described in this chapter, most will require extensive and detailed engineering surveys, designs, and environmental analysis even after the planning stages. In addition, most of the projects are a significant capital cost, and would need maintenance throughout the lifetime of the investment. As a result, it is recommended that the following projects be considered in the near term. The remainder of the projects can be revisited once enough volume creates a purpose and need for their construction.

### *Short-term*

- Lease the GTP spur (owned by NCDOT) to a private rail operator.
- Continue to compete for a military fueling contract in 2016, including essential incremental investments to support the facility in this effort. This activity would provide GTP with additional revenues.
- Make spot improvements to the overall facility to keep it in a state of good repair.
- Examine GTP's authority to optimize its competitiveness for state and federal grant funds for capital improvement projects.
- Aggressively market the GTP facility and property on a national and international basis.
- Align incentives of development organizations so that a business locating to GTP is a win for the region as a whole.
- Investigate retaining State ownership of the New Bern North Craven Street North Carolina Railroad Company Water Access property as a potential barge transload facility for oversized cargo loads.

### *Longer-term*

- Incrementally upgrade US 70 to interstate standards as noted in Governor McCrory's 25-Year Vision.
- Consider locating a major government facility or cluster of related smaller facilities at GTP.
- Continue to market GTP for long-term opportunities that could be accommodated at the existing facility: aircraft refurbishment, additional aircraft manufacturing, advanced manufacturing, and agricultural research for example.
- Conduct the environmental analysis for a CSXT spur from the GTP to railroad point "Elmer" in Kinston and obtaining the advance right-of-way. Track could be installed quickly once a user was identified, and CSXT is supportive of this direction.
- Initiate an environmental/planning/design for Section C of the Harvey Parkway from NC 58 to NC 11.

# Evaluation of Market and Mobility Opportunities at the Port of Morehead City

*The Port of Morehead City is one of two marine ports managed by the North Carolina State Ports Authority. Specializing in bulk and breakbulk cargoes, the Port is also designated as a Strategic Military port. Near-term recommendations thus focus on a “Super Street”-style advanced and coordinated traffic plan to reduce rail and truck Port traffic conflicts with auto and pedestrian traffic on US-70 Arendell Street. Longer term, the development of a Mobility Corridor, inclusive of the northern rail and highway bypass, and full development of Radio Island for component or finished product processing, energy and intermodal uses, is part of the Governor’s 25-Year Vision.*

## Introduction

The Port of Morehead City is one of two marine ports managed by the North Carolina State Ports Authority. Both ports are designated as Strategic Military ports, 2 of only 22 strategic seaports (17 commercial and 5 military) designated to handle deployments. The Port of Morehead City is the State’s natural deep water terminal, located 4 miles from the Atlantic Ocean. The Port of Morehead City handles bulk and breakbulk cargoes, as well as some bulk cargo by barge. The port currently does not handle containerized goods.

Radio Island is located east of and adjacent to the main port area and has been used for liquid bulk activities in the past and retains this legacy infrastructure. Some limited residential development has taken place on a portion of the island. The balance of Radio Island offers an expansion opportunity for Port operations as market conditions warrant.

Norfolk Southern has an exclusive lease of the entire North Carolina Railroad Company track which does not allow for other operators to serve the port. The Morehead City Port infrastructure challenge is primarily due to rail and road conflicts through the town. Constraints on the Port’s business expansion include train velocity, efficient handling of unit trains and on-port storage/facility tracks. There are rail vertical and horizontal clearance issues identified between the GTP and the Port of Morehead City. Since 2001, the North Carolina Railroad Company has improved the rail line and removed a number of horizontal and vertical obstructions. Existing infrastructure efficiently serves the needs of current volumes, yet expanded rail capacity will be required to accommodate significant growth. Recent experience with new business opportunities like the wood pellet distribution facility highlighted the limitations of current rail capacity.

Phosphate dominates the port export activity, accounting for over 80 percent of volumes. The balance of export activity is driven by a mix of wood chips, metal products, occasional military shipments, and other small volumes. The growing trend is toward containerization of these traditional bulk commodities. Some grains such as soybeans and dimensional lumber are increasingly utilizing containers in addition to traditional bulk methods of transit, driven by customers’ preference for better protection during transit and lower shipping rates made possible by larger container ships. Grain, wood and paper pulp, and wood products of all types are core bulk commodities tied to the industrial structure of North Carolina’s economy.

Bulk and breakbulk cargoes are more closely tied to the structure of the surrounding regional economy. While they typically generate lower revenues than handling containers, providing access to global markets for North Carolina producers of cargoes such as grain, wood products, and oversize manufactured capital goods provides important support for the state’s economy.

Soybean exports account for 10 percent of North Carolina's agricultural exports; add in wheat and feed grains and products, and the combined grain total rises to 18 percent of the state's exports and about \$490 million for the state's economy. Both ports have plans underway to add wood pellet storage and handling facilities, in partnership with private pellet producers. Beyond bulk grain and bulk wood pellets, for which handling equipment and rail improvements are required, no market opportunities were identified as precluded by the surrounding infrastructure. **No firm or industry reported that but for better rail or road access, they would locate in Eastern North Carolina and utilize the Port of Morehead City.**

### **Supportive Actions for Development at the Port of Morehead City**

Although no physical capacity or congestion constraints on the Port's market development were identified, two supportive actions were described in both the document review and confirmed in the interviews and workshops conducted for this study. These include:

1. A public information strategy that describes operations at the Port and the benefits of those operations to the local host community; and
2. Preparation for investments to efficiently manage both local community transportation needs and anticipated growth in the Port's road and rail traffic with implementation of the wood pellets facility and other Port initiatives.

### **Port-Community Dialogue**

Both port tenants as well as the surrounding host community expressed interest in a better flow of information and dialogue that would provide the Port with an opportunity to share the many positive benefits that it delivers to the local community. Selection of a consulting communications firm with strong public relations/outreach capabilities is recommended to assist the Port in its positive marketing initiatives with the surrounding community.

The Port of Morehead City is an economic driver to the town, Carteret County, and the entire state of North Carolina. Residents of Morehead City benefit from their proximity to the Port, though there are traffic needs through the city. The Port and inlet dredging operations provide sand to Atlantic Beach that protects the homes and beaches from erosion. Because of the proximity of the Port, this replenishment costs Atlantic Beach nearly nothing, benefiting tourists and residents. Similarly, the inlet is kept open for the Port through these dredging operations, which allows for better recreational boating and tourism activities. The town also has access to a boat ramp and public beach on Radio Island through a lease agreement with the Port that would otherwise be private.

The Port itself serves as a tourist attraction as part of the Crystal Coast Countdown, the local New Year's Eve celebration. There, the Port offers free behind-the-scene tours to celebration attendees who pass security clearances. The Port offers free parking for attendees of the North Carolina Seafood Festival held annually in Morehead City. The Port has, at times, held a booth at the event to showcase samples of the goods and commodities that go through the Port, noting their origins and destinations. In this way, it helps the tourists and residents better understand what goes on at the Port and how it plays a role in an increasingly globalized economy.

In addition to supporting tourism and activities, the Port is a source of direct employment for residents, providing stable jobs that allow people to live and work on the Crystal Coast. Supporting industries like housing, retail, and restaurants benefit from the Port employment through indirect spending as well. Finally, the presence of the Port, which is a state asset, helps the region qualify for more state funding than would be possible in the absence of the asset. As an example, the US 70 Corridor

initiative projects get higher scores because many trucks and vehicles on the route are destined for Morehead City. US 70 also serves as a hurricane evacuation route.

**Access Management Improvements along US 70 in Morehead City**

The implementation of a bypass around Morehead City has been discussed on a regional and statewide basis. At this time, it is recommended that additional consideration and study be conducted to identify cost-effective US-70 improvements through Morehead City, improvements including access management and intersection upgrades. These access management and intersection improvements could significantly enhance safety and mobility concerns with the mixed traffic in Morehead City.

While the Average Annual Daily Traffic (AADT) in Morehead City is not currently large enough to warrant the costly bypass investment, the AADT levels and mixed traffic composition are large enough to cause safety and mobility concerns for the city. The AADT along US 70, just east and west of NC 24, has remained fairly consistent with approximately 32,000 vehicles per day, as shown in Exhibit 6-1.

**Exhibit 6-1: US 70 Average Annual Daily Traffic (AADT) at NC 24, 2004-2013**

Location	2013	2012	2011	2010	2004
US 70 East of NC 24	29,000	32,000	33,000	36,000	33,000
US 70 West of NC 24	31,000	33,000	32,000	36,000	31,000

Source: NCDOT Traffic Volume Report, 2013

In addition, a 2005 US 70 Access Management Study indicated that the US 70/NC 24 intersection should be looked at for additional improvements due to its crash statistics. Exhibit 6-2 summarizes the crash statistics from this study and incorporates some new statistics for the entire US 70 Corridor in Morehead City.

**Exhibit 6-2: US 70 Crash Statistics, 2001-2004 and 2007-2012**

Location	No. of Crashes	No. of Injuries	Severity Index
US 70 and NC 24 (2001-2004)	31	12	3.39
US 70 Willis Rd to Banks St. (6/2007-5/2012)	377	138	4.80

Source: Kimley-Horn, Inc., US 70 Access Management Study (2005) for 2001-2004 and Martin/Alexiou/Bryson, US 70 Traffic and Safety Study (2012)<sup>50</sup>

While no fatalities occurred during these time periods, the injury rates for the crashes were 38.7% and 36.6%, respectively, versus statewide averages of 37.2% and 30.8% for similar facilities.<sup>51</sup> A 2005 study recommended the following improvements for the US 70/NC 24 intersection: signal improvements and coordination, median closures, and separation of traffic by one-way pair system and grade separation.<sup>52</sup> While the 2012 study indicated that the US 70 and NC 24 intersection had the highest frequency of collisions along the US 70 corridor studied (from Willis Road to Banks Street), it recommended improving visibility

<sup>50</sup>Accessed at: [http://townofmoreheadcity.com/moreheadwp/documents/planning-inspections/Prj\\_Median\\_Crash\\_Statistics\\_Summary.pdf](http://townofmoreheadcity.com/moreheadwp/documents/planning-inspections/Prj_Median_Crash_Statistics_Summary.pdf)  
<sup>51</sup>NCDOT Standard Three Year Crash Rates for non-fatal injury crashes. 2001-2003 used for US 70/NC 24 intersection, All State Highways table for NC Highways. 2009-2011 used for US 70 Willis Road to Banks Street, All State Highways table for US Highways. Crash Rates tables found at: <https://connect.ncdot.gov/resources/safety/Pages/Crash-Data.aspx>  
<sup>52</sup>ibid, p.13.

of signals (including back plates), spot capacity improvements including extending the eastbound left-turn lanes, improvements to make the intersection more perpendicular (as it is currently skewed), and improved pedestrian facilities.<sup>53</sup>

The planning level costs that could accommodate these suggested improvements range from \$785,000 (\$2014) for each Super Street Intersection (No Left Turn Lanes Existing) to \$10 million for a Full Grade Separation for a four-lane road.<sup>54</sup> It is also possible that only certain lanes would be grade separated, and not all four. However, for the purposes of this analysis, a range from a minimal investment (super street intersection) to a larger scale investment (grade separation of all four lanes) is evaluated. Assuming the projects would be constructed in 2019, the net present value (NPV) of these costs would be of \$0.56 million discounted at 7% for the Super Street Intersection and \$6.53 million discounted at 7% for the Full Grade Separation.

The relatively low costs associated with these spot improvements could provide significant safety and travel time benefits for the city’s residents and travelers that could justify the associated capital costs to the region. Since a detailed study on travel time savings (associated with the suggested interchange improvements) has not been performed the analysis focuses only on the ability of the safety benefits to exceed the capital costs of the improvements for two improvement scenarios. The two improvements considered for the US 70/NC24 intersection are the Super Street Intersection and a Full Grade Separation.

The safety benefits consider each cost improvement’s ability to reduce the number of accidents at the US 70/NC 24 intersection in Morehead City, the intersection with the highest frequency of collisions along the US 70 corridor in Morehead City.<sup>55</sup> The US 70 Traffic and Safety Study for Morehead City (2012) contained some expected crash reductions for intersection safety improvements, as shown below in Exhibit 6-3.

**Exhibit 6-3: Expected Crash Reductions for Intersection Safety Improvements**

Improvement Type	Expected Crash Reduction
Right-turn lane at intersection	25% of Total Crashes
Increase turn length	15% of Total Crashes
Positive offset for left turn lanes	37% of Total Crashes

Source: Martin/Alexiou/Bryson, US 70 Traffic and Safety Study (2012)

The crash reduction applied for the Super Street Intersection scenario assumes an average of the right-turn lane at intersection and the increasing turn length measures, or 20%; while the grade separation scenario assumes a 37% reduction in total crashes, similar to the reduction associated with the positive offset for left-turn lanes. The crash reduction percentages are then applied to the average number of crashes occurring each year at the intersection between 2001 and 2004, or 7.75 crashes (31 crashes/4 years). Exhibit 6-4 summarizes the annual crash reductions for each scenario, and the number of injuries associated with the accidents based on the injury percentage for the intersection between 2001 and 2004 (38.7%).

<sup>53</sup>Martin/Alexiou/Bryson, US 70 Traffic and Safety Study from 1,000' West of Willis Road to Banks Street, Morehead City, NC, 2012, p.7. Access at: [http://townofmoreheadcity.com/moreheadwp/documents/planning-inspections/Prj\\_Median\\_Crash\\_Statistics\\_Summary.pdf](http://townofmoreheadcity.com/moreheadwp/documents/planning-inspections/Prj_Median_Crash_Statistics_Summary.pdf)

<sup>54</sup>NC DOT Cost Estimate Guide, \$2014

<sup>55</sup>Martin/Alexiou/Bryson, p.7.

**Exhibit 6-4: Expected Annual Reduction of Crashes at US 70/NC 24 Intersection with Improvements**

	Total Crashes Reduced	Total Injury	Total PDO
<b>Super Street Intersection</b>	1.55	0.60	0.95
<b>Full Grade Separation</b>	2.87	1.11	1.76

Source: AECOM analysis

These crashes were then converted to the Maximum Abbreviated Injury Score (MAIS) accident types in order to apply U.S. DOT Guidance on the value of avoiding an accident. The conversion is based on the NHTSA KABCO-AIS Conversion Table (July 2011),<sup>56</sup> for Injury (severity unknown) that provides a percentage of each injury accident that is MAIS 5 (critical) through MAIS 0 (No Injury). The total annual value for accident severity is based on U.S. DOT Guidance and the National Highway Safety Council estimates for the value of avoiding an accident. The estimates applied in this analysis are summarized below in Exhibit 6-5.

**Exhibit 6-5: Value of Accidents Avoided, \$M**

Value of Accidents Avoided	\$2013	\$2014
<b>Value of Statistical Life, 2013</b>	\$ 9.200	\$ 9.338
<b>MAIS 5 Critical (0.593) Fraction of VSL</b>	\$ 5.456	\$ 5.537
<b>MAIS 4 Severe (0.266) Fraction of VSL</b>	\$ 2.447	\$ 2.484
<b>MAIS 3 Serious (0.105) Fraction of VSL</b>	\$ 0.966	\$ 0.980
<b>MAIS 2 Moderate (0.047) Fraction of VSL</b>	\$ 0.432	\$ 0.439
<b>MAIS 1 Minor (0.003) Fraction of VSL</b>	\$ 0.028	\$ 0.028
<b>No Injury, 2010</b>	\$ 0.004	\$ 0.004

Note: \$2013 converted to \$2014 using GDP Deflator

Source: USDOT, *Guidance on Treatment of the Economic Value of a Statistical Life (VSL) in USDOT Analyses, 2013*

Applying the crash costs in Exhibit 6-5 to the projections of crash reductions by injury type yields the annual savings. The NPV of these benefits aggregated over a 20-year analysis period (2020-2039) yield a total safety benefit of \$0.8 million discounted at 7% for the Super Street Intersection scenario and \$1.48 million discounted at 7% for the Full Grade Separation scenario. Exhibit 6-6 summarizes the preliminary benefit cost ratios for each improvement scenario based on these safety benefits only. The ratios range from 1.43 for the Super Street Intersection to 0.23 for the Full Grade Separation, using a discount rate of 7%. A benefit cost ratio of 1.0 implies that the net present value of the benefits is equal to the net present value of the costs. A ratio less than 1.0 implies that the net present value of the costs is greater than the net present value of the benefits.

<sup>56</sup> USDOT, 2014 TIGER Benefit-Cost Analysis Resource Guide, update April 18, 2014, p.3. Accessed at: <http://www.dot.gov/sites/dot.gov/files/docs/TIGER%20BCA%20Resource%20Guide%202014.pdf>

**Exhibit 6-6: Preliminary Benefit Cost Ratios for the Improvement with Safety Benefits Only**

	Total NPV (\$2014M) over 20 years	
	Discounted at 7%	Discounted at 3%
<b>Super Street Intersection</b>		
<b>Safety Benefits</b>	\$0.80	\$1.36
<b>Capital Costs</b>	\$0.56	\$0.68
<b>Benefit Cost Ratio</b>	<b>1.43</b>	<b>2.01</b>
<b>Full Grade Separation</b>		
<b>Safety Benefits</b>	\$1.48	\$2.51
<b>Capital Costs</b>	\$6.53	\$7.90
<b>Benefit Cost Ratio</b>	<b>0.23</b>	<b>0.32</b>

Source: AECOM analysis

These improvements also would have time savings and reliability benefits for travelers; however, these benefits cannot be estimated without additional study of the improvements. But as shown in Exhibit 6-6, the improvements based on the potential safety benefits alone warrant additional consideration and study, as they could provide essential cost-effective safety and travel time improvements to Morehead City residents and visitors. The intersection of US 70/NC 24 was used as an example, but similar benefits could be experienced at other high traffic and safety-concern intersections along US 70 in Morehead City. As a result, it is recommended that a more detailed corridor study be undertaken to determine if lower cost access and intersection improvements along US 70 in Morehead City could relieve the traffic congestion and safety conflicts that currently affect Morehead City residents and visitors.

Both the Governor’s 25-Year Vision and emerging market opportunities suggest that Port volumes could increase. One illustrative example is the potential for offshore energy development as summarized in Exhibit 6-7. While this is not an immediate market opportunity, it aligns with the Port’s strength long term.

**Exhibit 6-7: Market Opportunities for the Port of Morehead City**

Illustrative Future Market Opportunity for Port of Morehead City	Summary
<b>Offshore Energy</b>	<ul style="list-style-type: none"> <li>• <b>Description:</b> If the offshore energy market develops, North Carolina could capitalize in two ways: as a deployment and servicing port for offshore wind turbines, and/or the Port could support offshore crude oil and natural gas production.</li> <li>• <b>Implementation Considerations:</b> Wind energy would advance the state’s green energy initiative and provide a renewable source of energy, but obstacles include the need for approvals to develop a farm, a partnership with a location needing turbines or services, landside infrastructure and space requirements, and the distance from the Port to possible offshore sites. Oil and natural gas exploration and production represent a second energy opportunity. The Atlantic Outer Continental Shelf contains an undetermined amount of the resources. Risks include obtaining necessary approvals, competition from competing states and ports, volatile oil pricing, and landside infrastructure and space requirements. However, large impacts to the state’s economy are possible with the market opportunity.</li> </ul>

### Port of Morehead City Infrastructure Improvements

A number of infrastructure investments have been suggested and/or studied at the Port of Morehead City with the goal of improving rail and truck flows through the town and on the Port. These are collected and grouped by the type of issue they are designed to address. Not all are technically feasible nor recommended at this time, but they are compiled here to support future work to address these issues as the market evolves. The most feasible solutions to the problems are described further in the relevant section.

While rerouting trains out of Morehead City would be the most direct solution to US 70 issues in Morehead City, the NCRR rail study that most recently reviewed this issue concluded that rail volumes and the associated benefits would not justify the project at that time.<sup>57</sup> Because of the interest in the project, the EIIS study team reviewed the cost estimates. In preparation for developing potential rail infrastructure improvements at the Port of Morehead City, the “Track Relocation Feasibility Study: Havelock to Morehead City” was reviewed. The 2007 study for the NCRR investigated the possibility of relocating the rail line around Morehead City instead of the current alignment parallel to US 70 through the town.

The report concluded that “the future of the rail line between Havelock and Morehead City is directly related to and dependent on the future of the Port of Morehead City.” Clearly the access to the transload facilities offered by the Port provide the impetus for future growth in goods movement by directly linking the maritime, freight rail and truck modes of transportation.

The NCRR study looked at a variety of rail alignments, most of which avoid the Morehead City limits by instead coming to Radio Island and the Port via Beaufort from the east. At the time, the alignments ranged in cost from \$141 million to \$207 million. In today’s dollars, those estimates would likely fall roughly within the range of \$160M to \$240M, though many factors have changed since 2007 that would affect pricing, including the recession, volatility in construction materials pricing and labor costs, and increasingly strict environmental legislation.

The report concluded that Alternatives 3 and 5 along with a composite of Alternatives 3 and 5 afforded the best routing to Radio Island from the east and Beaufort. The report further concluded that Alternative 5 was considered the most favorable from an environmental and engineering standpoint.

The following represents the cost per mile associated with the three alternatives noted below:

	Original Estimate	Escalated Estimate
	2006 \$	2014 \$
<b>Alternative 3</b>	\$6.38M	\$7.52M
<b>Alternative 5</b>	\$5.88M	\$6.93M
<b>Alternative 3/5</b>	\$5.84M	\$6.88M

Without the benefit of an itemized estimate establishing the costs noted above, it is not possible to provide a detailed assessment of the cost estimates. A partial cost per mile cost was developed totaling \$4.0M per mile considering the construction of a single track along an undeveloped right-of-way with a width of approximately 200 feet (this is consistent with the acreage

<sup>57</sup> North Carolina Railroad Company. 2007. “Track Relocation Feasibility Study: Havelock to Morehead City”

and track length identified in the report for each alternative); assumptions on quantities and partial account for items of work including trackwork, clearing, grading, drainage and fencing. Although engineering and other general costs such as mobilization and performance bond cost were not included in the cost per mile, the additional cost for these appear to be in the 15% range which at \$4M would add another \$600,000 per mile which would translate to \$750,000 per mile cost with the 25% contingency factored into the total. These additional items bring the cost per mile to \$4.75M. While these items represent some of the major items of work, additional work scope, including but not limited to such work items as demolition, wetland mitigation, at grade crossings with warning devices, grade separations, and bridging of streams, were not included in the per mile cost calculation. Understanding that these elements would be required and would increase the costs, the costs reported in the NCRR report are within an acceptable range given the available information.

As demands grow to handle export of commodities such as wood pellets and/or grain, component and finished product processing, energy and intermodal, Radio Island becomes a viable location for such development. Consideration will need to be given to modifying the rail access of unit trains to serve Radio Island. If the train movements continue to access Radio Island from the west and not from Beaufort, it will be necessary to consider extending the existing track to the east beyond the current end of track (EOT). Because of available land and the track layout into Radio Island, rail access is restricted to a push-move into Radio Island. The eastbound train needs to pass the location of the turnout to Radio Island and the entire train must be advance eastward until the entire train clears the turnout to Radio Island. Consequently, there needs to be sufficient track length east of that turnout to Radio Island to hold the entire train, such that the locomotives at the head end of the train can then push the train back into the rail infrastructure to serve facilities on Radio Island. The length of the track extension will be dependent on the size of the train serving the facilities on Radio Island.

### **Short-Term Projects at Morehead City**

As the Mobility Corridor is a long-term vision, shorter-term initiatives are also of interest.

- A shorter-term solution to ensuring efficient road and rail movements in Morehead City would be to create frontage roads, or parallel streets to US 70, or to implement projects similar to the Super Street concept to relieve pressure on US 70. These types of projects, if implemented, would reduce the impact of trains on traffic, and would reduce conflicts by better separating traffic waiting to cross the railroad from the through traffic. Conducting traffic studies to determine how best to improve Arendell Street would provide the public with a short-term list of feasible projects. Some feasible ideas that should be considered include, but are not limited to, widening the road, synchronizing signals for higher vehicle throughput, consolidating at-grade crossings to limit rail noise and safety issues, intelligent transportation network signalling, and restructuring the lanes so that there are dedicated turn lanes or through lanes that would reduce backups. A traffic corridor plan would study signal phasing and the impacts on pedestrians, autos, trucks, and trains through Morehead City. Superstreet intersections cost an estimated \$0.8 million each, while constructing new frontage roads would cost on the order of \$3.4 million per mile for a two-lane road with shoulder.<sup>58</sup>
- An additional recommendation is to conduct a thorough engineering horizontal and vertical clearance review for the rail line between the GTP and the Port of MHC, and identify and existing constraints to allow for movement of oversized loads.
- Finally, information about the Port's operations and benefits should be shared more effectively with the public and business communities utilizing news outlets, events, and statewide marketing efforts as supported by the community during this study.

<sup>58</sup>NC DOT Cost Estimate Guide, 2014.

### Rail Loop at Port of Morehead City

There is an existing loop track on the Port of Morehead City, but it was reassessed to determine how it could function better for a wider variety of operations. Potential operations at the Port include a wood pellet export facility. Adding a new loop to the eastern side of the port could help the Port accommodate more volumes, provide a wider variety of services, and increase revenues to the Port. Finally, a more efficient movement of goods would allow for trains to move faster onto the Port property and reduce conflicts with Arendell Street traffic. In total, the tracks would cost an estimated \$5.0 million.

### Northern Carteret Rail and Highway Bypass<sup>59</sup>

The purpose of the project is to improve traffic safety, operations, and access between Havelock and Morehead City.<sup>60</sup> Other positive spillover effects would be improved access to the Port of Morehead City, Carteret County, and the Town of Newport. To do this, a new highway route is proposed as an alternative to US 70. The alternative is proposed to construct a new multi-lane freeway facility from the proposed Havelock Bypass/US 70 interchange to Beaufort (approximately 23.5 miles). The facility would be able to accommodate 2030 projected traffic volumes with an acceptable level of service. The estimated cost for the whole proposed corridor ranges from \$398.8 million to \$418 million (\$2014). The estimated cost for the proposed project corridor with the freeway/expressway combination ranges from \$291.7 million to \$310 million (\$2014). The study focused on realigning or rerouting highway traffic on a Northern Carteret Bypass should also consider designs and alignments that can accommodate rail right-of-way. However, yard or siding tracks to serve the Port of Morehead City will be needed (feasible north of Beaufort), and there are environmental and fiscal concerns along the route.

A bypass solution entering from the east will support landside access to future expanding Port volumes, and dramatically improve highway and rail velocity through the area. Also, introduction of new industrial development opportunities such as a container facility, a component or finished product processing site or energy infrastructure support at Radio Island would be an important milestone in supporting this need.

**Evaluate Public Private Partnership** opportunities for utilizing Radio Island for future development opportunities including component or finished product processing, container terminal and/or staging for energy projects.

## Conclusions

Of the projects described in this chapter, most will require extensive and detailed engineering surveys, designs, and environmental analysis even after the planning stages. In addition, most of the projects are a significant capital cost, and would need maintenance throughout the lifetime of the investment. As a result, it is recommended that the following projects be considered in the near term. The remainder of the projects can be revisited once enough volume creates a purpose and need for their construction.

- In the short term, pursue a “Super Street”-style advanced and coordinated traffic plan to reduce rail and truck Port traffic conflicts with vehicle and pedestrian traffic on US-70 Arendell Street. This is to include intelligent transportation network signaling to improve traffic flows and user information. Better use of parallel Bridges Street should be fully evaluated.
- Conduct thorough engineering horizontal and vertical clearance review for the rail line between the GTP and the Port of MHC, and identify and remove existing constriction to allow for movement of oversized loads.

<sup>59</sup>New Route (Northern Carteret Bypass) From the Havelock Bypass (TIP#R-1015) to Beaufort, Program Development Branch. NCDOT, July 2009

<sup>60</sup>This study does not include any discussion on rail infrastructure and solely focuses on vehicular traffic

- Implement on-Port loop track to build/break unit trains.
- Evaluate Public Private Partnership opportunities for utilizing Radio Island for future development opportunities including component or finished product processing, container terminal and/or staging for energy projects.
- Continue to evaluate a potential Northern Carteret Rail and Highway Bypass. A bypass solution entering from the east will support landside access to future expanding Port volumes, and dramatically improve highway and rail velocity through the area. Also, introduction of new industrial development opportunities such as a container facility or a component or finished product processing site at Radio Island would be an important milestone in supporting this need.
- Share information about the Port operations and benefits with the public and business communities more effectively through news outlets, events, and state-wide marketing efforts, as supported by the Town during this study.

# Funding Considerations

*Funding considerations were a recurring theme across all of the opportunities considered. This chapter discusses potential funding sources for the Wallace to Castle Hayne rail restoration should the market evolve to support the project's implementation. This is followed by a discussion of funding issues related to the GTP and the Ports.*

## Wallace to Castle Hayne

One hundred carloads per mile is sometimes an industry rule of thumb as the minimum level of traffic that would enable a short line railroad to cover all operating and capital maintenance costs of a rail line. The relevant threshold for W2CH would be around 2,700 carloads per year. Given the average weight per carload of 87 tons for freight to and from the Wilmington region, calculated from the STB 2011 Waybill Sample, forecasted carloads over W2CH are as shown in Exhibit 7-1.

**Exhibit 7-1: Forecast Carloads over W2CH**

Year	Low	Medium	High
2014	1,039	2,720	6,146
2020	1,117	2,915	6,755
2025	1,177	3,036	7,148
2030	1,237	3,121	7,460
2035	1,288	3,192	7,731
2040	1,321	3,214	7,854

While the annual volumes under the medium scenario exceed 2,700 carloads, these volumes do not exceed the threshold by such an extent that a private railroad would be induced to make a major new infrastructure investment. At this level of freight, ongoing capital maintenance and operating expenses would be covered, but not major railroad-funded incremental investments. As an example, if one were to assume that all operating cash flows for freight traffic above the 2,700 carload threshold were available to invest in new rail infrastructure, and the average cash flow from operations per ton-mile was equivalent to that of CSXT in 2013, \$0.013, the present value of these cash flows over the 30 year project period when discounted by 7 percent to 2014, would be only about \$100,000 under the medium scenario and \$1.4 million under the high scenario. These levels would not go far to defray the \$153 million estimated capital cost to restore W2CH.

## Investment by Private Shipper

Agricultural shippers in Eastern North Carolina have expressed interest in the W2CH restoration. The line could provide a more direct rail connection between the region's hog and poultry producers and the Port of Wilmington for unit trains during times of imported grain. These shippers might be willing to contribute funding as part of a partnership. Markets accessed by W2CH, however, would likely remain secondary to markets in the Midwest for these shippers. In addition, shipping cost reductions over the W2CH may not be sufficient to encourage investment that would even partially fund the \$153 million construction cost of W2CH.

# Federal Grant Programs

## TIGER

The TIGER Discretionary Grant program is designed to provide the United States Department of Transportation a means of investing in road, rail, transit, and port projects that aim to achieve critical national objectives. Since 2009, Congress has dedicated over \$4.1 billion over six rounds of funding. Of the total funding stream, more than \$800 million has been used to fund rail projects. In 2014, 72 transportation projects were awarded a total of \$600 million out of 797 eligible TIGER applications requesting \$9 billion in all. The TIGER Discretionary Grant program is highly competitive, with those applicants that can clearly convey the needs and can demonstrate quantitatively a positive benefit cost ratio being more successful in receiving grants.

Most TIGER grants have been for considerably less than \$153 million. Some grants for around \$100 million have been awarded. These have tended to be projects of national significance, such as the CREATE project to improve transcontinental rail flows through Chicago, the Crescent Corridor to remove trucks from the I-81 highway corridor in the Southeast, or the National Gateway initiative to improve rail intermodal flows between the Midwest and Northeast of the U.S.

**Exhibit 7-2: TIGER Grant Applications by Grant Size: 2009 - 2014**

Size of Grant	Number of Grants	Percentage
Less than \$15 Million	250	73%
\$15 - \$50 Million	85	25%
Over \$50 Million	7	2%
<b>Grand Total</b>	<b>342</b>	<b>100%</b>

Source: U.S. Department of Transportation

## U.S. Department of Agriculture (USDA)

USDA supports projects that finance and facilitate rural business or assist in developing essential community facilities in rural areas and towns. The Rural Business Enterprise Grants (RBEG) program offers \$10,000 to \$500,000 grants to rural public entities and rural private non-profit corporations with the criteria that at least 51 percent of the outstanding interest of a project have public membership or ownership. As a broad-based program, RBEG funds an array of activities. Rural transportation improvement and project planning activities are eligible given that the project benefits small and emerging private businesses. By definition, these businesses are those that employ 50 or fewer employees and have less than \$1 million in project gross revenues.

## U.S. Department of Commerce Economic Development Administration (EDA)

The U.S. EDA Public Works Program provides resources to meet construction and/or design of infrastructure needs of communities to enable them to become more economically competitive. The EDA Economic Adjustment Assistance program provides investments that support a wide range of construction and non-construction activities (including infrastructure, design, and engineering technical assistance). These grant programs have been used in the past to build or rehabilitate rail infrastructure. EDA grants focus on economically distressed area, which are defined by the EDA as those areas with an 1) unemployment rate that is at least one percentage point lower than the national average for the most recent 24-month period

for which data is available, or 2) per capita income that is 80 percent or less than the national per capita income for the most recent period for which data is available, or 3) has a special need. Pender County, where the W2CH segment is located, may meet some of these criteria.

EDA reports that the average size of Public Works investments is \$1.4 million, with the top range at \$3 million. The average size of the Economic Adjustment Assistance program investments has been \$0.8 million with the top range at \$1.3 million.

## Local Opportunities

Local communities sometimes invest in projects that boost local economic development. Appendix D includes several resolutions by local communities in support of the project.

### Golden LEAF Foundation

The Golden LEAF Foundation of North Carolina is a nonprofit corporation based in Rocky Mount that promotes social welfare by awards to non-profits and government entities. Grants prioritize agriculture, job creation and retention, and workforce preparedness for economically affected or tobacco crop-dependent regions of North Carolina. The Open Grants Program and Economic Catalyst Cycle programs under this foundation could be used to fund rail infrastructure.

## Federal Financing Programs

The federal government sponsors low interest financing programs that can be used for rail infrastructure improvements with repayment from future revenues. One complication to benefitting from any of these alternatives is the W2CH projected revenue stream. Therefore, the project could not repay financing itself. Rather, repayment of financing would need to be funded by other sources, such as state tax revenues. This may not be significantly different from the State of North Carolina directly issuing bonds to pay for W2CH.

### Railroad Rehabilitation and Improvement Financing (RRIF)

The RRIF program was established by the Transportation Equity Act for the 21st Century (TEA-21) with the Federal Railroad Administration as the financier. The FRA directly lends or guarantees loans up to \$3.5 billion to railroads, state and local governments, government-sponsored authorities and corporations, joint ventures that include at least one railroad, and shippers served by only a single railroad who intends to construct a new rail connection. Eligible projects include acquisition, improvement, or rehabilitation of infrastructure and equipment, debt refinancing, and development of intermodal or railroad facilities. Loans can cover 100 percent of the total project cost with repayment periods up to 35 years. The interest rate equals the U.S. Treasury rate for similar securities. A Credit Risk Premium is assessed as a portion of the loan based on determined overall risk.

To utilize the RRIF program, the State would need to designate the W2CH corridor as collateral for the loan. Some states are barred from using state-owned property as collateral for RRIF loans. In North Carolina, the ports and GTP have the power to borrow against property. In order to advance the W2CH project with this program, the alignment would need to be owned by one of these entities or another with the same power. Relevant sections of the State Statute are provided at the end of this section. Should this approach be considered in the future, the meaning of “useful for operation of the state port” (reference NC Statute 136-262 (a)(4)), would need to be evaluated. In addition, the GTP or the Port would need to evaluate the impact of the loan on their borrowing capacity and the impact of maintenance on their ability to maintain other operations. In short, while this funding approach is technically feasible, it carries downside risk to the borrower unless the state provides support.

**As reference, relevant parts of the Statute for Ports include:**

NC statute 136-262 (a)(4) Authorized to acquire, construct and maintain rail facilities but not operate, so long as it is useful for operation of the state port. Cannot be a rail carrier.

NC statute 136-262 (a)(3) Powers of the authority: rent, lease, buy, own, acquire, mortgage, otherwise encumber, and dispose of such property, real or personal.

NC statute 136-262 (a)(9) Authorized and empowered to accept loans and grants from federal, state, political state divisions in State, or public or private sources available for any and all purposes in the article. Mortgage/deed of trust or promissory note, ports cannot bind the state to repay their loans.

**Transportation Infrastructure Finance and Innovation Act (TIFIA)**

The Transportation Infrastructure Finance and Innovation Act program is administered by the Federal Highway Administration. FHWA provides loans, loan guarantees, and standby lines of credit for surface transportation projects. Highway, transit, railroad, intermodal freight, and port access improvements are all eligible projects. In particular, rail projects may include publicly owned freight rail facilities, intermodal freight transfer facilities, and projects within port terminals as well as inter-city passenger rail facilities and vehicles. Among other criteria that must be met are significance to national transportation, economic benefits, leverage by private capital, and promotion of innovative technologies. In short, this is not a grant program but rather a loan program; project sponsors can borrow against revenues (freight fees in the case of Wallace to Castle Hayne) at favorable rates.

**Department of Defense/Federal Appropriations**

A representative from the Military Surface Deployment and Distribution Command (SDDC) of the U.S. Department of Defense (DoD) indicated that SDDC considers W2CH to be a civil-sector project, which should therefore be funded by the civil sector. The DoD has indicated it has no funds available for W2CH.

One example of the DoD funding a rail construction project is the Northern Rail Extension, to be constructed and operated by the Alaska Railroad Corporation (ARRC). The project would extend 80 miles of new rail line off of the existing Eielson Branch in order to provide freight and possible passenger rail services in the corridor. The DoD’s interest focuses on the Joint Pacific Area Range Complex (JPARC), a large training area in the region. Other needs include (1) serving commercial freight for the community, (2) providing a transportation alternative for citizens, and (3) supporting regional tourism.

The total construction cost of the Northern Rail Extension is estimated to be between \$650 million and \$850 million, in four phases. Phase I of the project involves crossing the Tanana River. The \$188 million cost of Phase I is funded, and construction of Phase I is nearing completion. Funding has been provided through:

1. A series of U.S. congressional appropriations between 2005 and 2008 through the DoD, totaling about \$104 million.
2. Contributions from the State of Alaska, totaling \$84 million.

DoD funds were specifically directed to the Northern Rail Extension within a series of appropriations bills or “earmarks.”

## Funding Issues Beyond Identifying Candidate Sources - GTP and Port of MHC

Potential projects at the Port of Morehead City or the Global TransPark would be eligible for the federal sources outlined above, subject to the same qualifications. This section focuses on some of the funding challenges associated with uses of funds, as opposed to identifying funding.

### Local Match

Because of GTP's tight budget constraint, the funds are not available to secure the local match on available federal funds. Thus, the facility must forego these funds even as it is working to become more self sustaining. This is a net loss of federal funding to the state.

### State Support v. Grant Support for GTP

As a rule, state facilities receive a regular and predictable budget from which to work. Local or regional entities are eligible to apply for state funds. Interviews identified this as a problem, as the GTP has sometimes been prevented from applying for funds to advance projects.

The North Carolina Department of Commerce has several programs available to provide small grants to local government entities in rural areas for economic development purposes. GTP has not been eligible to receive grants for economic development. There are fewer options available to the GTP for economic development funds to attract businesses to the rural area in Lenoir County especially since as many federal programs are underfunded or highly competitive. As outlined below, GTP was granted the authority of local government as to the ownership, management and repair of facilities at the airport, and as such an entity, there is a case for its eligibility for grants to local government.

The NC Global TransPark was established under the Finance Article of the NC Constitution (Art. V, Sec. 13), and not under the Administrative Article like the Executive Branch departments (Art. III, Sec. 11). It was established as both “a body politic and corporate.” Here are several of the multiple types of authority that the GTP was granted:

- Authority of a state agency, G.S. 63A-3(a)
- Powers of a corporate body, G.S. 63A-4(a)(1)
- Authority of local governments:
  - Purchase and finance real or personal property in the manner provided for cities and counties under G.S. 160A-20 (allows local government to use installment contracts to finance the purchase or repair of facilities), G.S. 63A-4(a)(17)
  - Exercise the powers granted political subdivisions under Art. 4, Ch. 63 of the General Statutes, the Model Airport Zoning Act, G.S. 63A-4(a)(19); and issue zoning regulations under the Model Airport Zoning Act, to incl. issuing permits to construct, repair or replace existing structures, G.S. 63A-32(a)
  - Exercise the powers granted to municipalities and counties under Art. 6, Ch. 63 which governs municipalities purchasing and operating airports, G.S. 63A-4(a)(19)
  - Issue bonds, if approved by the Local Government Commission, G.S. 63A-9(f)

### **Economic Development Tool vs. Self-sustaining Enterprise**

Free or reduced rent and other incentives offered to induce economic activity to Eastern North Carolina undercut GTP's ability to generate revenues and become self sustaining. If rents are waived in order to attract business, a major revenue source is removed from the facility's budget.

### **Ability to Enter Into a Public Private Partnership**

GTP has its own independent PPP authority; this is an important advantage as it seeks development opportunities. The ports also have this ability through a separate section of the state constitution.

An important consideration in any potential PPP at the GTP is that the Kinston Regional Jetport at the Global TransPark is designated as an FAA Part 139 certified airfield; this certification documents that the airport agrees to certain operational and safety conditions aimed at ensuring safety at the public airport. As such, the airport must conform to the guidelines and required annual inspections under Part 139. The inspections include a number of steps: pre-inspection review; in-briefing with airport management; administration inspection of airport files and paperwork; movement area inspection; aircraft rescue and fire-fighting inspection; fueling facilities inspection; night inspection; and a post-inspection briefing with airport management. Most relevant to the GTP is the requirement that the airport be available for public use.

## Recommendations

*The SB 402 legislation directed a study of specific types of investments as well as a broader consideration of other types of investments or policies that could support greater commerce at the Port of Morehead City and the Global TransPark. The recommendations address both the specific project investment questions as well as the broader issues. Each major question and associated recommendation is summarized below.*

The underlying goal of both the SB 402 Study and the Governor's 25-Year Vision is to guide investments in infrastructure that foster economic growth. In Eastern North Carolina, these investments have the potential to be transformative and foster new growth in the region. The directive of the SB 402 Study is to consider the near term business case and long term strategic value for making the investments outlined in the legislation, based on a data-driven approach. Such quantitative assessments rely on economic models that project future outcomes under the assumption that existing economic relationships are maintained. The quantitative analysis was supplemented with extensive outreach to knowledgeable stakeholders.

*All of the subject projects offer some level of long-term strategic benefit. Current market conditions alone do not support immediate investment, when measured by economic return.*

Transportation infrastructure investment is one of many production inputs (workers, energy, resources, etc.) used to deliver a good or service. The presence of improved infrastructure by itself does not create demand. Rather, transportation infrastructure acts as a critical component of a broader strategy to realize a region's economic development and growth opportunities. The market analysis identified a number of non-capital factors that collectively challenge the region's economic advancement. Addressing these in the near term supports the region's development for a business case supporting strategic capital investments.

- **The region's growth and future competitiveness will benefit from consensus on priorities and goals.** The Governor's 25-Year Vision is an important milestone in developing this consensus. Investments and initiatives that demonstrate sustained commitment to the region and maintaining the major assets, promotes private investments.
- **Greater public and private sector collaboration will benefit the utilization of the GTP and the Port of Morehead City.** The promotion of the GTP as a logistics and manufacturing hub, and the attraction of new business to the region will utilize the Port of Morehead City and/or create greater demand for cargo utilizing the Wallace and Castle Hayne rail line.
- **Improved and timely data better supports expectations and unites stakeholders in addressing key issues and pursuit of new business.** This information allows the GTP and local development organizations to directly address workforce resources when marketing the region to new firms who might use the port, and/or the GTP.
- **A team approach optimizes our ability to execute the strategy.**

The study's findings and recommendations seek to provide some of the lessons learned and suggestions on how to leverage the region's assets to support growth, given the context of the regional economy.

## Findings and Recommendations

### Study Area #1: Restoring Track Between Wallace and Castle Hayne

#### Context

- Restoration of the Wallace to Castle Hayne line has significant strategic value to military and agricultural interests in the state. Restoring the line would also open Pender County to opportunities for rail served shippers.
- Connections to the Wallace to Castle Hayne line would be to the CSXT network, therefore restoration of the line alone would not provide a second rail carrier, or dual access to the area.
- Department of Defense (DoD) identifies restoration of W2CH as a high priority to insure redundancy, but has not identified federal funding to date
- No rail-dependent operators or businesses are currently stranded without a rail connection, however, select shippers may benefit from more direct routing if the line were restored.

#### Findings

The analysis finds that existing, near term market conditions do not support the significant investment of \$150 M+ to restore the track and structures between Wallace and Castle Hayne. However, the strategic value to the military and agriculture interests must be considered in the investment decision process. The Department of Defense identifies the restoration of the W2CH rail segment as a high priority to insure redundancy of rail service to facilities in eastern North Carolina, but has not offered funding support.

#### Recommended Actions

- Continue to preserve right of way and options over the line for the future.
- Seek federal funding for the DoD-supported restoration of the rail line.
- As the market dictates in Pender County, extend the existing CSXT rail line southward from Wallace to serve any new identified industry. The cost-per-mile for this extension is approximately \$3.5 million per mile without crossings or structures.

#### Recommended Actions, Port of Wilmington

- Continue efforts to work with CSXT to identify actions that will lead to regular intermodal (rail) service to the Port of Wilmington.
- Pursue implementation of recommendations from the ongoing Wilmington Traffic Separation Study of rail crossing consolidation and safety upgrades to improve safety and efficiency of rail and vehicular flow into Port of Wilmington.
- Pursue environmental, planning and conceptual design studies for the construction of a highway-railroad grade separated access at the North Gate of the Port of Wilmington. Separated access would improve safety, reduce vehicular congestion, and significantly increase rail capacity.
- As future traffic volumes grow at the Port of Wilmington, investigate the feasibility of a high-lift rail bridge across the Cape Fear River from the port area to connect to the rail network in Brunswick County. This would remove port rail traffic from Wilmington.

## Study Area #2: GTP Inland Terminal for Bulk or Refrigerated Cargo

### Context

- The initial concept for GTP was an aerropolis, the development of a highly efficient air cargo logistics facility that attracts shippers to Eastern North Carolina.
- The facility's largest success has been the attraction of Spirit AeroSystems and related suppliers.

### Findings

Bulk cargos are low margin commodities that are highly sensitive to changes in transportation costs. Given the comparatively short travel distance from GTP to both the Port of Morehead City and Norfolk, and the economics of rail market-driven rates, a transload facility could actually increase costs.

The greatest volume of refrigerated cargoes would likely be frozen poultry and pork. Meat products transport is evolving to refrigerated containers which are packed at the production site and shipped for export or domestic distribution. This would be in the immediate term a Wilmington port-based business from inbound truck moves.

A bulk or refrigerated transload facility is not recommended at GTP at this time under existing conditions.

### Recommended Actions

Monitor the market for changes but pursue other initiatives to support commerce at GTP in the short run.

## Study Area #3: Other GTP Initiatives

### Context

- Proximity to the region's military installations offers some opportunities and demonstrates the state's commitment to supporting military operations.
- GTP's distinguishing features include the longest runway east of the Mississippi and one that has been strengthened to accommodate heavy loads. It also has comparatively uncongested airspace.
- Businesses that site at the GTP do not pay property taxes to the City of Kinston or to Lenoir County, creating tax savings to businesses.
- Ability to provide a large local/area labor force was cited as an important factor for large employers.
- Availability of local amenities was cited as a potential concern impacting the ability to recruit new industry to the GTP.
- Improved highway access would benefit the GTP. However, transportation was not identified by any business as the chief reason GTP was not selected for potential development.
- Increased rail volumes and market changes would assist in lowering shipping rates through improved line and resource utilization.
- The GTP has managed their operating budget to the point of being close to breaking even, through a combination of efficiencies, budget cuts and expanded businesses.

### Findings

Pursue an incremental approach to growing business at GTP comprised of short-term initiatives to optimize utility of the facility and a longer-term effort to build market share.

## Recommended Actions

### *Short-term*

- Lease the GTP spur (owned by NCDOT) to a private rail operator.
- Continue to compete for a military fueling contract in 2016, including essential incremental investments to support the facility in this effort. This activity would provide GTP with additional revenues.
- Make spot improvements to the overall facility to keep it in a state of good repair.
- Examine GTP's authority to optimize its competitiveness for state and federal grant funds for capital improvement projects.
- Aggressively market the GTP facility and property on a national and international basis.
- Align incentives of development organizations so that a business locating to GTP is a win for the region as a whole.
- Investigate retaining State ownership of the New Bern North Craven Street North Carolina Railroad Company Water Access property as a potential barge transload facility for oversized cargo loads.

### *Longer-term*

- Incrementally upgrade US 70 to interstate standards as noted in Governor McCrory's 25-Year Vision.
- Consider locating a major government facility or cluster of related smaller facilities at GTP.
- Continue to market GTP for long-term opportunities that could be accommodated at the existing facility: aircraft refurbishment, additional aircraft manufacturing, advanced manufacturing, and agricultural research for example.
- Conduct the environmental analysis for a CSXT spur from the GTP to railroad point "Elmer" in Kinston and obtaining the advance right-of-way. Track could be installed quickly once a user was identified, and CSXT is supportive of this direction.
- Initiate an environmental/planning/design for Section C of the Harvey Parkway from NC 58 to NC 11.

## **Study Area #4: Rail and Highway Improvements that Benefit the Port of Morehead City**

### **Context**

- The Port of Morehead City is the state's natural deep water terminal, located four miles from the Atlantic shipping channel.
- Norfolk Southern has an exclusive lease of the entire North Carolina Railroad Company track which does not allow for other operators to serve the port.
- The Port of Morehead City and the Port of Wilmington have been designated as strategic military installations.
- The Port of Morehead City focuses on breakbulk and project cargo and some bulk cargo by barge.
- Existing infrastructure efficiently serves the needs of current volumes, yet expanded rail capacity will be required to accommodate significant growth.

- Recent experience with new business opportunities like the wood pellet distribution facility highlighted the limitations of current rail capacity.

### **Findings**

The Morehead City Port infrastructure challenge is primarily due to rail and road traffic conflicts through the town. Constraints on the Port's business development include train velocity, efficient handling of unit trains and on-port storage/ facility tracks. There are rail vertical and horizontal clearance issues identified between the GTP and the Port of Morehead City. Since 2001, the North Carolina Railroad Company has improved the rail line and removed a number of horizontal and vertical obstructions.

### **Recommended Actions**

- In the short term, pursue a "Super Street"-style advanced and coordinated traffic plan to reduce rail and truck Port traffic conflicts with vehicle and pedestrian traffic on US-70 Arendell Street. This is to include intelligent transportation network signaling to improve traffic flows and user information. Better use of parallel Bridges Street should be fully evaluated.
- Conduct thorough engineering horizontal and vertical clearance review for the rail line between the GTP and the Port of MHC, and identify and remove existing constriction to allow for movement of oversized loads.
- Implement on-Port loop track to build/break unit trains.
- Evaluate Public Private Partnership opportunities for utilizing Radio Island for future development opportunities including component or finished product processing, container terminal and/or staging for energy projects.
- Continue to evaluate a potential Northern Carteret Rail and Highway Bypass. A bypass solution entering from the east will support landside access to future expanding Port volumes, and dramatically improve highway and rail velocity through the area. Also, introduction of new industrial development opportunities such as a container facility or a component or finished product processing site at Radio Island would be an important milestone in supporting this need.
- Share information about the Port operations and benefits with the public and business communities more effectively through news outlets, events, and state-wide marketing efforts, as supported by the Town during this study.

## **Study Area #5: Statewide Coordination of Economic Development Pursuits**

### **Context**

- Development of this study identified an ongoing need to plan and interact across multiple agencies and stakeholders.

### **Recommended Actions**

- Create the Secretary of Transportation's Freight Intermodal Advisory Council – including but not limited to representatives from Boards of NC Department of Transportation, NC Department of Agriculture and Consumer Services, Department of Commerce, the Global TransPark and NC State Ports Authority. Private entities with State interest will be invited to join the Council, such as the North Carolina Railroad Company.
- Support the Governor's 25-Year Vision to leverage strategic infrastructure investments to foster regional and state economic growth and create jobs.

North Carolina Department of Transportation  
in collaboration with  
North Carolina Department of Commerce and  
North Carolina Department of Agriculture and Consumer Services





## Appendix A

### Conceptual Plans for Wallace to Castle Hayne Rail Restoration





MATCHLINE - STA. 3785+00 SEE SHEET 002

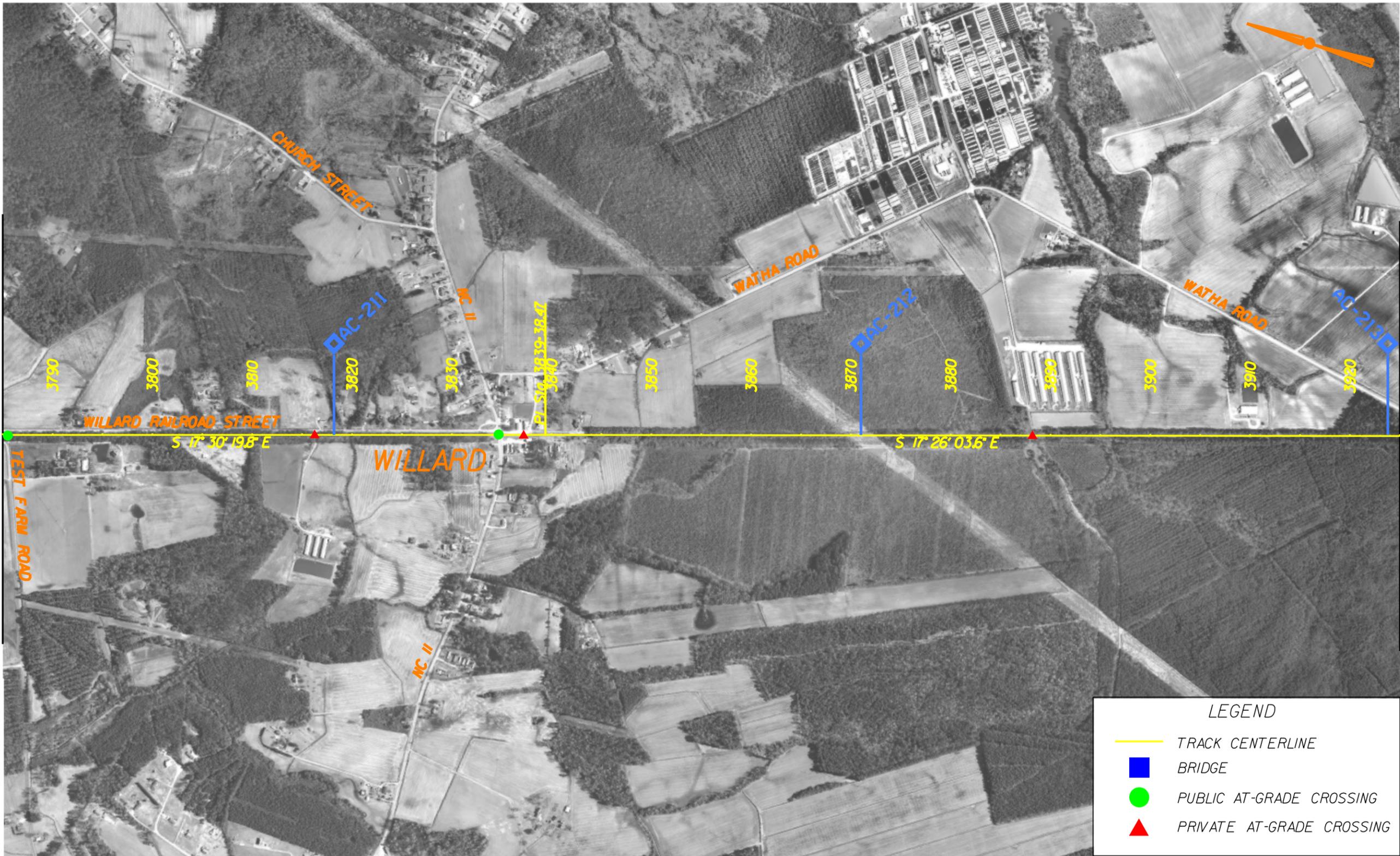
LEGEND	
	TRACK CENTERLINE
	BRIDGE
	PUBLIC AT-GRADE CROSSING
	PRIVATE AT-GRADE CROSSING

NO.	BY	DATE	REVISION

**INCOMPLETE PLANS**  
 DO NOT USE FOR ROW ACQUISITION  
**PRELIMINARY PLANS**  
 DO NOT USE FOR CONSTRUCTION

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
  
**RAIL DIVISION**  
 PREPARED BY: **PARSONS BRINCKERHOFF**

PROJECT		WALLACE TO CASTLE HAYNE REACTIVATION AND MARKET INVEST. STUDY	
TITLE		CONCEPTUAL PLANS STA. 3660+00 TO STA. 3785+00	
LOCATION		PENDER COUNTY, NC	
DGN BY	SMK	RAILROAD	NCDOT
DWN BY	SMK	VAL SEC	V.9.N.C.
CHK BY	DATE	AUG. 22, 2014	SCALE 1"=1000'
MILE POST			AC-208 TO AC-235
SHEET 001			



MATCHLINE - STA. 3785+00 SEE SHEET 001

MATCHLINE - STA. 3925+00 SEE SHEET 003

LEGEND	
	TRACK CENTERLINE
	BRIDGE
	PUBLIC AT-GRADE CROSSING
	PRIVATE AT-GRADE CROSSING

NO.	BY	DATE	REVISION





**PARSONS BRINCKERHOFF**

PROJECT		WALLACE TO CASTLE HAYNE REACTIVATION AND MARKET INVEST. STUDY	
TITLE		CONCEPTUAL PLANS STA. 3785+00 TO STA. 3925+00	
LOCATION		PENDER COUNTY, NC	
DGN BY	SMK	RAILROAD	NCDOT
DWN BY	SMK	VAL SEC	V.S.N.C.
CHK BY		DATE	AUG. 22, 2014
SCALE		1"=1000'	
MILE POST		AC-208 TO AC-235	
SHEET 002			

MATCHLINE - STA. 3925+00 SEE SHEET 002



MATCHLINE - STA. 4065+00 SEE SHEET 004

LEGEND	
	TRACK CENTERLINE
	BRIDGE
	PUBLIC AT-GRADE CROSSING
	PRIVATE AT-GRADE CROSSING

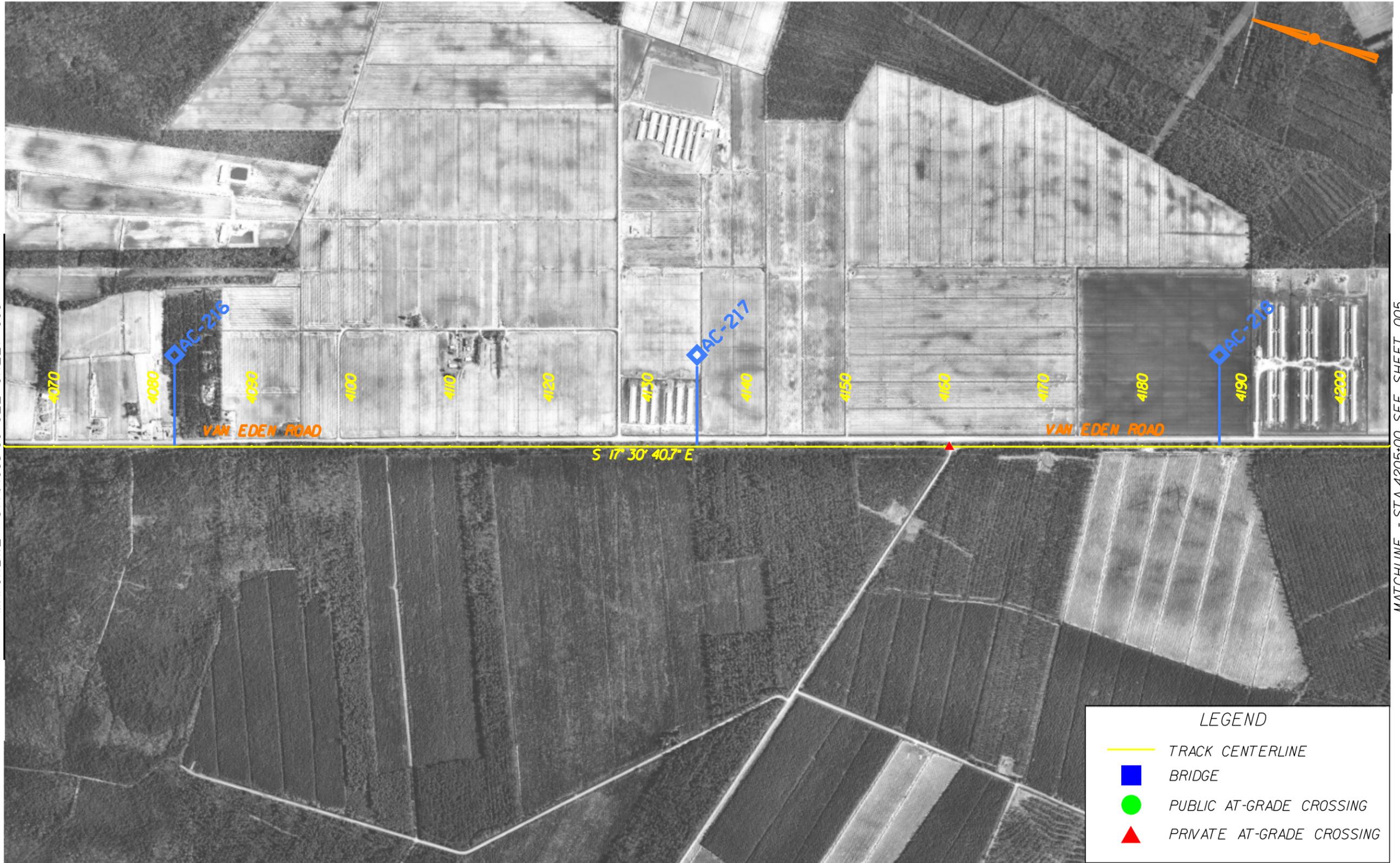
NO.	BY	DATE	REVISION

**INCOMPLETE PLANS**  
 DO NOT USE FOR ROW ACQUISITION  
**PRELIMINARY PLANS**  
 DO NOT USE FOR CONSTRUCTION

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
  
**RAIL DIVISION**  
 PREPARED BY:  
**PARSONS BRINCKERHOFF**

PROJECT WALLACE TO CASTLE HAYNE REACTIVATION AND MARKET INVEST. STUDY		MILE POST AC-208 TO AC-235	
TITLE			
CONCEPTUAL PLANS			
STA. 3925+00 TO STA. 4065+00			
LOCATION PENDER COUNTY, NC		SCALE 1"=1000'	
DGN BY SMK	RAILROAD NCDOT	DATE AUG. 22, 2014	
DWN BY SMK	VAL SEC V.9NC.	SHEET 003	
CHK BY	DATE	SCALE	

MATCHLINE - STA. 4065+00 SEE SHEET 003



MATCHLINE - STA. 4205+00 SEE SHEET 005

**LEGEND**

- TRACK CENTERLINE
- BRIDGE
- PUBLIC AT-GRADE CROSSING
- ▲ PRIVATE AT-GRADE CROSSING

NO.	BY	DATE	REVISION

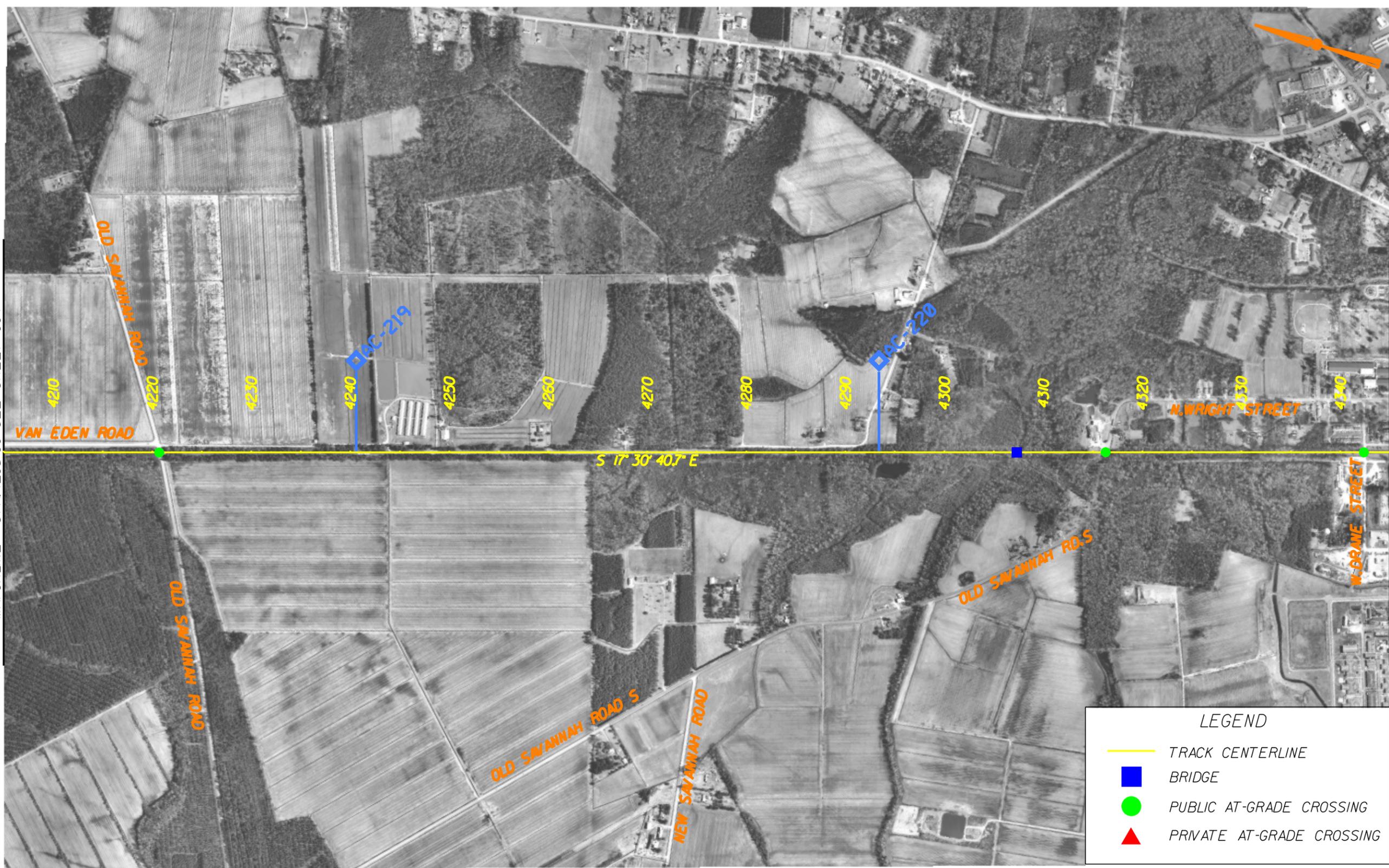
**INCOMPLETE PLANS**  
 DO NOT USE FOR ROW ACQUISITION  
**PRELIMINARY PLANS**  
 DO NOT USE FOR CONSTRUCTION

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  

**RAIL DIVISION**  
 PREPARED BY:  **PARSONS BRINCKERHOFF**

PROJECT WALLACE TO CASTLE HAYNE REACTIVATION AND MARKET INVEST. STUDY		MILE POST AC-208 TO AC-235	
TITLE CONCEPTUAL PLANS STA. 4065+00 TO STA. 4205+00			
LOCATION PENDER COUNTY, NC		SCALE 1"=1000'	
DGN BY SMK	RAILROAD NCDOT	VAL SEC V.9NC.	
DWN BY SMK	DATE AUG. 22, 2014	SHEET 004	

MATCHLINE - STA. 4205+00 SEE SHEET 004



MATCHLINE - STA. 4345+00 SEE SHEET 006

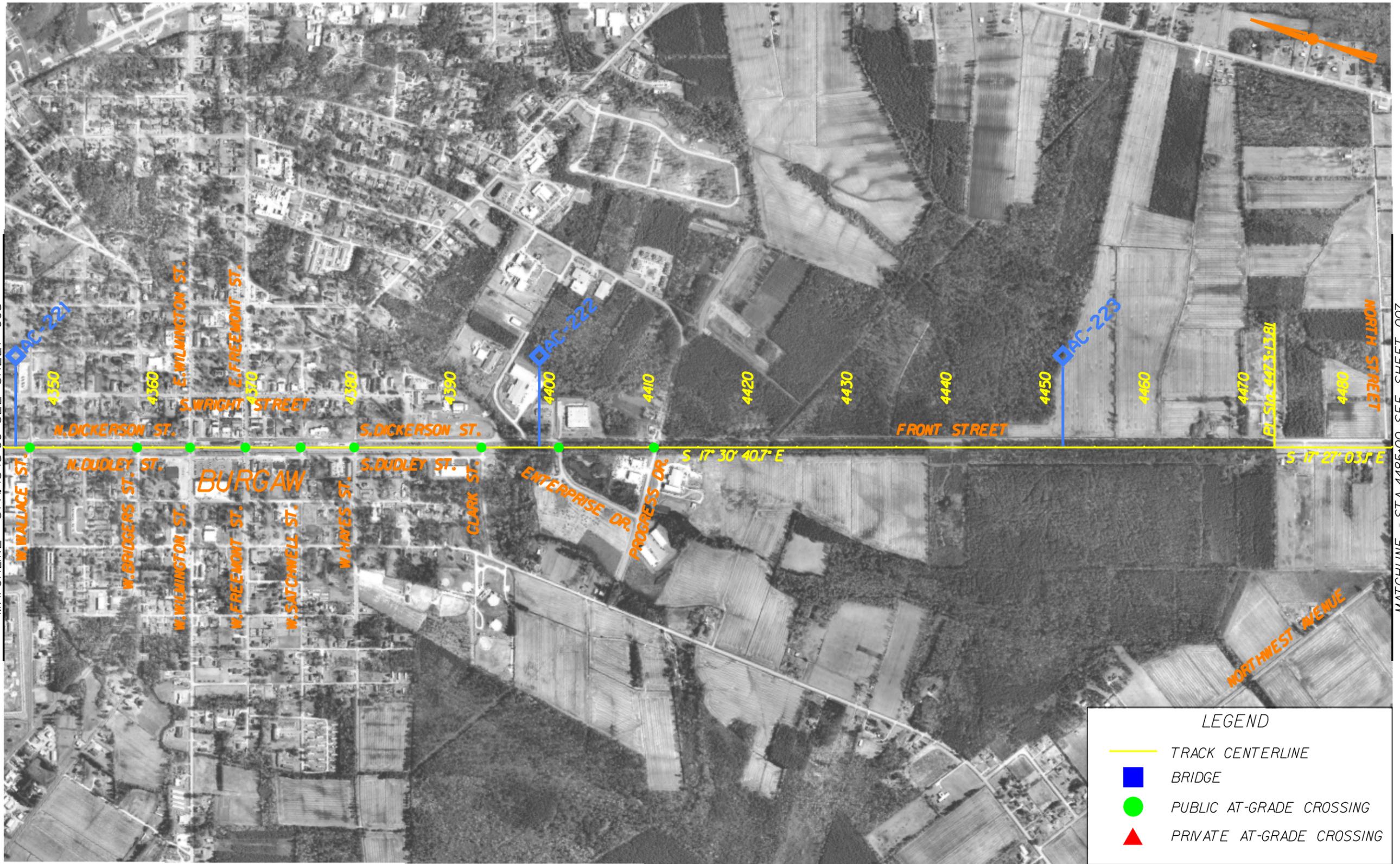
LEGEND	
	TRACK CENTERLINE
	BRIDGE
	PUBLIC AT-GRADE CROSSING
	PRIVATE AT-GRADE CROSSING

NO.	BY	DATE	REVISION

**INCOMPLETE PLANS**  
 DO NOT USE FOR ROW ACQUISITION  
**PRELIMINARY PLANS**  
 DO NOT USE FOR CONSTRUCTION

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
  
**RAIL DIVISION**  
 PREPARED BY: **PARSONS BRINCKERHOFF**

PROJECT	WALLACE TO CASTLE HAYNE REACTIVATION AND MARKET INVEST. STUDY		
TITLE	CONCEPTUAL PLANS STA. 4205+00 TO STA. 4345+00		
LOCATION	PENDER COUNTY, NC		
DGN BY	SMK	RAILROAD	NCDOT
DWN BY	SMK	VAL SEC	V.9NC.
CHK BY	DATE	AUG. 22, 2014	SCALE 1"=1000'
MILE POST	AC-208 TO AC-235		
			SHEET 005



MATCHLINE - STA. 4345+00 SEE SHEET 005

MATCHLINE - STA. 4485+00 SEE SHEET 007

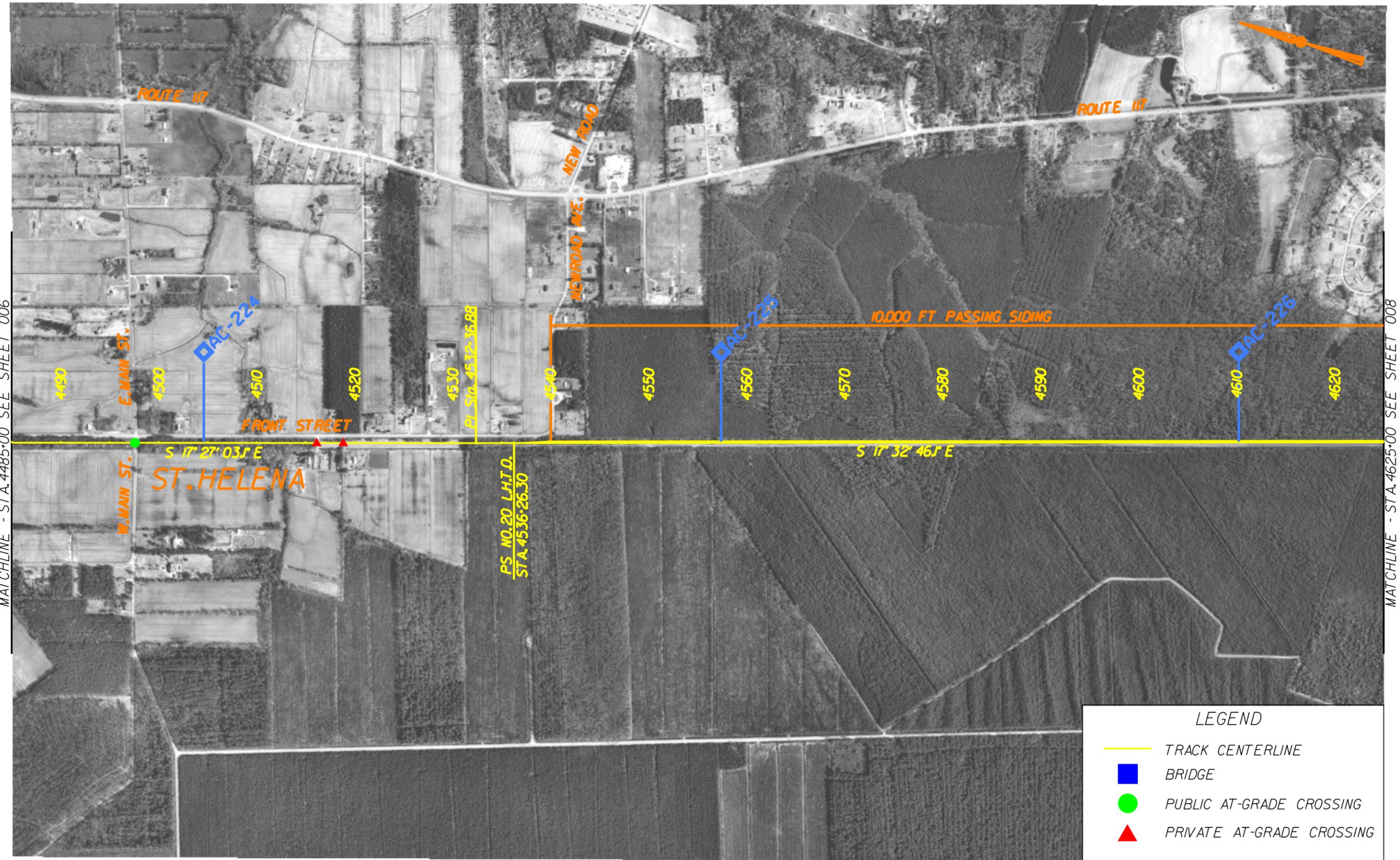
LEGEND	
	TRACK CENTERLINE
	BRIDGE
	PUBLIC AT-GRADE CROSSING
	PRIVATE AT-GRADE CROSSING

NO.	BY	DATE	REVISION

**INCOMPLETE PLANS**  
 DO NOT USE FOR ROW ACQUISITION  
**PRELIMINARY PLANS**  
 DO NOT USE FOR CONSTRUCTION

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
  
**RAIL DIVISION**  
 PREPARED BY: **PARSONS BRINCKERHOFF**

PROJECT		WALLACE TO CASTLE HAYNE REACTIVATION AND MARKET INVEST. STUDY	
TITLE		CONCEPTUAL PLANS STA. 4205+00 TO STA. 4345+00	
LOCATION		PENDER COUNTY, NC	
DGN BY	SMK	RAILROAD	NCDOT
DWN BY	SMK	VAL SEC	V.9NC.
CHK BY		DATE	AUG. 22, 2014
MILE POST		AC-208 TO AC-235	
SCALE		1"=100'	
		SHEET 006	



MATCHLINE - STA. 4485+00 SEE SHEET 006

MATCHLINE - STA. 4625+00 SEE SHEET 008

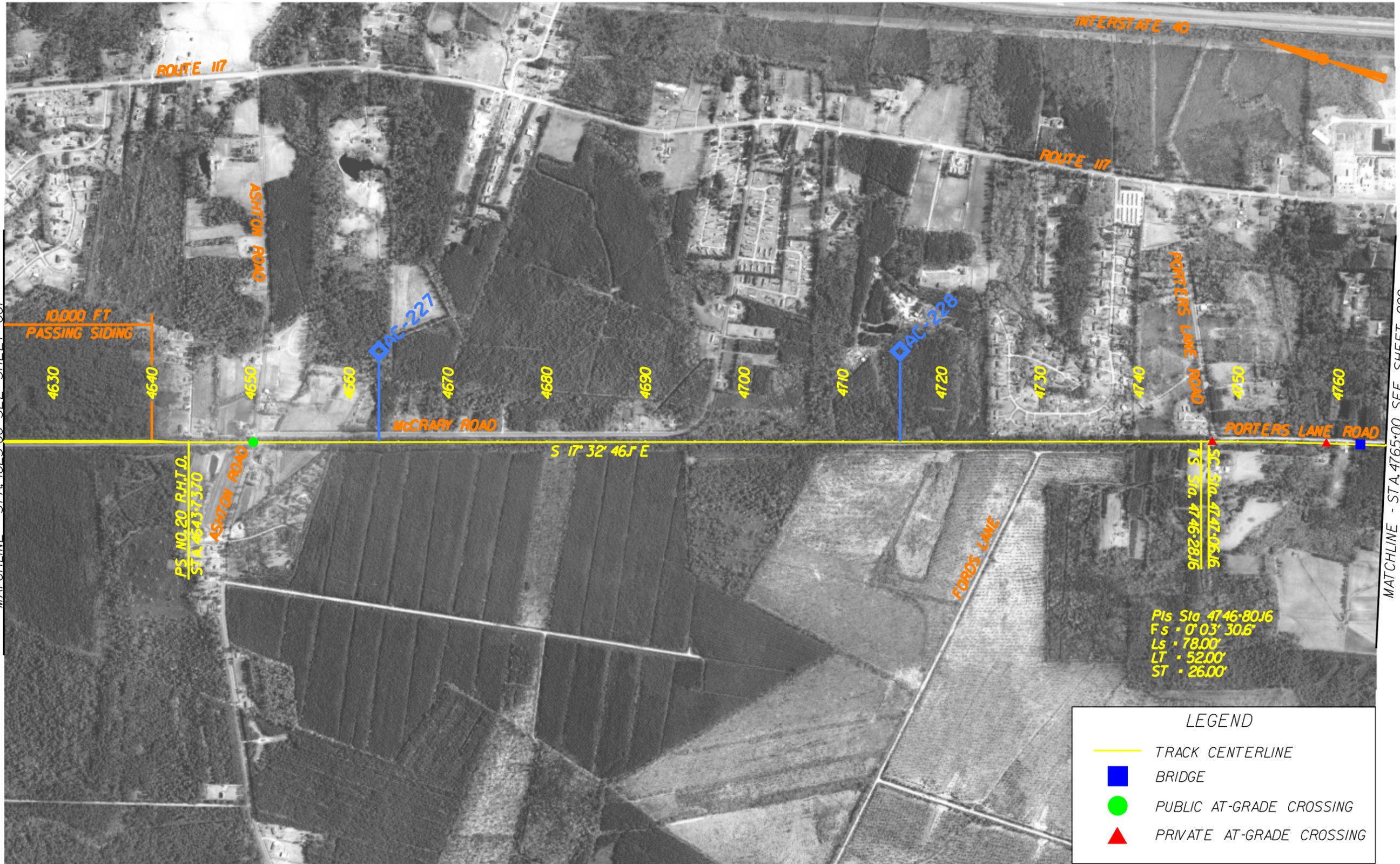
LEGEND	
	TRACK CENTERLINE
	BRIDGE
	PUBLIC AT-GRADE CROSSING
	PRIVATE AT-GRADE CROSSING

NO.	BY	DATE	REVISION

**INCOMPLETE PLANS**  
 DO NOT USE FOR ROW ACQUISITION  
**PRELIMINARY PLANS**  
 DO NOT USE FOR CONSTRUCTION

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
  
**RAIL DIVISION**  
 PREPARED BY:  
**PARSONS BRINCKERHOFF**

PROJECT	WALLACE TO CASTLE HAYNE REACTIVATION AND MARKET INVEST. STUDY		
TITLE	CONCEPTUAL PLANS STA. 4345+00 TO STA. 4625+00		
LOCATION	PENDER COUNTY, NC		
DGN BY	SMK	RAILROAD	NCDOT
DWN BY	SMK	VAL SEC	V.S.N.C.
CHK BY	DATE	AUG. 22, 2014	SCALE 1"=1000'
MILE POST	AC-208 TO AC-235		
SHEET 007			



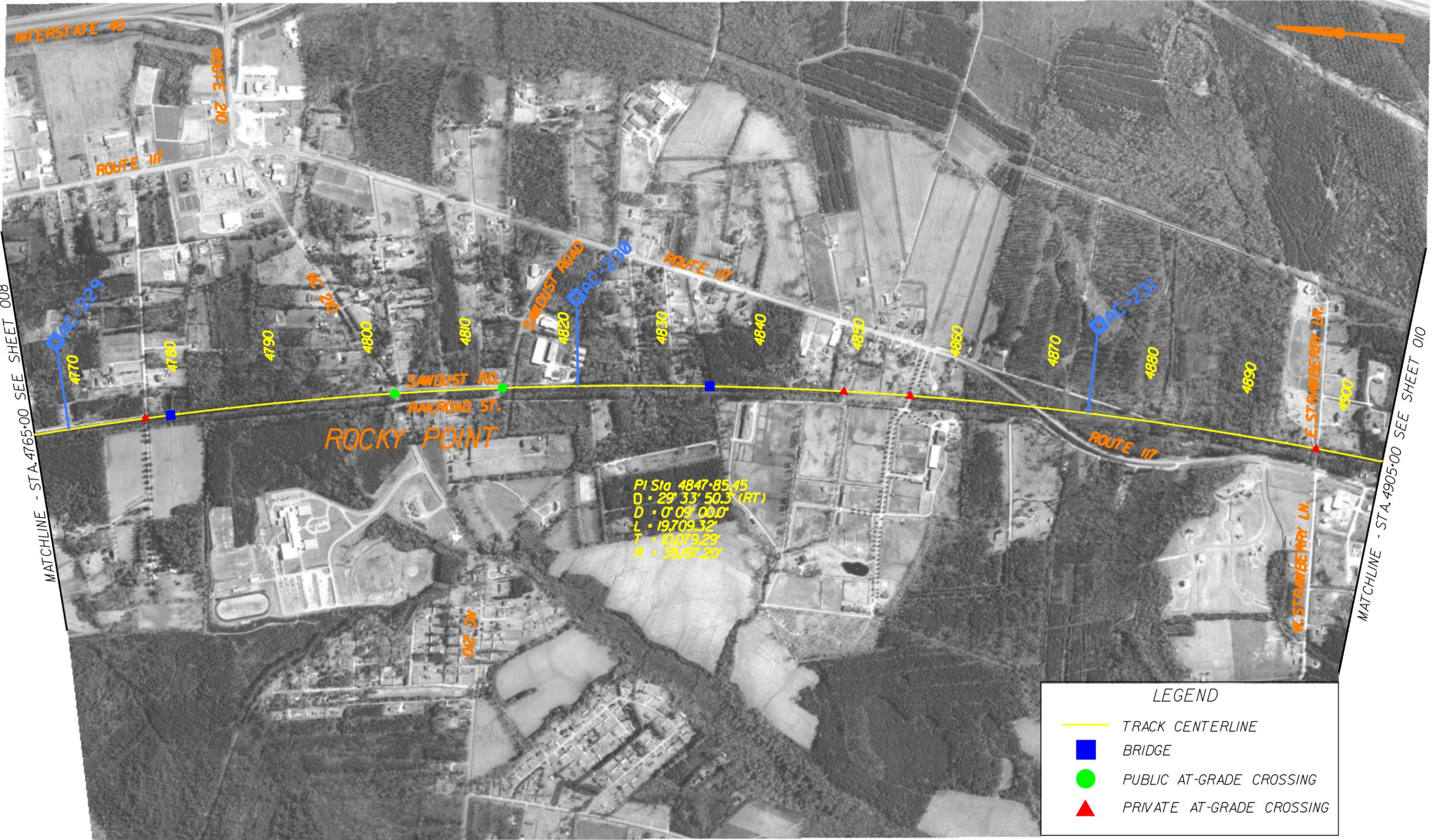
NO.	BY	DATE	REVISION

**INCOMPLETE PLANS**  
 DO NOT USE FOR ROW ACQUISITION  
**PRELIMINARY PLANS**  
 DO NOT USE FOR CONSTRUCTION

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
**RAIL DIVISION**

PREPARED BY: **PB PARSONS BRINCKERHOFF**

PROJECT WALLACE TO CASTLE HAYNE REACTIVATION AND MARKET INVEST. STUDY		MILE POST AC-208 TO AC-235	
TITLE CONCEPTUAL PLANS STA. 4625+00 TO STA. 4765+00		SHEET 008	
LOCATION PENDER COUNTY, NC	DGN BY SMK RAILROAD NCDOT	SCALE 1"=1000'	
DWN BY SMK VAL SEC V.9N.C.	CHK BY DATE AUG. 22, 2014		



MATCHLINE - STA. 4765+00 SEE SHEET 008

MATCHLINE - STA. 4905+00 SEE SHEET 010

LEGEND	
	TRACK CENTERLINE
	BRIDGE
	PUBLIC AT-GRADE CROSSING
	PRIVATE AT-GRADE CROSSING

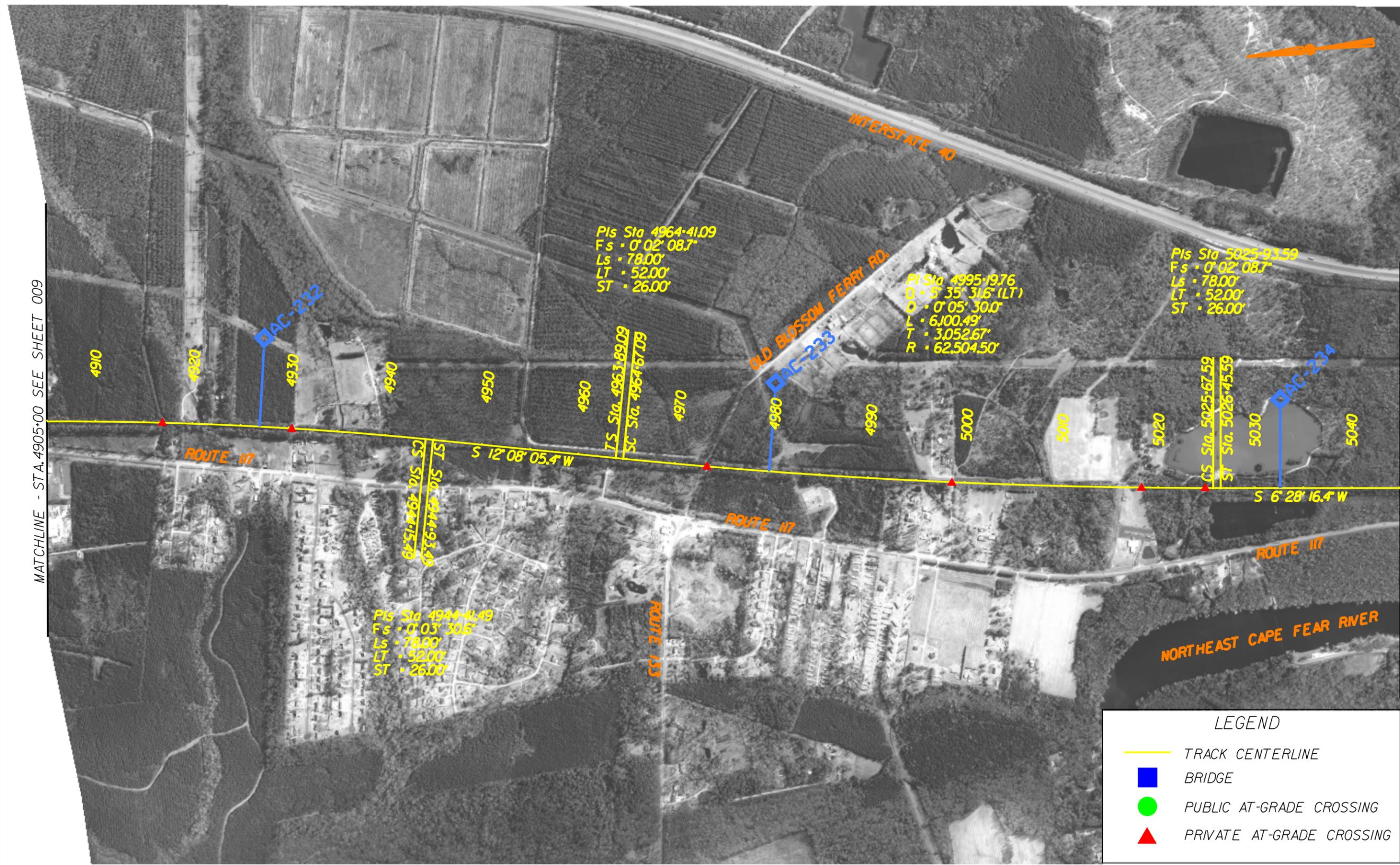
PI Sta 4847-85.45  
 D = 29' 33" 50.3' (RT)  
 D = 0' 09" 00.0"  
 L = 19709.32'  
 T = 10,079.29'  
 R = 38,197.20'

NO.	BY	DATE	REVISION

**INCOMPLETE PLANS**  
 DO NOT USE FOR ROW ACQUISITION  
**PRELIMINARY PLANS**  
 DO NOT USE FOR CONSTRUCTION

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
  
**RAIL DIVISION**  
 PREPARED BY: **PARSONS BRINCKERHOFF**

PROJECT WALLACE TO CASTLE HAYNE REACTIVATION AND MARKET INVEST. STUDY		MILE POST AC-208 TO AC-235	
TITLE CONCEPTUAL PLANS STA. 4765+00 TO STA. 4905+00			
LOCATION PENDER COUNTY, NC		SCALE 1"=1000'	
DGN BY SMK	RAILROAD NCDOT	SHEET 009	
DWN BY SMK	VAL SEC V.9.N.C.		
CHK BY	DATE AUG. 22, 2014		



MATCHLINE - STA. 4905+00 SEE SHEET 009

MATCHLINE - STA. 5045+00 SEE SHEET 011

LEGEND	
	TRACK CENTERLINE
	BRIDGE
	PUBLIC AT-GRADE CROSSING
	PRIVATE AT-GRADE CROSSING

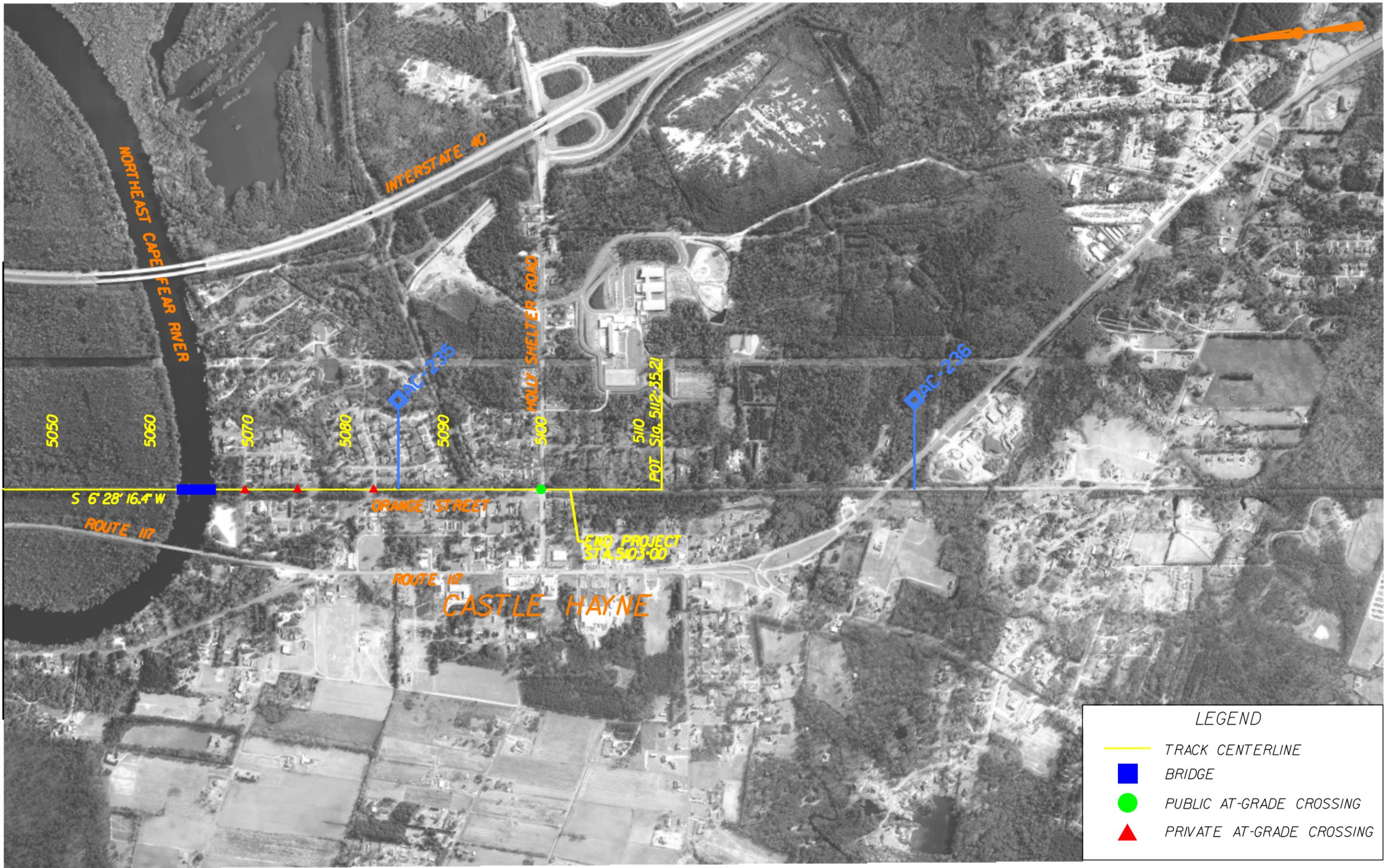
NO.	BY	DATE	REVISION

**INCOMPLETE PLANS**  
DO NOT USE FOR ROW ACQUISITION  
**PRELIMINARY PLANS**  
DO NOT USE FOR CONSTRUCTION

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
  
**RAIL DIVISION**  
 PREPARED BY: **PARSONS BRINCKERHOFF**

PROJECT	WALLACE TO CASTLE HAYNE REACTIVATION AND MARKET INVEST. STUDY		
TITLE	CONCEPTUAL PLANS STA. 4905+00 TO STA. 5045+00		
LOCATION	PENDER COUNTY, NC		
DGN BY	SMK	RAILROAD	NCDOT
DWN BY	SMK	VAL SEC	V.9N.C.
CHK BY	DATE	AUG. 22, 2014	SCALE 1"=1000'
MILE POST	AC-208 TO AC-235		
SHEET 010			

MATCHLINE - STA. 5045+00 SEE SHEET 010



LEGEND	
	TRACK CENTERLINE
	BRIDGE
	PUBLIC AT-GRADE CROSSING
	PRIVATE AT-GRADE CROSSING

NO.	BY	DATE	REVISION

**INCOMPLETE PLANS**  
 DO NOT USE FOR ROW ACQUISITION  
**PRELIMINARY PLANS**  
 DO NOT USE FOR CONSTRUCTION

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
  
**RAIL DIVISION**  
 PREPARED BY: **PARSONS BRINCKERHOFF**

PROJECT WALLACE TO CASTLE HAYNE REACTIVATION AND MARKET INVEST. STUDY	
TITLE CONCEPTUAL PLANS STA. 5045+00 TO STA. 5103+00	
LOCATION PENDER COUNTY, NC	MILE POST AC-208 TO AC-235
DGN BY SMK RAILROAD NCDOT	SCALE 1"=1000'
DWN BY SMK VAL SEC V.9NC.	
CHK BY DATE AUG. 22, 2014	



## Appendix B Wallace to Castle Hayne Cost Estimate



Wallace to Castle Hayne Cost Estimate Item	Unit	Quantity	Unit Cost	Cost	Allocated Contingency	Total
<b>I. Guideway</b>						<b>\$63,451,302</b>
<b>At Grade Track</b>						
New	TF	140,976	\$339	\$47,772,044	20%	\$57,326,452
Rehab	TF	5,280	\$99	\$524,795	20%	\$629,754
<b>Special Trackwork</b>						
No. 10 Turnouts	EA	5	\$133,400	\$667,000	20%	\$800,400
No. 20 Turnouts	EA	2	\$247,020	\$494,040	20%	\$592,848
<b>Roadway Crossings</b>						
Asphalt Crossing Surface - 2 lanes	TF	780	\$319	\$249,132	20%	\$298,958
Asphalt Crossing Surface - 1 lane	TF	450	\$319	\$143,730	20%	\$172,476
Concrete Panels	TF	156	\$862	\$134,485	20%	\$161,382
Passing Siding	TF	10,000	\$289	\$2,890,860	20%	\$3,469,032
<b>II. Systems</b>						<b>\$5,480,774</b>
<b>Crossing protection</b>						
Public Crossing-Gates, Flashers, Bells	EA	27	\$143,565	\$3,876,267	20%	\$4,651,520
Public Crossing-Cantilever, Gates, Flashers, Bells	EA	3	\$215,348	\$646,044	20%	\$775,253
Private Crossing Crossbucks	EA	30	\$1,500	\$45,000	20%	\$54,000
<b>III. Drainage</b>						<b>\$581,446</b>
<b>Drainage Culvert Items</b>						
18" RCP, Class III Reinforcement	LF	150	\$ 32.11	\$4,817	25%	\$6,021
18" RCP, Class V Reinforcement	LF	120	\$ 46.00	\$5,520	25%	\$6,900
24" RCP, III	LF	150	\$ 44.00	\$6,600	25%	\$8,250
24" RCP, V	LF	470	\$ 68.00	\$31,960	25%	\$39,950
30" RCP, V	LF	80	\$ 85.00	\$6,800	25%	\$8,500
36" RCP, V	LF	950	\$ 125.00	\$118,750	25%	\$148,438
42" RCP, V	LF	270	\$ 135.00	\$36,450	25%	\$45,563
48" RCP, V	LF	100	\$ 148.00	\$14,800	25%	\$18,500
60" RCP, V	LF	200	\$ 300.00	\$60,000	25%	\$75,000
72" RCP, V	LF	450	\$ 340.00	\$153,000	25%	\$191,250
Pipe Removal	LF	2940	\$ 9.00	\$26,460	25%	\$33,075
<b>IV. Structures (Required for all Bridge Alternatives)</b>						<b>\$12,703,200</b>
<b>New Bridges (Average of two calculation methods)</b>						
Stream Crossing 1 (SF Method)	SF	1980	\$700	\$1,386,000	20%	\$1,641,600
Stream Crossing 1 (TF Method)	TF	90	\$15,000	\$1,350,000	20%	\$1,641,600
Stream Crossing 2	SF	1980	\$700	\$1,386,000	20%	\$1,641,600
Stream Crossing 2	TF	90	\$15,000	\$1,350,000	20%	\$1,641,600
Stream Crossing 3	SF	1320	\$700	\$924,000	20%	\$1,094,400
Stream Crossing 3	TF	60	\$15,000	\$900,000	20%	\$1,094,400
Stream Crossing 4	SF	1320	\$700	\$924,000	20%	\$1,094,400
Stream Crossing 4	TF	60	\$15,000	\$900,000	20%	\$1,094,400
Stream Crossing 5	SF	660	\$700	\$462,000	20%	\$547,200
Stream Crossing 5	TF	30	\$15,000	\$450,000	20%	\$547,200
Rockfish Creek Crossing	SF	7700	\$700	\$5,390,000	20%	\$6,384,000
Rockfish Creek Crossing	TF	350	\$15,000	\$5,250,000	20%	\$6,384,000
Crash Walls at Existing US-117 Bridge	LS	1	\$250,000	\$250,000	20%	\$300,000
<b>CONSTRUCTION SUBTOTAL (I to IV)</b>						<b>\$82,216,721</b>

Wallace to Castle Hayne Cost Estimate Item	Unit	Quantity	Unit Cost	Cost	Allocated Contingency	Total	Bridge Alternative 1	Bridge Alternative 2	Bridge Alternative 3
							<b>Bridge Alternative 1</b>	<b>Bridge Alternative 2</b>	<b>Bridge Alternative 3</b>
<b>V. Structures (Additional Items for Bridge Alternatives)</b>							<b>\$11,508,000</b>	<b>\$11,070,000</b>	<b>\$75,396,000</b>
Rehabilitation Items (North East Cape Fear River)									
Structural Steel Repairs & Strengthening (Girders)	LBS	350,000	\$5	\$1,750,000	20%	\$2,100,000	\$2,100,000	-	-
Bridge Jacking for Bearing Replacements	LS	1	\$100,000	\$100,000	20%	\$120,000	\$120,000	-	-
New Bearings (Steel and Bronze Bearings)	EA	28	\$5,000	\$140,000	20%	\$168,000	\$168,000	-	-
Cleaning and Painting of Existing Structural Steel	LS	1	\$1,000,000	\$1,000,000	20%	\$1,200,000	\$1,200,000	-	-
Lead Paint Removal, Collection, and Disposal	LS	1	\$500,000	\$500,000	20%	\$600,000	\$600,000	-	-
Enclosure to Contain Lead Paint Removal	LS	1	\$250,000	\$250,000	20%	\$300,000	\$300,000	-	-
New Electrical and Mechanical Equipment to Refurbish Existing Swing Span	LS	1	\$250,000	\$250,000	20%	\$300,000	-	-	-
New Operators House	LS	1	\$250,000	\$250,000	20%	\$300,000	-	-	-
Retrofitting Existing Fender System	LS	1	\$100,000	\$100,000	20%	\$120,000	\$120,000	-	-
New Dolphins for Pier Protection	LS	1	\$250,000	\$250,000	20%	\$300,000	\$300,000	-	-
Substructure Concrete Repairs (Spalls, Racks, Unsound Concrete)	LS	1	\$500,000	\$500,000	20%	\$600,000	\$600,000	-	-
<b>Additional Bridge Items (Average of two Calculation Methods as Applicable)</b>									
New Ballasted Deck Spans for Existing Height Option (SF Method)	SF	6500	\$700	\$4,550,000	20%	\$5,070,000	-	\$5,070,000	-
New Ballasted Deck Spans for Existing Height Option (TF Method)	TF	260	\$15,000	\$3,900,000	20%	\$4,680,000	-	\$4,680,000	-
New Swing Span (140', including E&M, Control House, etc.)	SF	3625	\$1,600	\$5,800,000	20%	\$6,960,000	\$6,960,000	\$6,960,000	\$6,960,000
New Swing Span (140', including E&M, Control House, etc.)	TF	140	\$30,000	\$4,200,000	20%	\$5,040,000	-	\$5,040,000	\$5,040,000
New Through Girder Spans (100' for 29' High Bridge)	SF	2500	\$800	\$2,000,000	20%	\$2,400,000	-	-	\$2,400,000
New Through Girder Spans (100' for 29' High Bridge)	TF	100	\$17,000	\$1,700,000	20%	\$2,040,000	-	-	\$2,040,000
Remaining Spans for 29' High Bridge (1800' on both sides)	SF	90000	\$500	\$45,000,000	20%	\$54,000,000	-	-	\$54,000,000
Remaining Spans for 29' High Bridge (1800' on both sides)	TF	3600	\$15,000	\$54,000,000	20%	\$64,800,000	-	-	\$64,800,000
Retaining Walls at Approaches to 29' High Bridge	SF	86400	\$75	\$6,480,000	20%	\$7,776,000	-	-	\$7,776,000
<b>CONSTRUCTION SUBTOTAL (I to V)</b>							<b>\$93,724,721</b>	<b>\$93,286,721</b>	<b>\$157,612,721</b>
<b>VI. Miscellaneous</b>							<b>\$8,766,250</b>	<b>\$8,722,450</b>	<b>\$15,155,050</b>
Environmental Mitigation Allowance					5%	\$4,383,125.09	\$4,383,125.09	\$4,361,225.09	\$7,577,525.09
Temporary Facilities, Indirect Costs for Construction (Demob)					5%	\$4,383,125.09	\$4,383,125.09	\$4,361,225.09	\$7,577,525.09
<b>VII. Professional Services</b>							<b>\$20,619,439</b>	<b>\$20,523,079</b>	<b>\$34,674,799</b>
Design					8%	\$7,497,977.68	\$7,462,937.68	\$7,462,937.68	\$12,609,017.68
Project Management					5%	\$4,686,236.05	\$4,664,336.05	\$4,664,336.05	\$7,880,636.05
Construction Management					5%	\$4,686,236.05	\$4,664,336.05	\$4,664,336.05	\$7,880,636.05
Permitting, Environmental					2%	\$1,874,494.42	\$1,865,734.42	\$1,865,734.42	\$3,152,254.42
Survey, geotech					2%	\$1,874,494.42	\$1,865,734.42	\$1,865,734.42	\$3,152,254.42
<b>PROJECT SUBTOTAL (I to VII)</b>							<b>\$123,110,410</b>	<b>\$122,532,250</b>	<b>\$207,442,570</b>
<b>VIII. Project Contingency</b>					25%	\$30,777,602	\$30,777,602	\$30,633,062	\$51,860,642
<b>PROJECT TOTAL (I to VIII)</b>							<b>\$153,888,012</b>	<b>\$153,165,312</b>	<b>\$259,303,212</b>

Bridge Alternatives
Alternative 1 - Rehabilitate Existing Fixed Spans and Replace Swing Span with New Swing Span
Alternative 2 - Total Replacement at Existing Height
Alternative 3 - Total Replacement at 29' High



## Appendix C

### Wallace to Castle Hayne Benefit Cost Report



Wallace to Castle Hayne Rail Line  
Restoration Project  
Benefit Cost Analysis

Prepared for the North Carolina Department of Transportation

**Table of Contents**

Benefit Cost Analysis Summary ..... C-3

Analysis Assumptions ..... C-3

    Discount Rates ..... C-3

    Evaluation Period ..... C-3

    Tonnage Estimation ..... C-4

        Local Freight ..... C-4

        W2CH as a Shortcut ..... C-4

        W2CH as Secondary Access to Wilmington ..... C-5

Methodology ..... C-6

    Project Benefits ..... C-6

        Reduced Emissions ..... C-6

        Reduction in Shippers’ Carrying Cost ..... C-8

        Reduction in Accidents ..... C-9

        Reduction in Operating Expense ..... C-10

        Increase in System Redundancy and Resiliency Benefits ..... C-12

    Project Costs ..... C-12

        Residual Value Estimation ..... C-13

Benefit Cost Analysis Results ..... C-13

## Benefit Cost Analysis Summary

The estimated benefits of the Wallace to Castle Hayne (W2CH) rail line restoration are between \$6 million and \$22 million over a 30 year horizon. While these benefits seem large in absolute terms, they are modest relative to the cost needed to reactivate the line. The benefit cost ratio for the project is estimated to range from 0.05 to 0.17, with a net present value of between about \$108 million and \$124 million. The results indicate that the project does not generate sufficient benefits above its costs. A benefit cost ratio of 1 is the threshold by which projects can be considered cost effective.

**Table 1: Benefit Cost Analysis Summary Results**

Category	Mid Scenario 2014 \$	High Scenario 2014 \$	Low Scenario 2014 \$
Reduced emissions	1,940,390	5,338,682	802,436
Reduced inventory carrying costs	38,951	120,606	23,098
Reduction in accidents	607,983	1,525,896	174,429
Reduction in operating expense	4,404,975	12,313,112	1,899,409
Increase in system redundancy	3,040,407	3,040,407	3,040,407
<b>Total present value of benefits</b>	<b>10,032,706</b>	<b>22,338,703</b>	<b>5,939,779</b>
<b>Total present value of costs</b>	<b>134,464,950</b>	<b>134,464,950</b>	<b>134,464,950</b>
<b>Residual value</b>	<b>-3,865,548</b>	<b>-3,865,548</b>	<b>-3,865,548</b>
<b>Net present value</b>	<b>-120,566,696</b>	<b>-108,260,699</b>	<b>-124,659,623</b>
<b>Benefit/cost ratio</b>	<b>0.08</b>	<b>0.17</b>	<b>0.05</b>

## Analysis Assumptions

### Discount Rates

Dollar figures in this analysis are expressed in real 2014 dollars. Total cost estimates include an allowance for contingency. Therefore, no additional escalation was assumed. Yearly benefits and costs were discounted to present value using a 7.0 percent rate and a 2014 base year, consistent with U.S. DOT guidance for TIGER VI grants<sup>1</sup> and OMB Circular A-4.<sup>2</sup>

### Evaluation Period

The evaluation period includes two years of construction and 30 years of operations beyond the Project completion within which to accrue benefits.

Project costs are incurred in 2015 and conclude in 2016. The operations period begins in 2017 and continues through 2046. The analysis period, therefore, begins with the first expenditures in 2015 and continues to 2046.

<sup>1</sup>TIGER 2014 NOFA: Benefit-Cost Analysis Guidance, Updated March 14, 2014; <http://www.dot.gov/tiger/guidance>

<sup>2</sup> White House Office of Management and Budget, Circular A-94, *Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs* (October 29, 1992). ([http://www.whitehouse.gov/omb/circulars\\_a094](http://www.whitehouse.gov/omb/circulars_a094)).

All benefits and costs are assumed to occur at the end of each year, and benefits begin in the calendar year immediately following the final construction year.

### Tonnage Estimation

The estimated benefits reflect probable usage of the W2CH corridor. Benefits have been calculated for each of three categories of potential usage of the W2CH Corridor. Freight tonnage forecasts were developed primarily using rates of expected change in rail traffic from the U.S. Federal Highway Administration (FHWA) Freight Analysis Framework-3 (FAF-3). FAF-3 forecasts extend only to 2040, while the final analysis year of this analysis is 2046. Traffic levels were assumed to remain flat during the final six years between 2040 and 2046 for each case. Due to uncertainty in forecasting freight levels, tonnage levels often appear as high, medium, and low scenarios.

### Local Freight

Shippers physically located on the W2CH segment could use rail as a result of the project. It is assumed that if not for the W2CH project, these shippers would be solely reliant on truck freight transportation. Forecasted tons are show below. Shipment distances are assumed to be 570 miles for both rail and truck, the average distance for a rail movement to or from the Wilmington area as calculated from the 2011 STB Waybill Sample.

**Table 2: Summary of Forecasted Local Freight on W2CH**

Year	Scenario		
	Low	Medium	High
2014	0	2,500	5,000
2020	0	2,777	5,553
2025	0	2,969	5,938
2030	0	3,157	6,182
2035	0	3,202	6,403
2040	0	3,334	6,668

### W2CH as a Shortcut

Other freight could use W2CH as a more direct rail routing. In the no build scenario, where W2CH is not constructed, this freight would still use rail but would use a more circuitous routing. The nature of benefits and the extent of the mileage savings depend upon the type of traffic. Freight categories are below.

- Manifest freight. This is freight that is shipped in individual or groups of cars that must be sorted into (switched) and out of trains. Manifest freight is assumed to save 141 miles per trip using W2CH, since freight between Wilmington and points northeast could move directly over W2CH rather than a routing of Wilson – Pembroke- Hamlet – Wilmington.
- Unit train freight. This is freight that moves in complete trains that travel between origin and destination without being stored or split up. Unit train freight is further divided into the following.

- Military cargo. These are shipments between MOTSU and military depots in the Northeast. W2CH saves 68 miles for these shipments, since freight can proceed directly over the W2CH rather than a routing of Wilmington – Pembroke – Wilson.
- Agricultural shipments. These are shipments from the Port of Wilmington to hog and turkey production areas in Duplin, Wayne, and Sampson counties. For simplicity's sake, these are assumed to move between Wilmington and Warsaw. Mileage savings for these movements total 167 miles per trip, since shipments can proceed directly to Warsaw over the W2CH and avoid a circuitous routing of Wilmington – Pembroke – Wilson – Warsaw.

Forecast tonnage for each category of traffic is shown in the table below.

**Table 3: Forecast Freight Using W2CH as a Shortcut**

Year	Manifest			Agriculture			Military		
	Low	Medium	High	Low	Medium	High	Low	Medium	High
2014	0	102,400	204,800	41,385	82,770	275,900	40,350	40,350	40,350
2020	0	105,188	210,376	48,445	96,890	322,968	40,350	40,350	40,350
2025	0	105,305	210,610	53,446	106,892	356,307	40,350	40,350	40,350
2030	0	102,475	204,949	58,289	116,579	388,596	40,350	40,350	40,350
2035	0	99,833	199,666	62,549	125,097	416,992	40,350	40,350	40,350
2040	0	96,196	192,391	65,164	130,328	434,427	40,350	40,350	40,350

### W2CH as Secondary Access to Wilmington

W2CH also provides secondary access to the Wilmington area in case there is an outage on the Wilmington Subdivision. The freight that would benefit from this secondary access includes all freight forecast to originate or terminate in the Wilmington area as listed below.

**Table 4: Forecast Freight Benefitting from W2CH Secondary Access to Wilmington**

Year	Rail Tonnage
2014	4,727,752
2020	4,601,157
2025	4,732,303
2030	4,894,390
2035	5,028,707
2040	5,166,059

## Methodology

### Project Benefits

In keeping with the tonnage estimation, all project benefits were calculated based on the three estimation scenarios. Low, medium, and high results were produced for the analysis.

**Table 5: Summary of W2CH Benefits**

Category	Mid Scenario 2014 \$	High Scenario 2014 \$	Low Scenario 2014 \$
Reduced emissions	1,940,390	5,338,682	802,436
Reduced inventory carrying costs	38,951	120,606	23,098
Reduction in accidents	607,983	1,525,896	174,429
Reduction in operating expense	4,404,975	12,313,112	1,899,409
Increase in system redundancy	3,040,407	3,040,407	3,040,407
<b>Total PV of benefits</b>	<b>10,032,706</b>	<b>22,338,703</b>	<b>5,939,779</b>

The nature of benefits depends upon the type of freight. Table 6 below summarizes freight types and benefits associated.

**Table 6: W2CH Benefits by Applicable Freight Traffic**

	Local	Manifest	Agriculture	Military	All Wilmington
Reduced truck emissions	Yes	No	No	No	No
Reduced truck accidents	Yes	No	No	No	No
Reduced truck operating expense	Yes	No	No	No	No
Reduced rail emissions	No	Yes	Yes	Yes	No
Reduced rail accidents	No	Yes	Yes	Yes	No
Reduced rail operating expense	No	No	Yes	Yes	No
Reduced rail inventory carrying cost	No	No	Yes	Yes	No
Reduced rail inventory carrying cost due to redundancy	No	No	No	No	Yes

### Reduced Emissions

Emission savings result from two direct effects of the reactivation of the rail line. First, the route shortcut reduces miles traveled for existing rail freight. Second, it induces diversion of freight from truck to rail. The diverted freight results in a reduction in truck emissions but also increases rail emissions. The net effect is a positive benefit due to the higher environmental efficiency of rail.

The tables below show the monetized values and emission factors used in this analysis. Because emission factors are based on fuel efficiency, ton-mileage is converted to gallons of diesel fuel by multiplying by efficiency factors as provided by CSX for rail freight. CO<sub>2</sub> emissions for truck are also based on gallons consumed. The following equation shows the computation used to calculate this benefit.

$$Emissions\ Benefit = TM_{yk} * \frac{Gallons}{TM} * \frac{emissions}{Gallons} * \frac{\$value}{emissions}$$

TM<sub>yk</sub> = Ton-mileage in year y for scenario k

Truck emission factors other than for CO<sub>2</sub> are based on vehicle miles traveled. Therefore, in calculating the results for truck freight, the estimated tonnage was divided by the average tonnage per truck at 22.7 tons per truck, as provided by the Federal Highway Administration’s Freight Management and Operations branch<sup>3</sup>. This results in total VMT avoided by this mode. The VMTs are then multiplied by the emission factors and then by the monetized values to arrive at the emission benefit from avoided truck trips.

$$Truck\ emission\ savings = \frac{TM_{yk}}{Tonnage\ per\ truck} * \frac{emissions}{VMT} * \frac{\$value}{emissions}$$

TM<sub>yk</sub> = Ton-mileage in year y for scenario k

**Table 7: Modal Fuel Efficiency**

Mode Type	Ton-Miles/Gallon
CSX Rail	470
Truck	134

Source: CSX<sup>4</sup> & MNN<sup>5</sup>

**Table 8: Cost per Metric Ton of Pollutants**

Emissions type	2014\$ per Metric Ton
NO <sub>x</sub>	\$7,877
PM	\$360,383
VOC	\$1,999
CO <sub>2</sub>	Varies per year

Source: US DOT<sup>6</sup>

<sup>3</sup> [http://faf.ornl.gov/fafweb/Data/Freight\\_Traffic\\_Analysis/chap3.htm#32](http://faf.ornl.gov/fafweb/Data/Freight_Traffic_Analysis/chap3.htm#32) : value of 22.7 tons per truck

<sup>4</sup> <http://www.csx.com/index.cfm/about-csx/projects-and-partnerships/fuel-efficiency/>

<sup>5</sup> <http://www.mnn.com/earth-matters/energy/stories/fuel-efficient-transportation-an-overview>

<sup>6</sup> [http://www.dot.gov/sites/dot.gov/files/docs/TIGER\\_BCARG\\_2014.pdf](http://www.dot.gov/sites/dot.gov/files/docs/TIGER_BCARG_2014.pdf)

**Table 9: Cost per Metric Ton of CO<sub>2</sub>**

SCC in Discounted 2013\$ per Metric Ton	2017	2025	2030	2040	2050
Social Cost of CO <sub>2</sub>	\$44	\$53	\$57	\$68	\$78

Source: US DOT<sup>7</sup>

**Table 10: Emissions Factors of Truck and Rail for Pollutants**

Rail & Truck Emission Factors	
Rail NOX grams/gallon	96.5
Rail PM grams/gallon	4.5
Rail VOC grams/gallon	3.8
Rail CO2 pounds/gallon	22.2
Truck NOX grams/VMT	3.6
Truck PM grams/VMT	0.2
Truck VOC grams/VMT	0.1
Truck CO2 pounds/gallon	22.2

Source: US EPA, US DOE<sup>8</sup>

### Reduction in Shippers' Carrying Cost

The reduction in carrying costs result from travel time savings. The route shortcut reduces miles traveled for existing rail freight. These shippers can save on carrying costs as freight spends less time in transit. For diverted freight, the switch results in a net increase in carrying costs due to the relative increase in travel time, as truck is faster than rail. To calculate this benefit, total tonnage is multiplied by the average value per ton of freight rail \$246 (US DOT<sup>9</sup>). The total value of the freight in transit is converted to hourly rates and then multiplied by the appropriate rate, assumed to be 13 percent in this analysis per the FHWA Intermodal Transportation and Inventory Cost (ITIC) model estimate for in-transit inventory cost. The resultant calculation can be thought of as a value of freight travel time to the shipper. This value is then multiplied by the amount of hours saved to arrive at the savings. The amount of time saved is a function of mode speed and distance. Since the existing rail freight experiences a reduction in distance, freight hours traveled reduces. In the case of manifest freight, however, it is uncertain whether there would be any time savings associated with more direct routing over the W2CH.

<sup>7</sup> [http://www.dot.gov/sites/dot.gov/files/docs/TIGER\\_BCARG\\_2014.pdf](http://www.dot.gov/sites/dot.gov/files/docs/TIGER_BCARG_2014.pdf)

<sup>8</sup> *Emission Factors for Locomotives*, EPA-420-F-09-025, Office of Transportation and Air Quality, United States Environmental Protection Agency, April 2009; *Voluntary Reporting of Greenhouse Gases Program Fuel Emission Coefficients*, Independent Statistics and Analysis, U.S. Energy Information Administration, U.S. Department of Energy; MOVES Motor Vehicle Emission Simulator, Office of Transportation and Air Quality, United States Environmental Protection Agency.

<sup>9</sup> [http://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/publications/commodity\\_flow\\_survey/2012/united\\_state\\_s/index.html](http://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/publications/commodity_flow_survey/2012/united_state_s/index.html)

Because the volume of freight travelling between Hamlet and Wilmington is higher than the volume of freight that would be passing over the W2CH segment, it is uncertain whether train service would be as frequent. This reduced frequency in service may increase total transit time even, since cars would need to wait longer until the next train, even if distances are shorter. Therefore, manifest freight was not included in this benefit category. However, in the case of diverted freight, freight hours traveled increase as the relative mode speed is lower for rail. Therefore, while there are net benefits that result from carrying cost savings, the portion attributable to diverted freight is negative.

The following equation shows the computation used to calculate this benefit before adjusting for dis-benefits.

$$Carry\ Cost\ Benefit = T_{yk} * \frac{\$value}{T} * \frac{1}{hours\ per\ year} * \frac{miles}{speed} * \%rate$$

T<sub>yk</sub> = Tonnage in year y for scenario k

The following table shows the values used in the computation.

**Table 11: Values Used to Calculate Inventory Carrying Cost**

Variable	Value	Source
Miles saved (military)	68	PB
Miles saved (agriculture)	167	PB
Miles (diverted)	570	PB
Average speed truck	53.1	US DOT
Average speed rail	20	CSX
Rate	13%	US DOT
Value per ton	\$245.84	US DOT

Source: CSX<sup>10</sup>, US DOT<sup>11</sup>

### Reduction in Accidents

The BCA assumes constant accident rates for the “build” and “no build” scenarios. Accordingly, changes in accidents are a result of the changes in ton-miles in each of the scenarios analyzed. The calculation relies on accident rates per ton mile as shown in the table below. The resultant change in accidents is multiplied by monetized values to arrive at a total accident cost savings. The following equation shows the computation used to calculate this benefit.

<sup>10</sup> <http://www.railroadpm.org/Home/RPM/Performance%20Reports/CSX.aspx>

<sup>11</sup> [http://ops.fhwa.dot.gov/freight/freight\\_analysis/nat\\_freight\\_stats/docs/09factsfigures/table3\\_8.htm](http://ops.fhwa.dot.gov/freight/freight_analysis/nat_freight_stats/docs/09factsfigures/table3_8.htm). The 13 percent inventory carrying cost is from the FHWA Intermodal Transportation and Inventory Cost System Model (ITIC).

$$Accident\ benefit = TM_{yk} * \frac{accidents}{TM} * \frac{\$value}{accident}$$

TM<sub>yk</sub> = Ton-mileage in year y for scenario k

In calculating the results for truck freight the estimated tonnage was divided by the average tonnage per truck, as provided by the Federal Highway Administration’s Freight Management and Operations branch<sup>12</sup>. This results in total VMT avoided by this mode. The VMTs are then multiplied by accident rate and then by the monetized values to arrive at the accident benefit from avoided truck trips.

$$Truck\ accident\ savings = \frac{TM_{yk}}{Tonnage\ per\ truck} * \frac{accidents}{VMT} * \frac{\$value}{accident}$$

TM<sub>yk</sub> = Ton-mileage in year y for scenario k

**Table 12: Values Used to Calculate Accident Savings**

Accident Rates and Monetized Values	Accidents/TM & \$Value/Accident	Source
Rail Fatal Crashes per 100 mil. ton-miles	140	FRA
Rail Injury Crashes per 100 mil. ton-miles	580	FRA
Rail Damage Crashes per 100 mil. ton-miles	1,770	FRA
Fatal Crashes per mil. Truck VMT	0.012500	FMCSA
Injury Crashes per mil. Truck VMT	0.224550	FMCSA
Damage Crashes per mil. Truck VMT	0.785910	FMCSA
Value per Fatal Crash	\$9,100,000	US DOT
Value per Injury Crash	\$110,011	US/NC DOT
Value per Damage Crash	\$3,927	US DOT

Source: US DOT<sup>13</sup> & \*NC DOT<sup>14</sup> & FMCSA<sup>15</sup> & FRA<sup>16</sup>

### Reduction in Operating Expense

Operating expense savings are derived from decreases in mileage. To calculate these savings costs per ton-mile are multiplied by the total ton-miles for the respective benefit source. That is, existing freight

<sup>12</sup> [http://faf.ornl.gov/fafweb/Data/Freight\\_Traffic\\_Analysis/chap3.htm#32](http://faf.ornl.gov/fafweb/Data/Freight_Traffic_Analysis/chap3.htm#32) : value of 22.7 tons per truck

<sup>13</sup> [http://www.dot.gov/sites/dot.gov/files/docs/TIGER\\_BCARG\\_2014.pdf](http://www.dot.gov/sites/dot.gov/files/docs/TIGER_BCARG_2014.pdf)

<sup>14</sup> <https://connect.ncdot.gov/business/DMV/.../2012%20Crash%20Facts.pdf> – weighted average product of total non-fatal, non-PDO accidents and accident monetized values.

<sup>15</sup> Large Truck and Bus Crash Facts 2012. FMCSA-RRA-14-004. Analysis Division, Federal Motor Carrier Safety Administration, U.S. Department of Transportation. June 2014.

<sup>16</sup> One Year Accident/Incident Overview – Combined (2012). Office of Safety Analysis, Federal Railroad Administration, U.S. Department of Transportation. 2014.

movements taking the shortcut and the net difference between truck and rail for diverted freight. The following equation shows the computation of this benefit.

$$\text{Operating expense savings} = TM_{yk} * \frac{\$cost}{ton - mile}$$

TM<sub>yk</sub> = Ton-mileage in year y for scenario k

The following table shows the values used in the computation.

**Table 13: Values Used to Estimate Operating Expense Savings**

Variable	Value	Source
Cost/ton-mile unit rail	\$0.015	STB URCS
Cost/ton-mile diverted rail	\$0.034	STB 2011 Waybill
Cost/ton-mile diverted truck	\$0.09	ATRI

Source: STB & ATRI

The calculation of rail operating expense per variable ton-mile saved is detailed below. Results using the 2012 URCS were indexed to 2014 using the STB’s Railroad Cost Adjustment Factor – Adjusted (RCAF-A). Because the RCAF-A declined over this time period, the inflations adjustment reflects a reduction in costs.

**Table 14: Cost Savings Associated with Shorter Route between Wilson and Wilmington**

(Assume 90 Car Train, 108 Tons per Car, Covered Hoppers with Grain, RR Owned Cars, 2012 CSX URCS)

Route/Difference	Ton-Miles (TM)	Var. Cost (VC)	2014 \$'s Var. Cost	VC/TM	VC/TM 2014 \$'s
Wilmington - Wilson by W&W	1,059,480	\$33,650	\$27,257	\$0.032	\$0.026
Wilmington - Wilson by Pembroke	1,720,440	\$46,228	\$37,445	\$0.027	\$0.022
Difference	660,960	\$12,578	\$10,188	\$0.019	\$0.015
Wilmington - Warsaw by W&W	660,960	\$26,067	\$21,114.18	\$0.039	\$0.032
Wilmington - Warsaw by Pembroke	2,206,440	\$55,477	\$44,936.31	\$0.025	\$0.020
Difference	1,545,480	\$29,410	\$23,822	\$0.019	\$0.015

Estimated diverted rail variable costs represent total variable costs for rail movements to and from the Wilmington region as reflected by the 2011 STB Waybill Sample, adjusted to 2014 levels. Truck costs represent the marginal cost per mile of trucking in the Southeast as estimated by the American Transportation Research Institute (ATRI), the research wing of the American Trucking Associations. The resulting cost per mile of \$1.599<sup>17</sup> was divided by an assumed 22.7 tons per truck per documentation to the FHWA FAF-3. <sup>18</sup> FAF-3 documentation also found that total mileage including miles traveled empty is about 128 percent of loaded mileage. STB calculations of railroad variable costs include empty mileage. Therefore, to make truck and rail cost calculations comparable, the truck costs per ton-mile were multiplied by 128 percent to account for empty mileage.

### Increase in System Redundancy and Resiliency Benefits

The rail line reactivation will also provide redundancy to the Wilmington area. According to a railroader familiar with rail service in the area, there have been outages during 5 of the last 15 years. On average this amounts to an outage every three years. These outages last approximately 2 days. Accordingly, the average savings per year can be summarized with the following equation.

$$Redundancy\ benefit = T_{yk} * \frac{\$value}{T} * \%rate * \frac{1}{hours\ per\ year} * \frac{2(24h)}{3\ years}$$

T<sub>yk</sub> = Tonnage in year y for scenario k

This resiliency benefit applies to all existing freight to/from Wilmington.

### Project Costs

The total project costs are based off of Alternative 2 from the Technical Assessment and Cost Estimation section; the option includes a total bridge replacement at the Northeast Cape Fear River crossing. The costs were estimated to be \$153,165,312. Expenditures are expected to begin in 2015 and conclude by the end of 2016. Approximately 8% of the total project cost is expended in 2015 with the remainder in the following year. The 2015 expenditures represent the portion of the budget dedicated to preconstruction activities. The table below summarizes the discounted costs of the project.

Total Project Costs = \$153,165,312
2015 Expenditures = \$11,194,406
2016 Expenditures = \$141,970,906
Discount Rate = 7%
2014 Present Value = \$134,464,950

<sup>17</sup> American Trucking Associations, *An Analysis of the Operational Costs of Trucking: A 2013 Update*, September 2013.

<sup>18</sup> Oak Ridge National Laboratory, *FAF<sup>3</sup> Freight Traffic Analysis*, March 23, 2011, [http://faf.ornl.gov/fafweb/Data/Freight\\_Traffic\\_Analysis/faf\\_fta.pdf](http://faf.ornl.gov/fafweb/Data/Freight_Traffic_Analysis/faf_fta.pdf).

## Residual Value Estimation

Given that the analysis only considers 30 years of operations and the useful life of much of the infrastructure exceed this time period, a residual value is estimated in order to account for the possible remaining value of assets. The estimation assumes straight line depreciation and varying useful life estimates depending on the specific assets. Asset lives are derived from CSX depreciation rate prescriptions with the STB, as well as U.S. Bureau of Economic Analysis (BEA) depreciation rates for trackwork. The specific assets considered are listed below along with corresponding lifespan, costs, and remaining value at the end of the analysis period.

**Table 15: Estimation of W2CH Residual Value at 2046**

Structure	Approx. Asset Life Years	Cost 2014 \$	Remaining Value 2014 \$
Trackwork	38	78,253,108	16,489,853
Crossings	45	791,019	261,036
Bridges	70	26,910,000	15,338,700
Crossing Protection	30	10,622,413	0
<b>Total</b>	<b>N/A</b>	<b>116,846,540</b>	<b>32,089,589</b>

The residual values are summed and assumed to exist at the end of the project in 2046. The residual value is then discounted from 2046 back to 2014, resulting in a discounted present value of \$3,865,548. This amount is later deducted from the present value of costs as shown in Table 16 below.

**Table 16: Project Costs Discounted to 2014**

Costs Component	2014 \$
Present value of costs	134,464,950
Residual value	-3,865,548
PV of costs net of RV	130,599,402

## Benefit-Cost Analysis Results

At a 7 percent discount rate, the investments yield a net present value of **(\$120,566,696)** in the middle scenario, and a benefit-cost ratio of **0.08**. The results indicate that the reactivation of the rail line only generates modest benefits that are not sufficient to offset the cost of the project.

The table below presents the evaluation results for all three cases. All benefits and costs were estimated in constant 2014 dollars over an evaluation period extending 30 years beyond project completion in 2016.

**Table 17: Benefit Cost Analysis Summary Results**

<b>Project</b>	<b>Net Present Value (2014 \$ millions disc.)</b>	<b>Benefit Cost Ratio</b>
<b>Mid</b>	<b><u>(\$120,566,696)</u></b>	<b><u>0.08</u></b>
<b>High</b>	<b><u>(\$108,260,699)</u></b>	<b><u>0.17</u></b>
<b>Low</b>	<b><u>(\$124,659,623)</u></b>	<b><u>0.05</u></b>



## Appendix D Resolutions of Support for the Wallace to Castle Hayne Project



**WILMINGTON URBAN AREA METROPOLITAN PLANNING ORGANIZATION  
TRANSPORTATION ADVISORY COMMITTEE**

**RESOLUTION SUPPORTING THE RECONSTRUCTION OF THE RAILROAD TRACKS  
BETWEEN CASTLE HAYNE AND WALLACE**

**WHEREAS**, the Wilmington Urban Area Metropolitan Planning Organization provides transportation planning services for the City of Wilmington, Town of Carolina Beach, Town of Kure Beach, Town of Wrightsville Beach, Town of Belville, Town of Leland, Town of Navassa, New Hanover County, Brunswick County, Pender County, Cape Fear Public Transportation Authority and the North Carolina Board of Transportation; and

**WHEREAS**, the Wilmington Metropolitan Planning Organization is charged with developing, in cooperation with NCDOT, long-range local and regional multi-modal transportation plans; and

**WHEREAS**, the North Carolina Department of Transportation is examining the potential for and impacts of reconstructing 27-miles of railroad tracks between Castle Hayne to Wallace in southeastern North Carolina; and

**WHEREAS**, the 27-mile rail corridor is state-owned and links New Hanover, Pender and Duplin Counties; and

**WHEREAS**, the re-establishment of the railroad tracks would improve freight rail options to support the North Carolina State Port Authority, our military bases, improve access for moving products through the state's most agriculturally active region and improve access to major population centers to the north and west; and

**WHEREAS**, the re-establishment of the rail line would provide access to serve the military installation at Camp Lejeune and also provide a second rail line out of the North Carolina State Port in Wilmington linking the Port to the interior of the state and supporting economic development; and

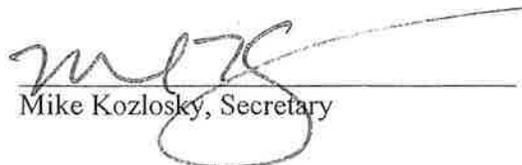
**WHEREAS**, these reconstructed railroad tracks would also allow the introduction of passenger rail between Wilmington and Raleigh via Goldsboro; and

**WHEREAS**, these reconstructed railroad tracks would have significant and profound positive economic benefits for southeastern North Carolina.

**NOW THEREFORE**, be it resolved that the Wilmington Metropolitan Planning Organization's Transportation Advisory Committee hereby encourages the North Carolina Department of Transportation to reconstruct the railroad line between Castle Hayne and Wallace and also requests that the North Carolina Department of Transportation do everything in their power to double track this rail line for future freight and passenger service.

**ADOPTED** at a regular meeting of the Transportation Advisory Committee on September 28, 2011.

  
\_\_\_\_\_  
Jonathan Barfield Jr., Chair  
Transportation Advisory Committee

  
\_\_\_\_\_  
Mike Kozlosky, Secretary



## RESOLUTION NO. 11-1068

### *A Resolution Supporting the Reconstruction of the Railroad Tracks Between Castle Hayne and Wallace*

**WHEREAS**, the Wilmington Urban Area Metropolitan Planning Organization provides transportation planning services for the City of Wilmington, Town of Carolina Beach, Town of Kure Beach, Town of Wrightsville Beach, Town of Belville, Town of Leland, Town of Navassa, New Hanover County, Brunswick County, Pender County, Cape Fear Public Transportation Authority and the North Carolina Board of Transportation; and

**WHEREAS**, the Wilmington Metropolitan Planning Organization is charged with developing, in cooperation with NCDOT, long-range local and regional multi-modal transportation plans; and

**WHEREAS**, the North Carolina Department of Transportation is examining the potential for and impacts of reconstructing 27-miles of railroad tracks between Castle Hayne to Wallace in southeastern North Carolina; and

**WHEREAS**, the 27-mile rail corridor is state-owned and links New Hanover, Pender and Duplin Counties; and

**WHEREAS**, the re-establishment of the railroad tracks would improve freight rail options to support the North Carolina state Port Authority, our military bases, improve access for moving products through the state's most agriculturally active region and improve access to major population centers to the north and west; and

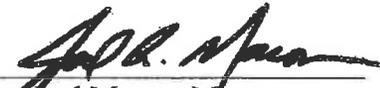
**WHEREAS**, the re-establishment of the rail line would provide access to serve the military installation at Camp Lejeune and also provide a second rail line out of the North Carolina State Port in Wilmington linking the Port to the interior of the state and supporting economic development; and

**WHEREAS**, these reconstructed railroad tracks would also allow the introduction of passenger rail between Wilmington and Raleigh via Goldsboro; and

*WHEREAS*, these reconstructed railroad tracks would have significant and profound positive economic benefits for Pender County and all of southeastern North Carolina.

*NOW THEREFORE*, be it resolved that the Town Council of the Town of Carolina Beach supports the efforts of the WMPO to re-establish the 27 mile rail corridor between Castle Hayne and Wallace; and further encourages the NC DOT to reconstruct the railroad line between Castle Hayne and Wallace, and also requests that the North Carolina Department of Transportation do everything in their power to double track this rail line for future freight and passenger service.

Adopted this 13<sup>th</sup> day of December 2011.

  
\_\_\_\_\_  
Joel Macon, Mayor

Attest:   
Melinda N. Prusa, Town Clerk





**RESOLUTION SUPPORTING THE RECONSTRUCTION OF THE RAILROAD TRACKS  
BETWEEN CASTLE HAYNE AND WALLACE**

**WHEREAS**, the Wilmington Urban Area Metropolitan Planning Organization provides transportation planning services for the City of Wilmington, Town of Carolina Beach, Town of Kure Beach, Town of Wrightsville Beach, Town of Belville, Town of Leland, Town of Navassa, New Hanover County, Brunswick County, Pender County, Cape Fear Public Transportation Authority and the North Carolina Board of Transportation; and

**WHEREAS**, the Wilmington Metropolitan Planning Organization is charged with developing, in cooperation with NCDOT, long-range local and regional multi-modal transportation plans; and

**WHEREAS**, the North Carolina Department of Transportation is examining the potential for and impacts of reconstructing 27-miles of railroad tracks between Castle Hayne to Wallace in southeastern North Carolina; and

**WHEREAS**, the 27-mile rail corridor is state-owned and links New Hanover, Pender and Duplin Counties; and

**WHEREAS**, the re-establishment of the railroad tracks would improve freight rail options to support the North Carolina State Port Authority, our military bases, improve access for moving products through the state's most agriculturally active region and improve access to major population centers to the north and west; and

**WHEREAS**, the re-establishment of the rail line would provide access to serve the military installation at Camp Lejeune and also provide a second rail line out of the North Carolina State Port in Wilmington linking the Port to the interior of the state and supporting economic development; and

**WHEREAS**, these reconstructed railroad tracks would also allow the introduction of passenger rail between Wilmington and Raleigh via Goldsboro; and

**WHEREAS**, these reconstructed railroad tracks would have significant and profound positive economic benefits for Pender County and all of southeastern North Carolina.

**NOW THEREFORE**, be it resolved that the Board of Commissioners of Pender County supports the efforts of the WMPO to re-establish the 27 mile rail corridor between Castle Hayne and Wallace; and further encourages the NC DOT to reconstruct the railroad line between Castle Hayne and Wallace, and also requests that the North Carolina Department of Transportation do everything in their power to double track this rail line for future freight and passenger service.

ADOPTED this the 21<sup>st</sup> day of November, 2011.

George R. Brown, Chairman

Rick Benton, Clerk to the Board

# Resolution



City Council  
City of Wilmington  
North Carolina

Introduced By: Laura W. Padgett, Councilmember

Date: 11/1/2011

**Resolution Encouraging the North Carolina Department of Transportation (NCDOT) to Reconstruct the Railroad Line between Castle Hayne and Wallace and Requesting NCDOT Consider Double Tracking this Rail Line for Future Freight and Passenger Service**

**LEGISLATIVE INTENT/PURPOSE:**

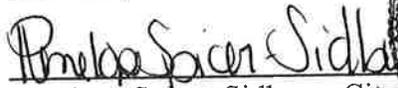
The North Carolina Department of Transportation is examining the potential for and impacts of reconstructing 27 miles of railroad tracks between Castle Hayne and Wallace in southeastern North Carolina. This 27 mile rail corridor is state owned and links New Hanover, Pender and Duplin Counties. The re-establishment of the railroad tracks would improve freight rail options to support the North Carolina State Ports Authority, our military bases, improve access for moving products through the state's most agriculturally active region, and improve access to major population centers to the north and west. The reconstructed railroad tracks would also allow the introduction of future passenger rail between Wilmington and Raleigh via Goldsboro. These reconstructed railroad tracks would have significant and profound positive economic benefits for southeastern North Carolina

**THEREFORE, BE IT RESOLVED:**

THAT, the Wilmington City Council encourages the NCDOT to reconstruct the railroad line between Castle Hayne and Wallace and also requests NCDOT consider double tracking this rail line for future freight and passenger service.

Adopted at a regular meeting  
on November 1, 2011.

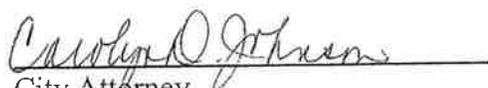
ATTEST:

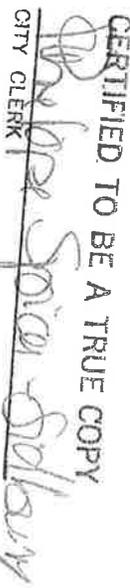
  
Penelope Spicer-Sidbury, City



  
Bill Saffo, Mayor

APPROVED AS TO FORM:

  
Carolyn O. Johnson  
City Attorney

CERTIFIED TO BE A TRUE COPY  
CITY CLERK  


RESOLUTION NO. (2011) 1750

Board of Aldermen  
Town of Wrightsville Beach, North Carolina  
Date: November 16, 2011



A RESOLUTION OF THE BOARD OF ALDERMEN OF  
THE TOWN OF WRIGHTSVILLE BEACH, NORTH CAROLINA  
EXPRESSING SUPPORT FOR RECONSTRUCTION OF THE RAILROAD TRACKS  
BETWEEN CASTLE HAYNE AND WALLACE IN SOUTHEASTERN NORTH CAROLINA

**WHEREAS**, the Wilmington Urban Area Metropolitan Planning Organization provides transportation planning services for the City of Wilmington; the Towns of Belville, Carolina Beach, Kure Beach, Leland, Navassa, and Wrightsville Beach; the Counties of Brunswick, New Hanover and Pender; the Cape Fear Public Transportation Authority, and the North Carolina Board of Transportation; and

**WHEREAS**, the Wilmington Metropolitan Planning Organization is charged with developing, in cooperation with NCDOT, long-range local and regional multi-modal transportation plans; and

**WHEREAS**, the North Carolina Department of Transportation is examining the potential for and impacts of reconstructing 27-miles of railroad tracks between Castle Hayne and Wallace in southeastern North Carolina that would link New Hanover, Pender and Duplin Counties; and

**WHEREAS**, the re-establishment of the railroad tracks would improve access for moving products through the state's most agriculturally active region; and improve access to major population centers to the north and west; and

**WHEREAS**, the re-establishment of the rail line would provide access to serve the military installation at Camp Lejeune and also provide a second rail line out of the North Carolina State Port in Wilmington linking the Port to the interior of the state and supporting economic development; and

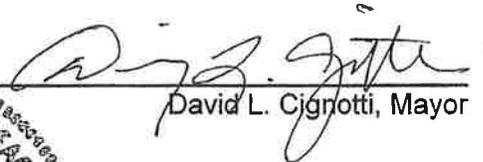
**WHEREAS**, these reconstructed railroad tracks would also allow the introduction of passenger rail between Wilmington and Raleigh via Goldsboro and would have significant and profound positive economic benefits for southeastern North Carolina.

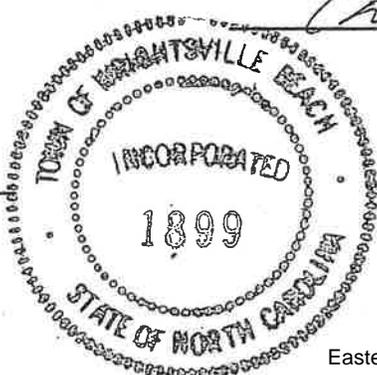
**NOW THEREFORE, BE IT RESOLVED** that the Board of Aldermen of the Town of Wrightsville Beach, North Carolina does hereby encourage the North Carolina Department of Transportation to reconstruct the railroad line between Castle Hayne and Wallace and to do everything in their power to double track this rail line for future freight and passenger service.

This Resolution duly adopted this 16<sup>th</sup> day of November, 2011.

ATTEST:

  
Sylvia Holleman, Town Clerk

  
David L. Cignotti, Mayor



*County of Brunswick*  
*Office of the County Commissioners*



**RESOLUTION SUPPORTING THE RECONSTRUCTION OF THE RAILROAD TRACKS  
BETWEEN CASTLE HAYNE AND WALLACE**

**WHEREAS**, the Wilmington Urban Area Metropolitan Planning Organization provides transportation planning services for a portion of Brunswick County, City of Wilmington, Town of Carolina Beach, Town of Kure Beach, Town of Wrightsville Beach, Town of Belville, Town of Leland, Town of Navassa, New Hanover County, Pender County, Cape Fear Public Transportation Authority and the North Carolina Board of Transportation; and

**WHEREAS**, the Wilmington Metropolitan Planning Organization is charged with developing, in cooperation with NCDOT, long-range local and regional multi-modal transportation plans; and

**WHEREAS**, the North Carolina Department of Transportation is examining the potential for and impacts of reconstructing 27-miles of railroad tracks between Castle Hayne to Wallace in southeastern North Carolina; and

**WHEREAS**, the 27-mile rail corridor is state-owned and links New Hanover, Pender and Duplin Counties; and

**WHEREAS**, the re-establishment of the railroad tracks would improve freight rail options to support the North Carolina State Port Authority, our military bases, improve access for moving products through the state's most agriculturally active region and improve access to major population centers to the north and west; and

**WHEREAS**, the re-establishment of the rail line would provide access to serve the military installation at Camp Lejeune and also provide a second rail line out of the North Carolina State Port in Wilmington linking the Port to the interior of the state and supporting economic development; and

**WHEREAS**, these reconstructed railroad tracks would also allow the introduction of passenger rail between Wilmington and Raleigh via Goldsboro; and

**WHEREAS**, these reconstructed railroad tracks would have significant and profound positive economic benefits for southeastern North Carolina.

**NOW THEREFORE**, be it resolved that the Brunswick County Board of Commissioners hereby encourages the North Carolina Department of Transportation to reconstruct the railroad line between Castle Hayne and Wallace and also requests that the North Carolina Department of Transportation do everything in their power to double track this rail line for future freight and passenger service.

**ADOPTED** at a regular meeting of the Brunswick County Board of Commissioners on February 6, 2012.

William M. Sue, Chairman  
Brunswick County Commissioners

ATTEST:

Deborah S. (Debby) Gore, NCCCE  
Clerk to the Board





**RESOLUTION BY THE BELVILLE BOARD OF COMMISSIONERS  
SUPPORTING THE RECONSTRUCTION OF THE RAILROAD TRACKS BETWEEN  
CASTLE HAYNE AND WALLACE**

**WHEREAS**, the Wilmington Urban Area Metropolitan Planning Organization provides transportation planning services for the City of Wilmington, Town of Carolina Beach, Town of Kure Beach, Town of Wrightsville Beach, Town of Belville, Town of Leland, Town of Navassa, New Hanover County, Brunswick County, Pender County, Cape Fear Public Transportation Authority and the North Carolina Board of Transportation; and

**WHEREAS**, the Wilmington Metropolitan Planning Organization is charged with developing, in cooperation with NCDOT, long-range local and regional multi-modal transportation plans; and

**WHEREAS**, the North Carolina Department of Transportation is examining the potential for and impacts of reconstructing 27-miles of railroad tracks between Castle Hayne to Wallace in southeastern North Carolina; and

**WHEREAS**, the 27-mile rail corridor is state-owned and links New Hanover, Pender and Duplin Counties; and

**WHEREAS**, the reestablishment of the railroad tracks would improve freight rail options to support the North Carolina State Port Authority, our military bases, improve access for moving products through the state's most agriculturally active region and improve access to major population centers to the north and west; and

**WHEREAS**, the reestablishment of the rail line would provide access to serve the military installation at Camp Lejeune and also provide a second rail line out of the North Carolina State Port in Wilmington linking the Port to the interior of the state and supporting economic development; and

**WHEREAS**, these reconstructed railroad tracks would also allow the introduction of passenger rail between Wilmington and Raleigh via Goldsboro; and

**WHEREAS**, these reconstructed railroad tracks would have significant and profound positive economic benefits for southeastern North Carolina.

**NOW THEREFORE**, be it resolved that the Belville Board of Commissioners hereby encourages the North Carolina Department of Transportation to reconstruct the railroad line between Castle Hayne and Wallace and also requests that the North Carolina Department of Transportation do everything in their power to double track this rail line for future freight and passenger service.

**ADOPTED** at a regular meeting of the Belville Board of Commissioners on October 24, 2011.

  
\_\_\_\_\_  
Jack Batson, Mayor

Attest:

  
\_\_\_\_\_  
Athina D. Williams, Town Clerk



**TOWN OF NAVASSA**

**334 Main Street  
Navassa, N.C. 28451  
Phone: (910) 371-2432  
townofnavassa.org**

Eulis A. Willis, *Mayor*

***Council Members***

Mike Ballard, *Mayor Pro-Tem*

Jerry Merrick

Antonio Burgess

Milton Burns

Craig Suggs

Claudia Bray, *Town Administrator*

Charlena Alston, *Town Clerk*

**RESOLUTION SUPPORTING THE RECONSTRUCTION OF THE RAILROAD TRACKS  
BETWEEN CASTLE HAYNE AND WALLACE**

**WHEREAS**, the North Carolina Department of Transportation is examining the potential for and impacts of reconstructing 27-miles of railroad tracks between Castle Hayne to Wallace in southeastern North Carolina;

**WHEREAS**, the 27-mile rail corridor is state-owned and links New Hanover, Pender and Duplin Counties;

**WHEREAS**, the re-establishment of the railroad tracks would improve freight rail options to support the North Carolina State Port Authority, our military bases, improve access for moving products through the state's most agriculturally active region and improve access to major population centers to the north and west;

**WHEREAS**, the re-establishment of the rail line would provide access to serve the military installation at Camp Lejeune and also provide a second rail line out of the North Carolina State Port in Wilmington linking the Port to the interior of the state and supporting economic development;

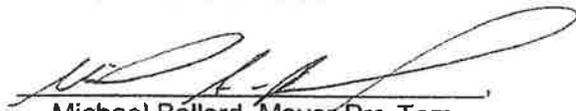
**WHEREAS**, these reconstructed railroad tracks would also allow the introduction of passenger rail between Wilmington and Raleigh via Goldsboro;

**WHEREAS**, these reconstructed railroad tracks would have significant and profound positive economic benefits for southeastern North Carolina and the Town of Navassa.

**NOW THEREFORE**, be it resolved that the Town of Navassa, North Carolina hereby encourages the North Carolina Department of Transportation to reconstruct the railroad line between Castle Hayne and Wallace and also requests that the North Carolina Department of Transportation do everything in their power to double track this rail line for future freight and passenger service.

I hereby certify that this is a true and correct copy of this resolution, duly adopted by the Town Council of Navassa on October 20, 2011 as it appears of record in its official minutes.

TOWN OF NAVASSA

By:   
Michael Ballard, Mayor Pro-Tem

By:   
Charlena Alston, Town Clerk

ATTEST

**RESOLUTION IN SUPPORT OF  
THE RESTORATION OF RAIL TRACK  
BETWEEN CASTLE HAYNE & WALLACE**

Whereas, the Cape Fear Area Rural Transportation Advisory Committee (Cape Fear Area RTAC) is made up of elected officials from Brunswick, Columbus and Pender Counties, and

Whereas, the Cape Fear Area RTAC is, among other things, charged with the responsibility of developing, in cooperation with the North Carolina Department of Transportation, long-range local and regional multi-modal transportation plans, and

Whereas, the North Carolina Department of Transportation is examining the potential for and impacts of restoring 27 miles of train tracks from Castle Hayne to Wallace, and

Whereas, such restored rail lines would allow the movement of bulk agricultural products to the Port of Wilmington, and

Whereas, such a restored rail tracks would likely have significant positive economic benefits for the Port. of Wilmington and southeast North Carolina,

Now therefore, be it resolved that the Cape Fear Area Rural Transportation Advisory Committee does hereby encourage the North Carolina Department of Transportation to strongly consider the restoration of said rail tracks as a way to enhance economic development in southeast North Carolina.

This the 21<sup>st</sup> day of March 2003.



May Moore, Chair  
Region 0 Area RTAC

Attest:  


Don Eggert, RPO Planner

*County of Brunswick*  
*Office of the County Commissioners*



**RESOLUTION SUPPORTING THE RECONSTRUCTION OF THE RAILROAD TRACKS  
BETWEEN CASTLE HAYNE AND WALLACE**

**WHEREAS**, the Wilmington Urban Area Metropolitan Planning Organization provides transportation planning services for a portion of Brunswick County, City of Wilmington, Town of Carolina Beach, Town of Kure Beach, Town of Wrightsville Beach, Town of Belville, Town of Leland, Town of Navassa, New Hanover County, Pender County, Cape Fear Public Transportation Authority and the North Carolina Board of Transportation; and

**WHEREAS**, the Wilmington Metropolitan Planning Organization is charged with developing, in cooperation with NCDOT, long-range local and regional multi-modal transportation plans; and

**WHEREAS**, the North Carolina Department of Transportation is examining the potential for and impacts of reconstructing 27-miles of railroad tracks between Castle Hayne to Wallace in southeastern North Carolina; and

**WHEREAS**, the 27-mile rail corridor is state-owned and links New Hanover, Pender and Duplin Counties; and

**WHEREAS**, the re-establishment of the railroad tracks would improve freight rail options to support the North Carolina State Port Authority, our military bases, improve access for moving products through the state's most agriculturally active region and improve access to major population centers to the north and west; and

**WHEREAS**, the re-establishment of the rail line would provide access to serve the military installation at Camp Lejeune and also provide a second rail line out of the North Carolina State Port in Wilmington linking the Port to the interior of the state and supporting economic development; and

**WHEREAS**, these reconstructed railroad tracks would also allow the introduction of passenger rail between Wilmington and Raleigh via Goldsboro; and

**WHEREAS**, these reconstructed railroad tracks would have significant and profound positive economic benefits for southeastern North Carolina.

**NOW THEREFORE**, be it resolved that the Brunswick County Board of Commissioners hereby encourages the North Carolina Department of Transportation to reconstruct the railroad line between Castle Hayne and Wallace and also requests that the North Carolina Department of Transportation do everything in their power to double track this rail line for future freight and passenger service.

**ADOPTED** at a regular meeting of the Brunswick County Board of Commissioners on February 6, 2012.

William M. Sue, Chairman  
Brunswick County Commissioners



ATTEST:

Deborah S. (Debby) Gore, NCCCE  
Clerk to the Board



**Jacksonville Urban Area**  
Metropolitan Planning Organization

**RESOLUTION SUPPORTING THE RECONSTRUCTION OF RAILROAD  
TRACKS BETWEEN CASTLE HAYNE AND WALLACE**

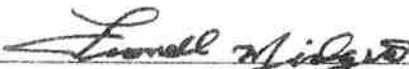
**WHEREAS**, the Jacksonville Urban Area Metropolitan Planning Organization recognizes the value of and seeks to promote safe, efficient and convenient rail transportation throughout Eastern North Carolina; and

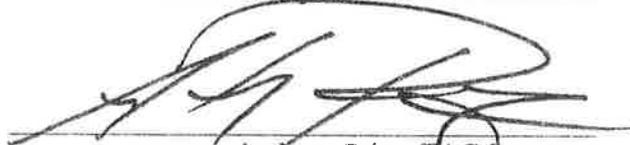
**WHEREAS**, the North Carolina Department of Transportation (NCDOT) is currently evaluating the potential for reconstructing 27 miles of railroad track between Castle Hayne and Wallace for improving rail connectivity in Southeastern North Carolina; and

**WHEREAS**, re-establishment of the Castle Hayne to Wallace rail line would improve regional mobility of people and goods, while also creating opportunities for economic development.

**NOW THEREFORE**, be it resolved that the Jacksonville Urban Area Metropolitan Planning Organization Transportation Advisory Committee hereby encourages the NCDOT to reconstruct the rail line between Castle Hayne and Wallace and requests that the line be double-track for enhanced service.

**ADOPTED** this the 26<sup>th</sup> day of January, 2012

  
Lionell Midgett, TAC Vice Chairman

  
Anthony Prinz, TAC Secretary

## RESOLUTION (2012-08)

RESOLUTION SUPPORTING THE RECONSTRUCTION OF RAILROAD TRACKS  
BETWEEN CASTLE HAYNE AND WALLACE

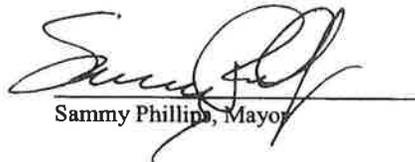
WHEREAS, the Jacksonville City Council recognizes the value of and seeks to promote safe, efficient and convenient rail transportation throughout Eastern North Carolina; and

WHEREAS, the North Carolina Department of Transportation (NCDOT) is currently evaluating the potential for reconstructing 27 miles of railroad track between Castle Hayne and Wallace for improving rail connectivity in Southeastern North Carolina; and

WHEREAS, re-establishment of the Castle Hayne to Wallace rail line would improve regional mobility of people and goods, while also creating opportunities for economic development;

NOW, THEREFORE, BE IT RESOLVED that the Jacksonville City Council hereby encourages the NCDOT to reconstruct the rail line between Castle Hayne and Wallace and requests that the line be double-track for enhanced service.

Adopted by the Jacksonville City Council in regular session this 17th day of January, 2012.



Sammy Phillips, Mayor

ATTEST:



Carmen K. Miracle, City Clerk

STATE OF NORTH CAROLINA  
COUNTY OF ONSLOW

**RESOLUTION 12-007**  
**SUPPORTING THE RECONSTRUCTION OF RAILROAD TRACKS**  
**BETWEEN CASTLE HAYNE AND WALLACE**

**WHEREAS**, the Onslow County Board of Commissioners recognizes the value of and seeks to promote safe, efficient, and convenient rail transportation throughout Eastern North Carolina; and

**WHEREAS**, the North Carolina Department of Transportation (NCDOT) is currently evaluating the potential for reconstructing 27 miles of railroad tracks between Castle Hayne and Wallace for improving rail connectivity in Southeastern North Carolina; and

**WHEREAS**, reconstruction of the railroad tracks between Castle Hayne and Wallace would improve regional mobility of people and goods, while also creating opportunities for economic development.

**NOW THEREFORE, BE IT RESOLVED** that the Onslow County Board of Commissioners do hereby encourage the North Carolina Department of Transportation to reconstruct the railroad tracks between Castle Hayne and Wallace and requests a double-track line be provided to enhance future service opportunities.

Adopted this the 18<sup>th</sup> day of January, 2012.



**Onslow County  
Board of Commissioners**

  
\_\_\_\_\_  
W.C. Jarman, Chairman

**ATTEST:**

  
\_\_\_\_\_  
Julie S. Wand, Clerk to the Board

**NEW HANOVER COUNTY BOARD OF COMMISSIONERS**

**RESOLUTION SUPPORTING THE RECONSTRUCTION OF THE RAILROAD TRACKS  
BETWEEN CASTLE HAYNE AND WALLACE**

**WHEREAS**, the Wilmington Urban Area Metropolitan Planning Organization provides transportation planning services for the City of Wilmington, Town of Carolina Beach, Town of Kure Beach, Town of Wrightsville Beach, Town of Belville, Town of Leland, Town of Navassa, New Hanover County, Brunswick County, Pender County, Cape Fear Public Transportation Authority and the North Carolina Board of Transportation; and

**WHEREAS**, the Wilmington Metropolitan Planning Organization is charged with developing, in cooperation with NCDOT, long-range local and regional multi-modal transportation plans; and

**WHEREAS**, the North Carolina Department of Transportation is examining the potential for and impacts of reconstructing 27 miles of railroad tracks between Castle Hayne to Wallace in southeastern North Carolina; and

**WHEREAS**, the 27-mile rail corridor is state-owned and links New Hanover, Pender and Duplin Counties; and

**WHEREAS**, the re-establishment of the railroad tracks would improve freight rail options to support the North Carolina State Port Authority, our military bases, improve access for moving products through the state's most agriculturally active region and improve access to major population centers to the north and west; and

**WHEREAS**, the re-establishment of the rail line would provide access to serve the military installation at Camp Lejeune and also provide a second rail line out of the North Carolina State Port in Wilmington linking the Port to the interior of the state and supporting economic development; and

**WHEREAS**, these reconstructed railroad tracks would also allow the introduction of passenger rail between Wilmington and Raleigh via Goldsboro; and

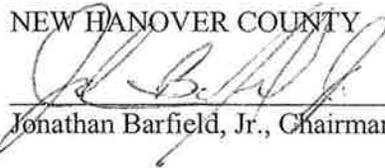
**WHEREAS**, these reconstructed railroad tracks would have significant and profound positive economic benefits for southeastern North Carolina.

**NOW, THEREFORE, BE IT RESOLVED**, that the New Hanover County Board of Commissioners hereby encourages the North Carolina Department of Transportation to reconstruct the railroad line between Castle Hayne and Wallace and also requests that the North Carolina Department of Transportation do everything in their power to double track this rail line for future freight and passenger service.

**ADOPTED** this the 7<sup>th</sup> day of November, 2011.



NEW HANOVER COUNTY

  
Jonathan Barfield, Jr., Chairman

ATTEST:

  
Sheila L. Schult, Clerk to the Board





## Appendix E

### Assessing Bulk Shipping Costs at the GTP



## Assessing the Economic Feasibility of Bulk Facilities at GTP

Four types of facilities have been proposed for construction at the Global TransPark to handle dry, refrigerated bulk. The analysis presented in this appendix considers the feasibility of using the facilities on the users and does not consider the capital or operating costs. The assumptions included in the analysis are outlined in the sections below, including the scenarios tested, methodology, and the conclusions.

### Baseline and Scenario Assumptions

The SB-402 Legislation specifically requires analysis of an inland terminal, transload equipment, and refrigerated and dry bulk storage. These four facilities define the three scenarios<sup>1</sup>, which are described below in terms of the assumptions used in the calculations for the baseline and the build scenarios. All scenarios are analyzed over 30 years (2020-2049) in 2014 dollars and discounted to the present using a 7% interest rate. The baseline scenario considers trucking goods from their origin to their destination port, bypassing GTP. The improvement case considers whether there is a savings to shippers by loading goods onto rail at GTP.

The baseline assumes a volume equivalent to that of 90 rail cars per day, approximately equivalent to a unit train. These are goods that could be diverted to use the bulk facility at GTP. The scenarios assume that shippers operate year-round as a way of smoothing seasonal peaks and troughs, resulting in an annualization factor of 365 days per year. One rail car can hold the equivalent of approximately four truckloads<sup>2</sup>, and soybeans are used as an example commodity for the analysis<sup>3</sup>. There are three likely destinations: the Port of Morehead City, the Port of Wilmington, and the Port of Norfolk. The distance traveled per truck is 71 miles to the Port of Morehead City<sup>4</sup> in Scenario 1, and 89 miles to the Port of Wilmington and 152 miles to the Port of Norfolk in Scenario 2. The numbers of trucks are expected to conservatively grow by 1% per year and carry 6.75 tons on average<sup>5</sup>. The per ton mile cost to ship by truck and train is shown in Exhibit E-1 below.

**Exhibit E-1: Truck and Train Shipping Costs, \$2014**

Cost per Ton Mile			
Destination	Truck*	Single Car Train**	Unit Train**
Morehead City (bulk)	\$0.19	\$0.432	\$0.132
Norfolk (container)	\$0.19	\$0.998	
Wilmington (container)	\$0.19	\$1.415	

**Sources:** \*Rypinski, Arthur. "Trucks and Federal Policy." RFF Workshop: Energy Use and Policy in the Trucking Sector. U.S. Department of Transportation. 10 Oct. 2012. Web. <[http://www.rff.org/Documents/Events/121010\\_trucking\\_event/Rypinski-presentation.pdf](http://www.rff.org/Documents/Events/121010_trucking_event/Rypinski-presentation.pdf)>.

\*\*URCS Database: assumes NS is operator, 27 tons per rail car, "hopper-open top general" car type for bulk and "flat car – general service" for container, commodity types include "food & kindred products" and "lumber & wood products," shipment charge set to 0, 90 cars per unit train and 1 car per single car train, segment type parameter set to "originate and terminate"

<sup>1</sup> Transload and dry storage facilities serve the same products

<sup>2</sup> ICLEI: Local Governments for Sustainability. *Environment and Economy Working Together: Holyoke's Partnership with Freight Rail*. Rep. ICLEI: Local Governments for Sustainability, n.d. Web. Nov. 2014. <[http://www.icleiusa.org/action-center/learn-from-others/Freight\\_Case\\_Study.pdf](http://www.icleiusa.org/action-center/learn-from-others/Freight_Case_Study.pdf)>.

<sup>3</sup> Informa Economics, "Heavier Semis: A Good Idea?" June 2009.

<sup>4</sup> Because the distance from the origin to GTP is unknown, only the distance between GTP and the Port of Morehead City is considered in the analysis. It is assumed that it is economical to truck from the origin to the Port of Morehead City.

<sup>5</sup> A trainload of soybeans is approximately 27 tons, and there are four trucks per railcar, resulting in 6.75 tons per truck.

The shipping costs per ton mile for rail were obtained from the 2013 Surface Transportation Board's Uniform Rail Costing System (URCS) Database found at STB's website<sup>6</sup>. A number of assumptions were included in the database tool in order to extract the variable costs per ton mile.

- The railroad parameter was specified as Norfolk Southern (NS) because all scenarios operate over NS for a portion of the trip. In Scenario 1, NS operates between GTP and the Port of Morehead City. In Scenarios 2B and 2C, a transfer to CSXT is needed to take the shortest route to Wilmington and Norfolk.
- The distance parameter corresponded to the distance from GTP to: the Port of Morehead City (71 miles), Norfolk (152 miles), and Wilmington (89 miles).
- The segment type parameter was set to "Originate and Terminate" for all scenarios, which indicates that the freight was picked up and delivered by the specified railroad, NS.
- The number of freight cars per train was assumed to be 90 for a unit train and 1 for a single car train.
- For Scenario 1, the freight car type was set to "Hopper- Open Top General," and for Scenario 2 it was set to "Flat Car – General Service."
- The tons per car were assumed to be 27 for all scenarios.
- The commodity type parameter is used to calculate loss and damages. The analysis assumes the products handled include "Food & Kindred Products" and "Lumber & Wood Products." These commodity types result in low loss and damages costs.
- Shipment charge, which is not a mandatory parameter to compute the variable costs, was set to 0.
- Shipment size was set to "single" for Scenarios 1B, 2B, and 2C. It was set to "unit" for Scenario 1C.

The URCS Database output resulted in a variable cost for each route and shipment type. Multiplying the miles for each route by the tonnage results in the ton-miles per route; dividing the variable cost by the ton miles results in the cost per ton mile. These costs are then converted to 2014 dollars using the GDP deflator<sup>7</sup> and are shown in Exhibit E-1.

The trucking costs per mile were obtained from a presentation by the US Department of Transportation on Trucks and Federal Policy<sup>8</sup>. As reported in the presentation, the freight revenue per ton mile by mode in 2007 was \$0.1654 for truck. Converting the 2007 value to 2014 dollars using the GDP deflator<sup>9</sup> results in a total shipper cost of \$0.19 per ton mile. This cost is used to calculate the baseline shipper costs baseline when multiplied by the distance from GTP to the applicable port.

In addition to shipping costs based on distance and tonnage, there are lift/handling fees and interchange fees that shippers incur. A lift/handling fee is charged at each end of a trip for handling the goods and is estimated at \$90 per truckload<sup>10</sup>. While the handling process for bulk goods differs between a hopper and a container, for the purpose of this analysis it is assumed that the fees are equal. This assumption is tested in the sensitivity analysis when a much lower \$10 fee is modeled to see if it changes the outcome. In the baseline, goods are handled twice: once at the origin when loading the truck, and once at the destination port when unloading the truck. In Scenarios 1B, 1C, 2B, and 2C, the goods are handled a total of four times: loading onto the truck at the origin, offloading the truck at GTP to storage, loading at GTP onto rail in either a hopper or container, and unloading at the destination port from the railcar.

Goods are transferred from trucks to rail under the scenarios, and because each rail car must connect with a Class I at the juncture of the spur, an interchange fee is incurred in addition to handling fees. Under Scenarios 1B and 1C, trains interchange once between the GTP rail spur operator and NS. Under Scenarios 2B and 2C,

---

<sup>6</sup> The database can be downloaded from the STB website: <http://www.stb.dot.gov/stb/industry/urcs.html>

<sup>7</sup> "Table 10.1—Gross Domestic Product and Deflators Used in the Historical Tables: 1940–2019." Historical Tables. Office of Management and Budget, n.d. Web. Sept. 2014. <<http://www.whitehouse.gov/omb/budget/Historicals>>.

<sup>8</sup> Rypinski, Arthur. "Trucks and Federal Policy." RFF Workshop: Energy Use and Policy in the Trucking Sector. U.S. Department of Transportation. 10 Oct. 2012. Web. <[http://www.rff.org/Documents/Events/121010\\_trucking\\_event/Rypinski-presentation.pdf](http://www.rff.org/Documents/Events/121010_trucking_event/Rypinski-presentation.pdf)>.

<sup>9</sup> "Table 10.1—Gross Domestic Product and Deflators Used in the Historical Tables: 1940–2019." Historical Tables. Office of Management and Budget, n.d. Web. Sept. 2014. <<http://www.whitehouse.gov/omb/budget/Historicals>>.

<sup>10</sup> Some shippers will pay more, some will pay less based on contractual agreements, but \$90 is an assumed average based on AECOM analysis.

trains interchange twice: between the GTP rail spur and NS, and from NS to CSXT. An interchange fee is charged by rail operators per carload for shipments transferring between rail lines and is estimated to be \$228 per train car<sup>11</sup>. The \$228 fee per rail car is found from the Surface Transportation Board's URCS Database found at STB's website<sup>12</sup>, output line 623. Because a variety of agreements and operating arrangements could alter the interchange fee, the sensitivity analysis also considers a \$0 fee.

### Scenario 1: Dry Bulk/Grain Facility

Scenario 1 considers constructing a dry bulk/grain storage facility at GTP. The facility would be capable of transloading and storing goods such as wood pellets or soybeans with the goal of removing trucks from the region's roads and consolidating trips to the Port of Morehead City through rail. The facility at GTP would provide trucks with a centralized location to bring bulk shipments and they can be combined on trains for final shipment to the port. The analysis considers whether the use of the facility costs less than the baseline or existing conditions, which is trucking the goods directly to the Port of Morehead City. Scenario 1 has two alternatives that are compared to the baseline, as described below. The key difference is the cost per ton mile for shipping by single car train or by unit trains.

- 1A (Baseline) – ship product to Port by truck
- 1B (single car train) – ship product to GTP by truck, unload, store, and load onto single car hopper train to Port of Morehead City
- 1C (unit train) – ship product to GTP by truck, unload, store, and load onto unit train to Port of Morehead City.

### Scenario 2: Container Facility

Scenario 2 considers constructing a facility that handles containers at GTP, much like an inland port. The goal of the facility would be to remove trucks from the region's roads, and consolidate trips to ports through rail. Another purpose of the facility would be to provide a centralized distribution center in eastern North Carolina for containerized goods, particularly for bulk products. Some soybean growers export via container to deliver a higher quality product and earn a higher rate. Also, the development of identity-preserved crops (high value, premium or niche market grains produced with a specific end use in mind) and food safety requirements are supporting a greater use of shipping agricultural products in containers, especially for the export market. The analysis considers whether shippers using a container facility at GTP would pay more or less than the baseline shipping cost, which is defined as trucking the goods directly to the Port of Wilmington or Norfolk (as Morehead City is not equipped to handle large-scale containerized operations). As a result, there are two alternatives to Scenario 2 that are compared to the baselines. The scenarios vary in the distance goods would travel to their respective ports.

- 2A (two Baselines) – ship containers to Port (Norfolk/Wilmington) by truck
- 2B (Norfolk) – ship containers to GTP by truck, unload and repack container, and load on train to Port of Norfolk
- 2C (Wilmington) – ship containers to GTP by truck, unload and repack container, and load on train to Port of Wilmington.

### Scenario 3: Refrigerated Goods

If there were a refrigerated packing and distribution facility at GTP, the goods could be transported in and out three ways. First, they can be distributed by rail to Wilmington or Norfolk (as Morehead City does not have the capability to handle refrigerated containers). Second, they could be sent by cargo plane. And third, they could be trucked in, repackaged and consolidated, and trucked to port. The feasibility of the three scenarios is qualitatively discussed in the paragraphs below.

---

<sup>11</sup> URCS Database, output line 623 for interchange operating costs based on NS; however, the \$228 fee per train car is assumed to be equal among the different rail operators: spur operator, NS, and CSXT.

<sup>12</sup> The database can be downloaded from the STB website: <http://www.stb.dot.gov/stb/industry/urcs.html>

Shipping refrigerated containers or “reefers” from GTP could be achieved by rail. In order to ship by rail, goods would need to be loaded at GTP and onto the NCDOT rail spur and transferred to NS, thereby incurring a fee for the interchange. As NS currently prices pickups at the spur very highly, this is detrimental to the shippers’ bottom lines. Continuing to the Port of Norfolk or Wilmington will cost travel time and another interchange with CSX. If the CSX rail spur were constructed at GTP, and/or the Wallace to Castle Hayne segment were reconstructed, only one carrier would be needed to get to Norfolk and Wilmington in a shorter route. If a refrigerated facility were to be constructed in the region, it would not locate at GTP because of the interchange costs and inconvenience of reaching a compatible port by rail. A more feasible option would be to place a facility off of GTP property and on the CSX A-line. However, because there has not been sufficient demand for the CSX spur, Wallace to Castle Hayne, or for a refrigerated facility at GTP, transporting reefers by rail is considered infeasible at this time.

With rail an infeasible option, shipping the refrigerated goods by air is another possibility. However, the Raleigh-Durham International Airport (RDU) is a nearby competitor with existing air cargo services and is only 95 miles from GTP. Currently there is no demand for air cargo into or out of GTP, and even if there were, it would be priced at double the cost due to the lack of a backhaul opportunity. As a result, using air cargo services at RDU is a more feasible opportunity than utilizing air service at GTP.

Finally, because shipping refrigerated cargo by rail and air are infeasible, trucking is the preferable mode of transport. Trucks could move the goods more efficiently to Wilmington and Norfolk than rail or air, and at a more affordable cost in a shorter time. With no demand for refrigerated goods near GTP, there is no need for a refrigerated facility in the region.

## Methodology

---

The following methodology was used to compare between the baseline and the two “build” scenarios in the analysis.

### Costs to Shippers

There are three primary costs that shippers bear with transporting goods: shipping costs, lift/handling fees, and interchange fees. Each cost places an additional pressure on shippers’ bottom lines and comes into consideration when deciding on modes for transport. The methodologies for applying the assumptions outlined previously are described in the sections below by scenario.

### Shipping Costs

Shipping costs are the cost per ton mile to move the product. In the baseline, the annual number of trucks is multiplied by the tons per truck (6.75), the average cost per ton mile to transport by truck, or \$0.19<sup>13</sup>, and the distance to the Port of Morehead City (71 miles). The build compares the cost of shipping by rail to the baseline of truck.

- **Scenario 1**

Scenario 1 considers shipping by rail from GTP to the Port of Morehead City by mixed freight trains or unit trains. In order to estimate the scenarios’ shipping costs, the number of trucks was converted to rail cars<sup>14</sup>. The rail cars were then multiplied by the applicable cost per ton mile as shown in Exhibit E-1, the distance to the Port (71 miles), and the tons per rail car (27)<sup>15</sup>. The cost per ton mile for a unit train (\$0.132) is lower than the cost per unit mile of a single car train (\$0.432), as calculated from data obtained from the URCS Database.

---

<sup>13</sup> Rypinski, Arthur. "Trucks and Federal Policy." RFF Workshop: Energy Use and Policy in the Trucking Sector. U.S. Department of Transportation. 10 Oct. 2012. Web. <[http://www.rff.org/Documents/Events/121010\\_trucking\\_event/Rypinski-presentation.pdf](http://www.rff.org/Documents/Events/121010_trucking_event/Rypinski-presentation.pdf)>.

<sup>14</sup> One rail car can hold approximately 4 truckloads

<sup>15</sup> 27 tons per rail car, per the Soy Transportation Coalition and the United Soybean Board, 2009

- **Scenario 2**

The cost of shipping in Scenario 2 was estimated in the same methodology as Scenario 1 for the number of rail cars and tons per rail car, but the destination ports were different, meaning there were two baselines. The containers would be shipped by truck in the baseline and rail in the build to the Port of Norfolk at a distance of 152 miles from GTP, or to Wilmington which is 89 miles from GTP. In the build, the routes used the per ton mile cost for a single car train for a container which varied based on the distance, at a cost of \$0.998 to Norfolk and \$1.415 to Wilmington.

### Lift/Handling Fees

Handling fees are applied to the truck and trainloads at each transition point and therefore mean that the more handling that a product needs in transport, the more it will cost to move. The cost per lift was assumed to be \$90 based on AECOM analysis. The handling in the baseline for both scenarios assumes that the trucks are loaded at the origin and unloaded at the destination, resulting in two lifts for the whole trip.

- **Scenario 1**

The trucks arriving at GTP have already experienced one lift at the origin. Once at GTP, the goods are offloaded to a storage facility, resulting in another move. Loading onto the train for the trip to the Port of Morehead City is a third move, and unloading at the Port is the fourth and final movement of goods. Four fees are applied in Scenario 1: two to trucks and two to rail cars.

- **Scenario 2**

Trucks bring the containers to GTP where they are unloaded, stuffed, and loaded onto trains to the Port of Norfolk or Wilmington and unloaded. Four fees are applied in Scenario 2: two to trucks and two to rail cars.

### Interchange Fees

Railroads charge fees for interchanging trains between carriers for the right to travel over another railroad's track or to switch the cars to another carrier's locomotive. Because truck is the only mode used in the baseline, no interchange fees are incurred. Interchange fees are charged on a per-car basis, so the number of train cars is constant across Scenarios 1 and 2. However, the number of interchanges varies based on the existing Class I networks between GTP and the destination ports<sup>16</sup>.

- **Scenario 1**

In Scenario 1, the trains would interchange once between the GTP spur and NS, who operates the mainline that the spur connects to. One interchange fee of \$228 is charged per rail car in Scenario 1.

- **Scenario 2**

In Scenario 2, there are two interchanges for each of the destinations. Trains from GTP destined for the Port of Wilmington will incur two interchanges: one from the GTP spur to the NS mainline, and again from NS to southbound CSXT at Goldsboro. The containers going to the Port of Norfolk experience the same interchanges, though the trains head northbound at Goldsboro on CSXT. Each interchange incurs a \$228 fee per railcar.

### Results

Each of the above costs associated with the shipping scenarios results are summed by scenario (baseline, Scenario 1, and Scenario 2). Then each scenario's annual total is subtracted from the baseline's annual total, resulting in the net cost (if it is negative) or benefit (if it is positive) of the rail move compared to truck. Each annual total was discounted at 7 percent and summed over the 30-year analysis period to determine whether the movement is economical.

As seen in Exhibit E-2, none of the movements provide savings to shippers compared to shipping by truck. Even if these volumes could be attracted there, constructing a bulk/dry handling or container facility at GTP is not economical at this time. The primary reason that none of the scenarios save shippers costs by rail is due to the distance between GTP and the destination ports. The shipping fees are based on tonnage moved

---

<sup>16</sup> No interchange fee is applied at the destination Port in either Scenario.

and distance, and have the greatest effect on the overall cost of the shipment. Handling and interchange fees are an extra burden on the shippers, who would save on half of the handling and pay no interchange fees by using trucks. It is important to note that shipping by unit train is the only option that is more cost-effective than trucking, based on the shipping costs. However, at this time there are insufficient volumes of product to attract a unit train to serve GTP; as a result, trucking will continue to be the most economical mode for shippers between GTP and the destination ports.

To test a range of feasible scenarios, sensitivity analyses were performed to determine whether key assumptions would change this result. This included reducing the handling fee from \$90 to \$10 per move, testing a range of truck to rail car ratios to reflect the variations across possible commodities handled, and eliminating the interchange costs. While the size of the penalty varied, the cost penalty of the shipping, additional handling, and interchanges could not be overcome given the comparatively short distance to the ports. The results of the original analysis and the sensitivities tested are presented in Exhibit E-2.

**Exhibit E-2: Summary of Scenario Cost Penalty Compared to Trucking**

Summary in \$2014M	Scenario 1: Dry Grain/Dry Bulk		Scenario 2: Containerized Bulk	
	1B: Grain comes to GTP by truck, goes to MHC by rail	1C: Grain comes to GTP by truck, goes to MHC by unit train	2B: Unload truck and re-stuff at GTP and ship to Norfolk by rail	2C: Unload truck and re-stuff at GTP and ship to Wilmington by rail
<b>Discounted Net Shipping + \$90 Handling + Interchange Costs (original analysis)</b>	\$ (282.6)	\$ (97.9)	\$ (1,275.4)	\$ (1,153.2)
<b>Discounted Net Shipping + \$10 Handling + Interchange</b>	\$ (231.2)	\$ (46.5)	\$ (1,224.0)	\$ (1,101.8)
<b>Discounted Net Shipping + \$90 Handling + Interchange (using 7 trucks per rail car)</b>	\$ (196.7)	\$ (12.0)	\$ (1,091.5)	\$ (1,045.5)
<b>Discounted Net Shipping + \$90 Handling + Interchange (using 2 trucks per rail car)</b>	\$ (339.9)	\$ (155.2)	\$ (1,398.0)	\$ (1,225.0)
<b>Discounted Net Shipping + \$90 Handling + \$0 Interchange</b>	\$ (209.1)	\$ (24.5)	\$ (1,128.5)	\$ (1,006.3)

**Note:** All scenarios are compared to trucking the goods to the destination

An additional sensitivity was tested to determine the point at which public benefits might overcome the costs to the shippers. If the public benefits of removing trucks from the road are greater than the costs to private industry, there would be support for the state to invest in such a facility at GTP.

### Public Benefits Analysis

By moving goods from truck to rail with the bulk/dry transload and container interchange at GTP, there are public benefits realized by other users of the state's roads. The reduction of truck traffic would result in pavement and congestion savings. From the state's perspective, these benefits could offset the costs to the private shippers, thereby making a bulk facility at GTP a feasible investment. To test this, the pavement and congestion savings that result from taking trucks off the road were estimated. The methodology of calculating these public benefits is described below.

## Pavement Savings

The bulk/dry transload facility at GTP would reduce the vehicle miles traveled (VMT) on the state's roads by diverting truck shipments to rail. The VMT avoided reduces the marginal cost of maintaining the pavement. The marginal cost of pavement for truck depends on whether the Interstate routes that would have been used are urban or rural. Because the routes between GTP and the destination ports are in rural parts of the state, it was assumed that the entire route is rural. The reduced VMT was calculated annually by subtracting the truck VMT in the build, which was zero because the goods are shipped by rail, from the baseline, which was the number of trucks times the distance to the destination ports.

The FHWA Cost Allocation Study, 2000 Addendum<sup>17</sup> estimated the marginal pavement costs per VMT for trucks to be \$0.056 (\$2000) or \$0.067 (\$2014) for a 60kip 4-axle US truck on rural Interstates<sup>18</sup>. Applying these marginal pavement costs to the annual reduction in truck VMT yields the pavement savings for each scenario. The VMT avoided estimates that these benefits are based on is conservative because it assumes that the truck trips are one-way.

- **Scenario 1**

Both of the train types (single car trains and unit trains) in Scenario 1 are going from GTP to the Port of Morehead City, which means each rail carload avoids four truck trips of 71 miles. The analysis conservatively assumes one-way truck trips are avoided. Multiplying the VMT avoided by the pavement costs per mile results in the pavement savings.

- **Scenario 2**

Similar to Scenario 1 but with different destinations, the truck trips avoided are multiplied by the respective distances to the Port of Wilmington (89 miles) and the Port of Norfolk (152 miles). Multiplying the VMT avoided by the pavement costs per mile results in the pavement savings.

## Congestion Savings

The bulk/dry transload facility also results in highway congestion savings by diverting shipments to rail. The reduction in truck VMT benefits the remaining highway drivers and reduces the marginal cost of congestion on these other vehicles. The marginal cost of truck congestion varies based on whether the Interstate routes used are urban or rural. Because the routes between GTP and the destination ports are in rural parts of the state, it was assumed that the entire route is on a rural Interstate. The reduced VMT was calculated annually by subtracting the truck VMT in the build, which was zero because the goods are shipped by rail, from the baseline, which was the number of trucks times the distance to the destination ports.

The Federal Highway Administration (FHWA) Cost Allocation Study, 2000 Addendum<sup>19</sup> estimated the marginal congestion costs per VMT to be \$0.033 (\$2000) or \$0.043 (\$2014) for a 60kip 4-axle U.S. truck on rural Interstates<sup>20</sup>. Multiplying these marginal congestion costs by the annual reduction in truck VMT yielded the congestion cost savings for each scenario. The VMT avoided estimates that these benefits are based on is conservative because it assumes that the truck trips are one-way.

- **Scenario 1**

Both of the train types (single car trains and unit trains) in Scenario 1 are going from GTP to the Port of Morehead City, which means each carload avoids four truck trips of 71 miles. The analysis conservatively assumes one-way truck trips are avoided. Multiplying the VMT avoided by the congestion costs per mile results in the congestion savings.

---

<sup>17</sup> "Addendum to the 1997 Federal Highway Cost Allocation Study Final Report." U.S. Department of Transportation Federal Highway Administration, May 2000. Web. Nov. 20014.  
<<https://www.fhwa.dot.gov/policy/fhcas/addendum.htm>>.

<sup>18</sup> \$2000 were escalated to \$2014 using GDP Deflators.

<sup>19</sup> "Addendum to the 1997 Federal Highway Cost Allocation Study Final Report." U.S. Department of Transportation Federal Highway Administration, May 2000. Web. Nov. 20014.  
<<https://www.fhwa.dot.gov/policy/fhcas/addendum.htm>>.

<sup>20</sup> \$2000 were escalated to \$2014 using GDP Deflators.

- **Scenario 2**

Similar to Scenario 1 but with different destinations, the truck trips avoided are multiplied by the respective distances to the Port of Wilmington (89 miles) and the Port of Norfolk (152 miles). Multiplying the VMT avoided by the congestion costs per mile results in the congestion savings.

The savings associated with the shipping scenarios are summed by scenario (baseline, Scenario 1, and Scenario 2). To calculate the total benefits of the baseline and scenarios, the annual public benefits are summed (pavement and congestion savings). Then each scenario's annual total is subtracted from the baseline's annual total, resulting in the net cost (if it is negative) or benefit (if it is positive) of the rail move compared to the truck shipment. Each annual total was discounted at 7 percent and summed over the 30-year analysis period. The public benefits of pavement and congestion cost savings, as shown in Exhibit E-3, total \$10.0 million in Scenario 1<sup>21</sup>, \$21.4 million in Scenario 2B, and \$12.6 million in Scenario 1C in discounted 2014 dollars.

**Exhibit E-3: Summary of Public Benefits**

Summary in \$2014M	Scenario 1: Dry Grain/Dry Bulk		Scenario 2: Containerized Bulk	
	1B: Grain comes to GTP by truck, goes to MHC by rail	1C: Grain comes to GTP by truck, goes to MHC by unit train	2B: Unload truck and re-stuff at GTP and ship to Norfolk by rail	2C: Unload truck and re-stuff at GTP and ship to Wilmington by rail
Discounted Net Pavement Savings	\$6.1	\$6.1	\$13.0	\$7.6
Discounted Net Congestion Savings	\$3.9	\$3.9	\$8.5	\$4.9
<b>Total Net Discounted Public Benefits</b>	<b>\$10.0</b>	<b>\$10.0</b>	<b>\$21.4</b>	<b>\$12.6</b>

**Note:** All scenarios are compared to trucking the goods to the destination

As shown in Exhibit E-4, totaling the discounted net benefits against the discounted net costs to shippers, a facility is still not economically viable. Even though a facility would result in pavement and congestion savings to the state and highway users, the facility would not be used by shippers because it costs them more to use rail than truck.

**Exhibit E-4: Total of Shipper Costs and Public Benefits**

Summary in \$2014M	Scenario 1: Dry Grain/Dry Bulk		Scenario 2: Containerized Bulk	
	1B: Grain comes to GTP by truck, goes to MHC by rail	1C: Grain comes to GTP by truck, goes to MHC by unit train	2B: Unload truck and re-stuff at GTP and ship to Norfolk by rail	2C: Unload truck and re-stuff at GTP and ship to Wilmington by rail
Total Net Discounted Public Benefits	\$10.0	\$10.0	\$21.4	\$12.6
Discounted Net Shipping + \$90 Handling + Interchange Costs	\$ (282.6)	\$ (97.9)	\$ (1,275.4)	\$ (1,153.2)
<b>Total (Sum of Net Discounted Benefits and Costs)</b>	<b>\$ (272.6)</b>	<b>\$ (87.9)</b>	<b>\$ (1,254.0)</b>	<b>\$ (1,140.6)</b>

**Note:** All scenarios are compared to trucking the goods to the destination

<sup>21</sup> Scenario 1B and 1C are equal because both scenarios have the same origin and destination.

The costs to shippers to use rail is greater than truck unless a unit train is used. As a result, only Scenario 1C could ever overcome the shipping, interchange, and handling costs when considering the public benefits. The public benefits from a bulk facility serving unit trains at GTP would only overcome the costs if it were 215 miles from the Port of Morehead City. At that point, as shown in Exhibit E-5, Scenario 1C would result in enough public benefits to overcome the cost to the shippers of using the facility by \$0.1 million. Because Scenario 1B considers moving products by single car trains and the costs per ton mile are higher than trucking, the total costs in Scenario 1B continue to increase faster than the benefits accrue. However, it is important to note that the public benefits are not likely to influence the mode by which a shipper sends goods; the costs incurred by the shipper will determine whether truck or rail is the more economical choice.

**Exhibit E-5: Sensitivity Analysis of Scenario 1 if Port of Morehead City were 215 Miles from GTP**

Summary in \$2014M	Scenario 1: Dry Grain/Dry Bulk	
	1B: Grain comes to GTP by truck, goes to MHC by rail, 215 Miles	1C: Grain comes to GTP by truck, goes to MHC by unit train, 215 Miles
Total Net Discounted Public Benefits	\$30.3	\$30.3
Discounted Net Shipping + \$90 Handling + Interchange Costs	\$ (589.5)	\$ (30.2)
<b>Total (Sum of Net Discounted Benefits and Costs)</b>	<b>\$ (559.2)</b>	<b>\$ 0.1</b>

**Note:** All scenarios are compared to trucking the goods to the destination.

Scenario 2 is not displayed because its net total costs increase as distance increases, and the distance to the Port of Morehead City is irrelevant.

The analysis shows that even if these volumes could be attracted to the GTP and the public benefits were considered, the costs to shippers are too high to transfer goods to rail at GTP for shipping to the Port of Morehead City, Norfolk, or Wilmington. The proximity of GTP to the ports, even by unit train, is a primary reason that a bulk facility there is not commercially feasible. In addition, the region already has a number of established grain handling facilities. Shipping bulk grain or refrigerated cargoes would also require investment in equipment for the Port of Morehead City.



## References



## References

- “§ 160A-20, Security Interest.” N.C. Gen. Stat., n.d. Web. 12 Dec. 2014. <[http://www.ncga.state.nc.us/EnactedLegislation/Statutes/HTML/BySection/Chapter\\_160A/GS\\_160A-20.html](http://www.ncga.state.nc.us/EnactedLegislation/Statutes/HTML/BySection/Chapter_160A/GS_160A-20.html)>.
- 20% Wind Energy by 2030: Increasing Wind Energy’s Contribution to U.S. Electricity Supply*. Rep. U.S. Department of Energy, July 2008. Web. Sept. 2014. <<http://www.nrel.gov/docs/fy08osti/41869.pdf>>.
- “2012 Census Publications - Ranking of Market Value of Ag Products Sold, North Carolina.” *Census of Agriculture*. United States Department of Agriculture, n.d. Web. Sept. 2014. <[http://www.agcensus.usda.gov/Publications/2012/Online\\_Resources/Rankings\\_of\\_Market\\_Value/North\\_Carolina/](http://www.agcensus.usda.gov/Publications/2012/Online_Resources/Rankings_of_Market_Value/North_Carolina/)>.
- “2012 Commodity Flow Survey United States.” *Bureau of Transportation Statistics*. United States Department of Transportation, n.d. Web. Sept. 2014. <[http://www.rita.dot.gov/bts/sites/rita.dot.gov/bts/files/publications/commodity\\_flow\\_survey/2012/united\\_states/index.html](http://www.rita.dot.gov/bts/sites/rita.dot.gov/bts/files/publications/commodity_flow_survey/2012/united_states/index.html)>.
- 2013 Annual Report*. Rep. North Carolina Global TransPark, 2013. Web. Sept. 2014. <[http://www.ncgtp.com/downloads/default-document-library/2013-gtpannual-report\\_final\\_web.pdf](http://www.ncgtp.com/downloads/default-document-library/2013-gtpannual-report_final_web.pdf)>.
- 2013 Consumer Expenditure Survey, Table 1800*. Rep. Bureau of Labor Statistics (BLS), Sept. 2014. Web. Oct. 2014. <<http://www.bls.gov/cex/2013/combined/region.pdf>>.
- 2014 Tiger Benefit-Cost Analysis (BCA) Resource Guide*. Rep. U.S. Department of Transportation, 18 Apr. 2014. Web. Sept. 2014. <[http://www.dot.gov/sites/dot.gov/files/docs/TIGER\\_BCARG\\_2014.pdf](http://www.dot.gov/sites/dot.gov/files/docs/TIGER_BCARG_2014.pdf)>.
- “About Lynx.” *XCOR Lynx Suborbital Spacecraft/Spaceplane*. XCOR, 2014. Web. Sept. 2014. <<http://xcor.com/lynx/>>.
- “About Us.” *The Terra Ceia Farms*. The Terra Ceia Farms, n.d. Web. Sept. 2014. <<https://www.terraceiafarms.com/page/about-us>>.
- AECOM, and URS. *NC Maritime Strategy: Existing and Planned Railroad Infrastructure*. Rep. North Carolina Department of Transportation, 31 May 2012. Web. <<http://www.ncdot.gov/download/business/committees/logistics/maritime/railroadsexistingplannedinfrastructure.pdf>>.
- AECOM, and URS. *NC Maritime Strategy Final Report*. Rep. North Carolina Department of Transportation, 26 June 2012. Web. <[http://www.ncdot.gov/download/business/committees/logistics/Maritime/NC\\_Maritime\\_final\\_report\\_2012-06-26.pdf](http://www.ncdot.gov/download/business/committees/logistics/Maritime/NC_Maritime_final_report_2012-06-26.pdf)>.
- “Americas Bunker Prices.” *Americas Bunker Price*. Ship & Bunker, n.d. Web. 5 Nov. 2014. <<http://shipandbunker.com/prices/am>>.

- An Analysis of the Operational Costs of Trucking: A 2013 Update*. Rep. American Transportation Research Institute, Sept. 2013. Web. Sept. 2014. <<http://truckexec.typepad.com/files/atri-operational-costs-of-trucking-2013-final.pdf>>.
- Anderson, Eric. "Rotterdam's Railex Expands to Florida." *Times Union*. N.p., 13 May 2014. Web. 12 Aug. 2014. <<http://www.timesunion.com/business/article/Rotterdam-s-Railex-expands-to-Florida-5475317.php>>
- At-Berth Regulation Webinar for Terminal and Vessel Plan Updates*. California Air Resources Board, 29 Apr. 2013. Web. Sept. 2014. <<http://www.arb.ca.gov/ports/shorepower/meetings/04292013/presentation.pdf>>.
- Bagli, Charles V. "Port Authority Struggles to Keep 2 Shippers." *The New York Times*. The New York Times, 13 Feb. 1999. Web. Sept. 2014. <<http://www.nytimes.com/1999/02/14/nyregion/port-authority-struggles-to-keep-2-shippers.html?src=pm&pagewanted=1>>.
- Bard, J., and F. Thalemann. *Offshore Infrastructure: Ports and Vessels*. Rep. Off-shore Renewable Energy Conversion Platforms – Coordination Action, n.d. Web. Sept. 2014. <[http://www.orecca.eu/c/document\\_library/get\\_file?uuid=6b6500ba-3cc9-4ab0-8bd7-1d8fdd8a697a&groupId=10129](http://www.orecca.eu/c/document_library/get_file?uuid=6b6500ba-3cc9-4ab0-8bd7-1d8fdd8a697a&groupId=10129)>.
- Batelle. *FAF3 Freight Traffic Analysis*. Rep. Oak Ridge National Laboratory., 23 Mar. 2011. Web. Sept. 2014. <[http://faf.ornl.gov/fafweb/Data/Freight\\_Traffic\\_Analysis/faf\\_fta.pdf](http://faf.ornl.gov/fafweb/Data/Freight_Traffic_Analysis/faf_fta.pdf)>.
- Bell, Rudolph. "GE Expansion to Add 80 Jobs." *Greenville Online*. N.p., 10 June 2014. Web. Sept. 2014. <<http://www.greenvilleonline.com/story/money/business/2014/06/10/ge-plans-m-expansion-local-operation/10264827/>>.
- Bickleman, Eric, and Bob Lowe. "Clinton Terminal Railroad Interview" Telephone interview. 12 June 2014.
- "Business and Cooperative Assistance." *USDA Rural Development*. United States Department of Agriculture, 14 Sept. 2011. Web. Sept. 2014. <[http://www.rurdev.usda.gov/bcp\\_rbeg.html](http://www.rurdev.usda.gov/bcp_rbeg.html)>.
- Calvin Luther Martin, Ph.D. *Your Guide To Wind Turbine Syndrome...a Roadmap to This Complicated Subject*. N.p., July 2010. Web. Sept. 2014. <<http://www.windturbinesyndrome.com/img/WTSguide.pdf>>.
- Cambridge Systematics, Inc. and Sanford Holshouser Economic Development. *U.S. 70 Corridor Economic Assessment*. Rep. U.S. 70 Corridor Commission and NCDOT, 07 Mar. 2014. Web. Sept. 2014. <[http://www.wral.com/asset/news/local/2014/06/19/13749531/78087-US\\_70\\_report.pdf](http://www.wral.com/asset/news/local/2014/06/19/13749531/78087-US_70_report.pdf)>.

Canup, C. R. (Buzz). "Canup and Associates Interview." Telephone interview. 25 Nov. 2014.

"Carolina Population Center." *UNC Carolina Population Center*. University of North Carolina, n.d. Web. Sept. 2014. <<http://www.cpc.unc.edu/>>.

*Class I Railroad Statistics*. Association of American Railroads, 15 July 2014. Web. Sept. 2014. <<https://www.aar.org/Documents/Railroad-Statistics.pdf>>.

Comments of CSXT Transportation, Inc., June 26, 2014, STB Ex. Parte 661 (Sub-No. 1), Rail Transportation of Grain Rate Regulation Review.

"Commercial Price, Average Cost per Kilowatt-Hour for North Carolina." *Duke Energy*. N.p., n.d. Web. Sept. 2014. <<http://www.duke-energy.com/north-carolina-large-business/rates-bills/commercial.asp>>.

Considine, Timothy J. *Economic and Environmental Impacts of Oil and Gas Development Offshore the Delmarva, Carolinas, and Georgia*. Rep. Interstate Policy Alliance, Sept. 2014. Web. Oct. 2014. <[http://media.wix.com/ugd/690417\\_6920632c241a431593a90b95f32d4314.pdf](http://media.wix.com/ugd/690417_6920632c241a431593a90b95f32d4314.pdf)>.

Corvin, Aaron. "Port to Rent Rail Cars in Deal with N. Dakota." *The Columbian*. N.p., 27 Aug. 2014. Web. Sept. 2014. <<http://www.columbian.com/news/2014/aug/27/port-to-rent-rail-cars-in-deal-with-n-dakota/>>.

"Crash Data and Maps." *Connect NCDOT*. N.p., n.d. Web. Sept. 2014. <<https://connect.ncdot.gov/resources/safety/Pages/Crash-Data.aspx>>.

Donnelly, Morgan. "Pulaski County to Get 205 New Jobs from Tomato Plant." *WLSL 10 NBC in Roanoke/Lynchburg Va.* N.p., 15 Mar. 2013. Web. Sept. 2014. <<http://www.wsls.com/story/21654611/250-news-jobs-in-pulaski-county>>.

"Draft STIP." *Connect NCDOT*. N.p., n.d. Web. Sept. 2014. <<https://connect.ncdot.gov/projects/planning/Pages/Draft-STIP.aspx>>.

EarthTech, and Wilbur Smith Associates. *Track Relocation Feasibility Study: Havelock to Morehead City*. Rep. N.p.: North Carolina Railroad, 2007. Print.

*Economic Development Agency Investment Programs*. Rep. National Association of Towns and Township, 23 July 2014. Web. Sept. 2014. <<https://www.nytowns.org/sites/default/files/Economic%20Development%20Agency%20Grant%20Programs.pdf>>.

Edwards, Andrew. "New Cold Storage Facility to Be Built at Port of Long Beach." *Press Telegram*. N.p., 20 Mar. 2014. Web. Sept. 2014. <<http://www.presstelegram.com/business/20140319/new-cold-storage-facility-to-be-built-at-port-of-long-beach>>.

Edwards, John. "Remote Controllers | Unmanned Vehicle Operators Require Diversity of Skills." *National Defense*. N.p., Dec. 2011. Web. Aug. 2014. <<http://www.nationaldefensemagazine.org/archive/2011/December/Pages/RemoteControllersUnmannedVehicleOperatorsRequireDiversityofSkills.aspx>>.

Elkinton, C., A. Blatiak, and H. Ameen. *Assessment of Ports for Offshore Wind Development in the United States*. Rep. U.S. Department of Energy., 21 Mar. 2014. Web. Sept. 2014. <[http://energy.gov/sites/prod/files/2014/04/f14/wind\\_offshore\\_port\\_readiness.pdf](http://energy.gov/sites/prod/files/2014/04/f14/wind_offshore_port_readiness.pdf)>.

"FAF3 Documentation." *Freight Analysis Framework (FAF)*. N.p., n.d. Web. Sept. 2014. <<http://faf.ornl.gov/fafweb/Documentation.aspx>>.

"Federal Wind Energy Policy." *American Wind Energy Association*. N.p., n.d. Web. Sept. 2014. <<http://www.awea.org/Advocacy/Content.aspx?ItemNumber=791>>.

"Freight Analysis Framework Data Tabulation Tool." *Freight Analysis Framework (FAF)*. N.p., n.d. Web. Sept. 2014. <<http://faf.ornl.gov/fafweb/Extraction1.aspx>>.

Freight Locator Database. *IHS Global Insight*. Sep. 2014. <<http://www.ihsglobalinsight.com/ProductsServices/ProductDetail839.htm>>.

Fuller, Lori. Telephone interview. 4 Dec. 2014.

General Assembly of North Carolina Session 2013, Session Law 2013-360, Senate Bill 402-Ratified, Approved July 26, 2013, <<http://www.ncga.state.nc.us/Sessions/2013/Bills/Senate/HTML/S402v7.html>>.

"Golden LEAF Foundation North Carolina." *Golden LEAF Foundation North Carolina*. N.p., n.d. Web. Sept. 2014. <<http://www.goldenleaf.org/>>.

"Google Maps." *Google Maps*. N.p., n.d. Web. 9 July 2014. <<https://www.google.com/maps>>.

*Governor McCrory's 25 Year Vision for North Carolina, Mapping Our Future*. Rep. North Carolina Department of Transportation, 2014. Web. Sept. 2014. <<http://www.ncdot.gov/ncvision25/ncvision25-for-print.pdf>>.

*Guidance on Treatment of the Economic Value of a Statistical Life (VSL) in USDOT Analyses*. Rep. United States Department of Transportation, 13 June 2014. Web. <[http://www.dot.gov/sites/dot.gov/files/docs/VSL\\_Guidance\\_2014.pdf](http://www.dot.gov/sites/dot.gov/files/docs/VSL_Guidance_2014.pdf)>.

"Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs." *Circular No. A-94 Revised*. Office of Management and Budget, 29 Oct. 1992. Web. Sept. 2014. <[http://www.whitehouse.gov/omb/circulars\\_a094](http://www.whitehouse.gov/omb/circulars_a094)>.

- Guillen, Pedro, Nic Wetzler, and Nick Abstoss. *Analysis of Maryland Port Facilities of Offshore Wind Energy Services*. Prepared for State of Maryland, Maryland Energy Administration. Rep. Kinetik Partners, 19 Dec. 2011. Web. Sept. 2014. <<http://energy.maryland.gov/documents/AnalysisofMarylandPortFacilitiesforOffshoreWindEnergyServices.pdf>>.
- HDR Engineering, Inc. *Economic Feasibility Study for the Restoration of Wallace to Castle Hayne Rail Corridor and Associated Port/Rail Improvements*. Rep. North Carolina Department of Transportation., 2004. Print.
- Hodgson, Thom J., Russell E. King, Michael G. Kay, Kimberly Smith, and Kristin Thoney. *Transportation Issues: The Global TransPark (GTP) versus Alternative Locations as a Home for Federal Express*. Rep. Raleigh: Logistics Center, Integrated Manufacturing Systems Engineering Institute, North Carolina State U, 1998. Print.
- “Incentives Move Cold Storage Project at Port Forward.” *Incentives Move Cold Storage Project at Port Forward*. WWAY3, 16 Dec. 2013. Web. Sept. 2014. <<http://www.wwaytv3.com/2013/12/16/incentives-move-cold-storage-project-port-forward>>.
- Informa Economics, Inc. *Heavier Semis: A Good Idea?* Rep. The Soy Transportation Coalition and the United Soybean Board, June 2009. Web. Sept. 2014. <<http://www.soytransportation.org/newsroom/SemiWeightLimitReport0609.pdf>>.
- “Interactive Data.” *U.S. Bureau of Economic Analysis (BEA)*. N.p., n.d. Web. Sept. 2014. <<http://www.bea.gov/itable/index.cfm>>.
- “Intermodal Transportation and Inventory Costing Model State Tool (ITIC-ST).” *FHWA*. N.p., 5 Apr. 2011. Web. Sept. 2014. <[http://www.fhwa.dot.gov/policy/otps/061012/iticst\\_info.htm](http://www.fhwa.dot.gov/policy/otps/061012/iticst_info.htm)>.
- Jacksonville Onslow Economic Development, Exiting Military Personnel by Military Occupational Specialty (MOS) by Year from Camp Lejeune and MCAS New River - All MOSs*. Rep. N.p.: n.p., 2014. Print.
- Jensen, Victoria Soukup. “Texas Helps General Aviation Airports Upgrade Fuel Systems.” *Airport Improvement Magazine*. Chapel Road Communications, LLC, Mar.-Apr. 2013. Web. Sept. 2014. <<http://www.airportimprovement.com/content/story.php?article=00463>>.
- Johnson, Jeremiah. “After Only 5 Weeks, Savannah-based Nordic Cold Storage Looking to Expand.” *Savannahnow.com*. N.p., 4 June 2013. Web. Sept. 2014. <<http://savannahnow.com/exchange/2013-06-04/after-only-5-weeks-savannah-based-nordic-cold-storage-looking-expand>>.
- Kasarda, John, PhD. Personal interview. 17 July 2014.
- Keating, Edward G., and Daniel Sommerhauser. *Funding Ammunition Ports*. Rep. RAND Corporation, 2012. Web. <[http://www.rand.org/pubs/technical\\_reports/TR1204.html](http://www.rand.org/pubs/technical_reports/TR1204.html)>.

- Kimley-Horn and Associates, Inc. *US 70 Access Management Study (2005) for 2001-2004 and Martin/Alexiou/Bryson, US 70 Traffic and Safety Study (2012)*. Rep. North Carolina Department of Transportation., Oct. 2012. Web. Sept. 2014.
- Kimley-Horn and Associates, Inc. *US 70 Access Management Study Clayton to Morehead City, NC*. Rep. North Carolina Department of Transportation. July 2005. Web. Sept. 2014. <[http://www.ncdot.gov/projects/us70corridor/download/US70\\_Access\\_Management\\_Study\\_Report.pdf](http://www.ncdot.gov/projects/us70corridor/download/US70_Access_Management_Study_Report.pdf)>.
- “Kinston Bypass Project.” *NCDOT*: N.p., n.d. Web. Sept. 2014. <<http://www.ncdot.gov/projects/kinstonbypass/>>.
- “Kinston Regional Jetport.” *Features*. North Carolina Global TransPark Authority, 2014. Web. Sept. 2014. <<http://www.ncgtp.com/features/kinston-regional-jetport.html>>.
- Krukin, Jeff. *The Commercial Spaceflight Industry: Brining Suborbital and Orbital Business to North Carolina*. Rep. Exodus Consulting Group, 15 Aug. 2013. Web. Sept. 2014. <[http://www.ncmbc.us/documents/Krukin\\_TheNewSpaceIndustryandNC-ASC08-13.pdf](http://www.ncmbc.us/documents/Krukin_TheNewSpaceIndustryandNC-ASC08-13.pdf)>.
- Landis, John D. “Planner’s Notebook: Electronic Spreadsheets in Planning The Case of Shiftshare Analysis.” *Journal of the American Planning Association* 51.2 (1985): 216-24. Web.
- Lenaers, William M., and Brent D. Coryell. “Reset: Extending the Life of Army Equipment.” *Army Logistician* 38.1 (2006): n. pag. *Army Logistician (Reset: Extending the Life of Army Equipment)*. Web. Sept. 2014. <[http://www.alu.army.mil/alog/issues/JanFeb06/reset\\_armyreq.html](http://www.alu.army.mil/alog/issues/JanFeb06/reset_armyreq.html)>.
- List, George F., and Robert S. Foyle. *Seven Portals Study: An Investigation of How Economic Development Can Be Encouraged in North Carolina Through Infrastructure Investment – Master Report*. Rep. no. FHWA/NC/2010-34-0. N.p.: North Carolina Department of Transportation, 2011. Print.
- “London Array |What the Technicians Do.” *London Array*. N.p., n.d. Web. Aug. 2014. <<http://www.londonarray.com/about-us-2/what-the-technicians-do/>>.
- Manta. “Terra Ceia Farms LLS.” Manta, n.d. Web. 2014. <<http://www.manta.com/c/mmf4vdj/terra-ceia-farms-llc>>
- Martin/Alexiou/Bryson. *US 70 Traffic and Safety Study from 1,000’ West of Willis Road to Banks Street, Morehead City, NC, 2012*. Rep. N.p., n.d. Web. Sept. 2014. <[http://townofmoreheadcity.com/moreheadwp/documents/planning-inspections/Prj\\_Median\\_Crash\\_Statistics\\_Summary.pdf](http://townofmoreheadcity.com/moreheadwp/documents/planning-inspections/Prj_Median_Crash_Statistics_Summary.pdf)>.
- McMillan, Jed. Telephone interview. 17 July 2014.
- “Methodologies to Measure and Quantify Transportation Management Center Benefits: Final Synthesis Report.” *FHWA*. N.p., Dec. 2012. Web. Sept. 2014. <<http://www.fhwa.dot.gov/publications/research/operations/12054/009.cfm>>.

*Miami International Airport Leading the Americas in International Air Cargo*. Rep. Miami-Dade Aviation Department, n.d. Web. Sept. 2014. <[http://www.miami-airport.com/pdfdoc/MIA\\_Cargo\\_Brochure.pdf](http://www.miami-airport.com/pdfdoc/MIA_Cargo_Brochure.pdf)>.

“Model Airport Zoning Act.” *Chapter 63 - Article 4*. N.C. Gen. Stat., n.d. Web. Sept. 2014. <[http://www.ncga.state.nc.us/EnactedLegislation/Statutes/HTML/ByArticle/Chapter\\_63/Article\\_4.html](http://www.ncga.state.nc.us/EnactedLegislation/Statutes/HTML/ByArticle/Chapter_63/Article_4.html)>.

Moffatt & Nichol. *North Carolina State Ports Authority Port Business Case Project*. Rep. North Carolina State Ports Authority., Feb. 2011. Web. Sept. 2014. <<http://savethecape.org/stcwp1/wp-content/uploads/PDFs/M&N211.pdf>>.

Mullis, Mike. “J.M. Mullis, Inc. Interview.” Telephone interview. 10 July 2014.

N.C. Gen. Stat. § 63A-9(f), *Bonds and Notes*. Rep. N.p., n.d. Web. Sept. 2014. <[http://www.ncga.state.nc.us/EnactedLegislation/Statutes/PDF/BySection/Chapter\\_63A/GS\\_63A-9.pdf](http://www.ncga.state.nc.us/EnactedLegislation/Statutes/PDF/BySection/Chapter_63A/GS_63A-9.pdf)>.

*NCDOT: US 70 Corridor*. North Carolina Department of Transportation, 03 Feb. 2012. Web. Sept. 2014. <<http://www.ncdot.gov/projects/US70corridor/>>.

“NCGTP Board of Directors.” *About*. North Carolina Global TransPark Authority, 2014. Web. Sept. 2014. <<http://www.ncgtp.com/about/gtp-board-of-directors.html>>.

“NCWorks Online.” *NCWorks Online. Connecting Talent to Jobs*. N.p., n.d. Web. Sept. 2014. <<http://www.ncworks.gov/>>.

“New Hanover Industrial Directory.” *Wilmington Business Development*. N.p., n.d. Web. Sept. 2014. <<http://www.wilmingtonbusinessdevelopment.com/who-else-is-already-here/industrial-directories/>>.

*New Mexico Commercial Spaceport Economic Impact Study*. Rep. Fultron Corporation, 30 Dec. 2005. Web. Aug. 2014. <<http://archives.elpalacio.org/cdm/ref/collection/p267801coll5/id/1155>>.

“North Carolina Activities.” *Bureau of Ocean Energy Management (BOEM)*. N.p., n.d. Web. Sept. 2014. <<http://www.boem.gov/State-Activities-North-Carolina/>>.

“North Carolina Agriculture Overview.” *North Carolina Department of Agriculture & Consumer Services*. N.p., n.d. Web. Sept. 2014. <<http://www.ncagr.gov/stats/general/overview.htm>>.

“North Carolina Center for Global Logistics Interview.” Telephone interview. 24 Nov. 2014.

“North Carolina Chamber of Commerce Interview.” Telephone interview. 20 Aug. 2014.

North Carolina Department of Transportation Cost Estimate Guide, \$2014. North Carolina Department of Transportation.

*North Carolina Department of Transportation Historical AADT Values 2013 to 2002*. Rep. North Carolina Department of Transportation Traffic Survey Group - Transportation Planning Branch, July 2014. Web. Sept. 2014. <[http://www.ncdot.gov/projects/trafficsurvey/download/2013\\_AADT\\_PDF\\_REPORT.pdf](http://www.ncdot.gov/projects/trafficsurvey/download/2013_AADT_PDF_REPORT.pdf)>.

North Carolina Department of Transportation. *Rail Network of Eastern North Carolina*

North Carolina Department of Transportation. *Statewide Travel Demand Model*

North Carolina Department of Transportation. *Wilmington Traffic Separation Study*. Working paper.  
N.p.: n.p., n.d. Print.

North Carolina Economic Development Board. *North Carolina Jobs Plan: Recommended Strategies for Economic Growth 2014-2024*. Rep. North Carolina Department of Commerce, Dec. 2013. Web.  
<[http://www.nccommerce.com/Portals/0/Documents/AboutOurDepartment/BoardsCommissions/NC%20Jobs%20Plan%20Report\\_Final.pdf](http://www.nccommerce.com/Portals/0/Documents/AboutOurDepartment/BoardsCommissions/NC%20Jobs%20Plan%20Report_Final.pdf)>.

“North Carolina Global TransPark Board.” Telephone interview. 22-23 Sept. 2014.

North Carolina Global TransPark Board of Directors Meeting, Global TransPark Authority, September 23, 2014, PowerPoint presentation

*North Carolina Should Weigh Continued Investment in the Global TransPark Authority and Consider How to Repay the Escheat Fund Loan: Final Report to the Joint Legislative Program Evaluation Oversight Committee*. Rep. no. 2011-02. Program Evaluation Division North Carolina General Assembly, 19 Apr. 2011. Web. Sept. 2014. <[http://www.ncleg.net/PED/Reports/documents/GTP/GTP\\_Report.pdf](http://www.ncleg.net/PED/Reports/documents/GTP/GTP_Report.pdf)>.

*North Carolina State Constitution*, Art. V, Sec. 13, <<http://www.ncga.state.nc.us/legislation/constitution/nconstitution.html>>.

“North Carolina State University Industrial and Systems Engineering Laboratory for Additive Manufacturing.” Personal interview. 18 July 2014.

“North Dakota, Port of Vancouver Sign Transportation Pact | North Dakota Department of Agriculture.” *North Dakota, Port of Vancouver Sign Transportation Pact | North Dakota Department of Agriculture*. North Dakota Department of Agriculture, 27 Aug. 2014. Web. Sept. 2014. <<http://www.nd.gov/ndda/news/north-dakota-port-vancouver-sign-transportation-pact>>.

*Offshore Wind Port Readiness Tool*. U.S. Department of Energy, 2014. Web. Sept. 2014. <<http://www.offshorewindportreadiness.com/Home>>.

Oliver, Zack, Joshua Levy, and Jeff DeBellis. *The Economic Impact of the Military in North Carolina*. Rep. The Labor & Economic Analysis Division of the North Carolina Department of Commerce, n.d. Web. Sept. 2014. <<http://www.nccommerce.com/Portals/47/Publications/Industry%20Reports/The%20Economic%20Impact%20of%20the%20Military%20on%20North%20Carolina.pdf>>.

*Overview: Addendum A, Overseas Contingency Operations.* Rep. United States Department of Defense, May 2013. Web. Sept. 2014. <[http://comptroller.defense.gov/Portals/45/Documents/defbudget/fy2014/amendment/FY2014\\_Budget\\_Request\\_Overview\\_Book\\_Amended.pdf](http://comptroller.defense.gov/Portals/45/Documents/defbudget/fy2014/amendment/FY2014_Budget_Request_Overview_Book_Amended.pdf)>.

Parker, Molly. "Contractor Chosen for Cold Storage Facility Port Project." *StarNewsOnline.com*. StarNewsOnline, 3 July 2014. Web. Sept. 2014. <<http://www.starnewsonline.com/article/20140703/ARTICLES/140709899>>.

"Part III. State Tax Collections." *North Carolina Department of Revenue Statistical Abstract 2012*. N.p., n.d. Web. Sept. 2014. <<http://www.dor.state.nc.us/publications/abstract/2012/part3.html>>.

"Pender County Industrial Directory." *Wilmington Business Development*. Wilmington Business Development, n.d. Web. Sept. 2014. <<http://www.wilmingtonbusinessdevelopment.com/who-else-is-already-here/pender-county-industrial-directory/>>.

Pihl, Kristi. "Railex Opens \$20 Million Wallula Wine Distribution Center." *Tri-City Herald*. Tri-City Herald, 25 Apr. 2013. Web. Sept. 2014. <[http://www.tri-cityherald.com/2013/04/25/2371294\\_railex-opens-20-million-wallula.html?rh=1](http://www.tri-cityherald.com/2013/04/25/2371294_railex-opens-20-million-wallula.html?rh=1)>.

*Port of Morehead City*. Rep. North Carolina Ports Authority, n.d. Web. Sept. 2014. <<http://www.ncports.com/elements/media/files/port-morehead-city-fact-sheet.pdf>>.

*Port of Morehead City 2013 Statistics*. Rep. North Carolina Ports Authority, n.d. Web. Sept. 2014. <<http://www.ncports.com/elements/media/files/port-morehead-city-2013-statistics.pdf>>.

PotashCorp. *The Next Stage of Growth*. Rep. N.p.: Potash Corporation of Saskatchewan, n.d. Print. Annual Report on Form 10-K for the Year Ended December 31, 2010. <[http://www.potashcorp.com/annual\\_reports/2010/media/PotashCorp\\_10-K\\_110225.pdf](http://www.potashcorp.com/annual_reports/2010/media/PotashCorp_10-K_110225.pdf)>.

Program Development Branch. *Feasibility Study: New Route (Northern Carteret Bypass) From the Havelock Bypass (TIP#R-1015) to Beaufort*. Rep. North Carolina Department of Transportation, 22 July 2009. Web. <[http://www.kimley-horn.com/Projects/Super70/pdfs/NCarteretBypass\\_FeasSt.pdf](http://www.kimley-horn.com/Projects/Super70/pdfs/NCarteretBypass_FeasSt.pdf)>.

"Property Data, Parcel Number 636601089018000." *Carteret County Property Data*. Carteret County Tax Office, n.d. Web. Sept. 2014.

"Public Airports and Related Facilities." *Chapter 63 - Article 6*. N.C. Gen. Stat, n.d. Web. Sept. 2014. <[http://www.ncga.state.nc.us/EnactedLegislation/Statutes/HTML/ByArticle/Chapter\\_63/Article\\_6.html](http://www.ncga.state.nc.us/EnactedLegislation/Statutes/HTML/ByArticle/Chapter_63/Article_6.html)>.

"Public Use Waybill Samples." *Industry Data Economic Data: Waybill*. Surface Transportation Board, n.d. Web. 2014. <[http://www.stb.dot.gov/stb/industry/econ\\_waybill.html](http://www.stb.dot.gov/stb/industry/econ_waybill.html)>.

"R-1 Annual Reports." *Annual Report Financial Data*. Surface Transportation Board, 2013. Web. 2014. <<http://www.stb.dot.gov/econdata.nsf/f039526076cc0f8e8525660b006870c9?OpenView>>.

“Railroad Rehabilitation & Improvement Financing (RRIF).” Federal Railroad Administration, n.d. Web. Sept. 2014. <<http://www.fra.dot.gov/Page/P0128>>.

*RCAF Quarterly Filings*. Association of American Railroads, 2014. Web. 2014. <<https://www.aar.org/Pages/RCAF-Quarterly-Filings.aspx>>.

Read, Richard. “Port of Portland Plans to Subsidize Hanjin Shipping and Other Cargo Carriers to Keep Them Calling.” *OregonLive.com*. The Oregonian, 7 Feb. 2014. Web. Sept. 2014. <[http://www.oregonlive.com/business/index.ssf/2014/02/port\\_of\\_portland\\_plans\\_to\\_subs.html](http://www.oregonlive.com/business/index.ssf/2014/02/port_of_portland_plans_to_subs.html)>.

“Renewable Energy Laws.” U.S. Department of Energy, 2014. Web. Sept. 2014. <[https://www4.eere.energy.gov/femp/requirements/requirements\\_filtering/renewable\\_energy](https://www4.eere.energy.gov/femp/requirements/requirements_filtering/renewable_energy)>.

“Renewable Energy | Clean Air Carolina.” *Clean Air Carolina*. N.p., n.d. Web. Sept. 2014. <[http://cleanaircarolina.org/?page\\_id=6755](http://cleanaircarolina.org/?page_id=6755)>.

Rypinski, Arthur. *Trucks and Federal Policy: RFF Workshop, Energy Use and Policy in the Trucking Sector*. Rep. U.S. Department of Transportation., 10 Oct. 2012. Web. Sept. 2014. <[http://www.rff.org/Documents/Events/121010\\_trucking\\_event/Rypinski-presentation.pdf](http://www.rff.org/Documents/Events/121010_trucking_event/Rypinski-presentation.pdf)>.

Schwab, Andrew. “First Flight Venture Center Interview.” Personal interview. 17 July 2014.

Sherman, Christopher. “Orlando FEMA Office Wades into Work.” *Orlando Sentinel*. Orlando Sentinel, 16 June 2005. Web. Sept. 2014. <[http://articles.orlandosentinel.com/2005-06-16/news/orfema16.027\\_1\\_fema-hurricanes-long-term-recovery](http://articles.orlandosentinel.com/2005-06-16/news/orfema16.027_1_fema-hurricanes-long-term-recovery)>.

*Short-Term Energy Outlook (STEO)*. Rep. U.S. Energy Information Administration, n.d. Web. <[http://www.eia.gov/forecasts/steo/pdf/steo\\_full.pdf](http://www.eia.gov/forecasts/steo/pdf/steo_full.pdf)>.

Sisson, Mark, and Krystle McBride. *The Economies of Cold Ironing*. Rep. Port Technology International, n.d. Web. Nov. 2014. <<https://www.broward.org/Port/MasterPlan/Documents/PTI%20Cold%20Ironing%20Economics.pdf>>.

Sommer, Kayleigh. “Port Mansfield Airport Approved for Drone Testing.” *TheMonitor.com*. The Monitor, 11 Sept. 2014. Web. Sept. 2014. <[http://www.themonitor.com/news/local/port-mansfield-airport-approved-for-drone-testing/article\\_cb9772e2-3a1d-11e4-949d-001a4bcf6878.html](http://www.themonitor.com/news/local/port-mansfield-airport-approved-for-drone-testing/article_cb9772e2-3a1d-11e4-949d-001a4bcf6878.html)>.

Spaceport America. “Facility Map.” *Facility Map*. N.p., n.d. Web. Sept. 2014. <<http://spaceportamerica.com/visit-us/facility-map/>>.

*StatsAmerica*. U.S. Economic Development Administration, n.d. Web. Sept. 2014. <<http://www.statsamerica.org/>>.

*Studied Rail Infrastructure Improvements in the Port of Morehead City Area*. Rep. N.p.: Down East Rural Planning Organization, 2014. Print.

- Sweeney, Mark. "McCallum Sweeney Consulting Interview." Telephone interview. 12 June 2014.
- Sweet Potatoes County Estimates*. Rep. U.S. Department of Agriculture and North Carolina Department of Agriculture & Consumer Services, n.d. Web. Sept. 2014. <<http://www.ncagr.gov/stats/coest/SweetpotCoest.pdf>>.
- "Table 10.1—Gross Domestic Product and Deflators Used in the Historical Tables: 1940–2019." *Historical Tables*. Office of Management and Budget, n.d. Web. Sept. 20014. <<http://www.whitehouse.gov/omb/budget/Historicals>>.
- Table 2. Market Value of Agricultural Products Sold Including Direct Sales: 2012 and 2007*. Rep. USDA, National Agricultural Statistics Service, n.d. Web. <[http://www.agcensus.usda.gov/Publications/2012/Full\\_Report/Volume\\_1,\\_Chapter\\_2\\_County\\_Level/North\\_Carolina/st37\\_2\\_002\\_002.pdf](http://www.agcensus.usda.gov/Publications/2012/Full_Report/Volume_1,_Chapter_2_County_Level/North_Carolina/st37_2_002_002.pdf)>.
- Table 27 General Sales Tax Rates and Net Collections and Individual Income Tax Net Collections and Personal Income for Those States Levying a General Sales Tax*. Rep. U.S. Census Bureau, Bureau of Economic Analysis, and Sales Tax Institute, 2012. Web. Sept. 2014. <<http://www.dornrc.com/publications/abstract/2012/table27.pdf>>.
- Tannenbaum, Eric. *U.S. Cost of Doing Business: An Update, Regional Financial Review*. Rep. Moody's Analytics., May 2014. Web. Sept. 2014.
- Tetra Tech EC, Inc. *Port and Infrastructure Analysis for Offshore Wind Energy Development*. Rep. Massachusetts Clean Energy Center, Feb. 2010. Web. Sept. 2014. <[http://images.masscec.com/uploads/attachments/Port%20and%20Infrastructure%20Analysis%20for%20Offshore%20Wind%20Energy%20Development/MA%20Port%20Study%20Final%20Report\\_4-20-10.pdf](http://images.masscec.com/uploads/attachments/Port%20and%20Infrastructure%20Analysis%20for%20Offshore%20Wind%20Energy%20Development/MA%20Port%20Study%20Final%20Report_4-20-10.pdf)>.
- The Economic Impact of Unmanned Aircraft Systems Integration in the United States*. Rep. Association for Unmanned Vehicle Systems International, Mar. 2013. Web. Sept. 2014. <[http://higherlogicdownload.s3.amazonaws.com/AUVSI/958c920a-7f9b-4ad2-9807-f9a4e95d1ef1/UploadedImages/New\\_Economic%20Report%202013%20Full.pdf](http://higherlogicdownload.s3.amazonaws.com/AUVSI/958c920a-7f9b-4ad2-9807-f9a4e95d1ef1/UploadedImages/New_Economic%20Report%202013%20Full.pdf)>.
- "TIGER Grant Data." United States Department of Transportation, 3 Oct. 2014. Web. <<http://www.dot.gov/policy-initiatives/tiger/tiger-grant-data>>.
- Tomer, Adie, and Joseph Kane. *Mapping Freight: The Highly Concentrated Nature of Goods Trade in the United States*. Tech. Brookings Institution, n.d. Web. Nov. 2014. <[http://www.brookings.edu/~media/research/files/reports/2014/11/freight%20networks/srvy\\_gcifreightnetworks\\_oct24.pdf](http://www.brookings.edu/~media/research/files/reports/2014/11/freight%20networks/srvy_gcifreightnetworks_oct24.pdf)>.

“Transportation Equity Act for the 21st Century.” *Transportation Equity Act for the 21st Century*. U.S. Department of Transportation, 5 Apr. 2011. Web. Sept. 2014. <<https://www.fhwa.dot.gov/tea21/>>.

“Transportation Infrastructure Finance and Innovation Act (TIFIA).” *MAP-21 - Fact Sheets - Transportation Infrastructure Finance and Innovation Act (TIFIA) | Federal Highway Administration*. N.p., n.d. Web. Sept. 2014. <<http://www.fhwa.dot.gov/map21/factsheets/tifia.cfm>>.

Transportation Management Group, Inc., *North Carolina Air Cargo System Plan and a Global Air Cargo Industrial Complex Study*, Raleigh, N.C., February 1992.

Transportation Planning Branch. *Strategic Highway Corridors (SHC) Vision Plan*. Rep. North Carolina Department of Transportation, 10 July 2008. Web. <<https://connect.ncdot.gov/projects/planning/TPB%20%20Strategic%20Highway%20Corridors/Strategic%20Highway%20Corridors%20Vision%20Plan.pdf>>.

*United States Department of Agriculture Economic Research Service*. USDA, n.d. Web. Sept. 2014. <<http://www.ers.usda.gov/>>.

“United States Department of Agriculture Foreign Agricultural Service.” USDA, n.d. Web. Sept. 2014. <<http://www.fas.usda.gov/>>.

University of Michigan 3D Lab, People, “People.” University of Michigan 3D Lab. University of Michigan, n.d. Web. Sept. 2014. <<http://um3d.dc.umich.edu/about/people/>>.

“URCS Worktables.” *Industry Data Economic Data: URCS*. Surface Transportation Board, n.d. Web. 2014. <<http://www.stb.dot.gov/stb/industry/urcs.html>>.

US 70 Corridor Commission. *NCDOT SPOT 3.0 Quantitative Scores (June 9, 2014), Funded Bypasses (June 4, 2014), Other Corridor Upgrades, Feasibility Studies*. Rep. Super 70 Corridor, 19 June 2014. Web. Sept. 2014. <<http://www.super70corridor.com/cms/lib04/NC01920485/Centricity/Domain/16/US%2070%20Corridor%20Status-%20June%2019%202014.pdf>>.

*U.S. Department of Agriculture*. USDA, n.d. Web. Sept. 2014. <<http://www.usda.gov/>>.

U.S. Department of transportation. FHWA. “Addendum to the 1997 Federal Highway Cost Allocation Study Final Report.” May 2000.

“U.S. Energy Information Administration - EIA - Independent Statistics and Analysis.” *Natural Gas, Solar, and Wind Lead Power Plant Capacity Additions in First-half 2014*. U.S. Department of Energy, 9 Sept. 2014. Web. Oct. 2014. <<http://www.eia.gov/todayinenergy/detail.cfm?id=17891>>.

U.S. Environmental Protection Agency, *Projected Emissions Rates 2016-2025*, 2009.

Waddell, Darlene. Personal interview. 12 June 2014.

Walden, Mike. *Agriculture and Agribusiness: North Carolina's Number One Industry*. Rep. North Carolina State University, May 2014. Web. Sept. 2014. <<http://ag-econ.ncsu.edu/sites/ag-econ.ncsu.edu/files/faculty/walden/agribusiness-2014.pdf>>.

Webb, Dee. *Soybeans County Estimates*. Rep. U.S. Department of Agriculture and North Carolina Department of Agriculture & Consumer Services, n.d. Web. Sept. 2014. <<http://www.ncagr.gov/stats/coest/SoybeansCoest.pdf>>.

North Carolina Department of Transportation  
in collaboration with  
North Carolina Department of Commerce and  
North Carolina Department of Agriculture and Consumer Services

