Global Transpark to Port of Morehead City Mobility Corridor

Rail Improvements Study

Submitted to
NC Department of Transportation

Submitted by
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Executive Summary

The North Carolina Department of Transportation (NCDOT) retained Mott MacDonald to evaluate potential rail and port infrastructure changes that would (1) improve rail access to the Port of Morehead City and (2) reduce conflicts between those rail operations and street traffic along Hancock Street in New Bern, and US 70 in Morehead City. This study was not intended to determine the recommended solutions along the corridor, but rather to offer alternatives and to provide a planning-level review of the options discussed. Also, note that the evaluations provided are cursory in nature. No detailed design, cost estimating, or environmental analysis was performed for this study. Should any of the concepts presented be considered for implementation or compared to other potential solutions, more detailed design and analysis would be needed.

A. Port Alternatives

It is the desire of the North Carolina State Ports Authority (NCSPA) to increase throughput at the Port of Morehead City with containers being the target cargo and rail being the predominant intermodal method. Currently, the port mainly serves the breakbulk and bulk market, and developing Radio Island as a container terminal is a potential option for the future of the Port of Morehead City. Improvements to infrastructure and a strong operations plan would both be required for the port to develop a rail-centric container terminal capable of throughput in excess of one million TEU per year targeting New Panamax (NPx) class vessels.

Waterway Infrastructure

The Port of Morehead City boasts one of the shortest distances from berth to deep water on the US Atlantic Coast; therefore, deepening the channel and container berths to 52 feet would be ideal for attracting the new NPx vessel class. Maintaining proper channel depth is paramount and it is recommended that a detailed study of the harbor, channel, and Beaufort Inlet's morphology, sedimentation, and coastal processes be conducted independent from the US Army Corps of Engineers (USACE) study. This additional study should include the development of best value dredging practices tailored to meet the long term goals of the Port of Morehead City. Additionally, a navigation study is also recommended to ensure turning and maneuvering can be done as needed and to confirm that larger vessels will not negatively impact existing berths.

Land Transport

The existing landside access road and rail infrastructure would likely not be able to support an increase in intermodal freight traffic. Roadway improvements in the US 70 corridor, such as upgrading US 70 to an interstate highway, are underway and should aid in the overland freight movements. Additional rail improvements at the Port of Morehead City and Radio Island should be considered, including a dedicated 20,000-ft siding near Radio Island and incorporation of a nearby rail yard to assemble ±3,500-ft car segments. An additional alternative would be to construct parallel track to the main line in order to assemble a long unit train. Also, the entrance to the Radio Island site needs to undergo significant

improvements to accommodate a change in use of the Port of Morehead City. Further, the rail line needs to be upgraded to FRA Class I standards and an overpass bridge from US 70 constructed.

Port Infrastructure

Under a scenario that utilizes the Port of Morehead City as a container port, a Radio Island operational efficiency plan should be developed concurrently with a plan for capital improvements to the port. Potential solutions to encourage efficiency could take several forms. For example, one possible consideration could be contracting with a single terminal operator or an alliance of carriers utilizing a single common gate facility rather than subdividing the property into multiple disconnected terminals each with separate operators and gates. Additionally, the plan might consider having the primary wharf be a 2,600-ft continuous structure, divided into two 1,300-ft berths so that each can service a 13,000 TEU NPx vessel. A secondary wharf at the south-east is suggested for container barge traffic. High density container stacking, utilizing rubber tired gantry (RTG) cranes, would maximize throughput on the available acreage. In addition, an intermodal yard with six parallel stub-ended ramp tracks, each 3,500 feet in length, served by five or more electric wide-span rail-mounted gantry cranes is recommended to achieve the goal of having 80% of the port throughput handled by rail. Note the connection to the existing rail alignment on Radio Island is too tight for typical intermodal operations and some realignment with additional property needs may be necessary.

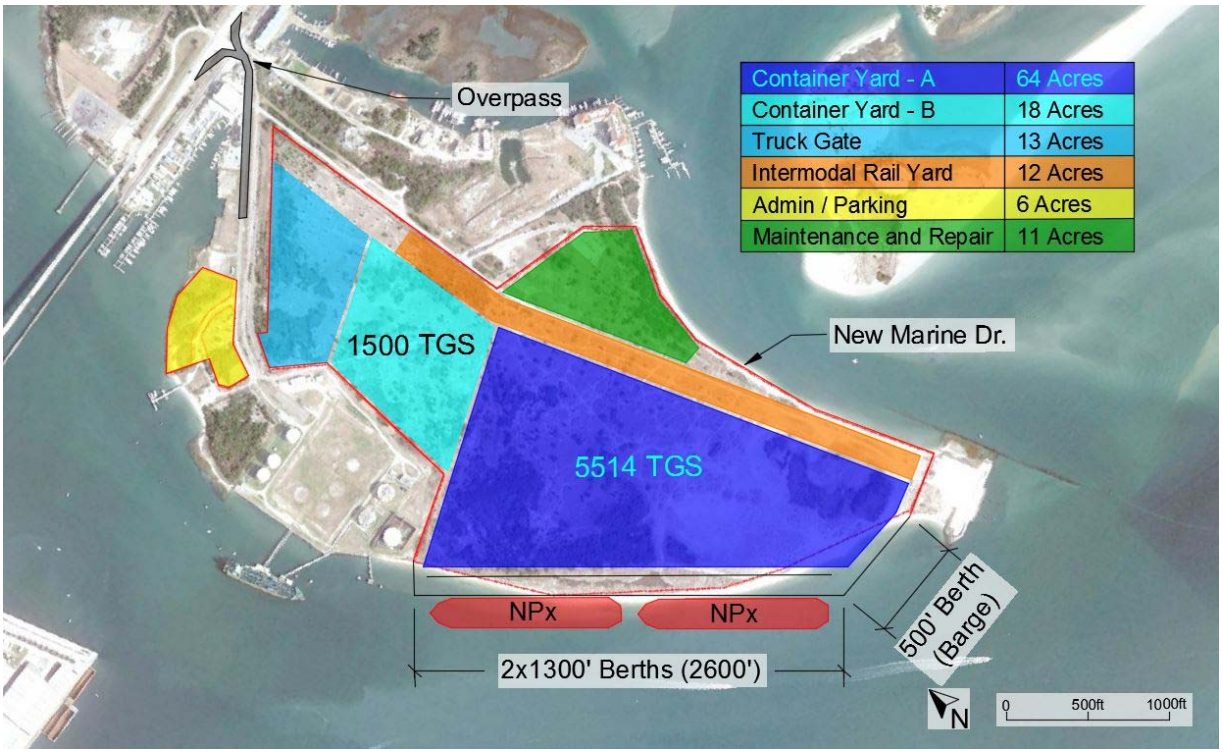

Figure 1: Potential Radio Island Layout Option

B. Rail Alternatives – New Bern

There were a number of alternatives considered for each of the study areas. The list below provides a summary of the alternatives selected for inclusion as potential enhancements. Note that each of these alternatives has operational, design, and construction challenges. Since the purpose of the study was to suggest new concepts that might be considered, alternatives were not discounted due to existing issues. It is the intent of the study to determine what potential options might warrant more detailed review.

Alternative "1" (GTP Connection) provides a new connection from the Global TransPark to CSXT's Parmele Subdivision. The estimated cost for this conceptual plan is $28 million.

Alternative "2" (Urban New Bern Bypass) provides a bypass of the North Carolina Railroad Company (NCRR) corridor around New Bern, while keeping the western lead to the New Bern Yard in operation. The purpose of this alternative is to avoid the street traffic interference along US 70. However, there are a number of impacts to existing property, and this alternative would add highway-rail crossings in other locations. The estimated cost for this conceptual plan is $204 million.

Alternative "3" (New Bern Bypass) provides a bypass around New Bern while keeping the western lead to the New Bern Yard in operation. As with Alternative 2, the purpose of this alternative is to avoid the street traffic interference along US 70. Alternative 3 is longer than Alternative 2, and could also affect existing properties and add new highway-rail crossings. The estimated cost for this conceptual plan is $197 million.

Alternative "**4" (Neuse River Bridge Replacement)** would replace the existing railroad bridge across the Neuse River and provide service to Bridgeton. This alternative was deemed to not be cost effective and had significant environmental issues. As such, it was not recommended for further consideration.

C. Rail Alternatives – Morehead City

As with the New Bern area, concepts were developed with the intent of reducing conflicts in the Morehead City area. Again, a planning-level analysis was performed for this study. Should any concepts noted below be considered, additional study would be needed.

Alternative "5" (Edgewater Yard) provides a new transfer yard on the NCRR corridor in Morehead City just beyond the median running section at "Edgewater." In this alternative, either an NS switching job or the local port switching railroad would work with the management of the Port and the City to develop a switching schedule that would be most conducive to both parties, allowing rail cars to be shuttled to and from the yard as needed. Norfolk Southern Railway (NSR) would then pick up and deliver formed trains at Edgewater Yard on whatever schedule it wants to use, but without the longer trains operating on the median running section of US 70. Since the scope of this study was to provide a planning level review of the potential for each alternative, no detailed analysis was performed regarding existing agreements between the port and other shippers. In particular, the master agreement between Norfolk Southern Railway (operator/maintainer) and the North Carolina Railroad (owner) does not anticipate this type of operation and may have to be renegotiated to achieve this concept. Other

institutional barriers may also be present. Should this concept be considered, additional coordination would be needed with PMC, NCRR, NSR, and others. The point of including this alternative was to explore the potential of having more frequent but shorter trains passing through Morehead City on a jointly agreed schedule with the City. The estimated cost for this conceptual plan is $11 million.

Alternative "6" (Morehead City Median Running Section Bypass) provides a bypass around downtown Morehead City to avoid the median running section. While this option removes the rail conflicts along US 70, it creates new conflicts to the north. Also, this alternative would affect residential and commercial properties along a corridor north of Bay Street. The estimated cost for this conceptual plan is $224 million.

Alternative "8" (Morehead City Bypass) provides a bypass to avoid areas along US 70 in Morehead City. However, this option would likely create new highway-rail conflicts, and affect residential, commercial, and agricultural property. The alternative is also located in close proximity to the Croatan National Forest. As with all options and due to the nature of the scope for this project, no detailed assessments of impacts were calculated. The estimated cost for this conceptual plan is $240 million.

Alternative "9" (Port Relocation) contemplates relocation of the port facilities from their current location to a site near Broad Creek and conversion of the former port site to recreational facilities. This option would remove train traffic related to port shipments in town, as a connection to the existing line could be made west of Morehead City. However, the plan would likely require extensive dredging and capital improvements. Due to the anticipated efforts to build a new port on the proposed location, it was determined to not carry this option forward for cost estimating purposes in this study.

Figure 2: Railroad Route Alternatives

Proposed Segment J
Proposed Segment I
Proposed Segment H
Proposed Segment F
Proposed Segment G
Proposed Segment B
Proposed Segment A
Proposed Segment C
Proposed Highway Alignment

GRIFTON
LA GRANGE
KINSTON
VANCEBORO
AURORA
DOVER
COVE CITY
MESIC
VANDEMERE
GRANTSBORO
BAYBORO
ALLIANCE
STONEWALL
NEW BERN
BRIDGETON
TRENT WOODS
RIVER BEND
PINK HILL
TRENTON
ORIENTAL
ARAPAHOE
MINNESOTT BEACH
POLLOCKSVILLE
BEULAVILLE
RICHLANDS
MAYSVILLE
HAVELOCK
NEWPORT
MOREHEAD CITY
BEAUFORT
ATLANTIC BEACH
PINE KNOLL SHORES
JACKSONVILLE
PELETIER
SWANSBORO
CEDAR POINT
BOGUE
CAPE CARTERET
EMERALD ISLE
INDIAN BEACH

Legend

- Proposed Highway Alignment
- Proposed Segment A
- Proposed Segment B
- Proposed Segment C
- Proposed Segment F
- Proposed Segment G
- Proposed Segment H
- Proposed Segment I
- Proposed Segment J
- Municipal Boundary

D. Conclusions

This study presents multiple options for improving rail transport in the Global TransPark to Port of Morehead City Mobility Corridor. These options are not intended to be "stand-alone" solutions, but rather are meant to be combined to best fit the needs and fiscal constraints that are faced. Also, any implementation plan should consider the timing of the projects, as it is unlikely that a full-scale improvement plan could be realized in short order. Also, the implementation plan should consider the benefit cost comparison of increasing the volume of product that the port can handle. For example, the following list shows a potential combination of enhancements and the suggested timeframe for implementation

Short Term

In the short term, the **Edgewater Yard Alternative** (Alternative 5) could be implemented if opportunities could be found at future renegotiation points with NSR and NCRR to allow for the segmented operation as previously described. This could accomplish the desired reduction in conflicts between trains and automobiles along the median running track portion of US 70 in Morehead City through the scheduling of trains shuttling cars between the proposed Edgewater Yard and the Port at times when highway traffic is minimal.

Long Term – Conventional Port Volumes

The **New Bern Bypass Alternative** (Alternative 3) would reduce conflicts between trains and automobiles caused by the location of the street-running track through the heart of New Bern.

The **GTP Connection Alternative** (Alternative 1) could potentially provide the facility with a second "originating railroad" through the new connection to CSX. It is yet to be seen if such a connection would actually improve rail service and reduce rail transportation rates at the Global TransPark, as this is a low level branch line for CSXT with multiple switching moves from the main "A Line" at Rocky Mount.

Long Term – High Growth Port Volumes

In the long term, if cargo volumes handled by the port increase significantly, then the recommended potential approach could be to build the **Morehead City Bypass Alternative** (Alternative 8).

The **Morehead City Bypass Alternative** (Alternative 8) has the potential to greatly expand port cargo volumes if an intermodal shipping container facility were built along its route.

Table 1: Estimated Lengths and Construction Costs for Alternatives based on PMC growth

Alternative	Length (mi)	Cost
Short Term Alternatives		
Edgewater Yard (Alt 5) *Provides a new transfer yard on the NCRR corridor in Morehead City just beyond the median running section at "Edgewater." (Segment B)*	1.39	$ 11 million
Long Term Moderate Growth		
GTP Connection (Alt 1) *Provides a new connection from the Global TransPark to CSXT's Parmele Subdivision. (Segment J)*	5.63	$ 28 million
New Bern Bypass (Alt 3) *Provides a bypass to the southwest of New Bern that avoids street interference and typical urban impact and allows for abandonment of current bridge. (Segments F and I)*	21.49	$ 345 million
Total	27.12	$ 373 million
Long Term High Growth		
Morehead City Bypass (Alt 8) *Provides a bypass around Morehead City to avoid the median running section, but will require mitigations along the bypass corridor in Beaufort. (Segment A)*	22.75	$ 240 million

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1. Introduction

This study was requested by the North Carolina Department of Transportation (NCDOT) to evaluate potential rail and port infrastructure changes that would (1) improve rail access to the Morehead City port and (2) reduce or eliminate conflicts between those rail operations and street traffic along Hancock Street in New Bern and US 70 in Morehead City. The study consists of three parts (A) potential improvements to the port, (B) potential rail enhancements in the New Bern and Global TransPark area, and (C) potential improvements in the Morehead City area.

Since its beginnings, North Carolina has relied upon its waterways, both ocean routes and local rivers, for the movement of goods and people throughout the State. As the United States transitioned from a largely domestic economy to being an international importer and exporter of goods and services, the country's dependence on coastal ports like the Port of Morehead City increased. Also, recent decades have witnessed a rapid population growth in the State's interior (especially along the North Carolina Railroad (NCRR) corridor). Combined, these changes highlight the increasing importance of the State's rail and road connections to coastal ports.

The Port of Morehead City was first established in the 1850's with the construction of a pier, warehouse, and railroad facilities. The role of state government in the operation and oversight of the seaports began in 1945 when the State legislature created the North Carolina State Ports Authority (NCSPA). The Authority's purpose was to create two ports that would promote the growth of the State's commerce and industry. Completed in 1952, the Port of Morehead City facilities are predominantly geared to receive smaller bulk and break-bulk vessels, and are unable to receive or service larger vessels or other cargo types. However, the Port of Morehead City, being located between competing and increasingly congested ports in Virginia and South Carolina makes North Carolina's assets more attractive. Shifting trade due to labor disputes on the west coast, cargo delays near major population centers, and the Panama Canal expansion all highlight the opportunities that exist in the marketplace for a modern, efficient, and responsive container terminal.

On the land side, the Norfolk Southern Railway (NSR) operating via long term lease over the North Carolina Railroad Company corridor (of which 100% of the stock in the company is owned by the State of North Carolina) serves the port via a line from Raleigh. The Carolina Coastal Railway (CLNA) handles local switching of rail cars within the Port of Morehead City terminal. Trucking companies serve the port, but the travel to major population centers requires them to pass through numerous signalized intersections before reaching the interstate system. Therefore, if the rail access to the port and throughout the region can be made more efficient, the cost to move certain commodities through the port could decrease, and the frequency of goods handled by the port could increase.

To compete effectively in today's global marketplace, the seaports of North Carolina and their associated inland transportation networks must offer businesses reliability, ease of use, quick

turnaround, rapid access to deeper inland population centers, and unique value over other regional ports. Development of high capacity intermodal rail operations and enhancement of the existing regional railroad network will strongly position the Port of Morehead City to capture new maritime trade opportunities.

Study Area

This feasibility study will focus on the Global TransPark to the Port of Morehead City (GTP2MHC) Mobility Corridor and the supporting rail network from Kinston in Lenoir County to the Port of Morehead City in Carteret County. In addition, a potential barge service from the Port of Morehead City is discussed. The study also includes the multimodal network that supports the Port of Morehead City, including rail bypasses and spurs and other key linkages that support the movement of goods to and from the port.

Figure 3: Railroad Study Area with Route Alternatives

Proposed Segment J
Proposed Segment I
Proposed Segment H
Proposed Segment F
Proposed Segment G
Proposed Segment B
Proposed Segment A
Proposed Segment C
Proposed Highway Alignment

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- Proposed Segment J
- Municipal Boundary

Purpose and Scope

US 70 between Raleigh and Morehead City, when combined with the North Carolina Railroad (NCRR), forms a key component of the state's transportation system, and has been designated by the State as a Strategic Transportation Corridor (STC). The State's STCs must operate well to help North Carolina attract new businesses and catalyze economic development. The US 70 STC is slated for improvements that would create a limited access freeway, with bypasses at Havelock, Goldsboro, Kinston, and North Carteret, and the replacement of the Grayden Paul drawbridge in Beaufort. It has also been officially designated as a future interstate.

The purpose of this study is to suggest potential railroad and port enhancements to improve mobility within the US 70 STC, specifically the furthering of a Mobility Corridor in the study area from the Global TransPark at Kinston, through New Bern, to the Port of Morehead City and Radio Island. Possible railroad enhancements studied include potential railroad bypasses for New Bern and Morehead City. Alternatives for port improvements, including operational efficiencies, and a new port layout for Radio Island and a potential barge service were also developed.

Pursuant to North Carolina Senate Bill 402, Section 34.23, NCDOT was charged in 2013 with studying the feasibility of infrastructure and access improvements for the Global TransPark and the Port of Morehead City. As part of the study, NCDOT was directed to evaluate infrastructure improvements to the Global TransPark, along with financial feasibility analyses for those infrastructure improvements. In addition, NCDOT was to assess highway and rail infrastructure improvements that improve access to the Global TransPark and the port. NCDOT has been studying highway improvements within the study area extensively. This report will not repeat those previous studies completed or currently underway, but will offer additional perspectives for integrated rail and port improvements that will coordinate with other alternatives for moving freight to and from the Port of Morehead City utilizing multimodal infrastructure.

2. Existing Conditions

Global TransPark to Port of Morehead City Mobility Corridor

The NCDOT Strategic Transportation Corridors Plan recommends that US 70 function as a freeway between Raleigh and Morehead City. The US 70 Corridor Commission's long range vision is to upgrade US 70 to interstate status and to enhance safety, mobility, and economic vitality. Recent feasibility studies have considered improving US 70 through James City (just east of New Bern) by replacing key intersections with interchanges to upgrade segments to freeway standards as well as identifying potential realignments between the existing US 17 Bypass and the proposed US 70 Havelock Bypass. The numerous (172) at-grade crossings within the study area also pose operational and maintenance challenges to maintain safety.

Rail Services in the Corridor

Beginning from the west, the focus area begins at the Global TransPark north of the City of Kinston and follows the NCRR corridor east through a small section into Jones County and then into Craven County through Dover, Cove City, and Tuscarora to New Bern and Havelock. The railroad continues east into Morehead City to the Port of Morehead City and its supporting facility across the Newport River, Radio Island.

The NCRR mainline, operated by NSR, between the Global TransPark and the Port of Morehead City consists mostly of a single track of continuously welded rail on timber ties. In this stretch of track, there are a total of 16 active industrial tracks emanating from the NSR main track. A 7-track yard is located at New Bern, a 3-track yard is located near the west end of Morehead City, and an 8-track yard that serves the port is located at Morehead City.

Global TransPark

The North Carolina Global TransPark is a 2,500-acre multimodal industrial/airport site in Kinston, North Carolina. In 1991, the General Assembly formed the Global TransPark Authority to improve the economy of eastern North Carolina by creating a multimodal industrial/airport site, offering industries access to air, rail, highways, and connections to North Carolina's two international ports. The Global TransPark is part of an economic development initiative intended to spur transition in the region from an agricultural base to one of skilled labor and industrial manufacturing.

Designated as a Foreign Trade Zone (FTZ 214), the park is centrally located on the mid-Atlantic seaboard between North Carolina's military installations, with Seymour Johnson AFB to the west, Cherry Point Marine Corps Air Station (MCAS) to the east, Camp Lejeune to the south and the U.S. Coast Guard Air Station in Elizabeth City to the north. The airport runway, at 11,500 feet, is one of the longest commercial runways in the State.

Figure 4: Global TransPark at Kinston, NC

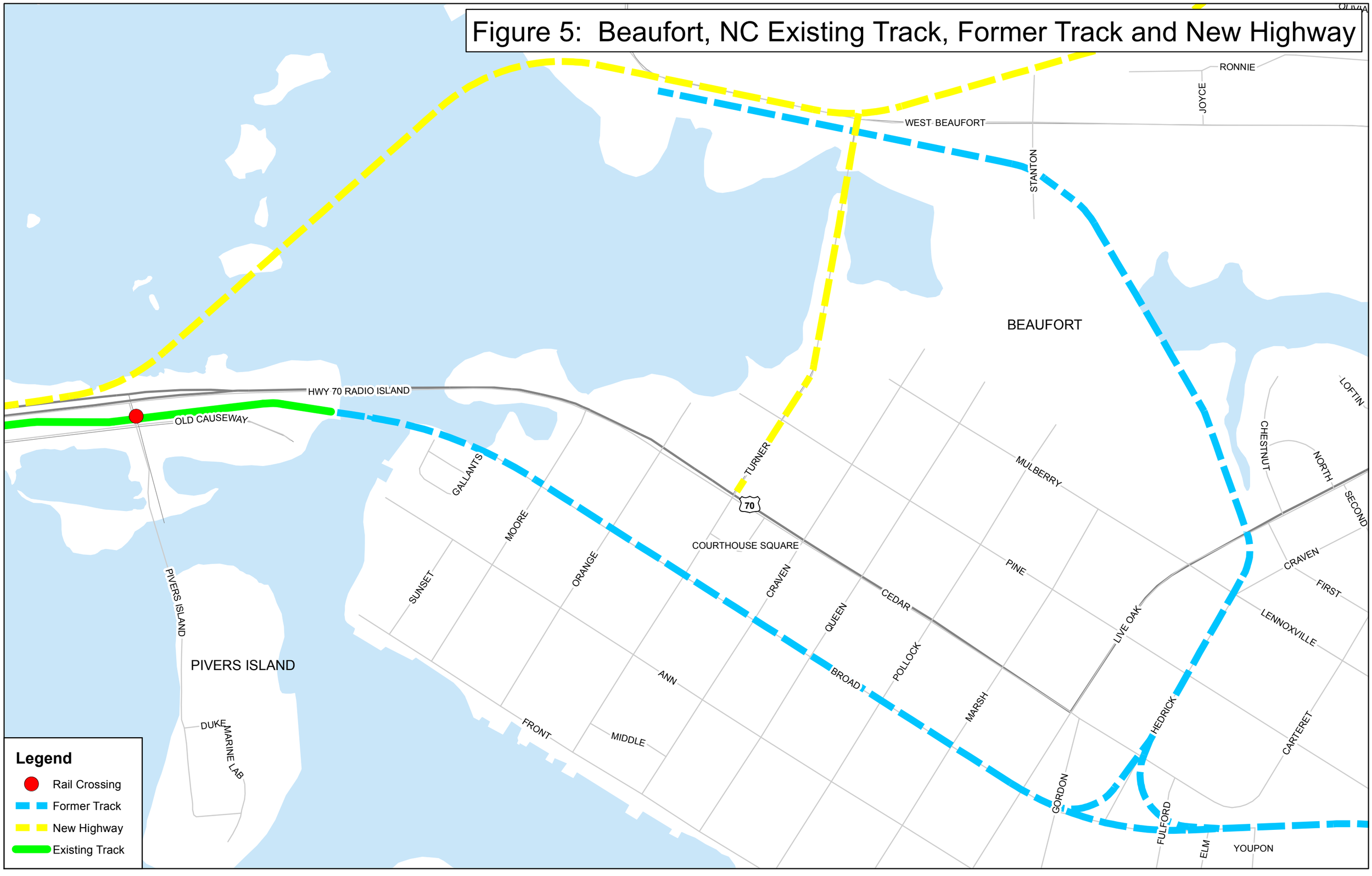
The rail access to the Global TransPark is currently provided by a single stub-ended industrial lead track connected at its southern end to the NSR/NCRR Railroad. The track was constructed by NCDOT in 2012 and is in excellent condition. It is owned by NCDOT and leased to the Gulf and Ohio Railway.

Beaufort

The Town of Beaufort, Carteret's county seat, is the third oldest town in North Carolina. Located on Beaufort Inlet, the fishing industry has been an important part of Beaufort's history. To the west is the tidal Newport River, separating Beaufort from Morehead City and to the east is the North River, another tidal river. US 70 passes through Beaufort, leading west across the Newport River to Morehead City and northeast to its end in the Town of Atlantic.

The Town of Beaufort was formerly served by the Beaufort & Morehead Railroad, which traveled eastward from Radio Island to Lennoxville and also to the Beaufort-Morehead City Airport. In the 1990's all of the trackage east of the bridge over Gallants Channel on the east side of Radio Island was abandoned, and the bridge was removed.

Figure 5: Beaufort, NC Existing Track, Former Track and New Highway

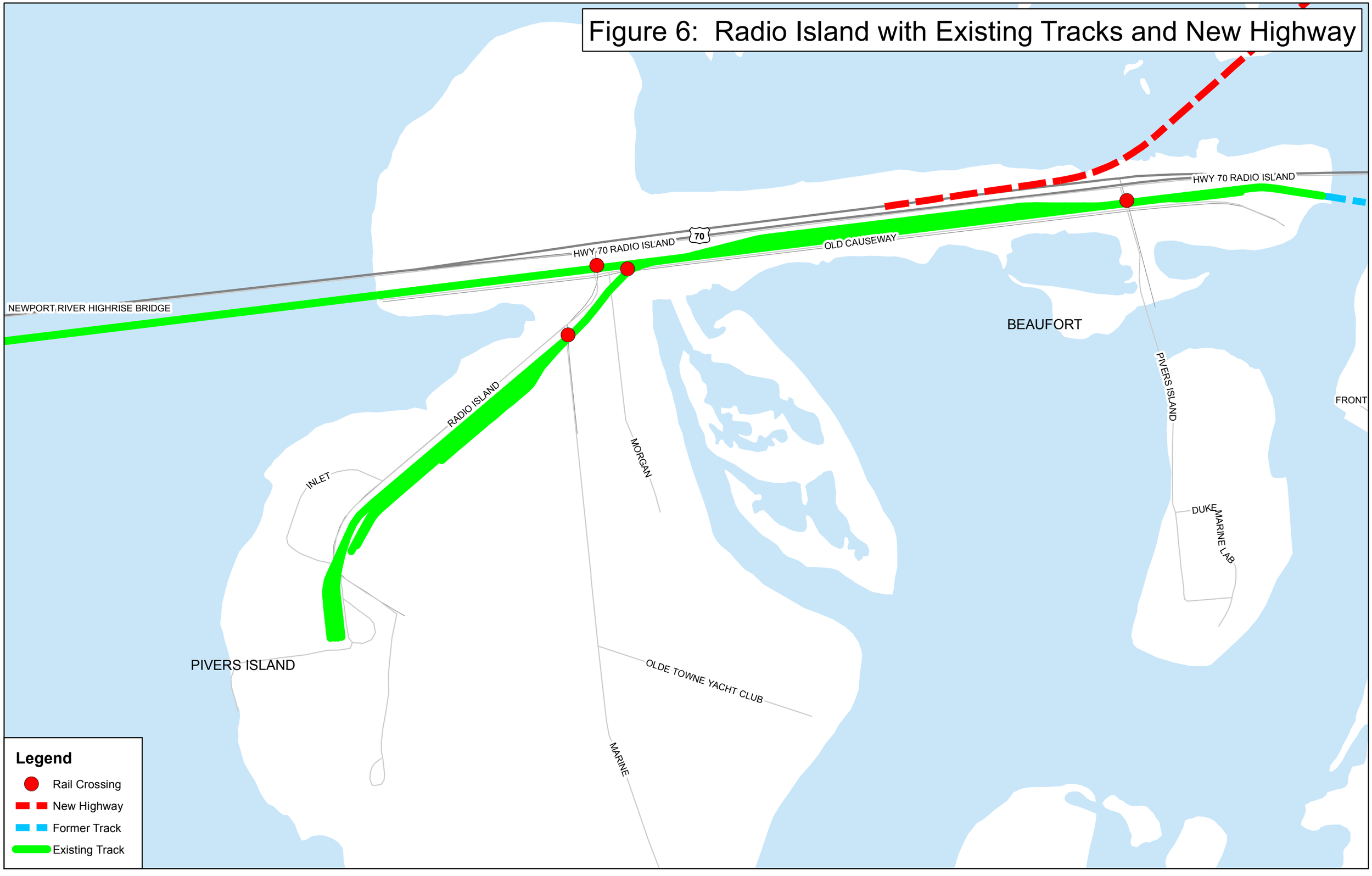


Radio Island

Radio Island, located across the Newport River from the Port of Morehead City, has been identified as an expansion area for the port. Radio Island currently has two liquids berths and is accessible by road and rail. Radio Island includes 183 acres suitable for port industrial development complete with municipal water and sewer. Currently, the port stores empty rail cars and stockpiles for exports on Radio Island. In addition, the military utilizes Radio Island for loading and unloading naval ships and servicing MCAS Cherry Point. The island also has private residential dwellings and US Navy recreational facilities.

Major roadways include US 70, Old Causeway Road (SR 1205), Radio Island Road (SR 1175), Morgan Street, and Marine Drive. US 70 is a two to four-lane divided major thoroughfare near Radio Island. The existing roadway drawbridge over Gallant's Channel (east of Radio Island) is in the process of being removed and replaced by a multilane facility from Radio Island to Olga Road (SR 1429) in Beaufort, North Carolina.

Figure 6: Radio Island with Existing Tracks and New Highway



Morehead City

During the early 1700s, settlement began in present day Carteret County and Morehead City. In the mid-nineteenth century, John Morehead, the twentieth Governor of North Carolina, helped to establish the port city. In addition, the North Carolina Legislature provided partial funding for railroad construction across the State including construction east of Raleigh to the port. Morehead City grew because the port and Pier 1 were built at Shepard Point, where the Newport River was eighteen to twenty feet deep and had a mile-wide channel.

The port and railroad were not the only contributing factors to growth in Morehead City. Recreational amenities, the shore line, and bountiful fishing have attracted visitors and residents. The area has become a popular vacation spot on the Atlantic coast; therefore, the benefits gained in mobility improvements must be weighed against the effects to the community.

Morehead City first had railroad service in 1858 with the completion of the Atlantic & North Carolina Railroad from Goldsboro (later the NCRR). Currently, the rail line from Goldsboro to Morehead City is owned by the NCRR and is operated by NSR. The Carolina Coastal Railway (CLNA) took over railroad switching services for the Port of Morehead City in 2010, covering the trackage between Morehead City and Radio Island.

Figure 7A: Morehead City Existing Track

MANDY
JUSTIN
WORTH
PLANTATION
NORTH FORTY
GARDEN
OLD GATE
WAGON
NORTH GATE
BROOK
PENNY
GALANTIS
JOHN PLATT
35TH
EATON
ASBY
MAPLE
KENZIE
ELM
COMMERCE
SYMI
MEDICAL PARK
PROFESSIONAL
PINE
GUARDIAN
BRIDGES
MCKNIGHT
BARBOUR
CHURCH
MYRTLE
WALDRON
HARRELL
HAMILTON
EMELINE
MORRIS
CHRISTO
DAVIS
CALAMANDA
YAUPON
CALICO
FERABEE
20TH
AVERY
26TH
25TH
BAY
23RD
22ND
FISHER
21ST
24TH
PINEY PARK
28TH
ARVON
HOMES
FULCHER
27TH
MOREHEAD CITY
(WEST)
BALD
NOYES
GLENN
BONNER
ABBOTT MORRIS
GUTHRIE
CRYSTAL OAKS
TAYLOR
ARENDELL
70
34TH
33RD
32ND
30TH
29TH
EVANS
SUNSET
SOUTH
BANKS
COLLEGE
ATLANTIC BEACH BRIDGE
EVANS
19TH
18TH
SHEPARD
SHACKLEFORD

Legend

- Rail Crossing
- Existing Track

Figure 7B: Morehead City Existing Track

CALAMANDA
CALICO
EDGEWATER
AVERY
BAY
FISHER
BRIDGES
ARENDELL
EVANS
SHEPARD
SHACKLEFORD
PATTERSON
17TH
16TH
15TH
14TH
13TH
12TH
11TH
10TH
9TH
8TH
7TH
6TH
5TH
4TH
3RD
18TH
MOREHEAD CITY
(EAST)
70
RADIO ISLAND
ARENDELL
PORT TERMINAL
NEWPORT RIVER HIGHRISE BRIDGE
HWY 70 RAD

Legend

- Rail Crossing
- Existing Track

3. Freight and Port Operations in the Study Area

Overview

Owned and operated by the NCSPA, the Port of Morehead City is strategically located along the eastern seaboard between major population centers with access to Interstates 95 and 40 via US 17 and US 70 as well as train service from NSR/NCRR and a terminal switching railroad operated by CLNA.

The Port of Morehead City is located four miles from the Atlantic Ocean and, with a 45-foot navigational channel, is one of the deepest ports on the US East Coast. This combination of features makes the port highly attractive to shippers wanting to get large ships in and out of port quickly. By comparison, Charleston, SC is approximately 10 miles, Hampton Roads, VA is 18 miles, and Wilmington, NC is 26 miles from open sea.

The Port of Morehead City handles both breakbulk and bulk cargo across its 5,500 feet of wharf frontage, which is divided into nine berths. It is the second largest importer of natural rubber in the country and a leading exporter of phosphate (source: NC Ports website).

The Port of Morehead City features a dry-bulk facility with a 225,000-ton capacity warehouse and nine acres of open bulk storage. A 177,000-square foot warehouse is available to house large shipments. The Port is a Customs Trade Partnership Against Terrorism (C-TPAT) certified location and is designated as a Foreign Trade Zone (FTZ 214).

These facilities are serviced by a variety of material handling equipment including a multi-purpose gantry crane for bulk, breakbulk, or containers, two 115-ton-capacity gantry cranes, one 125-ton mobile harbor crane, one dry bulk shiploader with maximum loadout rate of 3,000 tons per hour, and 39 lift trucks each with a capacity of 70,000 pounds. Rail access is available to berths, transit sheds, warehouses, and open storage.

The Port of Morehead City also has a large amount of undeveloped land on Radio Island, located east of the existing port. Radio Island currently has 183 acres available for development, mostly along the southwest ship channel side. Rail access to the island is provided by a bridge over the Newport River leading to a series of sidings. No direct access from the main line into the development area exists, nor is there an eastward railroad exit from the island. Additionally, residential development and a park occupy the northern portions of the island and along the railroad siding areas.

Economic Outlook

In general, ports across the US are experiencing increases in both container and bulk volumes, stable pricing, and decreases in operating expenses. These trends are anticipated to continue into the near future. The NCSPA aims to capitalize on these trends and desires to reach an excess of one million

twenty-foot equivalent unit (TEU) throughput at the Port of Morehead City per year. Table 2 displays TEU trends at ports across the country.

Table 2: US Ports and Twenty-foot Equivalent Unit (TEU) Trends

US Port	2010 TEUs	2011 TEUs	2012 TEUs	2013 TEUs	2014 TEUs	2015 (Jan-Aug 26) TEUs
Los Angeles, CA	4,067,182	4,129,651	4,093,873	3,967,389	4,271,199	2,628,302
Long Beach, CA	3,134,900	3,071,402	2,994,740	3,455,749	3,537,427	2,257,029
New York/ Newark	2,666,997	2,731,147	2,768,596	2,787,504	2,970,551	2,110,428
Savannah, GA	1,084,960	1,095,357	1,0932,70	1,157,180	1,355,457	1,076,114
Norfolk/Newport News, VA	737,215	741,842	816,688	902,075	981,097	681,364
Houston, TX	575,728	594,356	630,786	681,703	769,171	584,642
Tacoma, WA	483,344	485,557	624,215	723,899	821,304	551,456
Charleston, SC	565,663	600,424	643,662	657,876	748,146	545,079
Oakland, CA	778,022	778,671	761,389	780,291	821,080	528,069
Seattle, WA	946,005	806,756	758,884	571,955	458,328	324,496

The continued global economic recovery expected over the next several years and the NCSPA's market share, market position, and long-term growth expectations are considered sustainable as they are driven by a number of domestic port operating conditions. For example, the continued long-term growth outlook for US East Coast freight volumes associated with both increased world trade and the repositioning of cargo volumes from the West Coast due to congestion, capacity, and operational limitations at those facilities is one factor. Second, increases in the North-South container trade and transshipment opportunities. And third, the shift of resources to container operations in competing East Coast ports to the North and South.

In keeping with established business planning processes, the Authority continually updates its strategic business plan along with long-range market, financial, and corresponding capital infrastructure plans. Terminal improvements and equipment needs are identified and programmed to meet anticipated market growth requirements. Growth expectations are adjusted for both long-term and short-term economic impacts, such as recessions. Expenditures are focused on the expansion, purchase and maintenance of equipment and facilities at the Port of Wilmington and Port of Morehead City.

Since fiscal year 2005, the Authority has assertively worked to rehabilitate and expand its facilities, investing approximately $199.5 million in equipment and infrastructure, including new container cranes and construction of a new warehouse facility. During the current fiscal year (ending June 30, 2015) $3.6

million was transferred out of construction in progress to depreciable capital assets, related mostly to enhancing aging infrastructure and updating IT systems.

Capital investment for the upcoming fiscal year (ending June 30, 2016) is anticipated to increase significantly due to berth structure and rail infrastructure improvements, and is projected at approximately $13 million. Funding for these expenditures will be accomplished, as in recent years, by a combination of State and federal grants, private capital, reserves, and internal cash flows.

With recent global economic downturns, international trade has seen some of the deepest reductions ever posted. This has had a notable effect on the Authority's cargo volumes. However, global and regional recovery is underway and trade volume is anticipated to return to and exceed traditional levels in the coming years.

Growth in cargo movement activity, as reported in the Authority's fiscal year 2016 operating budget, assumes a 7% increase in container activity as well as new bulk business and growth in breakbulk activities at both the Port of Wilmington and the Port of Morehead City. As a result of these growth projections, the Authority is anticipating that utilization at its existing facilities will improve, thus raising operating profitability.

Radio Island's Plan Forward

NCSPA has determined that the development of Radio Island as a container terminal is beneficial to the Port and the economic growth of the region. However, there may be challenges to the plan, some of which will require uncommon approaches to overcome.

Typically, container terminals function by having container vessels bring in the containers, then cranes remove the containers and hostler trucks with container chassis move them to temporary storage, followed by having an over-the-road truck with an order enter the port to collect the container on a chassis and depart towards their destination. There are some variations on this model; however, they are mainly focused on automation. This study will focus on elements of this model as the basis of discussion.

It is believed that the available acreage on Radio Island can physically support a railroad-centric container terminal capable of throughput in excess of one million Twenty-foot Equivalent Unit (TEU) per year, provided the items listed in the sections below are addressed. Some realignment of the connection to the existing railroad line may be necessary to achieve this design.

Waterway Infrastructure

Excluding market forces, shipping lines seek several key elements when selecting a port of call. Adequate water depth for their vessel, simple and short travel from sea to berth, no wait for berth space, favorable mooring conditions, rapid and efficient service at berth, sufficient yard capacity to receive cargo, and a robust transportation network enabling goods to quickly reach large inland

population centers are all factors that shippers desire. The physical geography of the Radio Island site satisfies many of these needs or simplifies their accomplishment.

The distance from the Port at Morehead City to deep water is one of the shortest for ports along the Atlantic coast and mild currents make a "quick in and quick out" very possible. The current depth at mean low water of 45 feet is considered the current industry minimum. But, New Panamax (NPx), post-expansion Panamax vessels with a capacity of 12,000 TEU vessels are being designed for a maximum draft of 50 feet. Therefore, deepening to 52 feet would be preferable to shippers. This challenge is being seen throughout the eastern United States as ports attempt to prepare for the coming changes in vessels. However, while some ports are dealing with 30 to 80 miles of channel and the staggering associated cost of increasing channel depths for such distances, the Port of Morehead City enjoys the advantage of shorter distance to open water.

The ship channel is prone to heavy shoaling which can greatly reduce the navigable water depth. Maintaining proper channel depth is paramount and it is recommended that a detailed study of the harbor, channel, and Beaufort Inlet's morphology, sedimentation, and costal processes, be conducted independent from the USACE studies. This additional study should include the development of best value dredging practices tailored to meet the long term goals of the Port of Morehead City. Additionally, a vessel navigation and impact study should be conducted to ensure that safe maneuvering and safe turning can be performed given the basin constraints, and that new vessels do not cause surges which negatively impact existing berths or the environment.

Land Transport Infrastructure

The introduction of over one million TEU to the existing transportation network is not considered feasible at the current time due to the existing road and rail infrastructure and the distance from high volume transportation corridors. NCDOT has proposed that 80% or more of any Radio Island container traffic be carried via rail. The study team concurs with this approach, and sees high volume rail as one of the only ways the Port of Morehead City and Radio Island could be a viable and attractive container port. However, it is estimated that the intermodal yard would, on average, assuming a 5-day week, exchange three loaded 11,000-ft unit-trains per day to meet this demand throughput goal, and more during peak periods. Along the route between Morehead City and Raleigh, sidings could be extended to 12,500-ft without major disruptions to the highway network, such as the 8,900-ft siding at Pine Level, and the 10,100-ft Powhatan Siding, in order to allow for passing of the 11,000-ft trains.

To supply and hold the necessary rail cars, a dedicated siding having approximately 20,000 feet of track could be built near Radio Island. Figure 8 provides a conceptual location for such a track. Since Radio Island does not have sufficient length to hold a fully assembled unit-train, significant switching efforts will be required. This can be done by shuttling the smaller 3,500-ft car blocks to a nearby rail yard facility and assembling into trains there. But, this will increase the time and labor necessary to construct the unit-train and increase the frequency with which the community will interface with the shorter trains.

Another alternative is to construct sufficient parallel track to the main line so that the unit-train can be assembled on site and not interfere with the main line.

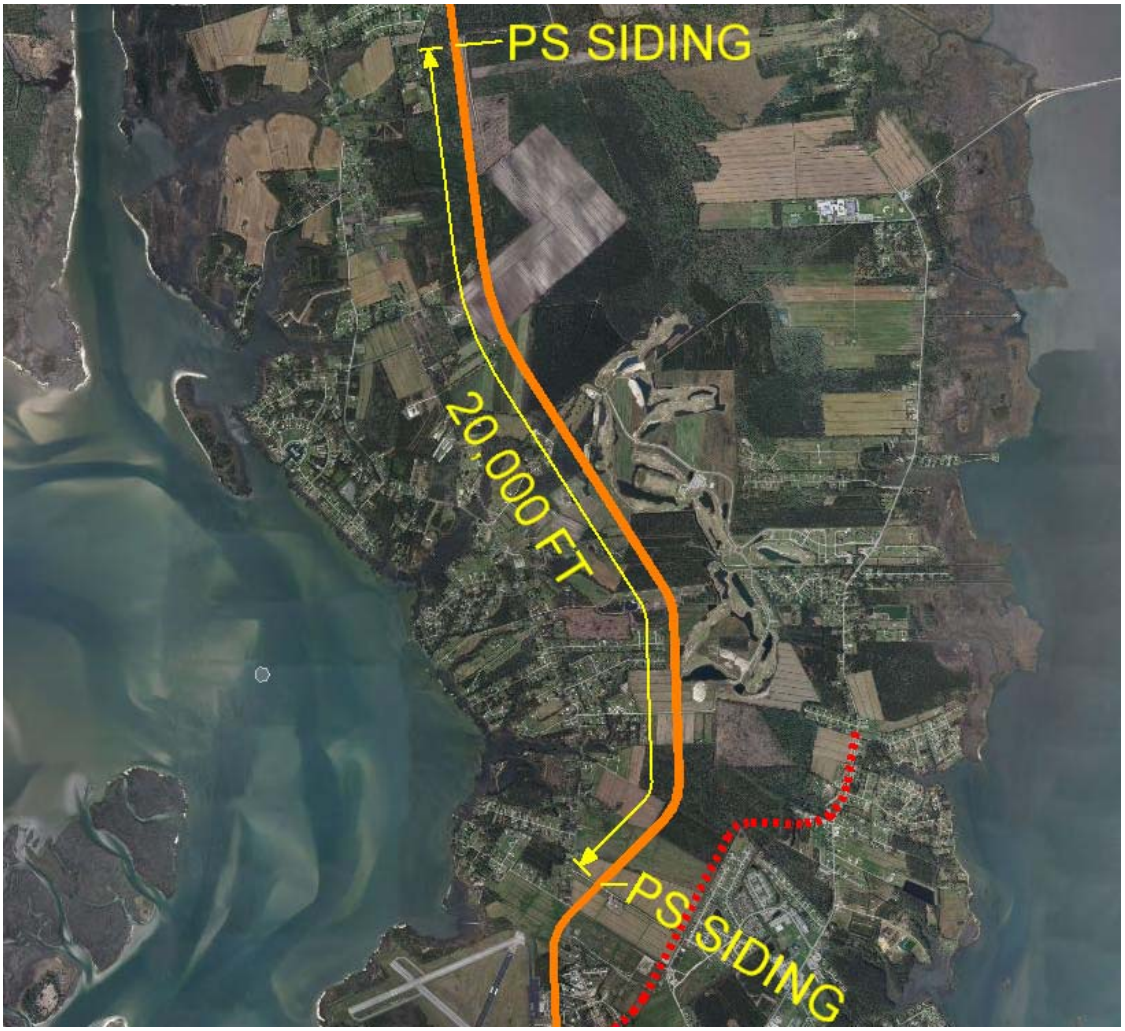


Figure 8: Potential Location of 20,000-ft Long Passing Siding along Proposed Track Segment "A"

The existing light industrial and medium density residential land uses located at what would become the main high-volume rail entrance to the port complicate the issue. The existing track on Radio Island was built to minimum railroad engineering standards and, as such, is not well-suited for usage by modern intermodal trains. It is recommended that the sections with sharp horizontal curves, such as the one located at the entrance to Radio Island, be reconstructed. In order to bring the trackage up to current standards, one of the buildings located at the entrance to Radio Island will likely be impacted.

With 80% of the throughput being transported by rail, there is still a significant volume that must be shipped by road. Due to the constricted nature of the port entrance and the mainline track, the

construction of overpass bridge(s) from US 70 would be required, and should be combined with the current efforts to upgrade and widen the Newport River Bridge. The configuration and directions serviced by the overpasses will require additional study and must be linked with the design of the gate system to ensure sufficient truck queuing without interfering with highway traffic.

The increase in truck traffic will accelerate the degradation of US 70 and considerably shorten its lifespan. For the general pavement section, this can be handled relatively simply, but this may not be the case for the causeway bridges both east and west of Radio Island. The design and physical conditions of these bridges will require special investigation.

An alternative to offset a portion of the truck traffic is to encourage the development of an intrastate short-sea container barge. This would allow 80 TEU or so to be shipped directly to places like Belhaven or New Bern. And if properly configured, the facility and equipment requirements could be quite minimal. Other types of barge services could be developed to specifically service the rail industry but their infrastructure requirements are more extensive. However, such movements are an exception to industry practices and will result in higher labor and transport costs. To date, these alternatives have not been practiced in coastal NC.

Figure 9: Example of barge service transporting containers

Figure 10: Example of rail car barge

Figure 11: Example of rail car ferry (two levels)

Port Infrastructure

This study proposes that the area available on Radio Island is sufficient to physically support a railroad-centric container terminal capable of throughput in excess of one million TEU per year. Before discussing the proposed port layout, it is imperative to understand that the proposed throughput will only be realized through thoughtful utilization of operational opportunities available only to this type of port and can be further accentuated by careful negotiation and coordination with the railroad(s) and shipper(s) and collaboration and communications with the communities.

Operational Efficiency

Rail-centric ports can realize phenomenal throughput due to their limitation of disruptive elements. In a traditional container terminal, the source of least efficiency is the introduction of the "non-port" trucker to the terminal either delivering or collecting a load. This is commonly the result of unfamiliarity with the security, gates, travel routes, equipment interface, etc. All these elements result in longer dwell times and lower moves per hour on high-value equipment. In a rail-centric port, most movements are done by the operator's staff who are knowledgeable, acclimated, and likely vested in the success of the terminal. To the extent possible, the more the external factors are limited on the terminal, the higher the productivity.

For a terminal of this size and proposed throughput, it is assumed that all container yard, vessel loading, and rail loading is handled by a single terminal operator. While this study proposes two main berths, the acreage available would be severely compromised if multiple gates and separated yards were required. However, given the highly desirable location of the terminal and the potential throughput, NCSPA could consider a multi-carrier alliance or a specialist operator. Such entities specialize in operating efficient terminals for multiple shipping lines which can increase competition and provide a buffer against the economic challenges a single shipping line operator might encounter. Many port authorities employ this method across the US, allowing the authority to own the land and equipment but permitting a variety of business arrangements and operational models. These key business decisions as well as the structure of the rail operations will be essential to improve the foundations of the port's business model and the possible throughput.

At the heart of a rail-centric port is, of course, the rail. The number of rail companies involved both aids and hinders productivity. The aid is through increased competition for rates which the individual container client and the shipper should realize in lower cost. The hindrance can come through more complex rail loadout requirements. The most productive rail-centric ports are the result of a partnership between one shipping line and one rail operator. The efficiency mainly being recognized in container placement on the out-bound side of operations, as the containers need only be segregated on the basis of regional destination. For example, all containers from the vessel bound for Atlanta are stacked separate from those bound for Chicago. Individual container matching with particular trucks is not the concern of the port terminal staff but will be handled later at the inland port destination. This results in very rapid loading of unit trains as a segment of cars need only be designated to match their combined destination. When a second or third rail carrier is introduced, this efficiency is reduced if there is not sufficient grounded container storage to affect a similar segregation for each carrier. Additionally, the yard staff unloading the vessels will realize lower efficiency due to the increased complexity.

Case Studies

Two case studies that should be considered are the Fairview Container Terminal in Prince Rupert, British Columbia (BC) Canada and Delta Port in Delta, BC Canada. Fairview Container Terminal has the

streamlined partnership of DP World (port operator), Canadian National Railway (CN) the rail operator, and numerous shipping lines. It has seen tremendous throughput on what is a single berth, small acreage terminal, using only container handling top-pick trucks, and almost 100% rail throughput; maximizing all the elements discussed above to their fullest potential.

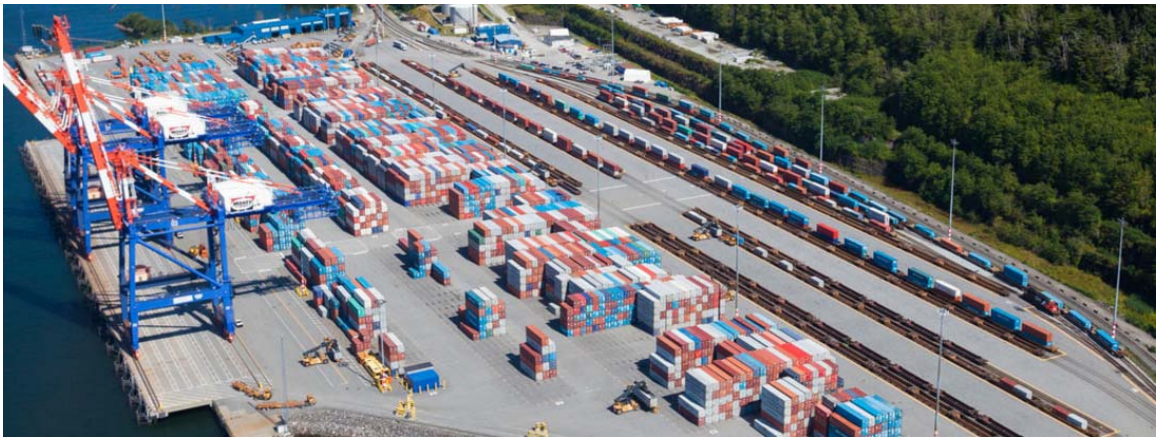


Figure 12: Fairview Container Terminal Layout at Prince Rupert, BC

Likewise, Delta Port in Delta, BC Canada is the partnership of Global Container Terminals (port operator), CN & Canadian Pacific Railway (rail operators) and numerous shipping lines and has been very successful. Unlike Prince Rupert, there is still considerable truck traffic to and from the terminal due to its proximity to the large population center of Vancouver, Canada. However, at Delta Port, CN has upgraded their infrastructure to allow for the construction of extremely long unit trains.

The Prince Rupert case study demonstrates that a rail specific port can operate efficiently when the terminal operator and rail line coordinate movement of freight to specific locations and if the rail operator considers the port as a key point on their systems and part of their core business strategy. The segregation of cargo is simplified on the port side of the freight movement. All freight designated for a specific destination is loaded onto the unit train without having to sort the boxes, and sorting is facilitated at the destination. This simplifies and speeds up the operations at the port facility. Delta Port is similar, but includes a greater level of truck movement from the port.

Figure 13: Delta Port (Vancouver, BC) Layout

Terminal Layout

The following description is a terminal that could be capable of 1.4 million TEU (±300,000 TEU) provided the above operational modifications are incorporated. The terminal is divided into five distinct areas: Administration, Berth, Container Yard, Intermodal Yard, and Maintenance & Repair. Procurement of the container handling equipment will likely be one of the largest cost items on the project; however, significant efficiency and maintenance savings can be captured though proper specification and oversight during design and fabrication.

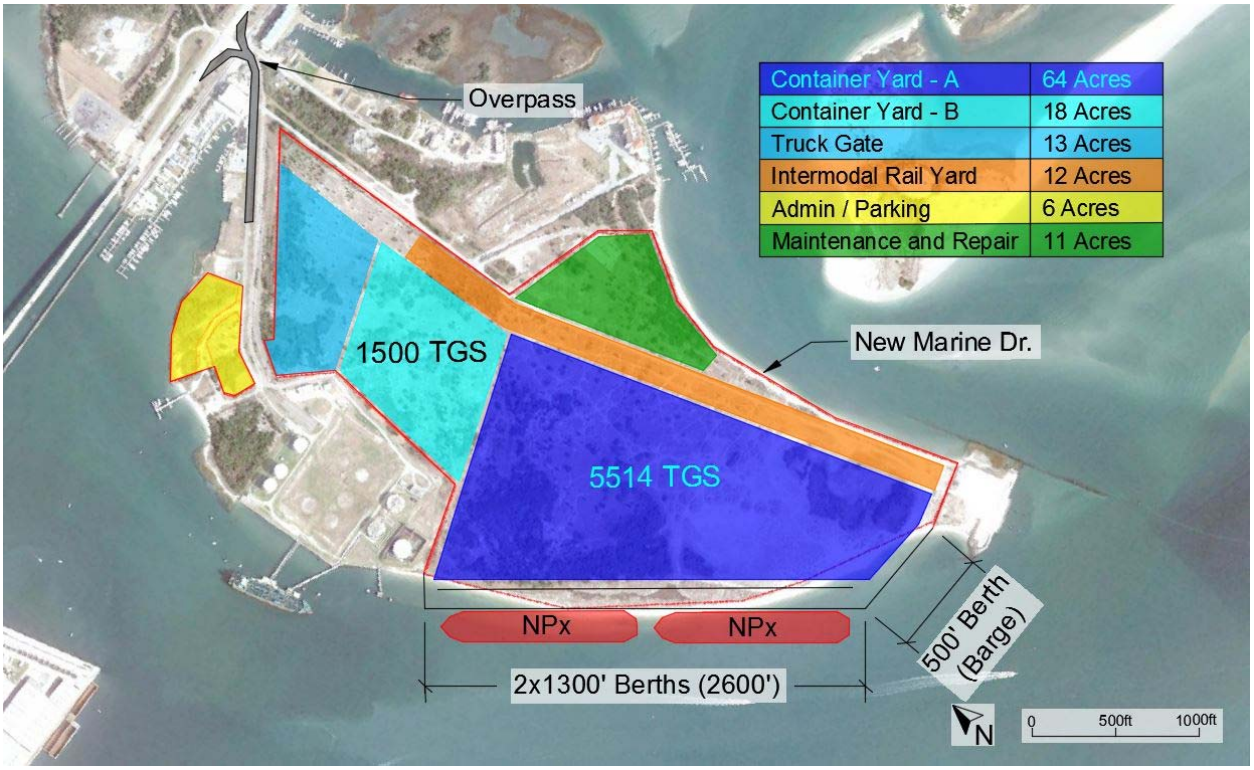


Figure 14: Potential Radio Island layout

Waterfront Berths

Two wharves have been considered for the development of Radio Island. The primary wharf would be a 2,600-ft continuous structure, divided into two 1,300-ft berths, each capable of servicing an NPx vessel. These berths would include modern service features such as eight or more super-post Panamax 100-ft gauge all electric container cranes, crane hurricane stowage equipment, cable reel power and communication system in a cable trough, alternative marine power for “cold-ironing” of vessels, vessel water supply, high performance rubber fenders with panel faces, high strength bollards, maintenance vehicle lane between waterside crane rail and berth face, high mast lighting along the back of the berth apron, and possibly direct on dock rail. Direct on dock rail would not be intended for loading containers but special cargoes. This would add considerable complication to the facility and would be counter to the container-dedicated nature of the terminal.

The secondary wharf would be intended for container barge traffic. This berth would include much less infrastructure and would likely be designed to allow loading and unloading of barges using reachstacker container handlers, depending on the nature of the barge service. In some locations, the container handling equipment is loaded onto the barge to facilitate unloading at the destination. The marginal wharf would require a robust pavement or deck structure, mooring bollards, and a fender system that would accommodate barges but not hinder equipment operations.

Container Yard

To facilitate higher throughputs, high density stacking will be required. The yard would need to utilize rubber tired gantry (RTG) cranes in a "one over five" (stacked) by six stacks wide configuration. This would provide Yard A with 5,514 twenty-foot grounded slots (TGS). The alignment of the stacks would be parallel to the wharf, as shown in Figure 14. Yard B would provide 1,500 TGS. The features of the yards can vary considerably depending upon how the RTGs are configured (all-electric cable reel, bus-bar or diesel), how the RTG fleet is to be utilized (move between rows as demand dictates, or have a dedicated quantity for each row), and how traffic flow is designed to move through the facility.

Intermodal Yard

The heart of the facility will be six parallel stub-ended ramp tracks, each 3,500 feet. Five or more electric wide-span rail-mounted gantry cranes would serve these ramps. Loading would be done from only the container yard side and no inter-track delivery lanes would be provided. To meet the target of 80% throughput by rail, some 68,000 feet for cars will need to be worked each day, which is approximately three 12,000-ft trains discharged and reloaded. Efficient removal of loads, a well thought out approach to pre-staging reloads, and rapid exchange of trains will be key to a successful operation.

Summary Port Alternatives

The efficient movement of goods in and out of the State is a vital contributor to the economic well-being of North Carolina. Nearly any business, large or small, must have the ability to receive or ship materials and products. Without an adequate multimodal network, products could fail to reach the consumer and material orders for production and assembly lines could go unfilled.

It is the desire of the NCSPA to increase throughput of the Port of Morehead City, with rail being the predominant intermodal method. Currently, the port mainly serves the breakbulk and bulk market. Thus, developing Radio Island as a container terminal is most desirable for the future of the Port of Morehead City. Improvements to infrastructure and operations should occur in order for the port to be a rail-centric container terminal capable of throughput in excess of one million TEU per year from NPx vessels.

Waterway Infrastructure

The Port of Morehead City boasts the shortest distance from deep water on the Atlantic Coast. Therefore, deepening channels and berths to 52 feet would be preferable. It is recommended that a detailed study of vessel maneuvering, along with Beaufort Inlet's morphology and costal processes, be developed.

Land Transport

Roadway improvements along the US 70 corridor, including the upgrade of US 70 to an interstate, are underway and should aid in the overland freight movements. Rail infrastructure in the GTP2MHC Mobility Corridor is discussed later in this report. Additional rail improvements to the PMC and Radio

Island should be constructed, and include a dedicated 20,000-ft siding near Radio Island and the incorporation of a nearby rail yard to assemble 3,500-ft car segments. An additional alternative would be to construct a parallel track to the main line in order to assemble a long unit train. The entrance to Radio Island should undergo significant improvements. The rail line should be upgraded to Class I curvature standards, and an overpass bridge(s) from US 70 constructed.

Port Infrastructure

Operational efficiencies should be developed concurrently with capital improvements to the Port of Morehead City. Potential solutions to improve efficiency could take several forms, including contracting with a single terminal operator or an alliance of carriers accessing one gate rather than multiple operations and gates. Radio Island should be redesigned into five distinct operational areas: Administration, Berth, Container Yard, Intermodal Yard, and Maintenance & Repair. It is also suggested that two wharves be developed on Radio Island. The primary wharf would be a 2,600-ft continuous structure, divided into two 1,300-ft berths, each capable of servicing an NPx vessel. The secondary wharf would be intended for container barge traffic. High density container stacking, utilizing RTG cranes, would increase throughput and maximize the port footprint. In addition, an intermodal yard with six parallel stub-ended ramp tracks, each 3,500 feet in length, served by five or more electric wide-span rail-mounted gantry cranes is suggested to achieve the 80% rail throughput.

4. Rail Alternatives

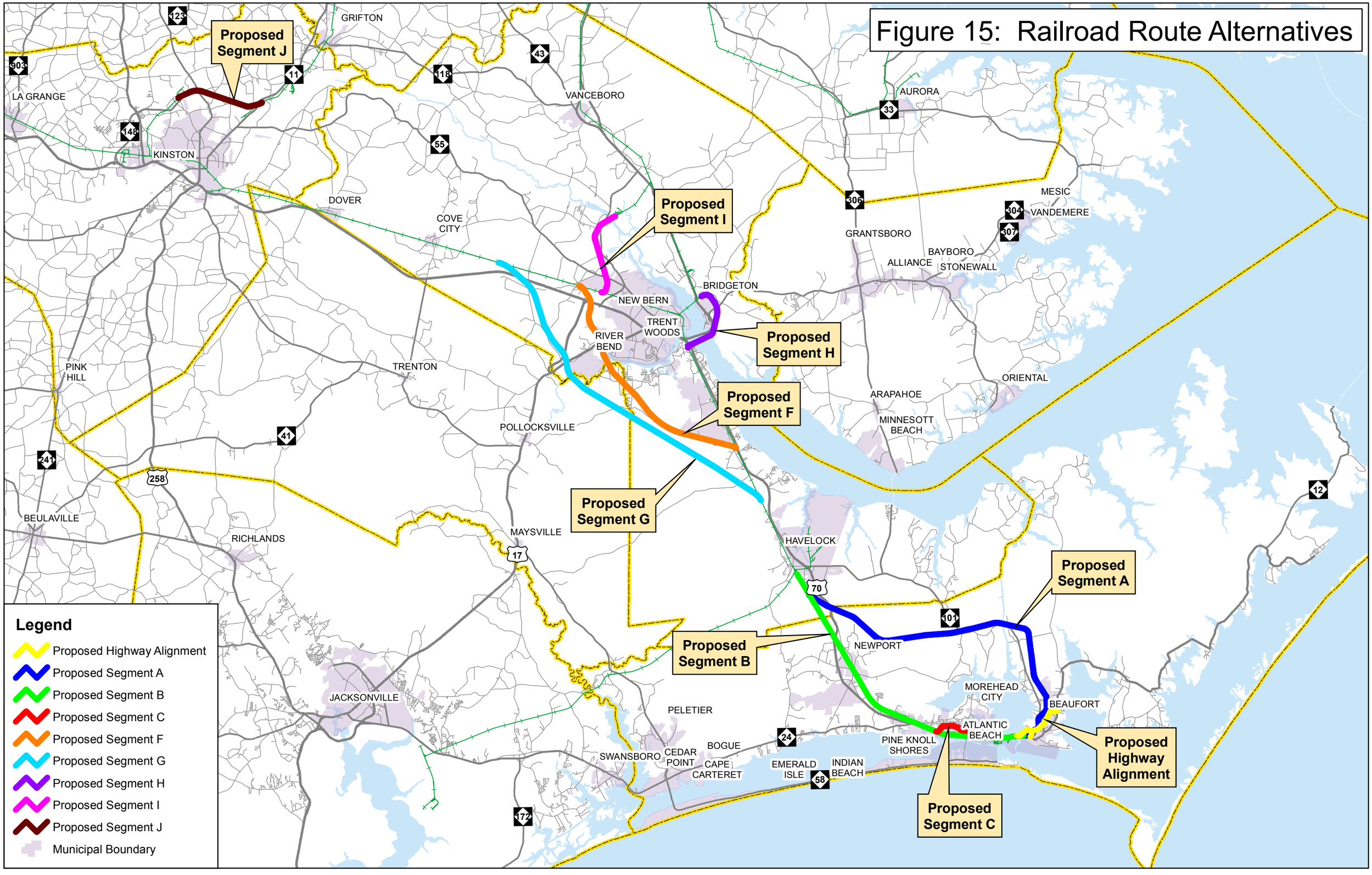
Improving rail access to and from the Port of Morehead City requires improving the rail alignment and operation in New Bern and Morehead City to mitigate or eliminate the “median running” sections that impact local business and cause safety concerns for motor vehicle operations. Also, improving fluidity and mobility of the rail operation by increasing capacity and speed is needed.

As shipments increase through the Port of Morehead City, it is expected that area highways will see an increase in truck traffic as well as increases in rail shipping movements. Infrastructure Improvements to the loading and unloading facilities, the port, industrial sites, and terminals will be required to handle the additional volume. Increases in train shipments could also lead to greater delays at at-grade rail crossings with longer and more numerous trains. Improvements to rail infrastructure within the GTP2MHC Mobility Corridor should coincide with the current highway planning already underway in the corridor.

Evaluation of Alternatives

Alternatives were evaluated using several factors, including capital cost, and the time frame for implementation. Human and environmental constraints, such as wetlands, agricultural and forestall lands, historic resources, and public facilities (parks, schools, libraries, fire and police stations) were considered during the development and evaluation of alternatives. The following maps identify known sensitive receptors. Note, however, that a detailed evaluation of these items was not part of this study. Should any alternative from this report be considered, additional environmental, engineering, and public involvement activities are recommended.

Figure 15: Railroad Route Alternatives



Human and Natural Environment Constraints

Environmentally sensitive areas containing coastal marshes and tidal flats as well as developed areas containing residences, commercial properties, and sensitive receptors, such as schools, were considered when selecting potential bypass routes around New Bern and the Global TransPark. In the immediate vicinity of Morehead City, developing railroad route alternatives was challenging due to a combination of dense residential and commercial development and the existence of large areas of environmentally sensitive lands. As a long established community, most of the land in Morehead City is either occupied by housing, businesses, or sensitive receptors, such as schools, coastal marshes and recreational beaches. There is also a very important and robust tourism industry in the area.

Construction Unit Costs

Construction unit costs were developed based upon publicly available railroad project data.

Trackwork

Each of the route segments "F", "G", "H", "I", and "J" were costed assuming the use of new, 136-pound track on timber ties.

Bridges

Segment "F" would involve two bridges of significant size. There would be one grade separation at US 70, which has six lanes of traffic and a wide median. There would also be a roughly 3,500-ft long bridge over the Trent River.

Drainage

Drainage was assumed to be accomplished through surface ditches, small culverts, and several bridges of considerable size and cost.

At-Grade Crossings

For the public highway-rail at-grade crossings, depending on average annual daily traffic volumes of the roadways and the results of diagnostic reviews of the involved roadway crossings, active crossing protection devices may be required. Segment "F" would involve 14 at-grade crossings and one grade separation over US 70. Segment "G" would involve 17 at-grade crossings and one grade separation crossing over US 70. Segment "H" would involve 8 at-grade crossings. Segment "I" involves 7 at-grade crossings. Segment "J" would require 9 at-grade crossings.

Right-of-Way

The scope of this study did not include developing detailed cost assessments for land that would be needed. So, in order to include some level of cost consideration for Right-of-way, designers assumed that, on average, acquiring land would cost $10,000 per acre in rural areas and $50,000 in more urbanized areas. Further, a 200-foot wide corridor was assumed when calculating the acreage necessary. While there is the potential for certain properties to cost well above the assumed amount, using the overall values at least allowed land cost to be factored into the overall analysis. Should any of

the alternatives presented in this report be considered, additional studies on the full cost of obtaining new property should be performed.

Estimated Construction Costs

The estimated construction costs for each segment are shown in **Table 3**.

Table 3: Estimated Lengths and Construction Costs for Each Route Segment

Segments	Length (mi)	Cost
A	22.75	$ 240,379,354
B	1.39	$ 10,918,253
C	3.93	$ 223,614,937
F	15.71	$ 203,584,807
G	23.35	$ 197,470,216
H	4.97	$ 213,112,649
I	5.78	$ 141,523,104
J	5.63	$ 28,284,080

NOTE: Estimates are for comparative purposes only and do not include costs for earthwork changes, roadbed materials, environmental mitigation, property acquisition, or coastal engineering requirements.

New Bern

Segments “F”, “G”, “H”, and “I” were developed to address rail traffic congestion issues in the New Bern area.

Connectivity to NSR serving Bridgeton

Segments “H” and “I” were developed to address the issue of maintaining NSR connectivity to Bridgeton. If the track that passes through the urban center of New Bern is removed from service, Segment “H” would serve Bridgeton from the south, utilizing a new bridge over the Neuse River to connect to the existing line. Segment “I” would connect the NSR operation on the west side of the Neuse River with a bridge and trackage rights over an industrial lead track that currently serves the Weyerhaeuser mill at Vanceboro, NC.

General description and assumptions

Segment “F” - The north end of Segment “F” begins at the NCRR EC Line, roughly two miles to the west of New Bern, and just east of the Clarks Road at-grade crossing in an undeveloped area. From there, the route runs southeast through agricultural areas, as the intent of the routing was to avoid dense residential and commercial areas. The route returns to the NCRR line approximately eight miles southeast of the Trent River and near the Riverdale Road at-grade crossing. The route is 15.71 miles long.

Segment "G" - The north end of Segment "G" begins at the NCRR EC Line about 9 miles to the west of New Bern, and west of Tuscarora-Rheims Road. From there, the route travels to the southeast utilizing several existing utility corridors to minimize impacts to local property owners. Several bridges will be needed as the route crosses the Trent River and its tributaries. This route then merges back into the NCRR mainline approximately 11 miles southeast of the Trent River. The route is 23.35 miles long.

Segment "H" - Segment "H" starts by utilizing an existing industrial track connection to NSR at James City. At the end of the existing track, an approximately 7,000-ft long bridge is proposed to be built across the Neuse River, with its eastern end being located roughly 1,450 feet south of the existing NC 55 bridge. From there, the route proceeds northwards, looping around the town of Bridgeton, and connecting to the eastern end of the wye track connection to the former Pamlico Oriental & Western Railroad. The route is 4.97 miles long.

Segment "I" - The southern end of Segment "I" begins at the NCRR EC Line roughly one mile west of New Bern and travels northwards through agricultural land, avoiding residential and commercial properties. An approximately 1,500-ft long bridge across the Neuse River would need to be built, and would connect to the western end of an existing industrial track serving the Weyerhaeuser paper mill at Vanceboro, NC. This industrial track connects to NS south of Ernul, NC. The route is 5.78 miles long.

Global TransPark

Segment "J" - Segment "J" would connect to the Global TransPark industrial track at Kinston, and it is intended to be utilized in conjunction with other route segments. From Global TransPark, the route immediately crosses John Mewborne Road. From there, the track goes eastward across agricultural land to connect to the existing CSX track near its crossing of NC 11 near Graingers, NC. The route is 5.63 miles long. Segment "J" provides additional rail access to the Global TransPark allowing for additional movements into and out of the Global TransPark and connects to existing CSX, while existing track within the Global TransPark connects to NCRR.

A major consideration for this alternative would be to determine CSX Transportation's long term plans to serve this branch line along with an analysis of potential rates. It should be noted that the NCRR/NS corridor provides a quicker and more direct connection to CSX at Selma, NC.

Figure 16: New Bern Rail Alternatives

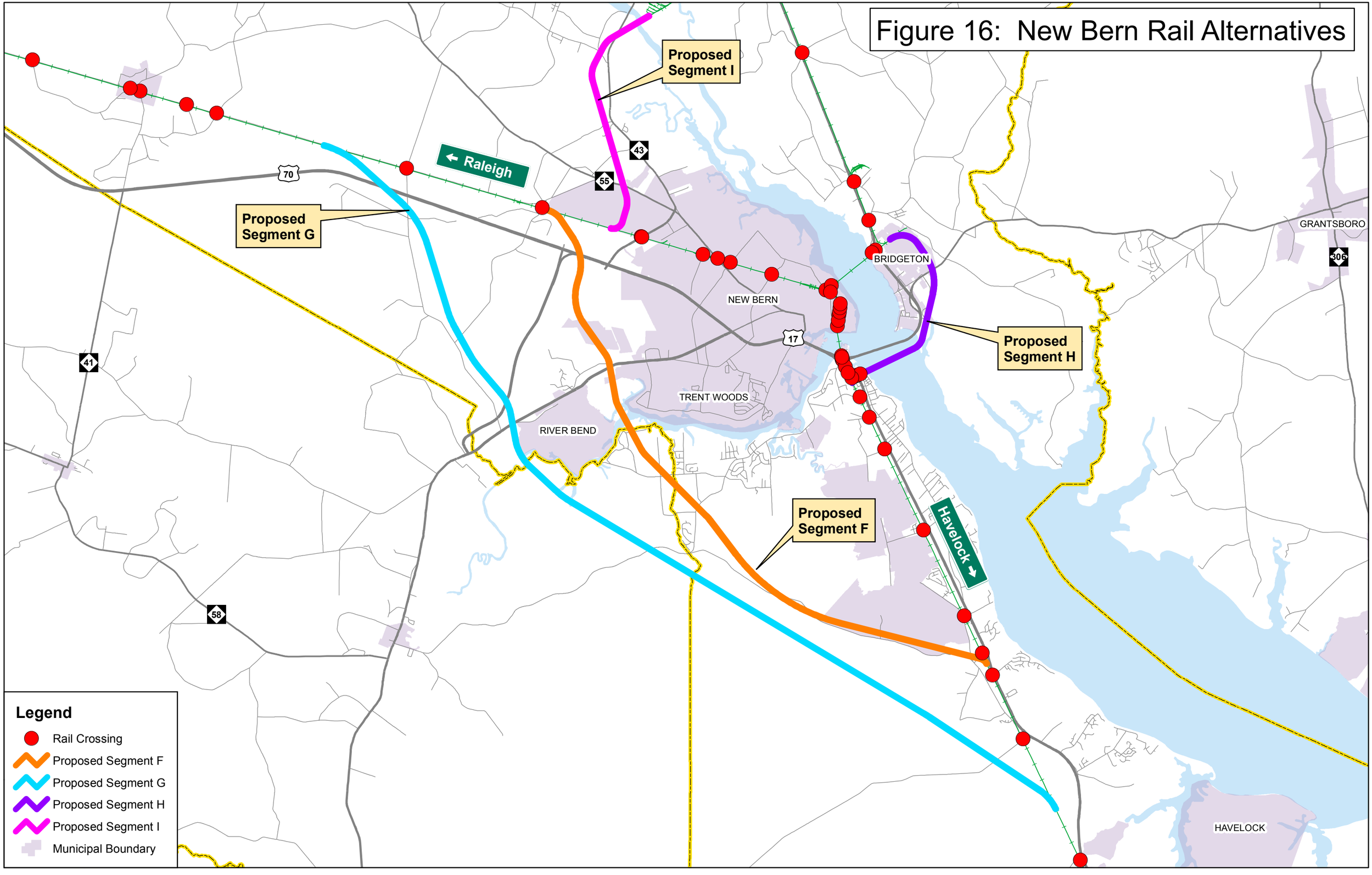


Figure 17: Segment Route "F"

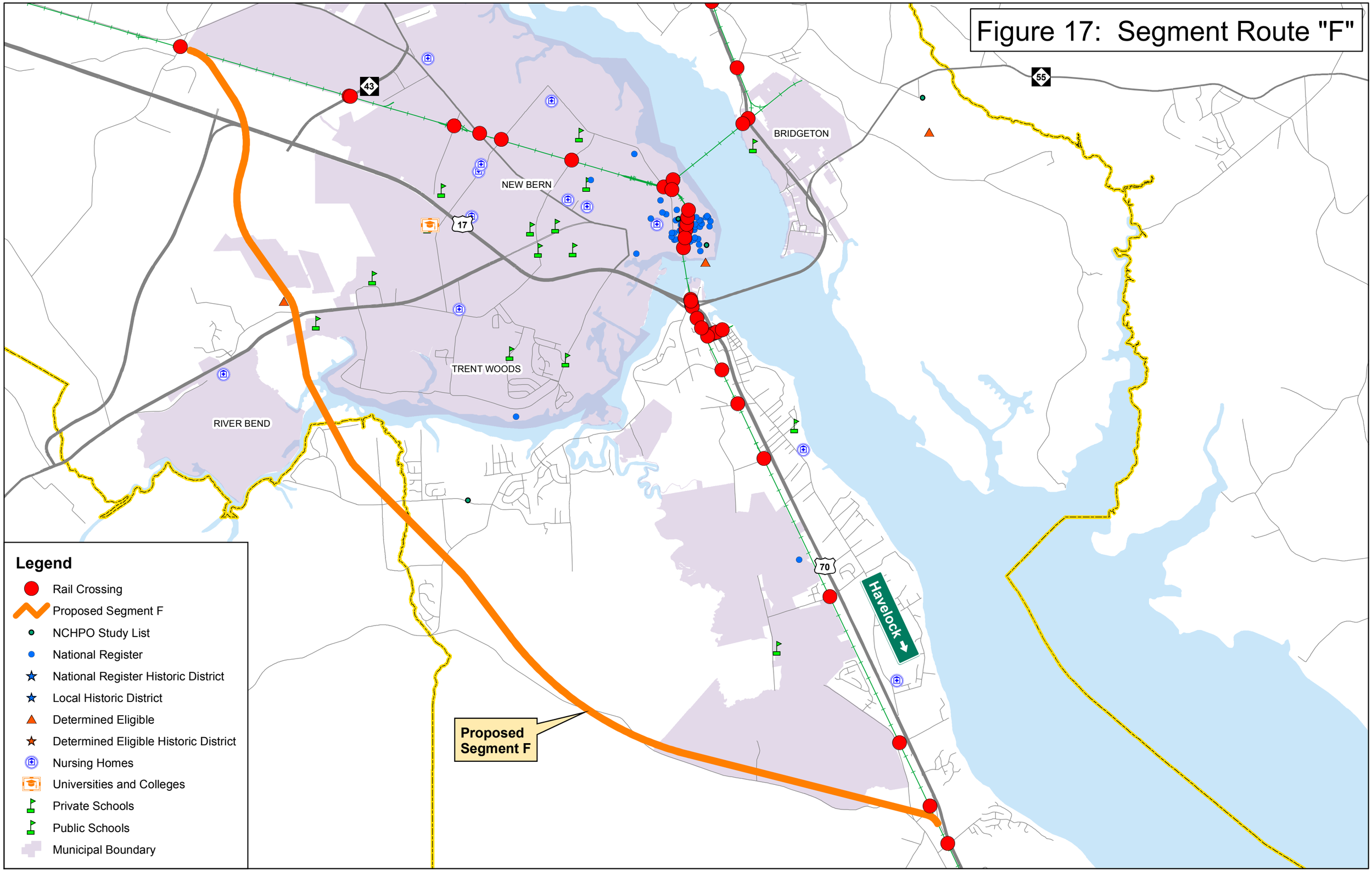


Figure 18: Segment Route "G"

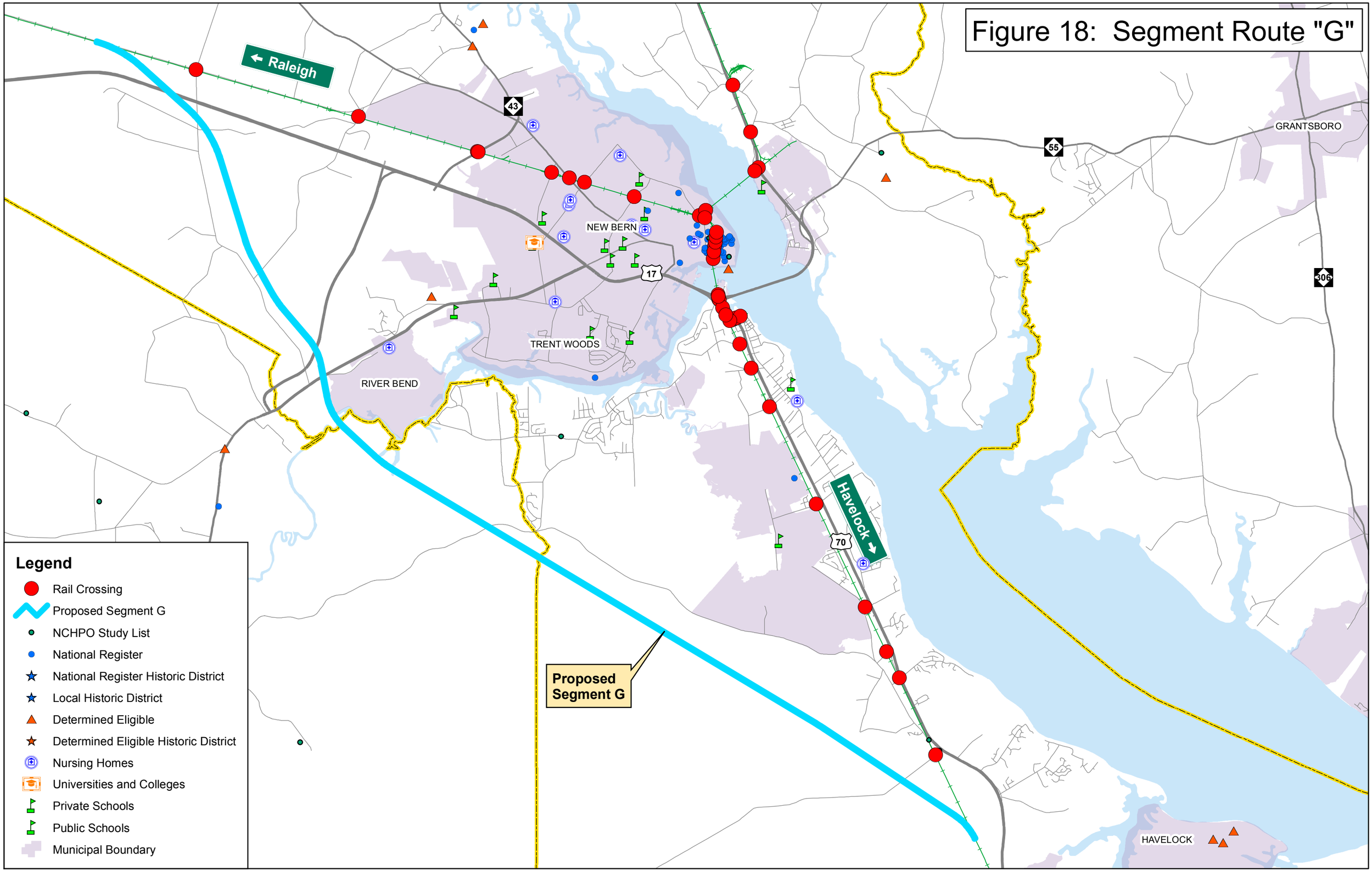


Figure 19: Segment Route "H"

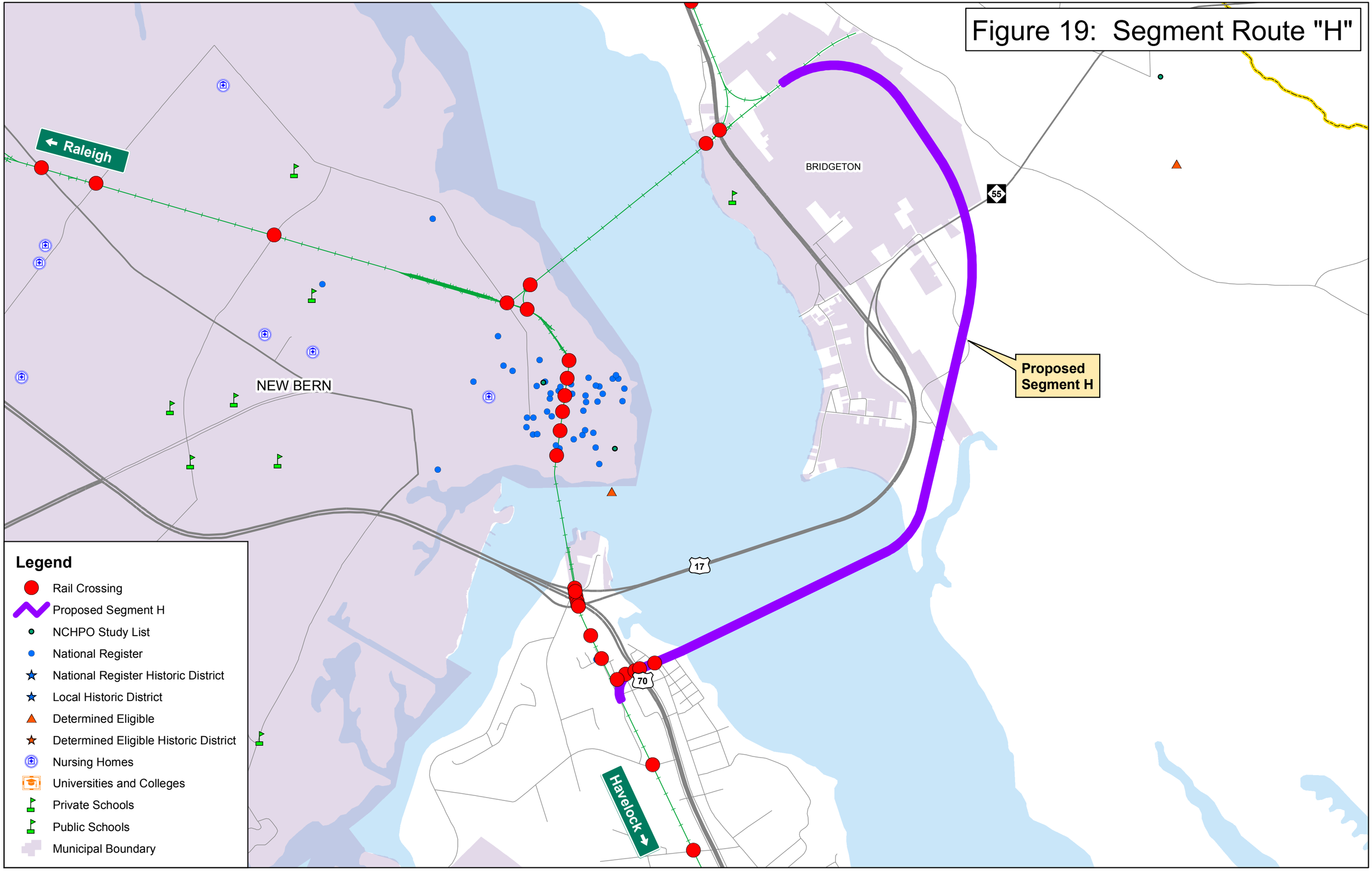


Figure 20: Segment Route "I"

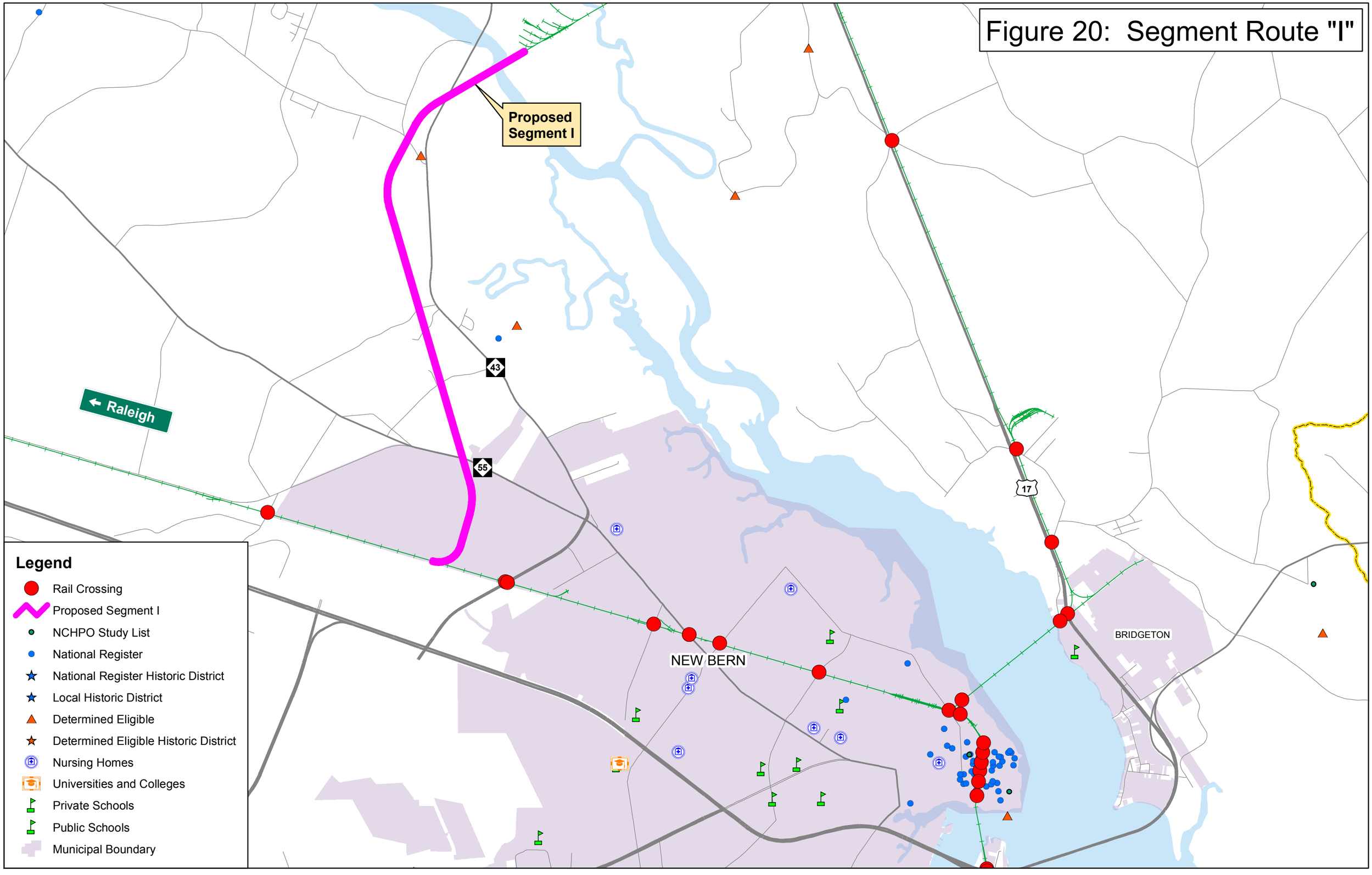
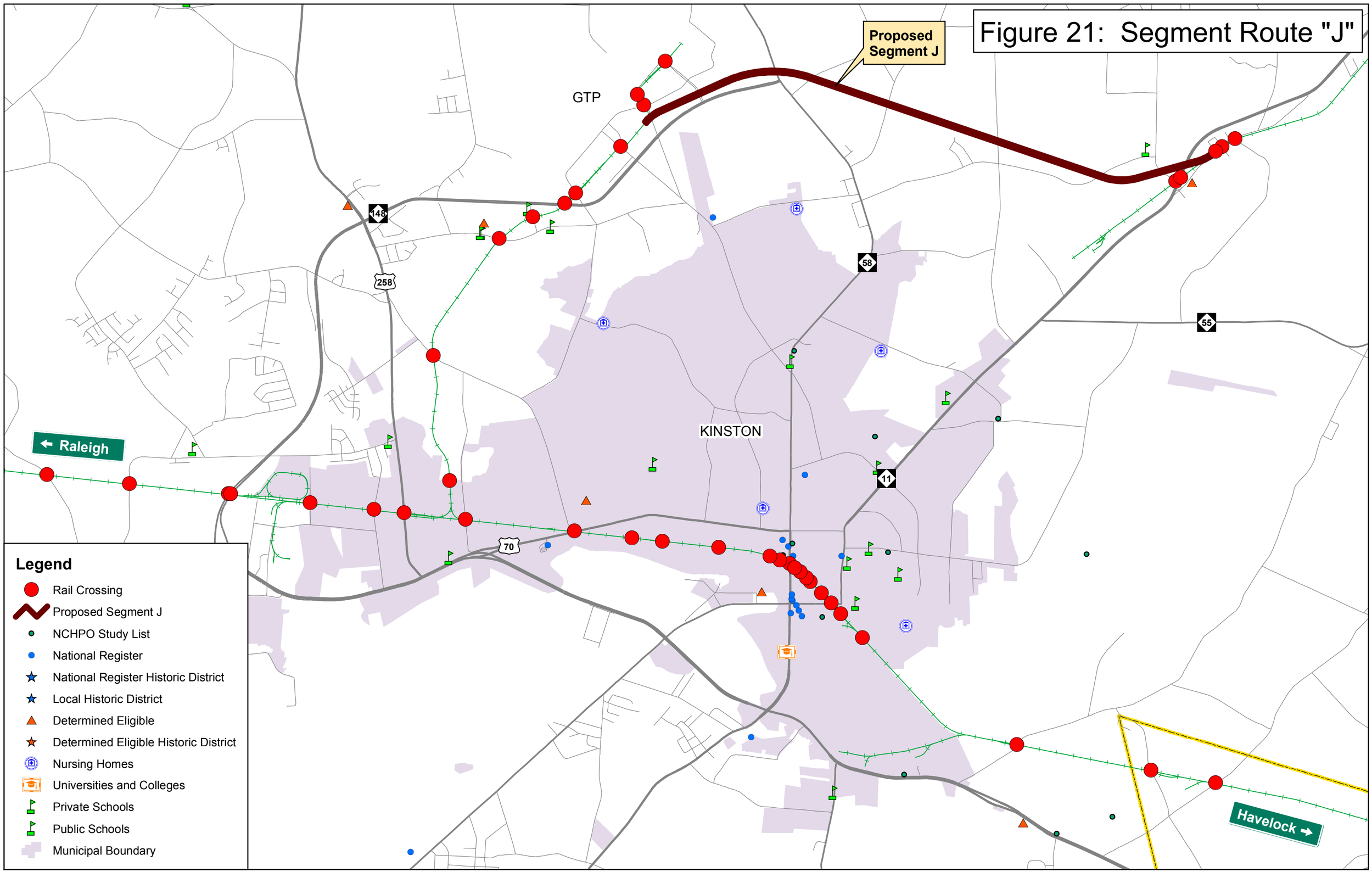


Figure 21: Segment Route "J"



Morehead City and Radio Island

Segments “A”, “B”, and “C” were developed to address rail traffic congestion issues in the Morehead City and Radio Island area.

Improvements to Existing Rail Lines and Operations

Segment “B” - Segment “B” proposes improvements to existing rail lines and facilities. The goal was a minimum build plan that would both lessen the disruption to highway traffic flows caused by the location of the existing NCRR track in the center of US 70 (Arendell Street) through most of Morehead City. Segment “B” also improves railroad service to the Port of Morehead City. This segment proposes to build a small, approximately 4-track railyard west of the intersection of Bridge Street and US 70. Railcars would be shuttled to and from the proposed railyard during times when they would have little impact on highway traffic, and on a more frequent basis than current service provided by NSR at Morehead City. NSR would haul completed trains to and from the new yard, thereby reducing the impact on highway traffic. It is also envisioned that such a service arrangement could reduce total costs of rail transportation serving the Port of Morehead City.

As with all alternatives discussed in this report, this concept has not been evaluated nor endorsed by NSR, NCRR, or local representatives. There is a master agreement between NSR and NCRR that does not anticipate this type of segmentation. This agreement would most likely need to be renegotiated at some point in the future if this concept were to proceed. There may be other institutional barriers. The purpose for including this alternative was to suggest that changes to the way trains are moved through Morehead City, as opposed to simply moving the trains away from Morehead City could also be discussed.

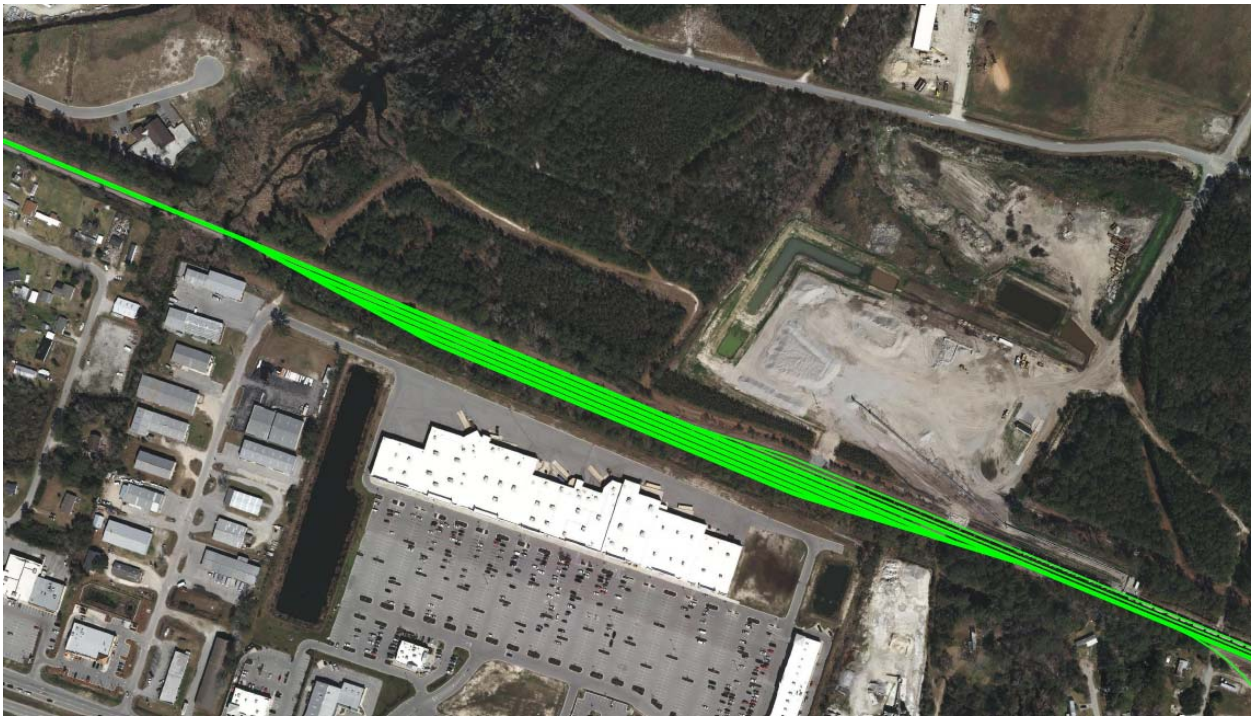


Figure 22: Segment Route "B" Proposed Four-track Railyard Along Existing NSR Mainline

General Description and Assumptions

Segment "A" - was designed to re-route rail traffic out of Morehead City by serving the Port of Morehead City and Radio Island from the east rather than the west as currently occurs. A feature of this route is that it was designed to travel through mostly undeveloped, agricultural land north of Beaufort, where intermodal container yards and facilities could be developed in the future. Also, as the intent was to minimize the effects to existing housing and businesses, a segment was routed along the edge of Federal government forest lands.

This segment begins at the end of existing trackage on Radio Island, and travels eastwards over a new, approximately 1,200-ft long bridge across Gallants Channel. From there, it crosses US 70 at-grade and turns northward to skirt around the eastern edge of Michael J. Smith Field (the Beaufort-Morehead City airport). As the route leaves the airport area, it continues northwards through agricultural land in the center of the peninsula, until it turns westward near the Town of North River after crossing Laurel Road at-grade. The route crosses the Intracoastal Waterway on a bridge parallel to NC 101. Then, it continues west initially crossing and then traveling along the border of the Croatan National Forest, until it terminates at the existing NCRR EC line at the south edge of Havelock, NC. The route is 22.75 miles in length. Detailed analyses of environmental issues that might be associated with this alternative were not included in the scope for this study. As with all alternatives presented, detailed studies are recommended if alternatives are to be considered and compared.

Segment "C" was developed in an attempt to show a way to move the track that is currently located in the center of US 70 in Morehead City to another location. In developing this alternative, designers tried to suggest the shortest feasible re-routing, while at the same time, considering the impacts to property owners and the environment. The western end of the route begins on the NCRR EC line just to the east of the Friendly Road at-grade crossing. The track crosses Bridge Street at-grade, and then proceeds northeast through a forested area, until it enters an existing utility corridor just west of the Brook Street crossing. It travels east through industrial property until it reaches the shoreline of Bogue Sound. As the route proceeds along the shoreline of Bogue Sound, the shoreline meanders, and the route travels through several residential properties. The route then turns to the southeast, crossing US 70 at-grade, and then merges back into the NCRR track just to the west of the Port of Morehead City railyard. The route is 3.93 miles long.

Figure 23: Segment Route "A"

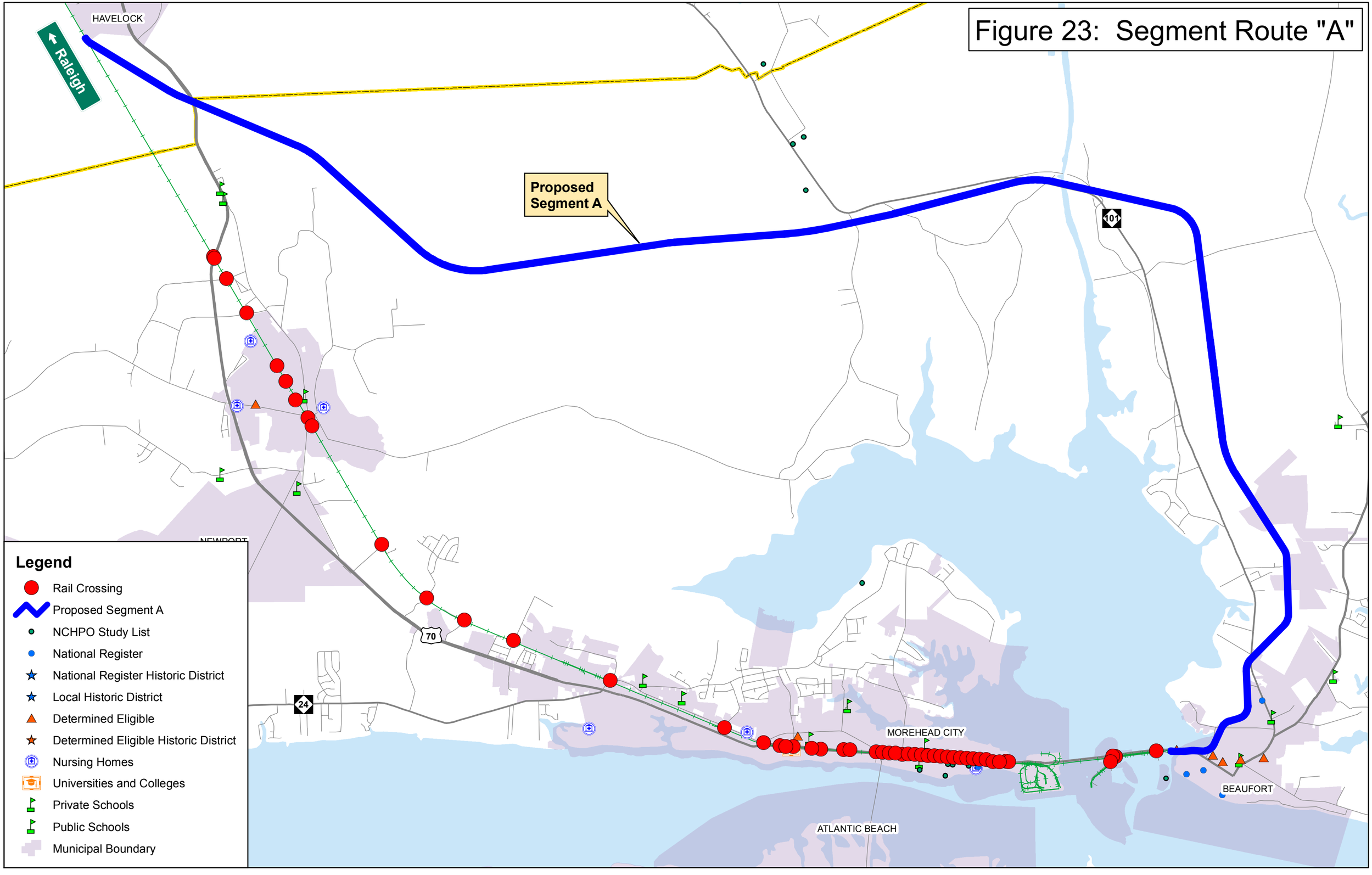
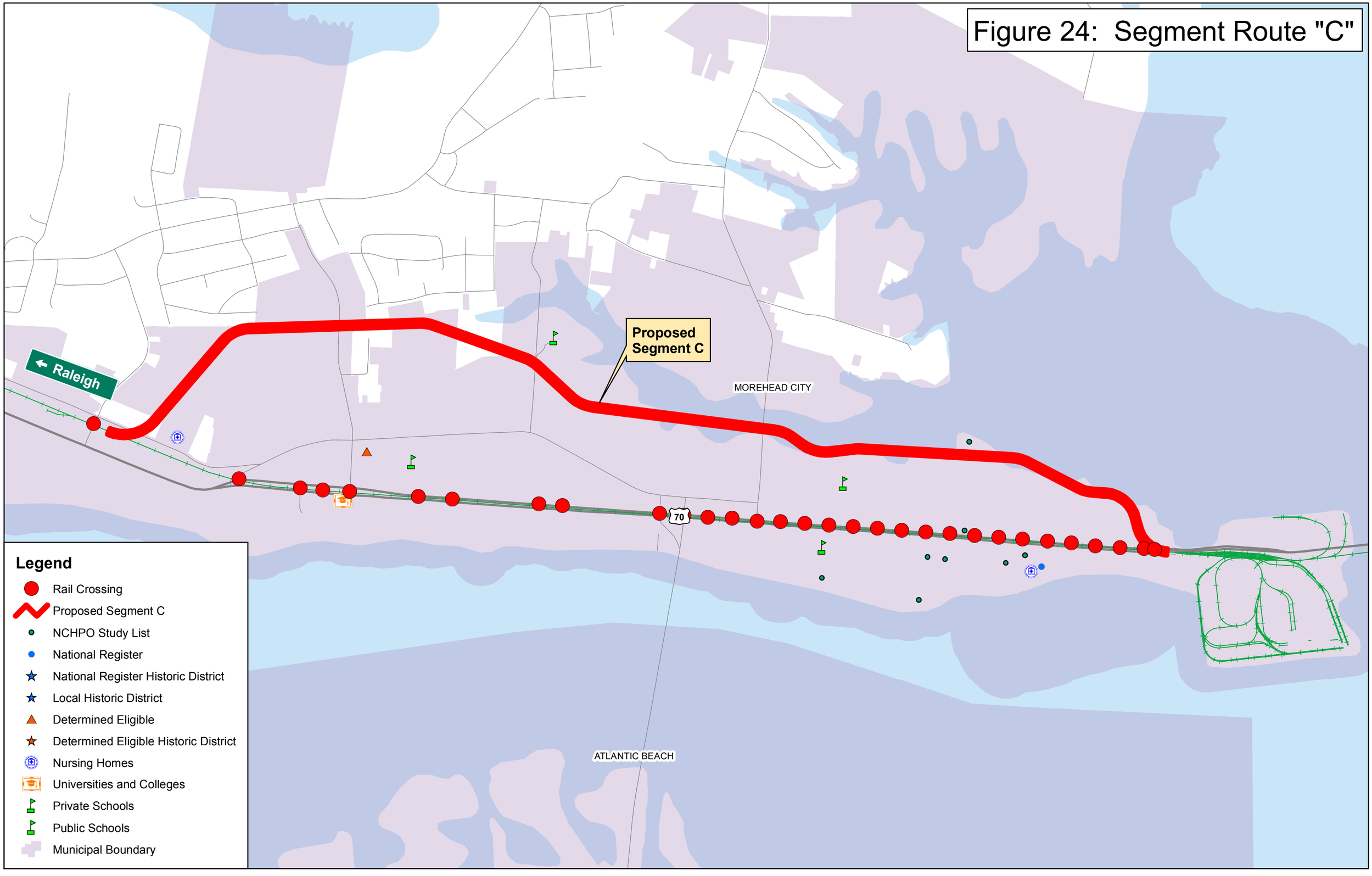


Figure 24: Segment Route "C"



Concepts Discussed But Not Carried Forward

A number of concepts were discussed, but for various reasons, not carried forward for detailed study. This section provides a brief description of those items.

Develop Barge Service to New Bern/Bridgeton

The New Bern Barge Service Alternative would transfer freight to the New Bern area by way of barges rather than by train. A transfer facility on the east side of the Neuse River would necessitate train movements through the heart of New Bern. A transfer facility located on the west side of the river was also discussed. This configuration would likely cause the need for a new rail crossing of the Neuse River. The shipment time from Port of Morehead City to New Bern might also prevent this alternative from being viable. As such, this alternative was not carried forward.

Develop Barge Service to Belhaven

The Belhaven Barge Service Alternative is a combination railroad and barge transportation service that includes the construction of a barge terminal at Belhaven, NC. The route was designed to accomplish two goals. The first goal was to minimize costs and impacts on the communities of Beaufort, NC and Morehead City, NC. The second goal was to provide an alternative railway shipper to NS. The railroad currently serving Belhaven is the Carolina Coastal Railway (CLNA). The shipment time from the Port of Morehead City to Belhaven might prevent this alternative from being viable. Also, evaluating additional considerations such as channel navigation and the construction of the transfer facility at Belhaven were beyond the scope of this study. As such, this alternative was not carried forward.

Construct New Port

One alternative considered was to convert the existing facilities at Radio Island and the Port of Morehead City to recreational uses, and construct a completely new port at Broad Creek 14 miles west of the existing port. The rail route would be entirely on undeveloped land, and would extend south from the existing rail spur that serves Camp Lejeune. However, the existing channel is only nine feet deep and the costs of both dredging to a depth of 52 feet and constructing completely new, equivalent port facilities would likely be prohibitive.

5. Summary

As requested by the North Carolina Department of Transportation (NCDOT), a number of alternatives have been developed to support increased Port throughput and mobility. As stated previously, it is not the intent of this study to develop recommendations, but rather to present options that could be considered when determining the best course of action during Port and rail planning. Also, as mentioned earlier, the evaluation of these alternatives was cursory, and should not be considered appropriate for detailed design or alternative comparison purposes.

Port Alternatives

Section 3 of this report discusses the existing Port of Morehead City operations, compares the operations at other ports, and suggests ways to support additional throughput at the Port. Specifically, the following items are discussed:

- Maintaining berths and a channel with a minimum depth of 52 feet
- Options for port operating plans
- Development of two wharves on Radio Island
- Development of new intermodal yard

Rail Alternatives

Section 4 of the report presents a number of alternatives developed to either support increased port throughput, address existing concerns, or both. A number of alternatives are presented, including the following:

- Creating a new rail connection into the Global TransPark
- Creating an alternative connection to Bridgeton
- Developing a rail bypass of New Bern
- Developing a rail bypass of Morehead City
- Altering the way trains are made up and shuttled through Morehead City

Implementation

This study presents multiple options for improving rail transport in the Global TransPark to the Port at Morehead City Mobility Corridor. These options are not intended to be “stand-alone” solutions, but rather are meant to be combined to best fit the needs and fiscal constraints that are faced. Also, any implementation plan should consider the timing of the projects, as it is unlikely that a full-scale improvement plan could be realized in short order. Also, the implementation plan should consider the benefit cost comparison of increasing the volume of product that the Port at Morehead City can handle. The following list shows a **potential** combination of enhancements and the suggested timeframe for implementation.

Short Term

In the near term, **Segment "B"/Edgewater Alternative (Alternative 5)** which proposes to develop a new transfer yard on the west side of Morehead City could be considered as a short-term project. Presumably, this project could be implemented at lower cost and potentially with minimal delay for permitting, as the proposed track would be built on existing railroad Right-of-way. The main purpose of this alternative was to offer the opportunity of having shorter (but more frequent) trains passing through Morehead City.

Long Term – Moderate Growth

In the long term, several approaches based on growth at the Port of Morehead City were developed based on a moderate growth scenario. One potential combination of alternatives would be to construct the new connection into the Global TransPark (Alternative 1) in conjunction with one of the New Bern Bypass options (combining Segments H and I for example).

Long-Term – High Growth

Should throughput at the port increase substantially, concepts that avoid highway-rail crossings could provide for increased efficiency. One potential option would be to build a new rail line to the north, similar to the concept discussed in Alternative 8 (Segment A).

Table 4: Estimated Lengths and Construction Costs for Alternatives based on PMC growth

Alternative	Length (mi)	Cost
Short Term Alternatives		
Edgewater Yard (Alt "5") *Provides a new transfer yard on the NCRR corridor in Morehead City just beyond the median running section at "Edgewater." (Segment B)*	1.39	$ 11 million
Long Term Moderate Growth		
GTP Connection (Alt "1") *Provides a new connection from the Global TransPark to CSXT's Parmele Subdivision. (Segment J)*	5.63	$ 28 million
New Bern Bypass (Alt "3") *Provides a bypass to the southwest of New Bern that avoids street interference and typical urban impact and allows for abandonment of current bridge. (Segments F and I)*	21.49	$ 345 million
Total	27.12	$ 373 million
Long Term High Growth		
Morehead City Bypass (Alt "8") *Provides a bypass around Morehead City to avoid the median running section, but will require mitigations along the bypass corridor in Beaufort. (Segment A)*	22.75	$ 240 million

6. References

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Appendix – Rail Alternatives Cost Estimates

NCDOT Rail Study
Summary Sheet
10/14/2016

Segment	Length (mi)	Cost
A	22.75	$ 240,379,354
B	1.39	$ 10,918,253
C	3.93	$ 223,614,937
D	0.20	$ 3,259,325
E	8.30	$ 36,857,290
F	15.71	$ 203,584,807
G	23.35	$ 197,470,216
H	4.97	$ 213,112,649
I	5.78	$ 141,523,104
J	5.63	$ 28,284,080

Indicates does not include port facilities costs.

Segment A

	Cost Items	Quantity	Unit Cost	Subtotal	Design	CM/Permits	Total
Route				$11,698,592	$935,887	$1,403,831	$14,038,310
	Clearing & Grubbing (tr.ft)	114,976	$3.30	$379,421			
	Earthwork (Cut/Fill) (cu.yds.)	88,978	$1.30	$115,671			
	Drainage & Utilities (rte. mile)	22.75	$250,000.00	$5,687,500			
	Property Acquisition (acre; 200-ft ROW)	551.60	$10,000.00	$5,516,000			
Structure				$71,033,200	$5,682,656	$8,523,984	$85,239,840
	Rehabilitate Viaduct (tr.ft.)	-	$1,360.00	$0			
	Replace Viaduct (tr.ft.)	-	$21,165.00	$0			
	New Viaduct on Old Abuts. (tr.ft.)	-	$21,165.00	$0			
	New Viaduct (completely) (tr.ft.)	-	(tr.ft. plus $2 mil)	$0			
	Aerial Structure (tf)	5,160	$13,720.00	$70,795,200			
	Retaining Wall - 16ft tall (LF)	-	$6,410.00	$0			
	Building Demolition (sf)	34,000	$7	$238,000			
Track				$38,671,922	$3,093,754	$4,640,631	$46,406,306
	New Main Line (115# Rail) (tf)	120,136	$320.00	$38,443,520			
	Repurposed Main Line (rail OK) (tf)	-	$64.00	$0			
	Shift Main Line (tf)	126	$27.00	$3,402			
	Turnouts	1	$225,000.00	$225,000			
	Shift Turnouts	-	$22,500	$0			
	Test & Commission	0.10					$14,568,446
	Allocation for environmental mitigation	0.25					$36,421,114
	Contingency	0.30					$43,705,337
	TOTALS			$121,403,714	$9,712,297	$14,568,446	$240,379,354

Segment B

	Cost Items	Quantity	Unit Cost	Subtotal	Design	CM/Permits	Total
Route				$1,371,549	$109,724	$164,586	$1,645,859
	Clearing & Grubbing (tr.ft)	7,321	$3.30	$24,159			
	Earthwork (Cut/Fill) (cu.ft.)	1,838	$1.30	$2,390			
	Drainage & Utilities (rte. mile)	1.38	$250,000.00	$345,000			
	Property Acquisition (acre)	20.00	$50,000.00	$1,000,000			
Structure				$0	$0	$0	$0
	Rehabilitate Viaduct (tr.ft.)	-	$1,360.00	$0			
	Replace Viaduct (tr.ft.)	-	$21,165.00	$0			
	New Viaduct on Old Abuts. (tr.ft.)	-	$21,165.00	$0			
	New Viaduct (completely) (tr.ft.)	-	(tr.ft. plus $2 mil)	$0			
	Aerial Structure (tf)	-	$13,720.00	$0			
	Retaining Wall - 16ft tall (LF)	-	$6,410.00	$0			
	Building Demolition (sf)	-	$7	$0			
Track				$4,142,720	$331,418	$497,126	$4,971,264
	New Main Line (115# Rail) (tf)	7,321	$320.00	$2,342,720			
	Repurposed Main Line (rail OK) (tf)	-	$64.00	$0			
	Shift Main Line (tf)	-	$27.00	$0			
	Turnouts	8	$225,000.00	$1,800,000			
	Shift Turnouts	-	$22,500	$0			
	Test & Commission	0.10					$661,712
	Allocation for environmental mitigatior	0.25					$1,654,281
	Contingency	0.30					$1,985,137
	TOTALS			$5,514,269	$441,142	$661,712	$10,918,253

Segment C

	Cost Items	Quantity	Unit Cost	Subtotal	Design	CM/Permits	Total
Route				$20,934,583	$1,674,767	$2,512,150	$25,121,500
	Clearing & Grubbing (tr.ft)	14,416	$3.30	$47,573			
	Earthwork (Cut/Fill) (cu.ft.)	415,008	$1.30	$539,510			
	Drainage & Utilities (rte. mile)	2.73	$250,000.00	$682,500			
	Property Acquisition (acre)	393.30	$50,000.00	$19,665,000			
Structure				$88,079,040	$7,046,323	$10,569,485	$105,694,848
	Rehabilitate Viaduct (tr.ft.)	-	$1,360.00	$0			
	Replace Viaduct (tr.ft.)	-	$21,165.00	$0			
	New Viaduct on Old Abuts. (tr.ft.)	-	$21,165.00	$0			
	New Viaduct (completely) (tr.ft.)	-	(tr.ft. plus $2 mil)	$0			
	Aerial Structure (tf)	6,350	$13,720.00	$87,122,000			
	Retaining Wall - 16ft tall (LF)	-	$6,410.00	$0			
	Building Demolition (sf)	136,720	$7	$957,040			
Track				$7,095,120	$567,610	$851,414	$8,514,144
	New Main Line (115# Rail) (tf)	20,766	$320.00	$6,645,120			
	Repurposed Main Line (rail OK) (tf)	-	$64.00	$0			
	Shift Main Line (tf)	-	$27.00	$0			
	Turnouts	2	$225,000.00	$450,000			
	Shift Turnouts	-	$22,500	$0			
	Test & Commission	0.10					$13,933,049
	Allocation for environmental mitigatio	0.25					$28,552,248
	Contingency	0.30					$41,799,148
	TOTALS			$116,108,743	$9,288,699	$13,933,049	$223,614,937

Segment D

	Cost Items	Quantity	Unit Cost	Subtotal	Design	CM/Permits	Total
Route				$1,080,964	$86,477	$129,716	$1,297,157
	Clearing & Grubbing (tr.ft)	1,063	$3.30	$3,508			
	Earthwork (Cut/Fill) (cu.ft.)	21,120	$1.30	$27,456			
	Drainage & Utilities (rte. mile)	1.00	$250,000.00	$250,000			
	Property Acquisition (acre)	16.00	$50,000.00	$800,000			
Structure				$0	$0	$0	$0
	Rehabilitate Viaduct (tr.ft.)	-	$1,360.00	$0			
	Replace Viaduct (tr.ft.)	-	$21,165.00	$0			
	New Viaduct on Old Abuts. (tr.ft.)	-	$21,165.00	$0			
	New Viaduct (completely) (tr.ft.)	-	(tr.ft. plus $2 mil)	$0			
	Aerial Structure (tf)	-	$13,720.00	$0			
	Retaining Wall - 16ft tall (LF)	-	$6,410.00	$0			
	Building Demolition (sf)	-	$7	$0			
	New Port Facilties (LS)	2		*			
Track				$565,160	$45,213	$67,819	$678,192
	New Main Line (115# Rail) (tf)	1,063	$320.00	$340,160			
	Repurposed Main Line (rail OK) (tf)	-	$64.00	$0			
	Shift Main Line (tf)	-	$27.00	$0			
	Turnouts	1	$225,000.00	$225,000			
	Shift Turnouts	-	$22,500	$0			
	Test & Commission	0.10					$197,535
	Allocation for environmental mitigatior	0.25					$493,837
	Contingency	0.30					$592,605
	TOTALS			$1,646,124	$131,690	$197,535	$3,259,325

* Indicates costs not included in this estimate

Segment E

	Cost Items	Quantity	Unit Cost	Subtotal	Design	CM/Permits	Total
Route				$4,365,153	$349,212	$523,818	$5,238,184
	Clearing & Grubbing (tr.ft)	43,827	$3.30	$144,629			
	Earthwork (Cut/Fill) (cu.ft.)	876,480	$1.30	$1,139,424			
	Drainage & Utilities (rte. mile)	8.30	$250,000.00	$2,075,000			
	Property Acquisition (acre)	100.61	$10,000.00	$1,006,100			
Structure				$0	$0	$0	$0
	Rehabilitate Viaduct (tr.ft.)	-	$1,360.00	$0			
	Replace Viaduct (tr.ft.)	-	$21,165.00	$0			
	New Viaduct on Old Abuts. (tr.ft.)	-	$21,165.00	$0			
	New Viaduct (completely) (tr.ft.)	-	(tr.ft. plus $2 mil)	$0			
	Aerial Structure (tf)	-	$13,720.00	$0			
	Retaining Wall - 16ft tall (LF)	-	$6,410.00	$0			
	Building Demolition (sf)	-	$7	$0			
	New Port Facilties (LS)	2		*			
Track				$14,249,640	$1,139,971	$1,709,957	$17,099,568
	New Main Line (115# Rail) (tf)	43,827	$320.00	$14,024,640			
	Repurposed Main Line (rail OK) (tf)	-	$64.00	$0			
	Shift Main Line (tf)	-	$27.00	$0			
	Turnouts	1	$225,000.00	$225,000			
	Shift Turnouts	-	$22,500	$0			
	Test & Commission	0.10					$2,233,775
	Allocation for environmental mitigatio	0.25					$5,584,438
	Contingency	0.30					$6,701,326
	TOTALS			$18,614,793	$1,489,183	$2,233,775	$36,857,290

* Indicates costs not included in this estimate

Segment F

	Cost Items	Quantity	Unit Cost	Subtotal	Design	CM/Permits	Total
Route				$10,167,580	$813,406	$1,220,110	$12,201,096
	Clearing & Grubbing (tr.ft)	82,973	$3.30	$273,811			
	Earthwork (Cut/Fill) (cu.ft.)	1,658,976	$1.30	$2,156,669			
	Drainage & Utilities (rte. mile)	15.71	$250,000.00	$3,927,500			
	Property Acquisition (acre)	380.96	$10,000.00	$3,809,600			
Structure				$65,651,670	$5,252,134	$7,878,200	$78,782,004
	Rehabilitate Viaduct (tr.ft.)	-	$1,360.00	$0			
	Replace Viaduct (tr.ft.)	-	$21,165.00	$0			
	New Viaduct on Old Abuts. (tr.ft.)	-	$21,165.00	$0			
	New Viaduct (completely) (tr.ft.)	-	(tr.ft. plus $2 mil)	$0			
	Aerial Structure (tf)	4,780	$13,720.00	$65,581,600			
	Retaining Wall - 16ft tall (LF)	-	$6,410.00	$0			
	Building Demolition (sf)	10,010	$7	$70,070			
Track				$27,001,360	$2,160,109	$3,240,163	$32,401,632
	New Main Line (115# Rail) (tf)	82,973	$320.00	$26,551,360			
	Repurposed Main Line (rail OK) (tf)	-	$64.00	$0			
	Shift Main Line (tf)	-	$27.00	$0			
	Turnouts	2	$225,000.00	$450,000			
	Shift Turnouts	-	$22,500	$0			
	Test & Commission	0.10					$12,338,473
	Allocation for environmental mitigatio	0.25					$30,846,183
	Contingency	0.30					$37,015,419
	TOTALS			$102,820,610	$8,225,649	$12,338,473	$203,584,807

Segment G

	Cost Items	Quantity	Unit Cost	Subtotal	Design	CM/Permits	Total
Route				$15,109,472	$1,208,758	$1,813,137	$18,131,367
	Clearing & Grubbing (tr.ft)	123,268	$3.30	$406,784			
	Earthwork (Cut/Fill) (cu.ft.)	2,465,760	$1.30	$3,205,488			
	Drainage & Utilities (rte. mile)	23.35	$250,000.00	$5,837,500			
	Property Acquisition (acre)	565.97	$10,000.00	$5,659,700			
Structure				$44,727,200	$3,578,176	$5,367,264	$53,672,640
	Rehabilitate Viaduct (tr.ft.)	-	$1,360.00	$0			
	Replace Viaduct (tr.ft.)	-	$21,165.00	$0			
	New Viaduct on Old Abuts. (tr.ft.)	-	$21,165.00	$0			
	New Viaduct (completely) (tr.ft.)	-	(tr.ft. plus $2 mil)	$0			
	Aerial Structure (tf)	3,260	$13,720.00	$44,727,200			
	Retaining Wall - 16ft tall (LF)	-	$6,410.00	$0			
	Building Demolition (sf)	-	$7	$0			
Track				$39,895,760	$3,191,661	$4,787,491	$47,874,912
	New Main Line (115# Rail) (tf)	123,268	$320.00	$39,445,760			
	Repurposed Main Line (rail OK) (tf)	-	$64.00	$0			
	Shift Main Line (tf)	-	$27.00	$0			
	Turnouts	2	$225,000.00	$450,000			
	Shift Turnouts	-	$22,500	$0			
	Test & Commission	0.10					$11,967,892
	Allocation for environmental mitigatio	0.25					$29,919,730
	Contingency	0.30					$35,903,676
	TOTALS			$99,732,432	$7,978,595	$11,967,892	$197,470,216

Segment H

	Cost Items	Quantity	Unit Cost	Subtotal	Design	CM/Permits	Total
Route				$2,540,181	$203,214	$304,822	$3,048,217
	Clearing & Grubbing (tr.ft)	19,212	$3.30	$63,400			
	Earthwork (Cut/Fill) (cu.ft.)	524,832	$1.30	$682,282			
	Drainage & Utilities (rte. mile)	3.64	$250,000.00	$910,000			
	Property Acquisition (acre)	88.45	$10,000.00	$884,500			
Structure				$96,473,230	$7,717,858	$11,576,788	$115,767,876
	Rehabilitate Viaduct (tr.ft.)	-	$1,360.00	$0			
	Replace Viaduct (tr.ft.)	-	$21,165.00	$0			
	New Viaduct on Old Abuts. (tr.ft.)	-	$21,165.00	$0			
	New Viaduct (completely) (tr.ft.)	-	(tr.ft. plus $2 mil)	$0			
	Aerial Structure (tf)	7,020	$13,720.00	$96,314,400			
	Retaining Wall - 16ft tall (LF)	-	$6,410.00	$0			
	Building Demolition (sf)	22,690	$7	$158,830			
Track				$8,619,240	$689,539	$1,034,309	$10,343,088
	New Main Line (115# Rail) (tf)	26,232	$320.00	$8,394,240			
	Repurposed Main Line (rail OK) (tf)	-	$64.00	$0			
	Shift Main Line (tf)	-	$27.00	$0			
	Turnouts	1	$225,000.00	$225,000			
	Shift Turnouts	-	$22,500	$0			
	Test & Commission	0.10					$12,915,918
	Allocation for environmental mitigatio	0.25					$32,289,795
	Contingency	0.30					$38,747,754
	TOTALS			$107,632,651	$8,610,612	$12,915,918	$213,112,649

* Indicates costs not included in this estimate

** Only needed on lines carrying TIH's

Segment I

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	Cost Items	Quantity	Unit Cost	Subtotal	Design	CM/Permits	Total
Route				$3,726,275	$298,102	$447,153	$4,471,530
	Clearing & Grubbing (tr.ft)	26,302	$3.30	$86,797			
	Earthwork (Cut/Fill) (cu.ft.)	610,368	$1.30	$793,478			
	Drainage & Utilities (rte. mile)	5.78	$250,000.00	$1,445,000			
	Property Acquisition (acre)	140.10	$10,000.00	$1,401,000			
Structure				$57,761,200	$4,620,896	$6,931,344	$69,313,440
	Rehabilitate Viaduct (tr.ft.)	-	$1,360.00	$0			
	Replace Viaduct (tr.ft.)	-	$21,165.00	$0			
	New Viaduct on Old Abuts. (tr.ft.)	-	$21,165.00	$0			
	New Viaduct (completely) (tr.ft.)	-	(tr.ft. plus $2 mil)	$0			
	Aerial Structure (tf)	4,210	$13,720.00	$57,761,200			
	Retaining Wall - 16ft tall (LF)	-	$6,410.00	$0			
	Building Demolition (sf)	-	$7	$0			
Track				$9,988,840	$799,107	$1,198,661	$11,986,608
	New Main Line (115# Rail) (tf)	30,512	$320.00	$9,763,840			
	Repurposed Main Line (rail OK) (tf)	-	$64.00	$0			
	Shift Main Line (tf)	-	$27.00	$0			
	Turnouts	1	$225,000.00	$225,000			
	Shift Turnouts	-	$22,500	$0			
	Test & Commission	0.10					$8,577,158
	Allocation for environmental mitigatio	0.25					$21,442,895
	Contingency	0.30					$25,731,473
	TOTALS			$71,476,315	$5,718,105	$8,577,158	$141,523,104

Segment J

	Cost Items	Quantity	Unit Cost	Subtotal	Design	CM/Permits	Total
Route				$4,324,809	$345,985	$518,977	$5,189,770
	Clearing & Grubbing (tr.ft)	29,719	$3.30	$98,073			
	Earthwork (Cut/Fill) (cu.ft.)	594,528	$1.30	$772,886			
	Drainage & Utilities (rte. mile)	5.63	$250,000.00	$1,407,150			
	Property Acquisition (acre)	204.67	$10,000.00	$2,046,700			
Structure				$0	$0	$0	$0
	Rehabilitate Viaduct (tr.ft.)	-	$1,360.00	$0			
	Replace Viaduct (tr.ft.)	-	$21,165.00	$0			
	New Viaduct on Old Abuts. (tr.ft.)	-	$21,165.00	$0			
	New Viaduct (completely) (tr.ft.)	-	(tr.ft. plus $2 mil)	$0			
	Aerial Structure (tf)	-	$13,720.00	$0			
	Retaining Wall - 16ft tall (LF)	-	$6,410.00	$0			
	Building Demolition (sf)	-	$7	$0			
Track				$9,960,080	$796,806	$1,195,210	$11,952,096
	New Main Line (115# Rail) (tf)	29,719	$320.00	$9,510,080			
	Repurposed Main Line (rail OK) (tf)	-	$64.00	$0			
	Shift Main Line (tf)	-	$27.00	$0			
	Turnouts	2	$225,000.00	$450,000			
	Shift Turnouts	-	$22,500	$0			
	Test & Commission	0.10					$1,714,187
	Allocation for environmental mitigation	0.25					$4,285,467
	Contingency	0.30					$5,142,560
	TOTALS			$14,284,889	$1,142,791	$1,714,187	$28,284,080