



# Wilmington Rail Realignment Alternatives Analysis

Prepared For:

Federal Railroad Administration and  
the City of Wilmington

Prepared By:

AECOM

October 2021

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## 1.0 INTRODUCTION

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The City of Wilmington (City), in coordination with the Federal Railroad Administration (FRA) (Lead Federal Agency) is undertaking a study to evaluate the realignment of an existing CSX Transportation (CSXT) freight rail line that traverses through City limits as well as unincorporated areas of Brunswick and New Hanover counties. The study, referred to as the Wilmington Rail Realignment (Project), proposes to reroute the existing freight rail line between Navassa (Davis Yard) and the Port of Wilmington. The result would create a new freight rail alignment that would improve freight rail operations, public mobility, and public safety in the region.

This Alternatives Analysis report documents the process and evaluation of alternatives considered for the Project. The result of the alternatives analysis process is the identification of a Preferred Alternative to be further evaluated through the National Environmental Policy Act (NEPA) process.

This document is organized as follows:

- Section 1 Project Description: This section defines the proposed action, Study Area, the Purpose and Need for the Project, and the study process.
- Section 2 Corridor Development Summary: Provides an overview of the development of study corridors and defines the alternatives being evaluated as part this alternatives analysis.
- Section 3 Public and Agency Involvement: This section provides an overview of the public and agency involvement to date for the Project.
- Section 4 Alternatives Evaluation: This section provides the evaluation of each of the alternatives under consideration for engineering and environmental factors.
- Section 5 Preliminary Conclusions: This section provides a summarized comparison of all the alternatives, highlights evaluation differentiators, and discusses draft recommendations for selecting a Preferred Alternative.
- Section 6 Final Recommendations: This section provides an overview of the final recommendations after considering comments received during the agency coordination meeting and virtual public open house.

### 1.1 PROJECT DESCRIPTION

#### 1.1.1 Study Area

The Study Area extends approximately one half mile on either side of the existing CSXT rail line from east of Navassa in Brunswick County to the Port of Wilmington through downtown Wilmington in New Hanover County and along the proposed new location corridors west of the Cape Fear River (Figure 1).

### 1.1.2 Proposed Action

The City is proposing to reroute the existing CSXT freight line onto a new freight rail alignment west of the City to provide a more direct route between the Port of Wilmington and Davis Yard and to eliminate 32 at-grade crossings within City limits. On a weekly basis, at least 26 train movements are made on the existing CSXT route referred to as the "Beltline". Some of the smaller, less frequent local trains may continue to operate over the northern half of the Beltline to provide access to existing rail customers for a period of time; however, the Project would seek to eventually relocate all freight rail traffic from the Beltline to the new route. The Project would not preclude future movements to the Castle Hayne Branch line (former Wilmington to Weldon Railroad). This Project also would accommodate expected future growth of freight rail operations within the Study Area.

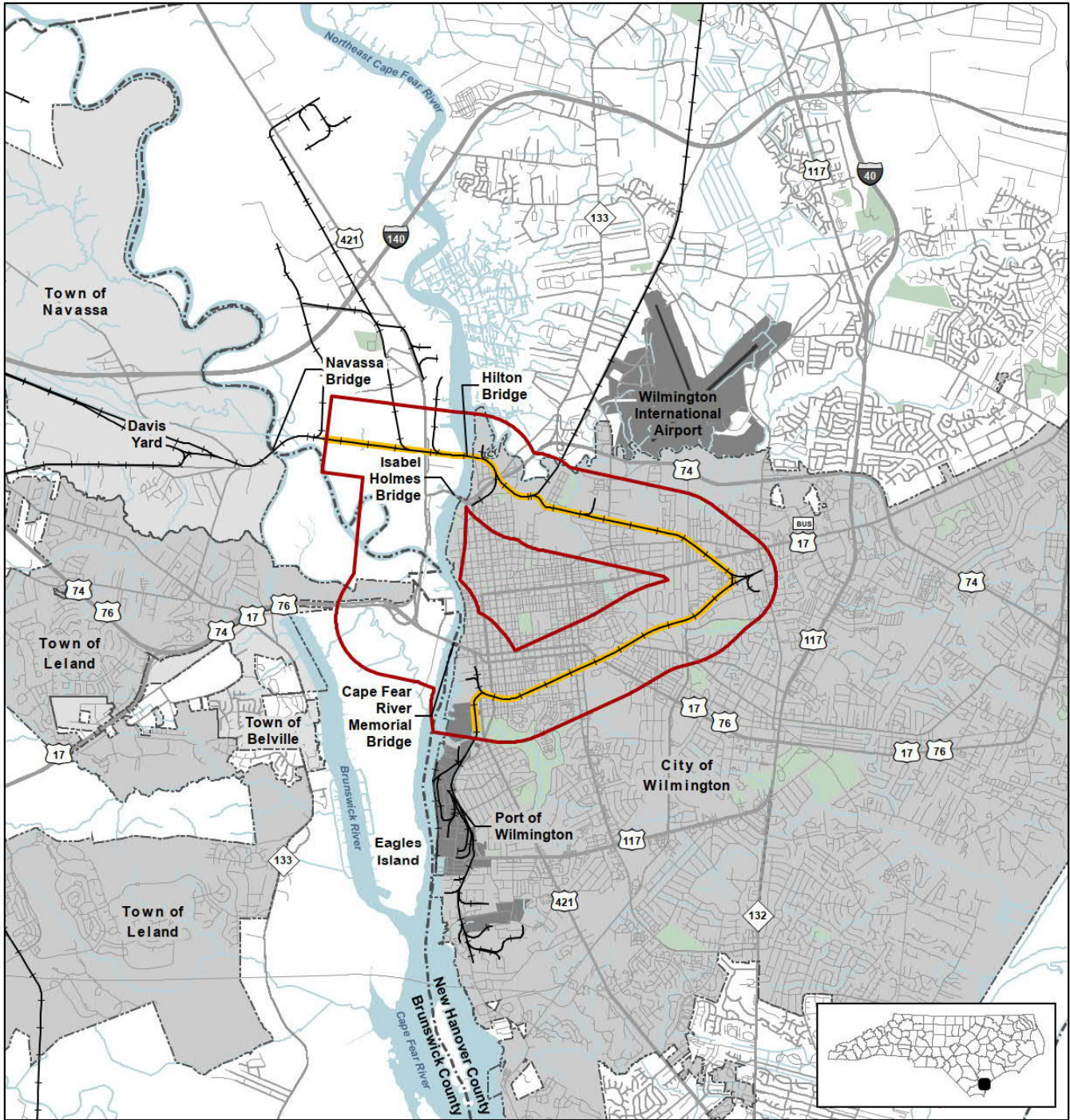
The Project would include a new single-track freight rail line that bypasses the City. The proposed freight rail line would follow S. Front Street and then crosses the Cape Fear River on a bridge structure in the vicinity of the Cape Fear Memorial Bridge (Figure 2). The rail line then would curve and head north to cross over Andrew Jackson Highway (US 74) and continues to cross the Cape Fear River before connecting to the existing CSXT freight rail line. Once the bypass rejoins the existing rail line, it continues west to Davis Yard.

### 1.1.3 Purpose and Need

The primary purpose of the Project is to improve safety, regional transportation mobility, and freight rail operations, while also improving the resiliency from storms, reliability of travel in the region, and operational fluidity of the sole freight rail route connecting the Port of Wilmington and southeastern North Carolina with the national freight rail network.

The Project addresses three main needs: enhanced efficiency of freight movement, improved safety, and improved regional mobility and reliability.





**Wilmington Rail  
Realignment Project**

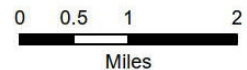
**New Hanover County and  
Brunswick County, NC**

**Legend**

- Study Area
- County Boundary
- Municipal Boundary
- Park
- Railroad
- Existing Rail Line

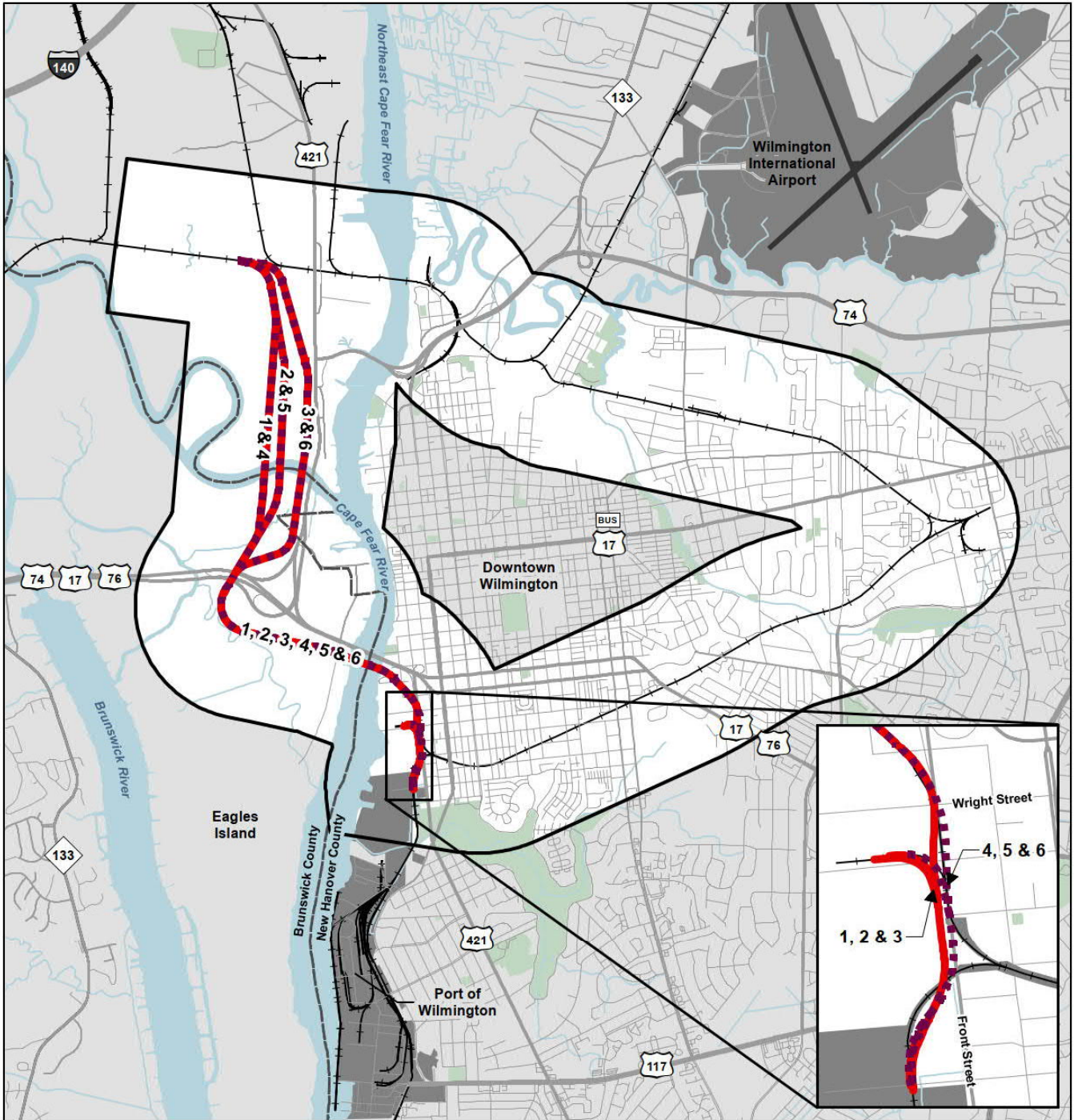
**Figure 1  
Study Area**

**Date: April 2021**



1 inch = 8,000 feet





**Wilmington Rail  
Realignment Project**

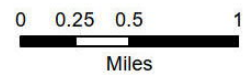
**New Hanover County and  
Brunswick County, NC**

**Legend**

- Study Area
- County Boundary
- Park
- Railroad
- Alternatives 1, 2 & 3
- Alternatives 4, 5 & 6

**Figure 2  
Proposed Alternatives**

**Date: June 2021**



1 inch = 4,000 feet



## ENHANCED EFFICIENCY OF FREIGHT MOVEMENT

Under the existing conditions, freight trains traveling between the Port of Wilmington and Davis Yard navigate through downtown Wilmington with restricted speeds of 10 mph due to movable bridges, curvature of the Beltline at the "V" east of downtown, and general track conditions. Under these constraints, it can take a freight train up to 1.75 hours to travel the 10 miles from the Hilton Bridge, north of the Cape Fear Memorial Bridge to the Port of Wilmington). According to the 2017 Wilmington Rail Improvements report, the existing rail infrastructure of the Beltline and the Port of Wilmington will not sustain anticipated future freight traffic volumes. The report notes that both the Beltline and Port of Wilmington rail lines will require additional investment to increase velocity and capacity to mitigate roadway congestion occurring when trains pass through highway-rail intersections. In addition, rail infrastructure improvements will be needed to accommodate rail volume increases over time<sup>1</sup>.

## IMPROVED SAFETY

To access the Port of Wilmington, freight trains must currently travel over seven miles through the City, crossing 30 public and two private at-grade crossings. These at-grade crossings pose potential risks to public safety from potential for traffic conflicts, transport of hazardous materials through the City, increased traffic delays, and increased auto emissions due to longer idling. With proposed freight movement growth, these risks could increase in the future.

## IMPROVED REGIONAL MOBILITY AND RELIABILITY

Due to the combined effects of rapid population growth and rapidly increasing freight volumes at the Port of Wilmington, delays at at-grade crossings will likely increase in future years and result in reduced mobility and reliability of the transportation network in the Study Area. The impacts are expected to worsen at an accelerated rate in the coming decades.

## BENEFITS OF THE PROJECT

### Improve Operational Fluidity

The Project would create a more efficient freight rail route between Navassa and the Port of Wilmington resulting in travel time savings and increased throughput capacity.

### Improved Resiliency

In addition to meeting the above needs, the Project would provide improved resiliency. Wilmington is in the designated coastal zone for North Carolina and is affected by storm surge and coastal flooding. Localized flooding and storm debris can impact regional mobility and reliability through track and roadway closures. The resiliency of the sole freight rail route serving the region would be improved by providing higher river crossings and infrastructure better designed to mitigate flood related damages. As storms and hurricanes increase in

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<sup>1</sup> Mott MacDonald. Landside Rail Improvements Service the Port and Moving Trains Safely Through the Community". September 2017. [https://connect.ncdot.gov/resources/Rail-Division-Resources/Documents/2017.09.06\\_Wilmington%20Rail%20Improvements\\_Optimized.pdf](https://connect.ncdot.gov/resources/Rail-Division-Resources/Documents/2017.09.06_Wilmington%20Rail%20Improvements_Optimized.pdf)

frequency and intensity, flooding becomes a common occurrence. During Hurricane Florence in 2017, I-40, US 421, and other major highway routes into Wilmington, as well as sections of the CSXT railroad were flooded or washed out making it difficult to transport supplies into Wilmington.

## 1.2 STUDY PROCESS

The Project is being administered under a grant provided by the FRA. Because the Project is using federal funds and will require federal permitting, the Project must comply with the National Environmental Policy Act (NEPA) of 1969, as amended. FRA's planning process identifies two phases: Pre-NEPA and NEPA. The Project is currently in the Pre-NEPA phase. In this phase, the Project is undergoing development to further define the Purpose and Need and identify a feasible range of alternatives to be considered. The goal of the Pre-NEPA phase is to identify a Preferred Alternative that would advance through the NEPA process.

The City prepared a *Draft Purpose and Need*<sup>2</sup> and completed the *Wilmington Rail Realignment Screening Report* (Screening Report) in January 2021<sup>3</sup>. The next step in the Pre-NEPA phase is the continued refinement and evaluation through the Alternatives Analysis process documented in this report. Each alternative will be reviewed using a set of engineering and environmental evaluation factors. Based on each alternative's performance against those criteria, a recommendation for a Preferred Alternative will be made and further discussed in Section 5.0. The City will seek input from the public as well as environmental and regulatory resource agencies to inform the recommendation of a Preferred Alternative. Upon approval of the Alternatives Analysis Report by the FRA, the Preferred Alternative will advance for more detailed analysis and preliminary engineering as part of the NEPA process.

In advance of the detailed discussion of the engineering and evaluation factors considered during this Alternatives Analysis process (Section 4.0); this report provides a summary of Pre-NEPA activities conducted to date. Section 2.0 details how the alignments studied in this report were developed. Section 3.0 identifies the public and agency involvement to date (note this section may have significant updates as the Alternatives Analysis process progresses and additional outreach/feedback occurs). Section 4.0 includes a discussion of the engineering and evaluation factors considered during the Alternatives Analysis process. Section 5.0 summarizes initial findings of the process and recommendations for the NEPA phase of the Project. Finally, Section 6.0 summarizes the comments received during the public and agency involvement throughout this Alternatives Analysis process, provides a final recommendation for the Preferred Alternative, and summarizes the next steps moving forward into the NEPA phase.

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<sup>2</sup> AECOM. 2021a. Wilmington Rail Realignment Draft Purpose and Need Report. January 2021. <https://www.wilmingtonnc.gov/home/showpublisheddocument/12838/637491697074270000>

<sup>3</sup> AECOM. 2021b. Wilmington Rail Realignment Corridor Screening Report. January 2021. <https://www.wilmingtonnc.gov/home/showpublisheddocument/12840/637491697093000000>

## 2.0 CORRIDOR DEVELOPMENT SUMMARY

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In 2017, the City completed the *Wilmington Rail Realignment and Right of Way Use Alternatives Feasibility Study*<sup>4</sup> that identified three potential corridors for the rail realignment. These corridors served as the basis for the Screening Report which further evaluated these corridors and resulted in a set of options that when combined create a set of end-to-end Build Alternatives to be evaluated in the Alternatives Analysis process.

### 2.1 SCREENING REPORT

During development of the Screening Report, the Project underwent a two-step screening process to assess potential corridors for the bypass and determine which alternatives should be carried forward into this Alternatives Analysis Report. The first step included an initial screening using a qualitative assessment of the three corridors recommended by the 2017 Feasibility Study. A set of screening criteria was applied that resulted in two corridors advancing for more detailed study. The second step provided a more rigorous quantitative screening evaluation of the remaining corridors. To better evaluate the remaining corridors, each corridor was divided into three Sections. Each Section was further divided into Options (Figure 3). This allowed for a more detailed evaluation of each Section and Option. Again, a set of evaluation criteria were applied to each Section and Option. As discussed in the Screening Report, several metrics led to the elimination of corridors and options from the first and second screening evaluations, including, lack of direct movements, number of highway crossings, inconsistency with local plans, proximity to the USS North Carolina Battleship, and human and environmental impacts.

In addition to evaluating the proposed Options, the Screening Report also evaluated a No-Build Alternative and Upgrade Existing Alternative for comparison. The No-Build Alternative assumed that no changes to the existing CSXT freight rail line (track or operations) would occur through the City. The Upgrade Existing Alternative looked at ways to improve the existing rail line while achieving some of the same benefits as a new route.

The Screening Report also considered a new location corridor crossing the Cape Fear River approximately 3,500 feet south of the existing Cape Fear Memorial Bridge. This crossing was studied at a conceptual level based on comments received from the public during the November 2020 Public Open House (see Section 3.2 for additional details). Conceptual engineering evaluations determined that crossing the Cape Fear River at this location was not feasible because it would require impractical grades needed to meet clearance requirements for Battleship Road on Eagles Island. Steeper track grades require additional locomotive power resulting in additional operating costs. Additionally, soil conditions along Eagles Island are assumed to be poor quality due to the history of the US Army Corps of Engineers using the land

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<sup>4</sup> Moffatt and Nichol. 2017. *Wilmington Rail Realignment and Right of Way Use Alternatives Feasibility Study*. June 2017.

<https://www.wilmingtonnc.gov/home/showpublisheddocument/11206/637152921723230000>

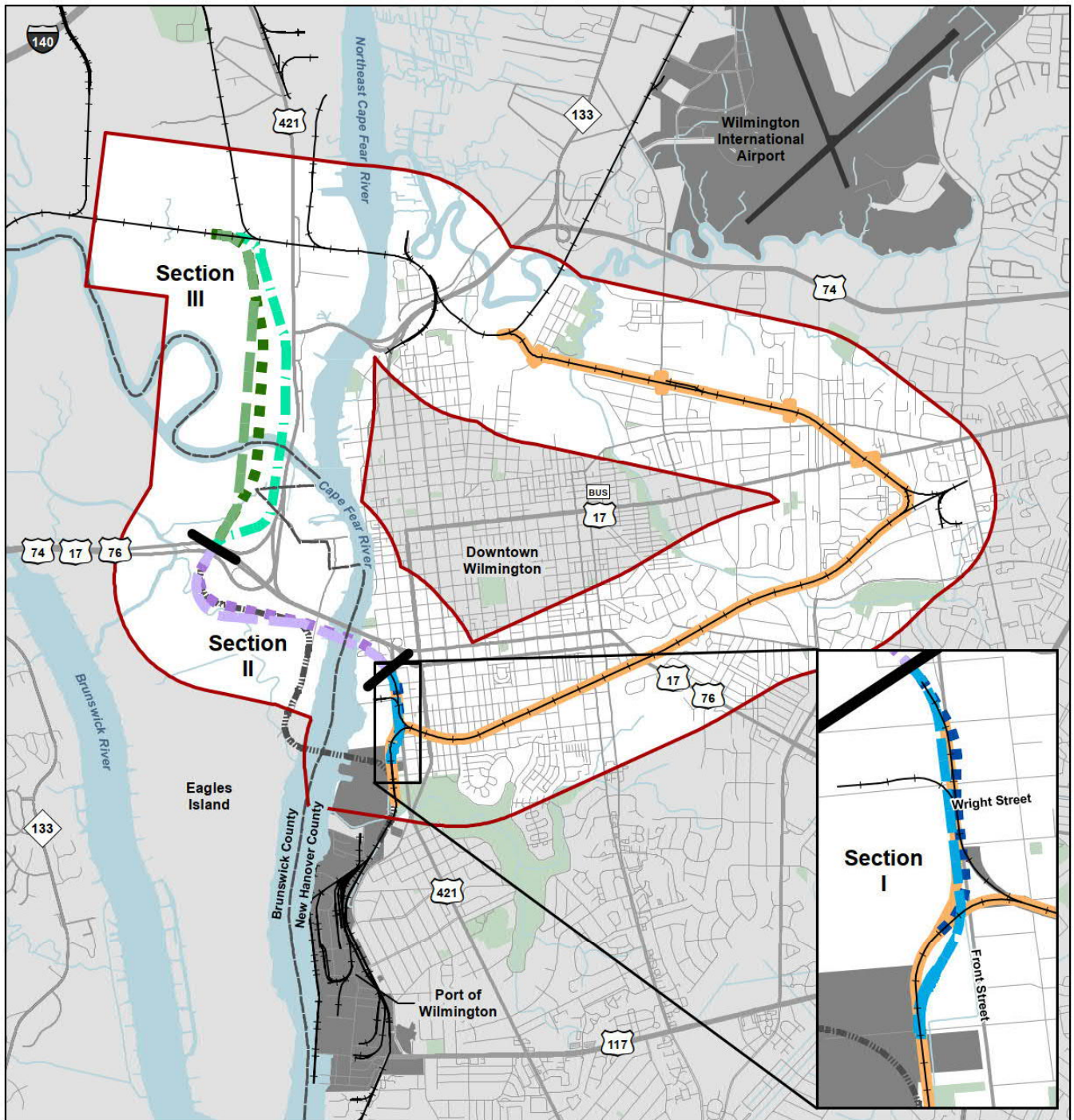
for the placement of dredged materials, thus prohibitively increasing the project costs. These types of soil conditions are not suitable to use as sub-grade or foundation material for the proposed railbed as they are typically high in sand, silt, and organic materials and cannot reliably hold rail loadings. This more southern crossing would likely have more structure length than the other Build Alternatives due to the additional width of the navigational channel at this location, adding to the complexity of design and construction. Also, a connection to shippers located north of the Port of Wilmington, within the Wilmington Historic District, would still need to be constructed to provide a connection between this more southern corridor and the Port of Wilmington. A detailed description of the engineering constraints has been appended to this report. A crossing any further south was determined to be infeasible due to potential interferences with the Port of Wilmington turning basin within the Cape Fear River. A crossing south of the Port of Wilmington was also determined to be infeasible due to bridge height requirements that would be needed to continue to provide access to ships calling to the Port of Wilmington. This concept was eliminated as part of the 2017 Feasibility Study.

The screening process resulted in the identification of Sections and Options that could be combined to form end-to-end Build Alternatives for further evaluation in this report. The following is a summary of the outcomes of the screening process:

- No-Build Alternative advanced for comparison
- Upgrade existing was eliminated from further study due to potential impacts on the built environment and engineering constraints associated with elevating the rail line
- Section 1: Options a and b advance
- Section 2: Option b advances; Option a was eliminated due to inconsistency with the Cape Fear Memorial Bridge Replacement Feasibility Study and higher likelihood of impacts to natural resources
- Section 3: Options a, b, and c advance

As such, the following options were carried forward for further investigation through the Alternatives Analysis process as described in Section 2.2 of this report: No-Build, Section 1 Option a, Section 1 Option b, Section 2 Option b, Section 3 Option a, Section 3 Option b, and Section 3 Option c. Details of the screening process and analysis are provided in the Screening Report.





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Realignment Project**

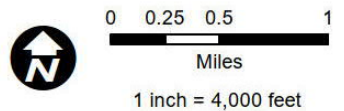
**New Hanover County and  
Brunswick County, NC**

**Legend**

- Study Area
- County Boundary
- Park
- Railroad
- Upgrade Existing
- Section I Option a
- Section I Option b
- Section II Option a
- Section II Option b
- Section III Option a
- Section III Option b
- Section III Option c
- Conceptual Southern Crossing Option

**Figure 3  
Screening Report Corridors**

**Date: June 2021**



## 2.2 PROPOSED BUILD ALTERNATIVES

By combining the remaining options within each of the three sections after the Screening Report was finalized (see Section 2.1), six Build Alternatives are possible. The components of the six Build Alternatives are presented in Table 1. As proposed, each of the Build Alternatives consists of approximately four miles of new track between the Port of Wilmington and the CSXT SE line to connect to Davis/Navassa Yard. All six Build Alternatives share a common route over the Cape Fear River and US 74 (Section II). The locations of the Build Alternatives are shown on Figure 4 through Figure 9.

Table 1: Build Alternatives

Proposed Alternative		Section I		Section II		Section III
Alternative 1	=	Option a	+	Option b	+	Option a
Alternative 2	=	Option a	+	Option b	+	Option b
Alternative 3	=	Option a	+	Option b	+	Option c
Alternative 4	=	Option b	+	Option b	+	Option a
Alternative 5	=	Option b	+	Option b	+	Option b
Alternative 6	=	Option b	+	Option b	+	Option c

In addition to these six Build Alternatives, the No-Build Alternative will be evaluated as a baseline for comparison to the Build Alternatives.

### 2.2.1 No-Build Alternative

The No-Build Alternative includes the existing Beltline through the City and provides a connection between the Port of Wilmington and Davis Yard via the CSXT SE line. It is approximately eight miles in length and has 32 at-grade crossings. The Project does not propose any new elements or improvements under the No-Build Alternative. All existing conditions would remain the same except for improvements planned as part of the Wilmington Beltline Improvement Project (North Carolina Department of Transportation (NCDOT) State Transportation Improvement Program (STIP) Project P-5740)<sup>5</sup> and two additional grade-separated crossings that are planned as part of the Independence Boulevard Project (NCDOT STIP U-4434). In general, existing conditions would remain the same as current conditions. Freight rail traffic would continue to operate along the Beltline through the City's most densely populated areas. The numerous at-grade crossings create a safety concern through the City due to the potential for rail/vehicle conflicts and pedestrians crossing the rail tracks. The existing freight rail tracks would continue to be subject to flooding during major storm events,

<sup>5</sup> North Carolina Department of Transportation (NCDOT). 2021. NCDOT: 2020-2029 Current STIP. March 2021.

<https://connect.ncdot.gov/projects/planning/STIPDocuments1/NCDOT%20Current%20STIP.pdf>

impeding the movement of goods. Regional mobility and reliability would continue to worsen due to increases in population and freight operations within the Study Area.

### 2.2.2 Alternative 1

Alternative 1 begins by tying into the existing Wilmington Terminal Railroad (WTRY) line at Greenfield Street, then follows along the west side of S. Front Street. At Wright Street, this Build Alternative turns northwest to cross Surry Street and crosses the Cape Fear River on structure for approximately one mile before turning north and crossing over US 17 just west of the existing US 17/US 421/US 74/US 76 interchange. Alternative 1 then crosses the western leg of the Cape Fear River and returns to grade before continuing north to tie into the existing CSXT SE Line approximately 0.4 mile west of US 421. Alternative 1 is shown on Figure 4.

### 2.2.3 Alternative 2

Alternative 2 begins by tying into the existing WTRY line and follows the same alignment as Alternative 1 along the west side of S. Front Street and the crossing of the Cape Fear River. After crossing the existing US 17/US 421/US 74/US 76 interchange and the western leg of the Cape Fear River, the centerline of Alternative 2 travels north parallel to US 421 approximately 400 feet east of the centerline for Alternatives 1 and 4 and ties into the existing CSXT SE Line approximately 0.4 mile west of US 421 at the same approximate location as Alternatives 1 and 4. Alternative 2 is shown on Figure 5.

### 2.2.4 Alternative 3

Alternative 3 begins by tying into the existing WTRY line and follows the same alignment as Alternatives 1 and 2 along the west side of S. Front Street and the crossing of the Cape Fear River. After crossing the existing US 17/US 421/US 74/US 76 interchange and the western leg of the Cape Fear River, the centerline of Alternative 3 travels north parallel to US 421 approximately 700 feet east of the centerline for Alternatives 2 and 5, and ties into the existing CSXT SE Line approximately 0.3 mile west of US 421. Alternative 3 is shown on Figure 6.

### 2.2.5 Alternative 4

Alternative 4 begins by tying into the existing WTRY line at Greenfield Street, follows north along existing Front Street until Meares Street, then crosses S. Front Street to continue slightly east of S. Front Street. At Wright Street, Alternative 4 turns northwest to cross Surry Street, crosses the Cape Fear River on structure for approximately one mile before turning north and crossing over US 17 just west of the existing US 17/US 421/US 74/US 76 interchange. Following the same alignment as Alternative 1 west of the Cape Fear River, the alternative then crosses the western leg of the Cape Fear River and returns to grade. Alternative 4 continues north to tie into the existing CSXT SE Line approximately 0.4 mile west of US 421. Alternative 4 is shown on Figure 7.

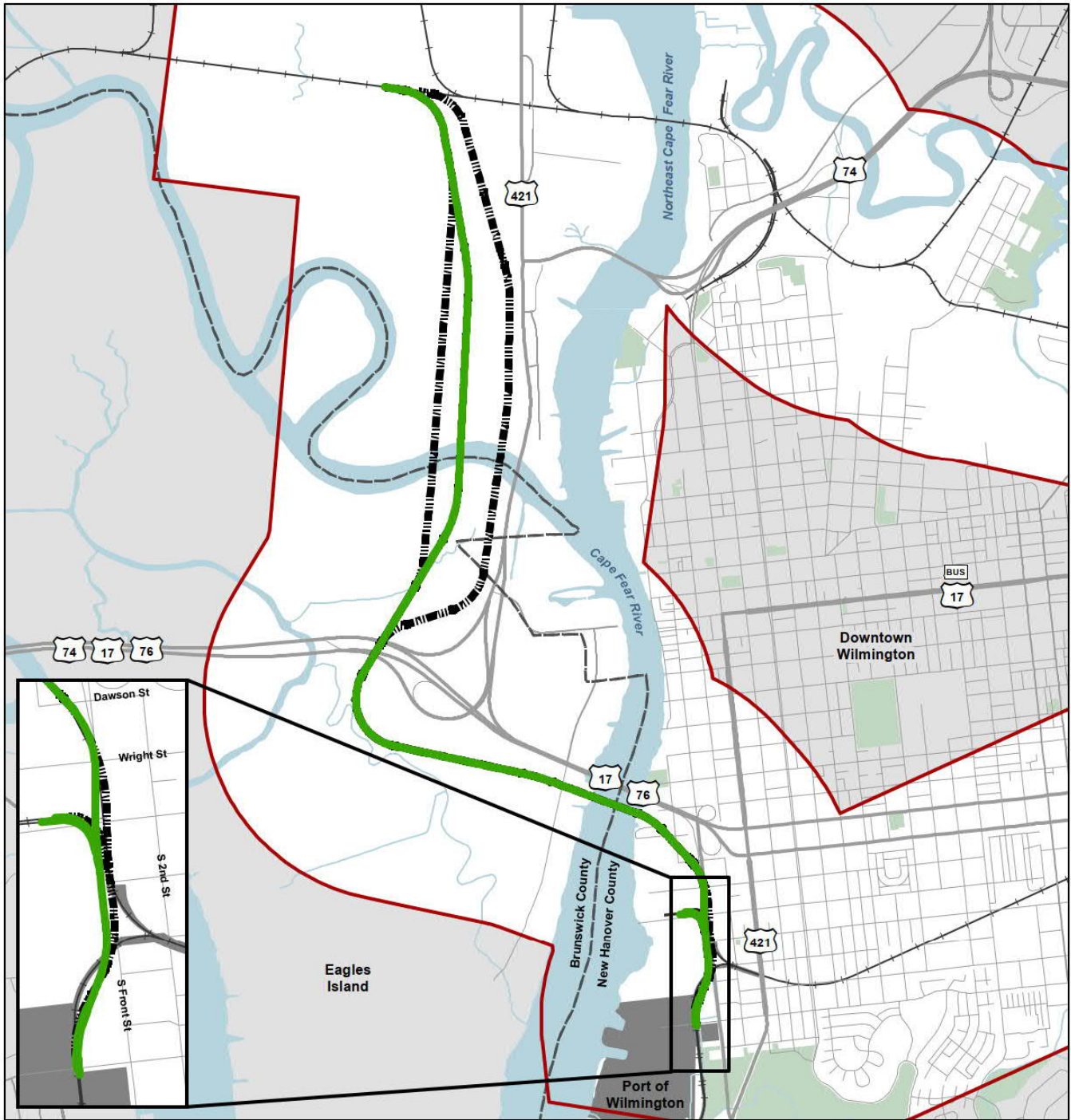
### 2.2.6 Alternative 5

Alternative 5 follows the same alignment as Alternative 4 starting at the existing WTRY line. After crossing the Cape Fear River, Alternative 5 turns north and crosses over US 17 just west of the existing US 17/US 421/US 74/US 76 interchange. The centerline for this concept travels north parallel to US 421 approximately 400 feet east of the centerline for Alternatives 1 and 4 and ties into the existing CSXT SE Line at the same approximate location as Alternatives 1 and 4. Alternative 5 is shown on Figure 8.

### 2.2.7 Alternative 6

Alternative 6 follows the same alignment as Alternatives 4 and 5 starting at the existing WTRY line at Greenfield Street. After crossing the Cape Fear River, Alternative 6 turns north and crosses over US 17 just west of the existing US 17/US 421/US 74/US 76 interchange. The centerline for this concept travels north parallel to US 421 approximately 700 feet east of the centerline for Alternatives 2 and 5, and ties into the existing CSXT SE Line approximately 0.3 mile west of US 421. Alternative 6 is shown on Figure 9.





**Wilmington Rail  
Realignment Project**

**New Hanover County and  
Brunswick County, NC**

**Legend**

- Study Area
- County Boundary
- Park
- Railroad
- Alternative 2
- Other Proposed Build Alternatives

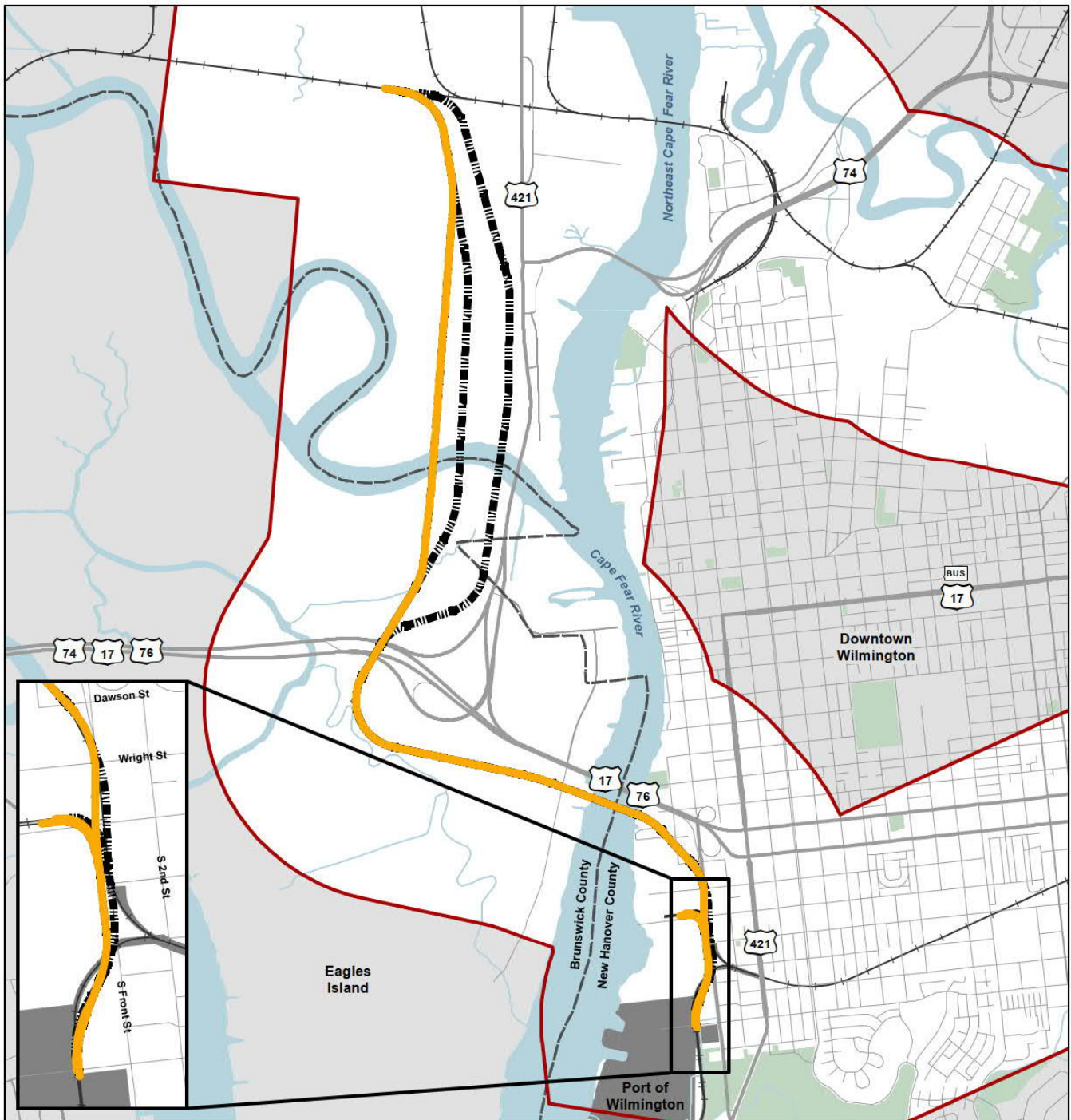
**Figure 5  
Build Alternative 2**

**Date: June 2021**



0 0.125 0.25 0.5  
Miles

1 inch = 2,250 feet



**Wilmington Rail  
Realignment Project**

**New Hanover County and  
Brunswick County, NC**

**Legend**

- Study Area
- County Boundary
- Park
- Railroad
- Alternative 1
- Other Proposed Build Alternatives

**Figure 4  
Build Alternative 1**

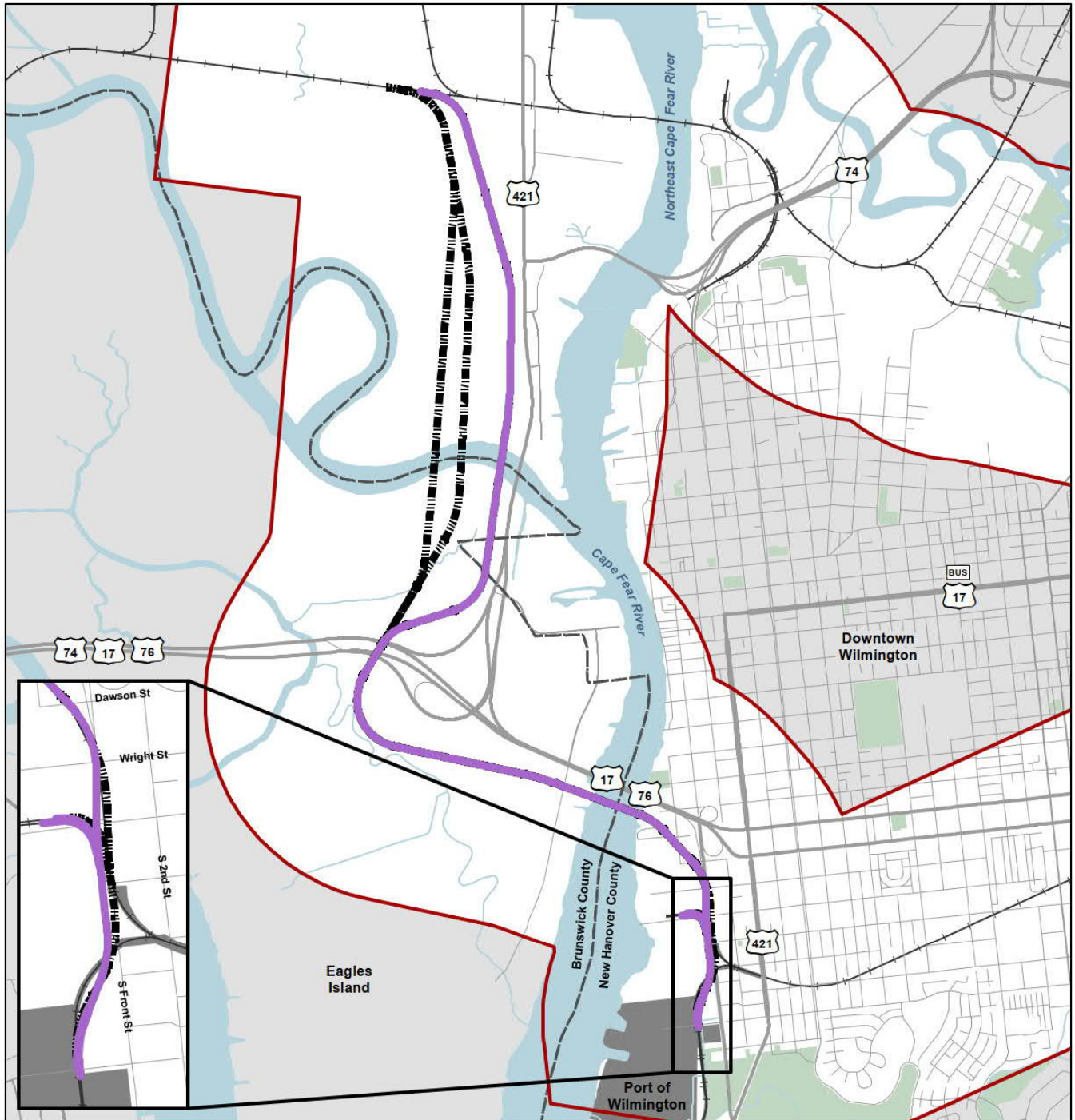
**Date: June 2021**



0 0.125 0.25 0.5  
Miles

1 inch = 2,250 feet





**Wilmington Rail  
Realignment Project**

**New Hanover County and  
Brunswick County, NC**

**Legend**

- Study Area
- County Boundary
- Park
- Railroad
- Alternative 3
- Other Proposed Build Alternatives

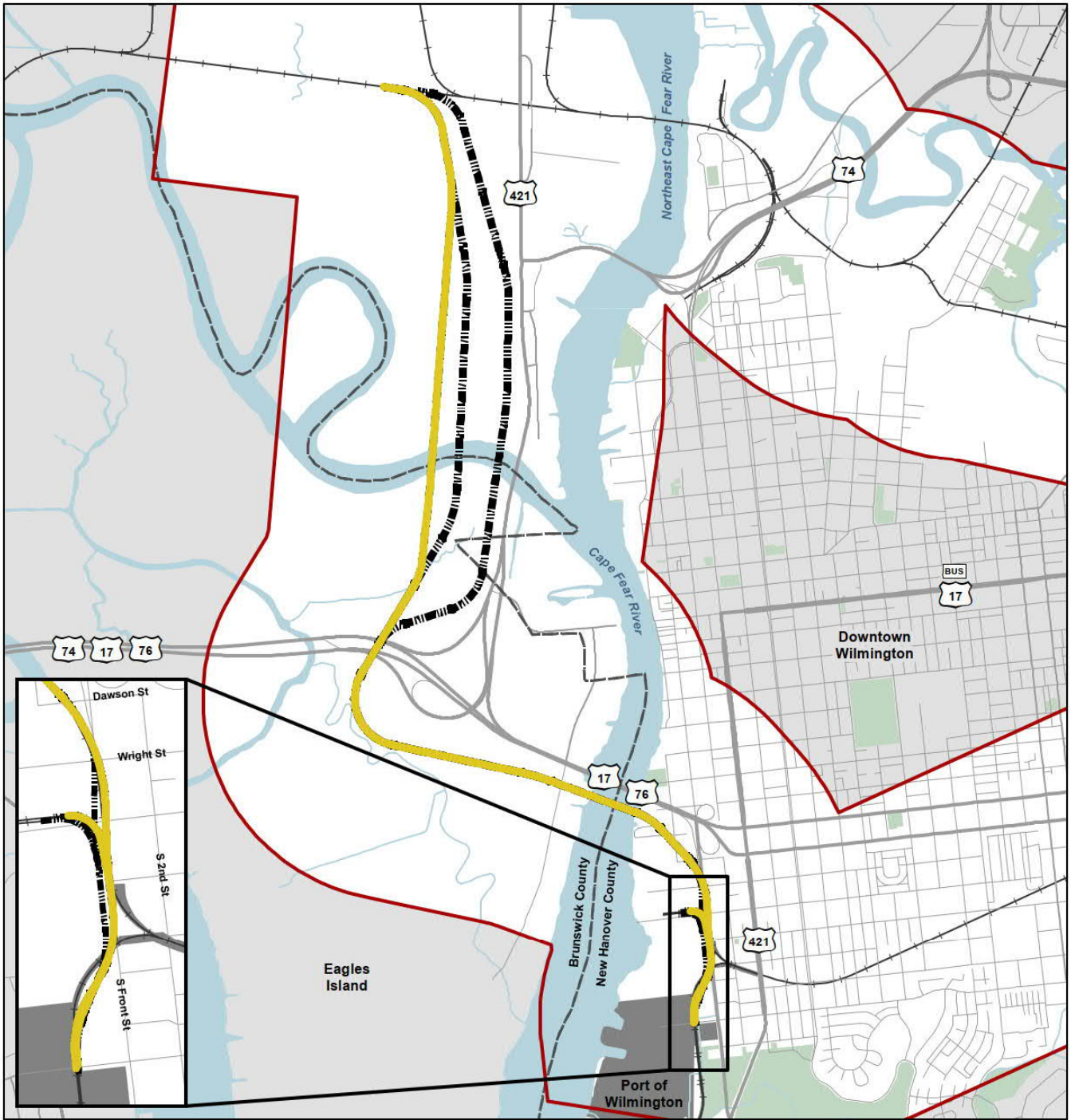
**Figure 6  
Build Alternative 3**

**Date: June 2021**



0 0.125 0.25 0.5  
Miles

1 inch = 2,250 feet



**Wilmington Rail  
Realignment Project**

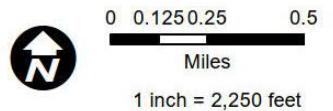
**New Hanover County and  
Brunswick County, NC**

**Legend**

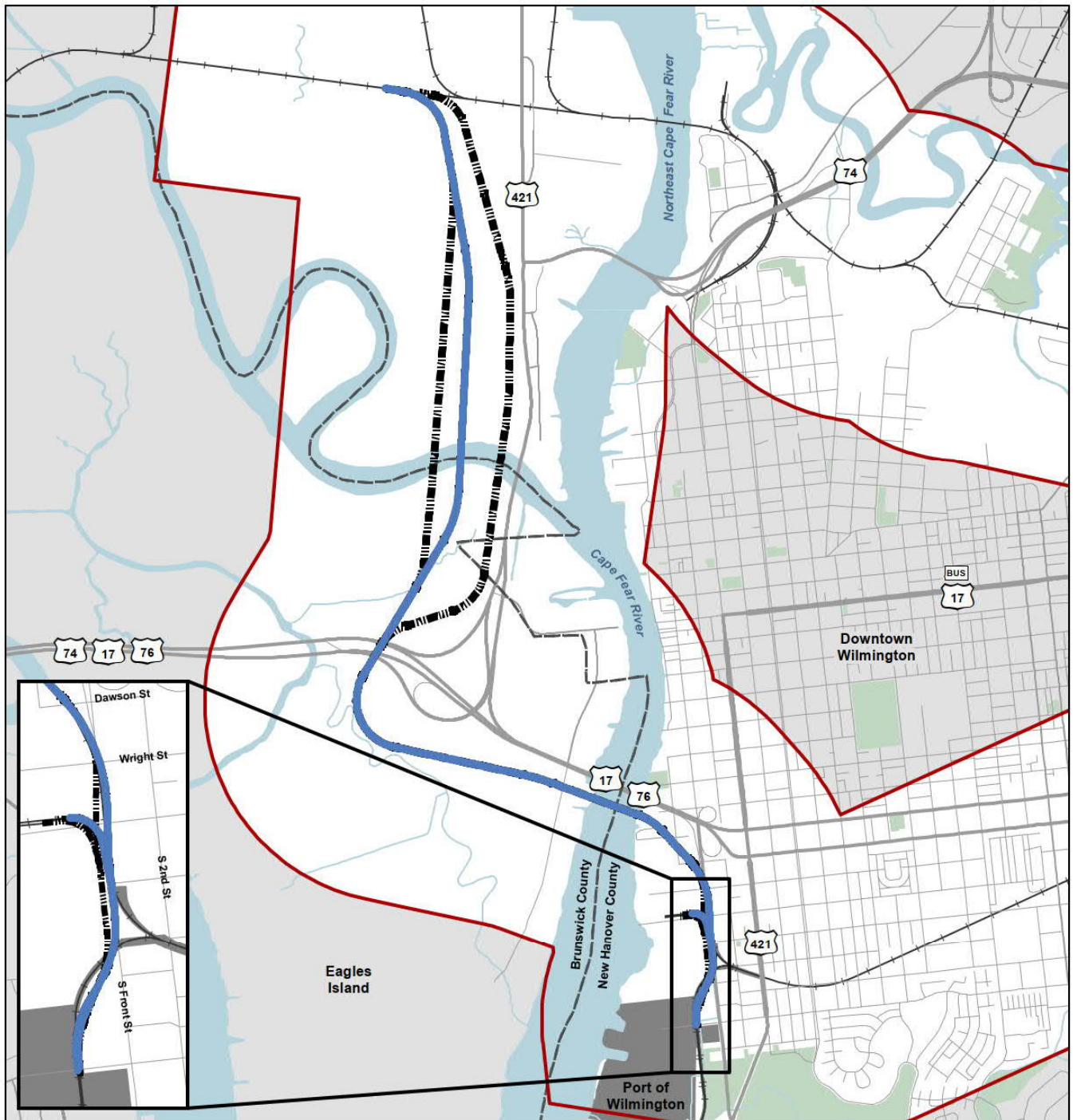
- Study Area
- County Boundary
- Park
- Railroad
- Alternative 4
- Other Proposed Build Alternatives

**Figure 7  
Build Alternative 4**

**Date: June 2021**







**Wilmington Rail  
Realignment Project**

**New Hanover County and  
Brunswick County, NC**

**Legend**

- Study Area
- County Boundary
- Park
- Railroad
- Alternative 5
- Other Proposed Build Alternatives

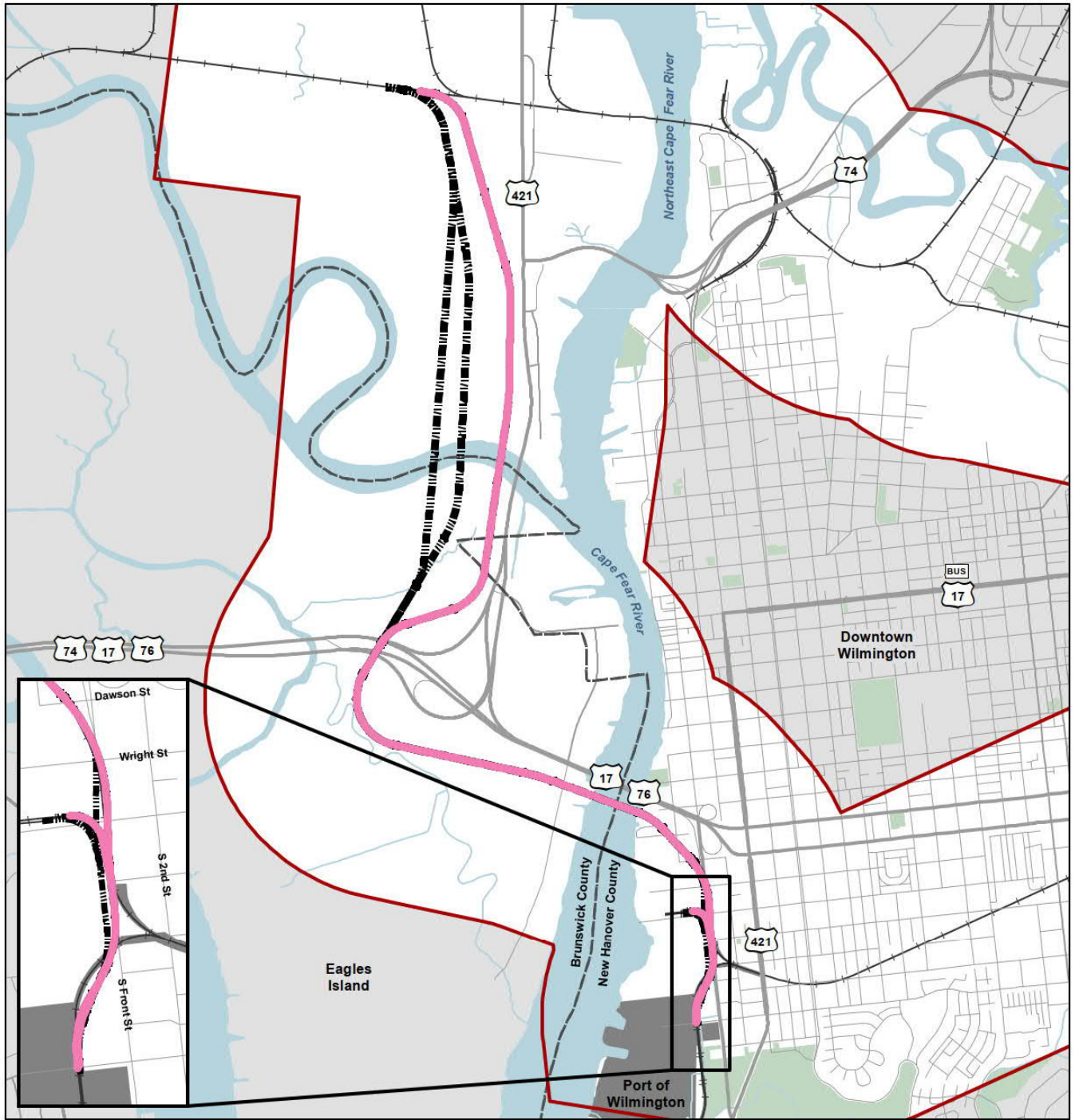
**Figure 8  
Build Alternative 5**

**Date: June 2021**



0 0.125 0.25 0.5  
Miles

1 inch = 2,250 feet



**Wilmington Rail  
Realignment Project**

**New Hanover County and  
Brunswick County, NC**

**Legend**

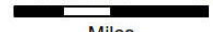
- Study Area
- County Boundary
- Park
- Railroad
- Alternative 6
- Other Proposed Build Alternatives

**Figure 9  
Build Alternative 6**

**Date: June 2021**



0 0.125 0.25 0.5



Miles

1 inch = 2,250 feet



## 3.0 PUBLIC AND AGENCY INVOLVEMENT

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A Public Involvement Plan (PIP) has been developed for conducting and documenting agency coordination and public outreach efforts in support of the Project. It outlines, then describes in detail, the key goals of the PIP, methods to achieve the stated goals, appropriate steps for the successful implementation of the PIP, and overall schedule of planned activities. The City will coordinate with agency representatives from various federal and state regulatory agencies during the planning process to ensure compatibility between the Project and resource protection regulations. The PIP identifies the various agencies and stakeholders as well as the various methods of outreach<sup>6</sup>.

### 3.1 AGENCY INVOLVEMENT

The FRA is the lead federal agency for this Project. Agencies with jurisdiction over various human, cultural, and natural resources potentially affected by the Project were contacted to be a cooperating agency and include:

- United States Army Corps of Engineers
- United States Coast Guard
- United States Environmental Protection Agency
- United States Fish and Wildlife Service
- National Marine Fisheries Service
- Surface Transportation Board

At the time of this report, agencies in bold have accepted a cooperating agency role.

Coordination with regulatory and resource agencies has been ongoing since Project inception and will be integral throughout the duration of the Project. Meetings will be held with agencies at targeted specific decision points during Project planning to address NEPA and other applicable federal regulatory requirements concurrently to streamline decision-making. The first such meeting was held with agency representatives on November 12, 2020 to introduce the Project, identify the preliminary purpose and need, discuss the corridor screening process, and receive feedback on the Project. A summary of this meeting is included in Appendix A.

The information included to-date is a synopsis of agency involvement through the Screening Report development and this report will be updated to include all additional coordination conducted with agencies through the Alternatives Analysis process prior to finalization.

### 3.2 PUBLIC INVOLVEMENT

Virtual open houses were available to the public to review Project information and materials. The first was held from November 16, 2020 to December 15, 2020 as part of the Screening Report effort. The second was held June 28, 2021 and July 28, 2021 for the Alternatives

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<sup>6</sup> AECOM. 2021c. Wilmington Rail Realignment Draft Public Involvement Plan. January 2021. <https://www.wilmingtonnc.gov/home/showpublisheddocument/12376/637459793346970000>



Analysis. Open houses were advertised by several media outlets including local news channels and newspapers. A variety of advertisement methods and outreach were implemented including:

- Public outreach work session
- Wilmington City Council meeting
- City of Wilmington social media plan
- Postcard mailings
- Project website updates
- Quarterly project updates
- Direct communication with stakeholders
- Local media advertisements
- Email notifications
- Flyer distributions
- Hard copy meeting materials

From the first open house, fifty-six public comments were received during the public comment period. Topics of the comments received include opposition to corridors presented, safety concerns, traffic concerns, physical, human, cultural, and natural resource impacts, bicycle and pedestrian accommodations, and environmental justice considerations. Comments were received requesting a crossing further south to be considered. As discussed in Section 2.1, this crossing was developed at a conceptual engineering level and eliminated from further study due to numerous navigational and engineering constraints.

Items listed above in bold font were part of the targeted minority and/or low-income community outreach. Special populations identified in the Study Area include low-income and minority population groups that have been traditionally underrepresented in public engagement efforts. These groups account for a high percentage of the population in the Study Area, which heightens the importance of ensuring these populations are engaged and consulted in the Project's development. To address the unique needs of these populations, the first of several planned special populations public outreach work sessions ("Community Ambassador Discussions") was held with community leaders on October 6th, 2020 in order to obtain their feedback on:

- Appropriate project messaging to reach the community
- Community engagement materials/techniques
- Opportunities to deliver on-site presentations/offer on-site presentations to key groups

Feedback from this special populations work-session included:

- An emphasis on the importance of conducting a variety of outreach communication techniques to reach the community
- An emphasis on the importance of augmenting planned outreach with low-tech, personal communication

- An emphasis on the importance of collaboration with the public and community groups throughout the Project's development

This feedback was immediately incorporated into the Project's Screening Report outreach initiatives and is reflected in the following techniques deployed to ensure that public outreach was reaching identified special populations, to include:

- Supplementing the Press Release for mainstream media with purchased advertising in *The Wilmington Journal*. *The Wilmington Journal* is a local publication geared towards the African American perspective with deep roots in the Study Area communities
- Supplementing the virtual meeting room with printed meeting room materials in local community centers, libraries, and City offices
- Posting flyers advertising input opportunities in local community centers, libraries, and City offices
- Mailing postcards advertising the public input opportunities to residences in close proximity to the existing rail corridor
- Committing to the hosting of similar "Community Ambassador Discussions" in advance of each public meeting for assistance/feedback on planned outreach techniques

The special populations outreach methodology described is consistent with and follows section 1.6.1 Special Populations Outreach in the Project's PIP6.

See Section 6.1 for comments received and response as part of the second open house.

A summary of the comprehensive outreach methods and comments received from the virtual open house is included in Appendix B.

## 4.0 ALTERNATIVES EVALUATION

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To evaluate each of the alternatives and make a recommendation for the Preferred Alternative, engineering characteristics of the alternatives were evaluated as well as the potential impacts to human, cultural, and natural resources. Potential impacts of the six Build Alternatives were assessed by analyzing an affected environment for each resource. For comparison, the No-Build Alternative is also presented and evaluated. It is assumed that existing conditions would remain the same under the No-Build Alternative as no improvements are proposed to the existing rail line by the Project.

Each Build Alternative was evaluated against the same set of criteria, as described in the following sections. Due to the proximity of the six Build Alternatives, as well as sharing portions of their alignments (as described in Section 2.2), the Build Alternatives share many similar characteristics. However, it is essential to evaluate each Build Alternative individually and consider where they differ to assess which alternative is optimal. A summary of quantitative and qualitative engineering, human environment, and physical environment considerations is included in Section 5.0, to compare relative impacts of all Alternatives towards identification of a Preferred Alternative.

### 4.1 ENGINEERING CONSIDERATIONS

Several factors were considered in evaluating each Build Alternative from an engineering perspective. The metrics include track length, horizontal and vertical alignment, turnouts, grade crossings, length and type of structures, presence of major utilities, and on-going transportation projects within the Study Area. These factors identify design features that may be more desirable from an engineering and operations perspective. These factors will also be considered when developing cost estimates. Project costs are dependent upon many variables including but not limited to track length, structure length and height, type and number of structures, subsurface conditions, environmental mitigation (i.e., purchasing wetland bank credits, wetland restoration, site specific design features, etc.), utility impacts, maintenance costs, and operational costs. While detailed cost estimates have not been included as an evaluation factor in this Alternatives Analysis Report, at this stage it can be assumed that the greater the involvement or impact to any one or combination of these variables, the greater the costs.

During the Screening phase, conceptual engineering for the Project considered each conceptual corridor's compatibility with the S. Front Street Widening (NCDOT STIP U-5734) and Cape Fear Memorial Bridge replacement projects. After the Screening Report was complete, the Isabel Holmes Bridge Flyovers Project (NCDOT STIP U-5731) was identified as being in the vicinity of the Project and preliminary designs for this project were obtained. After evaluation of these designs it was determined that compatibility with the Isabel Holmes Bridge Flyovers Project should also be considered a factor in evaluating Build Alternatives for the Project.



Other engineering considerations include grade separations, curves, and track length. Another factor considered is the height and type of span to cross the Cape Fear River. A Navigational Impact Report is being prepared for the Project in coordination with Section 1.0 and Appendix A of the US Coast Guard’s Bridge Permit Application Guide, COMPDTPUB P16591.3D, July 2016. As planning for the Project progresses, refinements to the design may occur to avoid or minimize impacts to identified resources or to improve operational efficiency. These engineering considerations would influence the cost of the Project.

Table 2 provides a summary of the results of the engineering characteristics considered for each alternative.

Table 2: Engineering Criteria Comparison Matrix

Metric	Alternative						
	No-Build	1	2	3	4	5	6
Design Features							
Length of new track/length of existing track (miles)	0.0/8.02	3.98/0	4.01/0	4.12/0	4.03/0	4.06/0	4.17/0
Number of sharp mainline curves (8 deg or greater)	5	1	1	3	2	2	4
Number of turnouts	7	4	4	4	3	3	3
Number of public at-grade crossings	30	1	1	1	4	4	4
Number of grade separations	5	2	2	3	2	2	3
Number of bridges over water	3	3	3	2	3	3	2
Length of track on proposed structure Track Feet (TF)	n/a	11,049	11,149	12,299	11,049	11,149	12,299
Number of major Utility Line crossings	n/a	1	3	3	1	3	3
Reuse of out-of-service railbed (TF)	n/a	1,847	3,354	n/a	1,847	3,354	n/a
Potential to accommodate future STIP U-5731 US 421 at Isabel Holmes Bridge Flyovers Project?	n/a	Yes	Yes	No	Yes	Yes	No

#### 4.1.1 Design Features

The No-Build Alternative is approximately eight miles in length and has 30 at-grade public crossings, with the only improvements planned as part of the Wilmington Beltline Improvement Project (NCDOT STIP P-5740) and two additional grade-separated crossings that are planned as part of the Independence Boulevard Project (NCDOT STIP U-4434). Therefore, freight rail traffic would continue to operate along the Beltline through the City, which creates a safety

concern due to the potential for rail/vehicle conflicts and pedestrians crossing the rail tracks at numerous at-grade crossings.

In contrast, each of the Build Alternatives consist of approximately four miles of new track between the Port of Wilmington and the CSXT SE line to connect to Davis Yard. This is half the distance when compared to the No-Build Alternative. All Build Alternative alignments significantly reduce the number of at-grade crossings because freight rail traffic would bypass the City, directly resulting in improved safety. All Build Alternatives result in one public at-grade crossing at Dawson Street<sup>7</sup>; however, Alternatives 4, 5, and 6 have three additional public at-grade crossings of S. Front Street that cannot be avoided without closing S. Front Street. Alternatives 4, 5, and 6 utilize the original designs for the S. Front Street Widening (STIP U-5734). All Build Alternatives require a grade separation crossing of US 76 located west of the interchange with US 74/US 421.

Due to expansive wetland presence on Eagles Island, any Build Alternative would require an elevated structure such as a bridge to minimize impacts to waterways, wetlands, and floodplains. The elevated structure also reduces the risk for potential flooding of the tracks during storm events. The elevated structure would be built using materials able to withstand repeated flooding and storm events to provide resiliency and maintain reliability of freight operations. Alternatives 3 and 6 have the greatest amounts of track proposed on structure. All Build Alternatives involve two waterway crossings: however, Alternatives 1, 2, 4 and 5 cross over an additional man-made open water body located to the north of the US 17/ US 74/US 421 interchange. For the northern crossing of the Cape Fear River, the river bends in the vicinity of where all the Build Alternatives cross. Alternatives 1 and 4 cross at the far side of the bend which may be preferable for boats navigating that portion of the river. Alternatives 2 and 5 cross in the middle of the river bend and Alternatives 3 and 6 cross at the approach of the bend which may be less desirable. In addition, all the Build Alternatives cross the Alligator Creek restoration project on elevated structure. More information about the Alligator Creek restoration project is provided in Section 4.2.1.

#### 4.1.2 Utility Line Crossings

Alternatives 2, 3, 5, and 6 require three crossings of the major utility line in the area compared to Alternatives 1 and 4 that only require one crossing of the line. Due to the need for an elevated track structure in this area, clearance requirements would need to be met and may result in the need to raise the transmission line. Fewer crossings are preferable.

#### 4.1.3 Out-of-Service Railbed Use

One of the key differentiators among the Build Alternatives is the potential reuse of the out-of-service railbed located west of US 17/US 421 on Eagles Island. During Screening Report

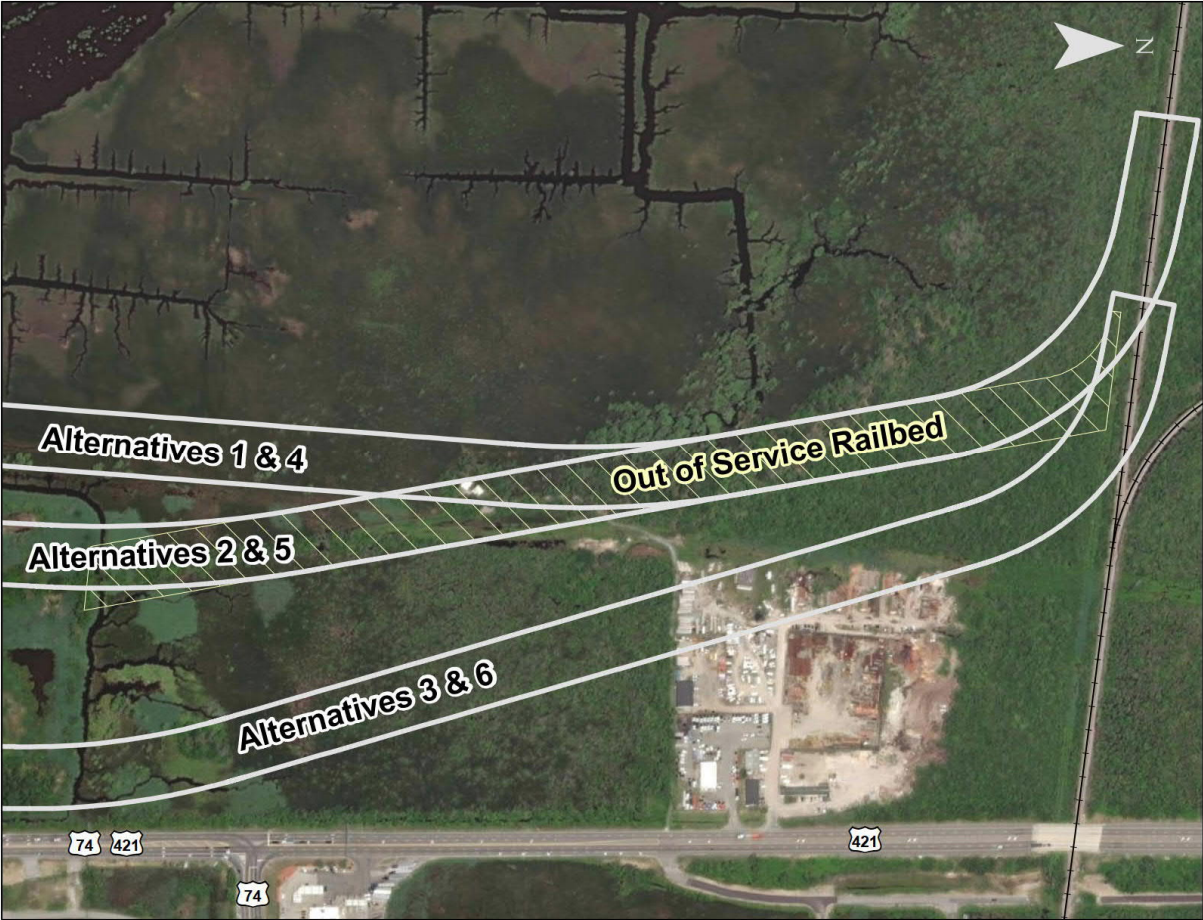
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<sup>7</sup> As planning for the Project progresses, this at-grade crossing will be further evaluated and may be eliminated. This would result in zero new public at-grade crossings for Alternatives 1, 2, and 3.

development, reviewing agencies suggested that the reuse of the existing railbed be considered. The out-of-service railbed is a remnant of the Atlantic Coastline Railroad Company and has been out of service for over 100 years. The out-of-service railbed is not intact and has no visible rail infrastructure present (tracks, ties, etc.); therefore, the integrity of this existing railbed is uncertain. The out-of-service railbed would require reconstruction if used as part of the project and could result in additional temporary wetland impacts during construction of the Project.

Alternatives 2 and 5 have the greatest length of reuse of the rail bed. Portions of the railbed remain as a raised berm above natural ground level. Exhibit 1 below shows the approximate location of the rail bed as interpreted from historic deed records. As described in Section 4.2.6, reuse of the railbed does provide an opportunity to minimize impacts to higher quality wetlands identified west of the railbed.

Exhibit 1: Approximate Location of Out-of-Service Railbed

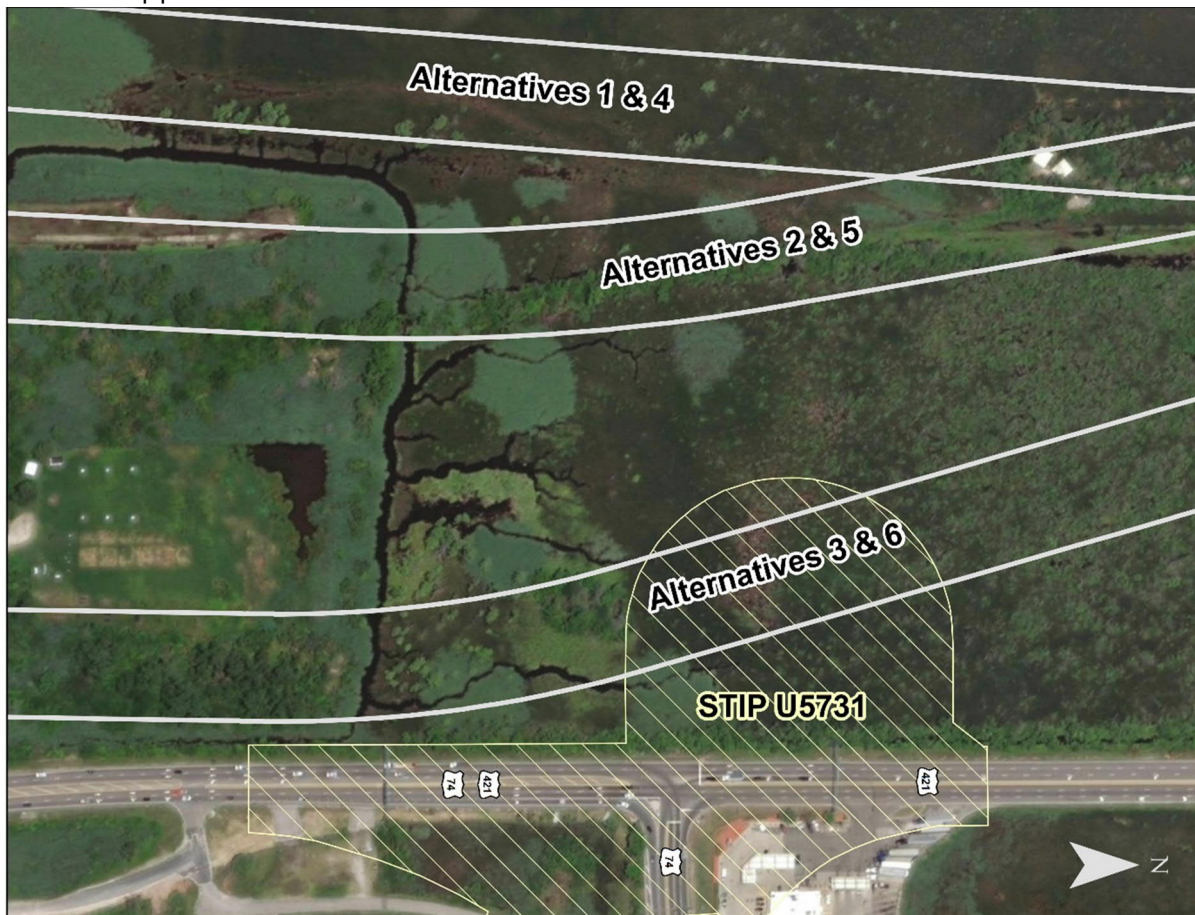




#### 4.1.4 Future Isabel Holmes Bridge Flyovers

Following the completion of the Screening Report, preliminary designs for the Isabel Holmes Bridge Flyovers Project (NCDOT STIP Project U-5731) were obtained due to its proximity to the Project. It is necessary to accommodate this project as it is a fiscally-constrained project programmed in NCDOT's STIP. As shown in the exhibit below, Alternatives 3 and 6 would conflict with the proposed location of the Isabel Holmes Bridge Flyovers Project, while all other Build Alternatives would accommodate this project.

Exhibit 2: Approximate Location of STIP U-5731



## 4.2 HUMAN, CULTURAL, AND NATURAL ENVIRONMENTAL RESOURCES

### 4.2.1 Human Environment

The affected human environment was evaluated based on a 200-foot wide corridor, centered on each of the Build Alternatives (100 feet on either side). Several factors were considered, including the presence of community resources, adjacent land uses, and environmental justice considerations. Human environment considerations for this Project are documented in greater

detail in the *Wilmington Rail Realignment Human Environment Technical Study* included in Appendix C.

#### COMMUNITY RESOURCES

Community resources that were considered include parks, greenways, bicycle routes, public transportation, boat/beach access areas, places of worship, cemeteries, emergency medical services (EMS), fire/police stations, schools, colleges/universities, community centers, and childcare facilities (Figure 10). None of the above community resources are present on Eagles Island. It is anticipated each of the Build Alternatives could result in an overall benefit to the community, as they would remove rail traffic from going through the City and thus enhance community connectivity and mobility.

Potential impacts to the 201 Carolina Beach Road and the 203 Port City Trolley Wave Bus routes and two associated bus stops along S. Front Street would likely result from Alternatives 4, 5, and 6. In addition to the potential impacts to public transit, multiple bike lanes and sidewalks are mapped within the Build Alternative impact areas along S. Front Street.

Additional coordination with Wave Transit and surrounding businesses will be conducted throughout the NEPA phase of the Project, after a Preferred Alternative has been identified.

#### LAND USE

Zoning from the City of Wilmington, New Hanover County, and Brunswick County was used to determine the consistency of the Project with existing and planned land uses within the Study Area<sup>8 9 10</sup>. The Build Alternatives pass through areas zoned as industrial, conservation, residential mixed use and commercial. All six Build Alternatives' potential impact areas are made up of mostly industrial zoned areas. The Project would not likely result in substantial changes to zoning in New Hanover County. In Brunswick County, land zoned as conservation areas may be impacted. The Build Alternative corridors intersect several parcels, ranging from 38 parcels (Alternative 1) to 53 parcels (Alternative 6). Many of the parcels intersected by the Project are located along S. Front Street. The New Hanover County Sheriff's Department shooting range is located on the west side of US 74/ US 421, north of the Cape Fear River. Alternatives 2 and 5 traverse along the western edge of the shooting range property and 3 and 6 along the eastern edge. As planning for the Project progresses, refinements to the design may occur to avoid or minimize impacts to properties.

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<sup>8</sup> Brunswick County. Geographic Information Systems. Accessed September 2020.  
<https://www.brunswickcountync.gov/gis/data/>

<sup>9</sup> City of Wilmington. City of Wilmington Zoning. Accessed September 2020.  
<https://data-wilmingtonnc.opendata.arcgis.com/datasets/zoning-boundaries>

<sup>10</sup> New Hanover County. New Hanover County Zoning File. Accessed September 9, 2020.  
<https://opendata.nhcgov.com/datasets/nhc-zoning>

Compatibility with local land use and transportation projects is an important consideration for the Project. The Project is compatible with the following plans:

- *Create Wilmington Comprehensive Plan*<sup>11</sup>
- *Plan NHC*<sup>12</sup>
- *Coastal Area Management Act (CAMA) Core Land Use Plan*<sup>13</sup>
- *Cape Fear Moving Forward 2045 Metropolitan Transportation Plan*<sup>14</sup>
- *North Carolina Comprehensive State Rail Plan*<sup>15</sup>
- *NCDOT 2020-2029 Current STIP*<sup>5</sup>

While the Project is generally compatible with NCDOT 2020-2029 STIP projects in its vicinity, Alternative 3 and Alternative 6 would conflict with the preliminary engineering designs for the Isabel Holmes Bridge Flyovers Project, which proposes a new fly-over and free flow ramp at the interchange of US 74 and US 17/US 421. The Project evaluation also considered compatibility with the S. Front Street Widening project (NCDOT STIP U-5734) and the Cape Fear Memorial Bridge replacement project. Each alternative presented and evaluated in this report is compatible with these projects. Additionally, the Build Alternatives may conflict with future planned greenways and bicycle/pedestrian facilities within the City as identified in the Wilmington-New Hanover County Comprehensive Greenway Plan. The *Wilmington-New Hanover County Comprehensive Greenway Plan* proposes the Surry St Trail, a greenway connecting Nun Street to Wright Street, along with proposed bicycle lanes and sharrows along S. Front Street<sup>16</sup>. The *Walk Wilmington: A Comprehensive Pedestrian Plan*<sup>17</sup> includes a similar planned multi-use path along the waterfront that turns east then continues down S. Front Street, along with some long-term sidewalk projects on the roads adjacent to S. Front Street (WMPO 2009). Additional coordination with local officials will occur throughout the NEPA phase of the Project as not to preclude the construction of other programmed projects in the area.

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<sup>11</sup> City of Wilmington. 2016. The Create Wilmington Comprehensive Plan. <https://www.wilmingtonnc.gov/departments/planning-development-and-transportation/comprehensive-plan>

<sup>12</sup> New Hanover County. 2016. New Hanover County Comprehensive Plan: Plan NHC. <https://planning.nhcgov.com/long-range-planning/comprehensive-plan/>

<sup>13</sup> Brunswick County. Geographic Information Systems. Accessed September 2020. <https://www.brunswickcountync.gov/gis/data/>

<sup>14</sup> WMPO. 2020. Cape Fear Moving Forward 2045 Metropolitan Transportation Plan. November 2020. <https://www.wmpo.org/plans/#transit>

<sup>15</sup> NCDOT. 2015b. NCDOT Rail Division North Carolina Comprehensive State Rail Plan. August 2015. <https://connect.ncdot.gov/resources/Rail-Division-Resources/Documents/2015%20Comprehensive%20State%20Rail%20Plan-%20Full%20Report.pdf>

<sup>16</sup> WMPO. 2013. Wilmington-New Hanover County Comprehensive Greenway Plan. January 2013. <https://www.wmpo.org/plans/#transit>

<sup>17</sup> Wilmington Urban Area MPO (WMPO). 2009. Walk Wilmington: A Comprehensive Pedestrian Plan. August 2009. [https://www.wmpo.org/wp-content/uploads/2016/06/2009-08\\_WalkWilmington\\_PlanFINAL.pdf](https://www.wmpo.org/wp-content/uploads/2016/06/2009-08_WalkWilmington_PlanFINAL.pdf)



SOCIOECONOMICS

According to the US Census Bureau, between 2000 and 2010 the population of Brunswick and New Hanover counties experienced population growth of 46.9 percent and 26.4 percent, respectively<sup>18</sup>. Based on projections made by the North Carolina Office of State Budget and Management (NCOSBM), the upward trend of growth is expected to continue through 2039 for both counties (Table 3)<sup>19</sup>.

Table 3: Population Trends and Forecast

Area	Population				Growth (2000 to 2039)		
	2000	2010	2020	2039	Difference (2000 to 2039)	Percent Change	Annualized Growth
Brunswick County	73,143	107,431	146,135	210,202	137,059	187.4%	4.8%
New Hanover County	160,307	202,667	239,272	309,830	149,523	93.3%	2.4%
North Carolina	8,049,313	9,535,483	10,630,691	12,919,921	4,870,608	60.5%	1.6%

Source: NCOSBM (2019)

In addition to population growth, the transportation network within the City is also experiencing the influx of commuters living outside of New Hanover County. Within the Demographic Study Area (DSA), an area defined as the Census Block Groups that are located within the Study Area, the 2014-2018 American Community Survey (ACS) data indicate approximately 35,000 citizens reside within the DSA and 118,000 within the City. Approximately 21,000 workers are commuting to New Hanover County from Brunswick and Pender counties and approximately 5,000 workers are commuting outside of New Hanover County to Brunswick and Pender counties<sup>20</sup>.

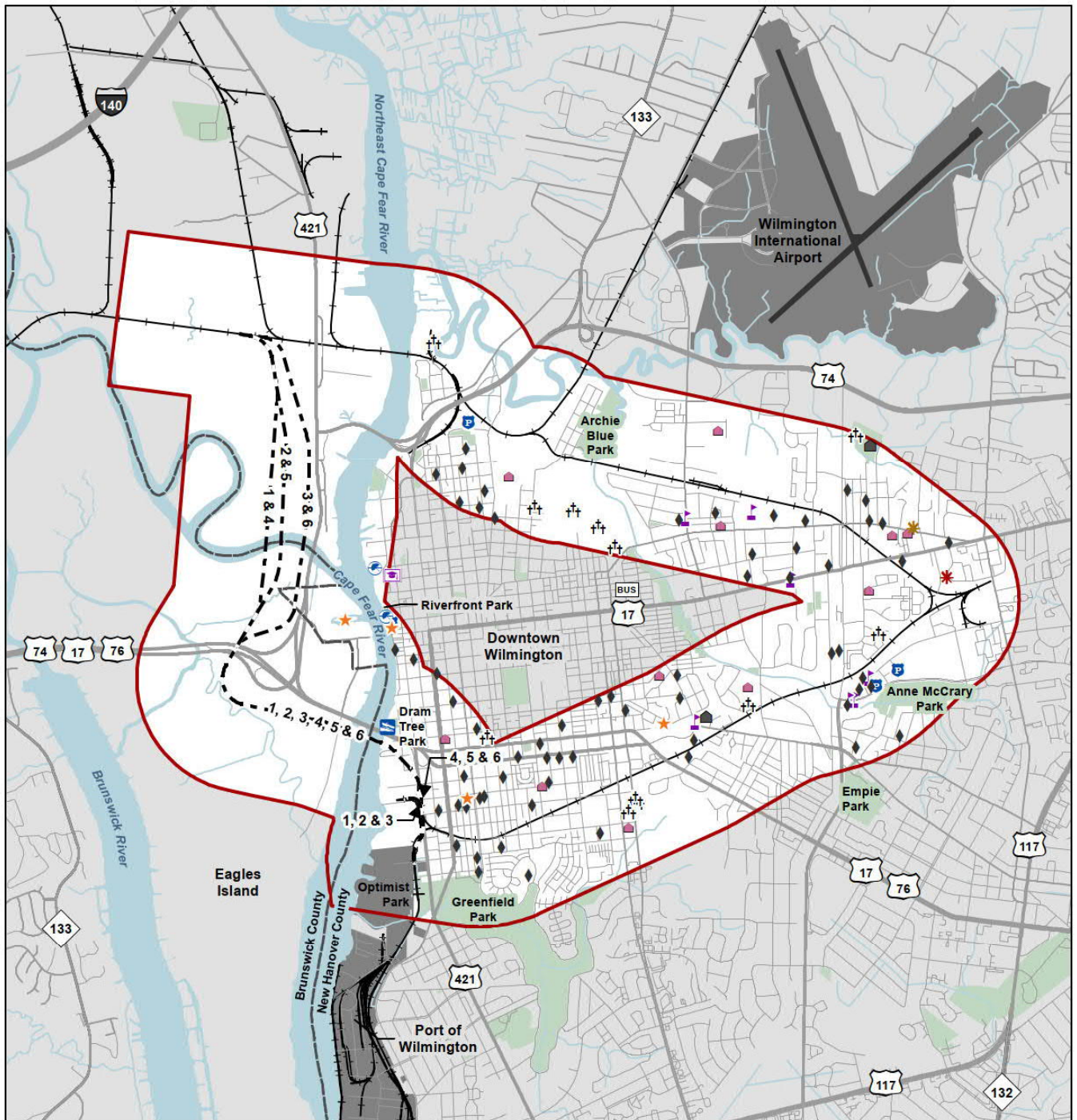
<sup>18</sup> US Census Bureau. 2016. Population Distribution and Change.

<https://www.census.gov/library/publications/2011/dec/c2010br-01.html>

<sup>19</sup> NC OSBM. 2019. Annual County Populations. <https://www.osbm.nc.gov/demog/county-projections>

<sup>20</sup> US Census Bureau. 2020. 2014-2018 American Community Survey 5-year Estimates.

<https://www.census.gov/acs/www/data/data-tables-and-tools/data-profiles/2018/>



**Wilmington Rail  
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Source: NC OneMap Data & Google Maps

**Legend**

- Study Area
- County Boundary
- Park
- Railroad
- Proposed Alternatives
- College/University
- Community Center
- NR Historic Resource
- Boat Access
- Beach Access Site
- Place of Worship
- \* Fire Stations
- †† Cemetery
- Law Enforcement Location
- ✎ School
- ★ EMS
- Childcare Facility

**Figure 10  
Community Resources**

**Date: June 2021**



0 0.25 0.5 1  
Miles

1 inch = 4,000 feet

## ENVIRONMENTAL JUSTICE

Demographic data were gathered from the 2010 US Census and the 2014-2018 ACS 5-year estimates<sup>20</sup> for the DSA to determine the presence of populations meeting the thresholds for environmental justice. Block Groups within the DSA are listed in Table 4 and shown on Figure 11.

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations<sup>21</sup>, directs that, "each federal agency make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health and environmental effects of its programs, policies, and activities on minority populations and low-income populations." Disproportionately high and adverse effects on minority and low-income populations are defined as adverse effects that are:

- Predominately borne by a minority population and/or low-income population or
- Will be suffered by a minority population and/or low-income population and are appreciably more severe or greater in magnitude than the adverse effects that will be suffered by the non-minority population and/or non-low-income population

Based on demographic data available from the 2014-2018 ACS and guidance from the Council on Environmental Quality (CEQ)<sup>22</sup>, thresholds were used to determine the presence of environmental justice communities at the Block Group level. The thresholds are determined based on the percentage of minority and low-income, or below-poverty, populations living in the county. The standard of practice used for minority populations is 10 percentage points above the county average, or 50 percent, whichever is less. For this Project, the minority threshold in New Hanover County was determined to be 32.9 percent. For low-income populations the standard of practice is 5 percentage points above the county average, or 25 percent, whichever is less. For this Project, the low-income threshold in New Hanover County was determined to be 22.3 percent. The Block Groups with minority and/or low-income populations exceeding the county thresholds are shown in bold font in Table 4.

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<sup>21</sup> USEPA. 1994. Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations. [https://www.epa.gov/sites/production/files/2015-02/documents/exec\\_order\\_12898.pdf](https://www.epa.gov/sites/production/files/2015-02/documents/exec_order_12898.pdf)

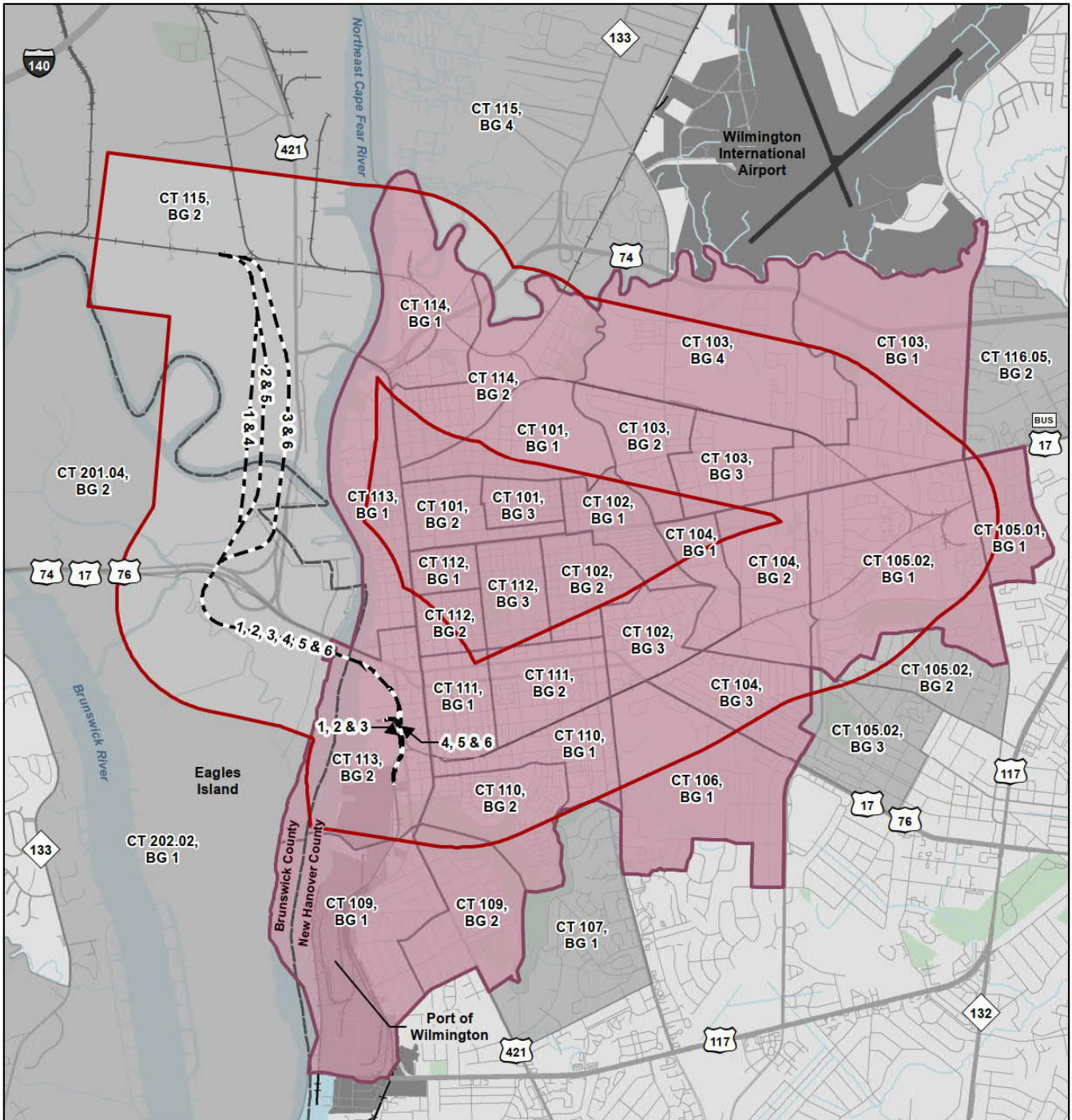
<sup>22</sup> USEPA. 1997. Environmental Justice Guidance under the National Environmental Policy Act. [https://www.epa.gov/sites/production/files/2015-02/documents/ej\\_guidance\\_nepa\\_ceq1297.pdf](https://www.epa.gov/sites/production/files/2015-02/documents/ej_guidance_nepa_ceq1297.pdf)



Table 4: Block Groups

Block Group	Minority Population (Threshold 32.9 percent)	Below Poverty Level (Threshold 22.3 percent)
Census Tract 101, Block Group 1	80.5%	54.5%
Census Tract 101, Block Group 2	24.6%	2.1%
Census Tract 101, Block Group 3	64.0%	38.8%
Census Tract 102, Block Group 1	19.7%	22.8%
Census Tract 102, Block Group 2	66.0%	16.7%
Census Tract 102, Block Group 3	58.5%	38.7%
Census Tract 103, Block Group 1	57.7%	33.8%
Census Tract 103, Block Group 2	18.5%	17.3%
Census Tract 103, Block Group 3	15.6%	37.4%
Census Tract 103, Block Group 4	91.5%	51.1%
Census Tract 104, Block Group 1	23.1%	21.4%
Census Tract 104, Block Group 2	19.3%	2.0%
Census Tract 104, Block Group 3	11.2%	9.8%
Census Tract 105.01, Block Group 1	43.3%	57.9%
Census Tract 105.02, Block Group 1	35.5%	38.9%
Census Tract 106, Block Group 1	4.4%	2.4%
Census Tract 109, Block Group 1	33.6%	8.9%
Census Tract 109, Block Group 2	17.0%	11.0%
Census Tract 110, Block Group 1	81.3%	81.3%
Census Tract 110, Block Group 2	30.2%	28.0%
Census Tract 111, Block Group 1	74.8%	11.9%
Census Tract 111, Block Group 2	94.0%	67.0%
Census Tract 112, Block Group 1	14.5%	18.0%
Census Tract 112, Block Group 2	48.8%	42.7%
Census Tract 112, Block Group 3	76.0%	43.4%
Census Tract 113, Block Group 1	15.0%	19.5%
Census Tract 113, Block Group 2	42.1%	40.6%
Census Tract 114, Block Group 1	95.7%	46.7%
Census Tract 114, Block Group 2	70.9%	29.9%

Source: US Census Bureau, 2020



**Wilmington Rail  
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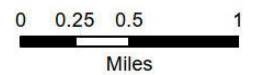
Source: U.S. Census Bureau - 2018 Census Block Groups

**Legend**

- Study Area
- County Boundary
- Park
- Demographic Study Area
- DSA Block Groups
- Excluded Block Groups
- Railroad
- Proposed Alternatives

**Figure 11  
Demographic Study Area**

**Date: June 2021**



1 inch = 4,000 feet

All six Build Alternatives pass through Census Tract 113, Block Group 2 which includes both a minority and low-income population. Although a minority and low-income population exists within the block group, the predominant land uses impacted are in industrial areas (the Build Alternatives avoid residential areas to the maximum extent practicable). Redirecting rail movements outside the City would also provide an overall benefit to the environmental justice populations residing adjacent to the existing track by enhancing community connectivity, reducing noise levels, enhancing visual quality, and improving safety. Train operations as well as traffic delays due to the numerous at-grade crossings associated with the No-Build Alternative would likely increase as the population grows as currently projected. Much of the Study Area is inhabited by environmental justice populations. Additional coordination with community leaders to discuss the potential impacts, mitigation efforts, and benefits of the Project on environmental justice populations will continue throughout project development.

#### 4.2.2 Transportation

An assessment for each existing public at-grade crossing that intersects the existing rail line was taken to determine the Annual Average Daily Traffic (AADT), exposure to freight traffic, and vehicle delays (minutes) in 2020 and the future No-Build Condition in 2040. The Future No-Build condition was calculated by applying a growth rate of 0.5% to the existing data. To determine the growth rate, historic volume data was collected and aggregated for intersections within the Study Area. That analysis resulted in a negative growth rate; however, to be conservative, a 0.5% growth rate was used to allow for some growth of the City of Wilmington to occur in the 20-year timeframe evaluated for future conditions. Additional details regarding the methodology and findings of the traffic analysis are documented in the *Wilmington Rail Realignment Traffic Analysis* (Appendix D).

This analysis assumes current train operations would remain the same; however, future freight operations would likely increase for the future build condition due to rapidly increasing freight volumes at the Port of Wilmington. Future freight operations will be considered and included in the traffic analysis for the Preferred Alternative during the NEPA phase.

Under the future No-Build condition, the AADT is expected to increase for each of the public at-grade crossings because of population and employment growth in the area. Exposures and vehicle delays at grade crossings is also expected to increase.

Table 5: Traffic Analysis Results for Public At-Grade Crossings

#	Crossing Number	Route	2020			2040 No-Build		
			AADT	Exposure	Vehicle Delay (mins)	AADT	Exposure	Vehicle Delay (mins)
1*	629448M^	S. Front Street (SR 1140)	16,730	33,460	2,183	18,480	36,960	2,412
2	629446Y^	S. 3 <sup>rd</sup> Street	19,450	38,900	2,538	21,490	42,980	2,804



			2020			2040 No-Build		
#	Crossing Number	Route	AADT	Exposure	Vehicle Delay (mins)	AADT	Exposure	Vehicle Delay (mins)
		(US 421)						
3	629445S	S. 4 <sup>th</sup> Street	310	620	40	340	680	44
4	629443D	Martin Street at Hooper Street	410	820	54	450	900	59
5	629442W	S. 5 <sup>th</sup> Street	2,270	4,540	296	2,510	5,020	328
6	629441P	S. 6 <sup>th</sup> Street/Martin Street	620	1,240	81	690	1,380	90
7	629440H	S. 7 <sup>th</sup> Street	620	1,240	81	690	1,380	90
8	629439N	S. 8 <sup>th</sup> Street	820	1,640	107	910	1,820	119
9	629438G	S. 9 <sup>th</sup> Street	620	1,240	81	690	1,380	90
10	629437A	S. 10 <sup>th</sup> Street	520	1,040	68	570	1,140	74
11	629436T	S. 12 <sup>th</sup> Street	210	420	27	230	460	30
12	629435L	S. 13 <sup>th</sup> Street	2,890	5,780	377	3,190	6,380	416
13	629434E	Marstellar Street	1,440	2,880	188	1,590	3,180	207
14	629443X	S. 16 <sup>th</sup> Street (SR 1218)	17,720	35,440	2,312	19,580	39,160	2,555
15	629432R	S. 17 <sup>th</sup> Street (SR 1219)	17,930	35,860	2,340	19,810	39,620	2,585
16	629431J	Oleander Drive (US 76)	27,820	55,640	3,630	30,740	61,480	4,011
17	629430C	Wrightsville Avenue (SR 1411)	18,960	37,920	2,474	20,950	41,900	2,734
18	629429H	Colonial Drive	3,920	7,840	512	4,330	8,660	565
19	629428B	Forest Hills Drive	820	1,640	107	910	1,820	119
20	629427U	Mercer Avenue	1,030	2,060	134	1,140	2,280	149
21	629426M	Covil Avenue	17,830	35,660	2,327	19,700	39,400	2,571
22	629290C	Market Street (US 17)	37,090	74,180	4,840	40,980	81,960	5,348
23	629289H	Henry Street	410	820	54	450	900	59
24	642724T	Clay Street	310	620	40	340	680	44
25	629288B	Princess Place Drive (SR 1301)	9,480	18,960	1,237	10,470	20,940	1,366
26	629287U	N. 30 <sup>th</sup> Street (SR 1302)	3,810	7,620	497	4,210	8,420	549
27	629286M	N. 23 <sup>rd</sup> Street	16,490	32,980	2,152	18,220	36,440	2,378

			2020			2040 No-Build		
#	Crossing Number	Route	AADT	Exposure	Vehicle Delay (mins)	AADT	Exposure	Vehicle Delay (mins)
		(SR 1302)						
28	629284Y	King Street	1,130	2,260	147	1,250	2,500	163
Total			28,926			31,960		

\*Alternatives 4, 5 and 6 propose three at-grade crossings on Front Street within approximately 1,500 feet. All Build Alternatives propose an at-grade crossing near the intersection of Dawson Street and Surry Street with Surry Street being proposed to be closed at this location. Two uninhabited parcels would still require access from Dawson Street however, minimal vehicle traffic is expected.

Source: Wilmington Rail Realignment Draft Purpose and Need (2021); NCDOT AADT Mapping; forecasts from U-4434 Independent Blvd extension project

All Build Alternatives propose an at-grade crossing near the intersection of Dawson Street and Surry Street with Surry Street being proposed to be closed at this location. Two uninhabited parcels would still require access from Dawson Street however, minimal vehicle traffic is expected. Alternatives 1, 2, and 3 have potentially one public at-grade crossing at Dawson Street whereas Alternatives 4, 5, and 6 have four public at-grade crossings: Dawson Street and three crossings along S. Front Street within approximately 1,500 feet. However, all Build Alternatives propose to move freight traffic out of downtown Wilmington along a western bypass of the City, significantly eliminating exposure and decreasing vehicle delays at the existing at-grade crossings. The Project would improve safety and traffic operations by eliminating over 32 at-grade rail crossings and would remove the over 31,000 minutes of daily vehicle delay associated with the at-grade crossings throughout downtown Wilmington.

### 4.2.3 Cultural Resources

The Project is subject to compliance with Sections 106 and 110 of the National Historic Preservation Act (NHPA) of 1966, as amended (36 CFR 800), which requires federal agencies to take into account the effects of their undertaking on properties listed on or eligible for listing on the National Register of Historic Places (NRHP), including archaeological sites, and afford the Advisory Council on Historic Preservation an opportunity to comment on the effects of the undertaking.

Section 110(f) of the NHPA requires that federal agencies considering undertakings that may directly and adversely affect National Historic Landmarks (NHLs), “to the maximum extent possible, undertake such planning and actions as may be necessary to minimize harm to such landmark, and shall afford the Advisory Council on Historic Preservation a reasonable opportunity to comment on the undertaking” [Section 110(a)(2)(B) and Section 110(f)].

Additional coordination with the North Carolina State Historic Preservation Office (NCHPO) will confirm an Area of Potential Effects (APE) for cultural resources. For the purposes of this document, a proposed APE has been developed that consists of an area one quarter mile from either side of the centerline of the Build Alternatives for aboveground resources (Figure 12).

The same area was used as part of an initial evaluation for terrestrial archaeological resources, defined as the archaeological study area, using an archaeological predictive model. An APE has not yet been defined for archaeological resources, therefore potential impacts to archaeological resources were assessed within a smaller corridor of 200 feet, defined as the archaeological study corridor.

#### HISTORIC ARCHITECTURAL RESOURCES

Two known NRHP resources are located within the APE; the Wilmington Historic District and the USS North Carolina Battleship (Figure 12). The Wilmington Historic District encompasses approximately 170 acres and contains approximately 2,785 resources. The APE passes through southwestern and northwestern portions of the district.

Table 6 summarizes the potential effects on parcels within the Wilmington Historic District. Additional coordination with the NCHPO is needed to determine the level of effect of the Project on the Wilmington Historic District, including avoidance, minimization, and mitigation of any impacts to the greatest extent practicable.

Table 6: Wilmington Historic District Potential Effects

	No-Build Alternative	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6
Wilmington Historic District (acres)	18	18	18	19	19	19	21
Number of Parcels in District	20	20	20	21	23	23	24

The USS North Carolina Battleship is located on the west bank of the Cape Fear River and is also included as a contributing resource within the Wilmington Historic District. The battleship was further listed by the National Park Service as an NHL. The APE passes just to the west of the battleship’s NRHP and NHL boundaries. The Build Alternatives do not physically impact the USS North Carolina Battleship or its property, however, visual or auditory effects may occur due to the proximity of the Project to the property. Additional coordination with the NCHPO is needed to determine the level of effect of the Project on the USS North Carolina Battleship.

Additional investigations to determine potential NRHP eligible resources within the APE were conducted and documented in the *Wilmington Rail Realignment Reconnaissance-Level Historic Architectural Survey* (Appendix E). One of the inventoried resources is believed to be potentially eligible for NRHP listing, the former Holy Church of Jesus Christ (currently Spirit of Truth Ministries) at 216 Marstellar Street. Other inventoried resources are believed to lack the necessary significance and/or integrity for NRHP listing. Additional coordination with the NCHPO will occur in order to determine the level of effect the Project may have on the two



known NRHP resources and the eligibility of the resources identified during the reconnaissance-level survey.

#### ARCHAEOLOGICAL RESOURCES

After a review of the North Carolina Office of State Archaeology (OSA) records provided on August 8, 2020, 22 archaeological sites have been identified within the archaeological study area. An additional 24 resources were reported by a 2012 Masters of Arts thesis by an East Carolina University Maritime Studies graduate student<sup>23</sup>. However, the sites identified by Minford have not been reported to the OSA or evaluated for inclusion in the NRHP. The sites identified by OSA and Minford are noted in the *Wilmington Rail Realignment Archaeological Resources Technical Study* (Appendix F). Additional coordination with OSA and NCHPO to determine the eligibility of these sites will occur during the NEPA phase of the Project.

Of the 22 sites identified by OSA, two sites are located within the 200-foot corridor of the Build Alternatives, Site 31NH597 and 31NH686. Site 31NH597 is intersected by Alternatives 1 and 4 and Alternatives 2 and 5; Site 31NH686 is intersected by Alternatives 3 and 6. Site 31NH597, associated with the historic Point Peter, was recorded with the OSA in April 1979 as a historic site with an artifact assemblage that includes historic ceramics, slate shingles, rosin deposits, and ballast stones. The site has not been evaluated for NRHP eligibility. Site 31NH686 was identified by the OSA in 1992 as a railroad causeway and turntable. Based on the lack of tracks or turntable-related machinery, coupled with disturbances caused by relic hunters and frequent flooding, Site 31NH686 was determined not eligible for the NRHP when it was recorded in 1992; therefore, no adverse effects are anticipated to this site. If Alternative 1, 2, 4 or 5 is carried forward as the Preferred Alternative, archaeological studies may be needed to assess NRHP eligibility for Site 31NH597.

Two additional sites—31NH593 and 31NH595—are recorded with the OSA as point features and the actual size and extent of these two sites is unknown. Site 31NH593 lies between Alternatives 2 and 5 and Alternatives 3 and 6 and is plotted approximately 320 feet from the former and about 225 feet from the latter. The site was recorded as a remnant of a brick railroad-related building and vestiges of track bed adjacent to it. A sketch map and details included in the site form for 31NH593 depicts the structure as approximately 15-feet by 140-feet oriented north-south, with the former tracks located about 20 feet to the east. Site 31NH593 has not been evaluated for NRHP eligibility. The small and north-south linear nature of the site suggests it would not extend into Alternatives 5 or 6 since those are several hundred feet away. Finally, a modern gun range has been constructed at the location of 31NH593. It is possible the construction activities associated with this facility have significantly disturbed or even destroyed 31NH593.

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<sup>23</sup> Minford, Robert J. 2012 *For the Love of Profit: Examining Traditional Capitalism on Eagles Island, North Carolina*. Master's thesis, Department of History, East Carolina University.)

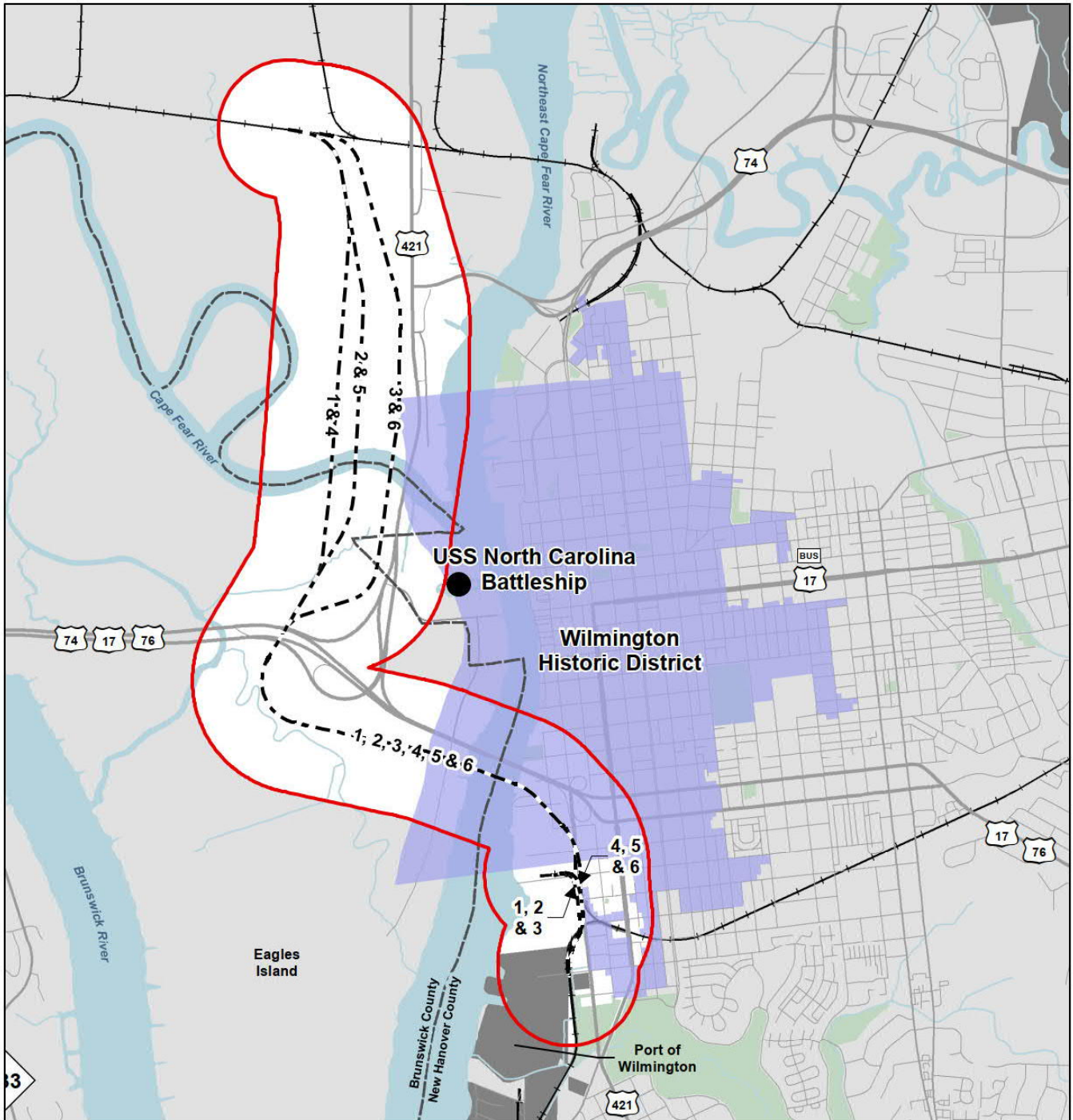
Site 31NH595 lies about 440 feet east of Alternatives 2 and 5 about 125 feet west of Alternatives 3 and 6. No information about the site is provided on its site form. Likewise, no information is included in the metadata appended to the GIS point aside from its classification as a historic site. It is presumed the site has not been evaluated for NRHP eligibility. It is unlikely this site would extend into Alternatives 2 and 5 for two reasons. First is the distance it is from Alternatives 2 and 5. Second, Alternatives 2 and 5 runs along a low/wet area of marsh unlikely to contain elements of a terrestrial site. With regards to Alternatives 3 and 6, it is not possible to tell if the site extends into that alignment without field investigations.

Additionally, a terrestrial archaeological predictive model was created to better understand the potential for archaeological resources within the Build Alternative corridors. The variables used for the Project include soil drainage classification, the acreage of developed/disturbed areas, and historical map data. These variables were analyzed in a GIS model for the Study Area. The six Build Alternatives were then overlaid in the model, and each was calculated for its acreage of no, low, and high probability for the presence of archaeological resources. The results of the predictive model are summarized in Table 7.

All Build Alternatives have a low likelihood of encountering preserved and significant archaeological resources, as each impact approximately one percent or less of high probability areas. These areas are located mainly within portions of the Build Alternative corridors on the west side of the Cape Fear River. Additionally, Alternatives 2 and 5 pass through a portion of Point Peter, the historically-documented area that is identified as low probability due to the amount of disturbance present; however, this area is less disturbed than the area where the known archaeological site (Site 31NH597) is found, and therefore rated as high probability in the model. This results in a half-acre more of potential high probability areas for Alternatives 2 and 5 (approximately 1.4 percent compared to 0.95 percent for all other Build Alternatives).

Table 7: Results of Archaeological Predictive Model by Alternatives

	No-Build Alternative	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6
No Probability (acres)	0	8.89	8.60	6.22	8.89	5.60	6.22
Low Probability (acres)	0	88.85	89.39	94.79	88.26	88.80	94.20
High Probability (acres)	0	0.95	1.41	0.95	0.95	1.41	0.95



**Wilmington Rail  
Realignment Project**

**New Hanover County and  
Brunswick County, NC**

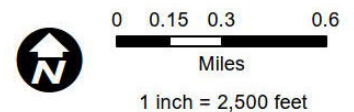
Source: NCHPO Data

**Legend**

- Proposed Area of Potential Effects (APE)
- County Boundary
- Park
- Wilmington Historic District (NR)
- Railroad
- Proposed Alternatives
- National Register (NR) Resource

**Figure 12  
Proposed APE and  
Known Historic Resources**

**Date: June 2021**



#### 4.2.4 Noise and Vibration

Preliminary noise and vibration evaluations were assessed using guidance provided by the Federal Transit Administration (FTA). The FRA relies on the FTA Guidance Manual (2018) for evaluating improvements to conventional freight rail lines such as the rail lines in this Project. Screening buffer distances used for this study are based on criteria and procedures presented in the FTA Transit Noise and Vibration Impact Assessment Manual<sup>24</sup>. Further detail regarding the assessment of noise and vibration effects from the Project are documented in the *Wilmington Rail Realignment Noise and Vibration Technical Study* (Appendix G).

The screening for noise-sensitive receptors for all alternatives considered within this Project include relevant receptors that are defined by FTA criteria. A 1,200-foot screening buffer was used to provide a count of parcels by land use, which represents the worst-case scenario for noise assessments. The descriptions of noise-sensitive land uses defined by FTA is summarized in Table 8.

Table 8: FTA Noise-Sensitive Land Uses

Land Use Category	Land Use Category
1	Tracts of land where quiet is an essential element in their intended purpose. This category includes lands set aside for serenity and quiet, such as outdoor amphitheaters, concert pavilions, and National Historic Landmarks with significant outdoor use.
2	Residences and buildings where people normally sleep. This category includes homes and hospitals, where nighttime sensitivity to noise is of utmost importance.
3	Institutional land uses with primarily daytime and evening use. This category includes schools, libraries, and churches, where it is important to avoid interference with such activities as speech, meditation, and concentration. Buildings with interior spaces where quiet is important, such as medical offices, conference rooms, recording studios, and concert halls fall into this category, as well as places for meditation or study associated with cemeteries, monuments, and museums. Certain historical sites, parks, and recreational facilities are also included.

Source: FTA 2018

<sup>24</sup> Federal Transit Administration. 2018. Transit Noise and Vibration Impact Assessment Manual, September 2018. [https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123\\_0.pdf](https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf)



Most of the parcels intersected by the Project fall within Land Use Category 2. Of the Build Alternatives, Alternative 4 includes the fewest parcels and Alternative 3 includes the most. Additionally, Alternative 4 includes the fewest number of parcels that fall within Land Use Category 3 and Alternative 3 includes the most parcels. The Project does not intersect Land Use Category 1 parcels.

Table 9 summarizes the count of noise-sensitive land uses by Land Use Category within 1,200 feet of the centerline for each alternative.

Table 9: Number of Noise-Sensitive Parcels Categorized by Land Use

Land Use Category	No-Build Alternative	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6
1	0	0	0	0	0	0	0
2	1,786	217	222	251	217	219	250
3	65	10	11	12	9	10	11

The screening for vibration-sensitive receptors for all alternatives included relevant receptors that are defined by FTA criteria. A 600-foot, 200-foot, and 120-foot screening buffer were used to provide a count of parcels by land use, which represents the worst-case scenario for vibration assessments. The FTA descriptions of vibration-sensitive land uses is summarized in Table 10.

Table 10: Land Use Categories for General Vibration Assessment Impact Criteria

Land Use Category	Land Use Type	Land Use Category
-	Special Buildings	This category includes special-use facilities that are very sensitive to vibration and noise that are not included in the categories below and require special consideration. However, if the building will rarely be occupied when the source of the vibration (e.g., the train) is operating, there is no need to evaluate for impact. Examples of these facilities include concert halls, TV and recording studios, and theaters.
1	High Sensitivity	This category includes buildings where vibration levels, including those below the threshold of human annoyance, would interfere with operations within the building. Examples include buildings where vibration-sensitive research and manufacturing <sup>1</sup> is conducted, hospitals with vibration-sensitive equipment, and universities conducting physical research operations. The building's degree of sensitivity to vibration is dependent on the specific equipment that will be affected by the vibration. Equipment moderately sensitive to vibration, such as high-resolution lithographic equipment, optical microscopes, and electron microscopes with vibration isolation systems are included in this category. <sup>2</sup> For equipment that is more sensitive, a Detailed Vibration Analysis must be conducted.
2	Residential	This category includes all residential land use and buildings where people normally sleep, such as hotels and hospitals. Transit-generated ground-borne vibration and noise from subways or surface running trains are

Land Use Category	Land Use Type	Land Use Category
		considered to have a similar effect on receivers. <sup>3</sup>
3	Institutional	This category includes institutions and offices that have vibration-sensitive equipment and have the potential for activity interference such as schools, churches, doctors' offices. Commercial or industrial locations including office buildings are not included in this category unless there is vibration-sensitive activity or equipment within the building. As with noise, the use of the building determines the vibration sensitivity.

Source: FTA 2018

<sup>1</sup> Manufacturing of computer chips is an example of a vibration-sensitive process.

<sup>2</sup> Standard optical microscopes can be impacted at vibration levels below the threshold of human annoyance.

<sup>3</sup> Even in noisy urban areas, the bedrooms will often be in quiet buildings with effective noise insulation. However, ground-borne vibration and noise are experienced indoors, and building occupants have practically no means to reduce their exposure. Therefore, occupants in noisy urban areas are just as likely to be exposed to ground-borne vibration and noise as those in quiet suburban areas.

Table 11 shows a summary of the number of vibration-sensitive land uses within the various screening distances.

Table 11: FTA Vibration Screening Analysis - Number of Parcels Categorized by Land Use

Screening Distance (ft.)	No-Build Alternative	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6
600 <sup>1</sup>	0	0	0	0	0	0	0
200 <sup>2</sup>	241	7	7	7	18	18	18
120 <sup>3</sup>	12	0	0	0	0	0	0

<sup>1</sup> Includes Land Use Category 1

<sup>2</sup> Includes Land Use Category 2

<sup>3</sup> Includes Land Use Category 3

The number of potentially affected parcels noted in Table 11 vary due to their proximity to the existing or proposed rail line. The No-Build Alternative has the highest number of parcels because the existing rail line would continue to run through the City. The proposed Build Alternatives reduce the number of potentially affected parcels because the rail line bypasses the downtown area.

A detailed assessment for noise and vibration impacts will be conducted using the full FTA general assessment guidelines for the Preferred Alternative as part of the NEPA process when planned rail traffic operations have been defined.

#### 4.2.5 Hazardous Materials

The Build Alternative corridors were investigated to identify sites where hazardous materials may exist for each Build Alternative. Eleven sites were identified within Section I of the Project along S. Front Street south of the Cape Fear Memorial Bridge. Five sites were identified within

Section II of the Project and two sites were identified within Section III of the Project west of US 421. Alternatives 3 and 6 contain the most sites (18) while the remaining alternatives contain 16 sites. There were no historical or current sites located in the corridor for Alternatives 1, 2, 4, and 5 within Section III of the Project. Hazardous materials sites were not identified along the No-Build Alternative corridor. It is anticipated any existing sites would not be impacted by the No-Build Alternative.

As planning for the Project progresses, additional studies may be required to ascertain the status of soil and/or groundwater contamination at these sites and whether corrective action is ongoing at sites without a reported closure date. This knowledge will be critical to understand the potential for exposure to contamination in the Study Area and to assess the removal and proper disposal or treatment of excavated soil and groundwater extracted during any necessary dewatering activities. Upon review of the available reports or documentation associated with these sites, it may be necessary to collect soil and/or groundwater samples prior to subsurface activities to properly assess disposal and/or treatment of soil and groundwater.

Additional documentation of the hazardous materials investigations completed are documented in the *Wilmington Rail Realignment Hazardous Materials Technical Study* (Appendix H).

#### 4.2.6 Natural Environment

Several factors were considered in evaluating the affected environment of each Build Alternative from a natural environment perspective. The factors considered include biotic resources, protected species, and jurisdictional issues. Natural environmental resources were identified within a 200-foot corridor centered on the conceptual alignment of each Build Alternative. The anticipated impacts from each alternative are identified within this area. Natural environment considerations for this Project are documented in greater detail in the *Natural Resources Technical Report* included in Appendix I.

#### FLOODPLAINS

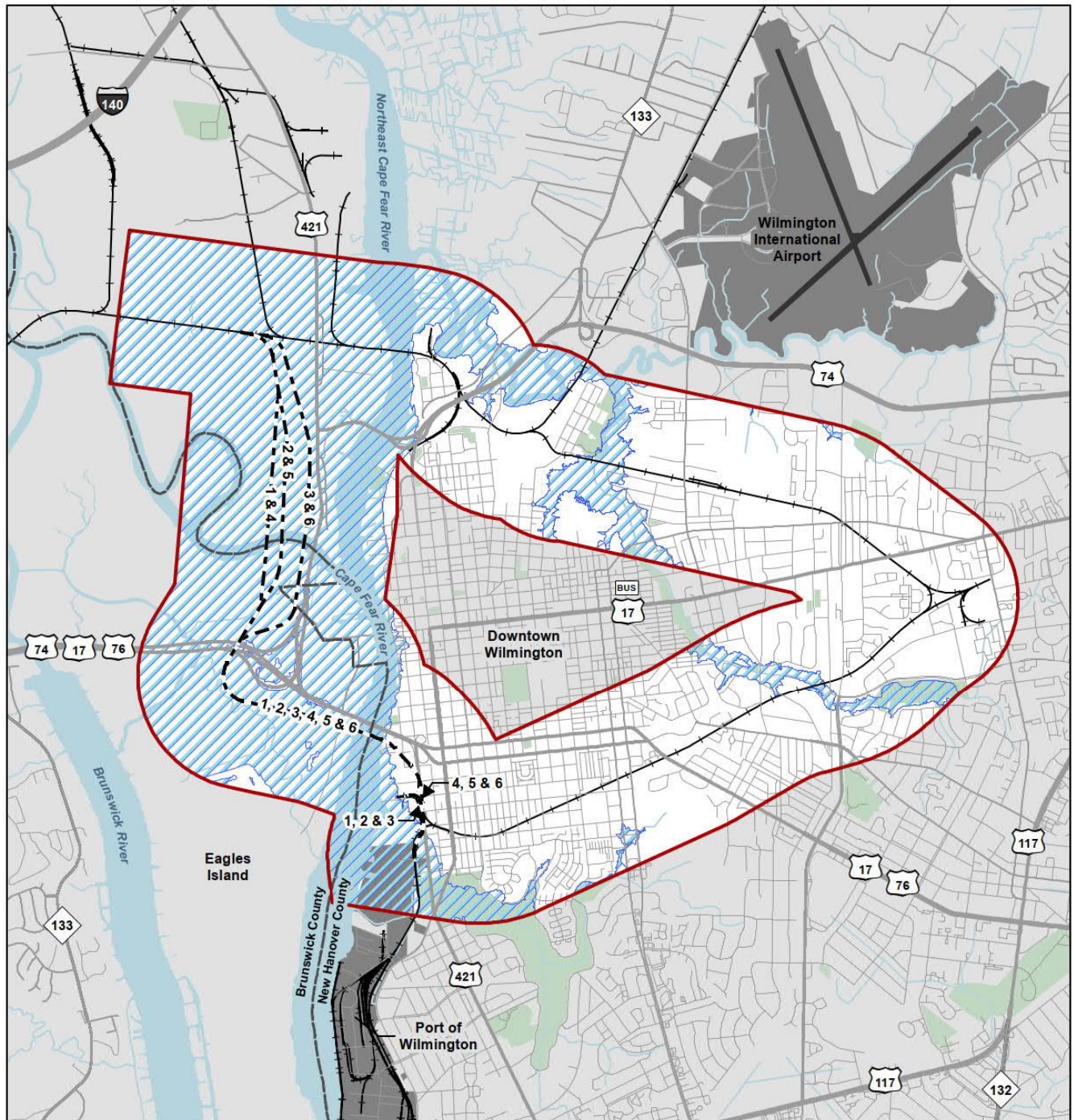
Much of the Project occurs in floodplains recognized on the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRMs) as Special Flood Hazard Area (SFHA) (Figure 13), a designs for the Preferred Alternative will be developed according to the *Preliminary Hydraulic Analysis for Conceptual Engineering* memorandum<sup>25</sup>. Impacts to FEMA SFHA floodplains within the Build Alternatives ranges from 81.9 acres (Alternative 4) to 85.6 acres (Alternative 3). Any one of the six Build Alternatives would result in impacts to FEMA-

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<sup>25</sup> Preliminary Hydraulic Analysis for Conceptual Engineering. January 2021.

<https://www.wilmingtonnc.gov/home/showpublisheddocument/12842/637491697100030000>





**Wilmington Rail  
Realignment Project**

**New Hanover County and  
Brunswick County, NC**

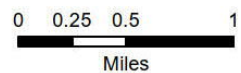
Source: NC FRIS Data

**Legend**

- Study Area
- County Boundary
- Park
- Special Flood Hazard Area
- Railroad
- Proposed Alternatives

**Figure 13  
Special Flood Hazard Areas**

**Date: June 2021**



1 inch = 4,000 feet



regulated floodplains. Coordination with FEMA will be required to ensure there would be no negative impacts to the base flood elevation (BFE) and insurable structures resulting from the Project.

#### BIOTIC RESOURCES

Two designated NHP Natural Heritage Natural Areas (NHNA) are located within the build alternatives: Lower Cape Fear River Aquatic Habitat and Brunswick River/Cape Fear River Marshes<sup>26</sup> (Figure 14). NHNA are defined by NHP as “a site (terrestrial or aquatic) of special biodiversity significance due to the presence of rare species, unique natural communities, important animal assemblages, or other ecological features”.

Impacts to NHP Natural Areas ranges from 60.6 acres (Alternatives 3 and 6) to 73.6 acres (Alternatives 1 and 4).

Fifteen terrestrial communities were identified in the Build Alternatives: and are summarized in Table 12. Alternatives 2 and 4 contain more areas dominated by native vegetation which provide more suitable habitat for protected and rare species.

Table 12: Percent Coverage of Terrestrial Communities

Community	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6
Maintained/ Disturbed	25%	29%	30%	25%	29%	30%
Blackwater Bottomland	1%	1%	<1%	1%	1%	<1%
Brackish Marsh	19%	10%	3%	19%	10%	3%
Coastal Fringe Evergreen	1%	1%	1%	1%	1%	1%
Cypress-Gum Swamp	2%	2%	2%	2%	2%	1%
Dry-Mesic Oak Hickory	2%	2%	-	2%	2%	-
Estuarine Fringe Pine	<1%	<1%	<1%	1%	1%	1%
Mesic Mixed Hardwood	-	-	2%	-	-	2%
Nonriverine Swamp	-	-	3%	-	-	3%
Pine/Scrub Oak Sandhill	-	-	1%	-	-	1%
Salt Shrub	-	<1%	-	-	<1%	-
Small Depression	<1%	<1%	-	<1%	<1%	-
Swamp Island Evergreen	-	<1%	1%	-	<1%	1%
Tidal Freshwater Marsh	27%	28%	36%	27%	29%	36%
Tidal Swamp	13%	15%	14%	13%	15%	14%

Note: Areas of open water were not included in the table. These areas included streams and ditches and total approximately 15 acres.

<sup>26</sup> NC Natural Heritage Program (NHP). 2021. North Carolina Natural Heritage Data Explorer. <https://ncnhde.natureserve.org/>.

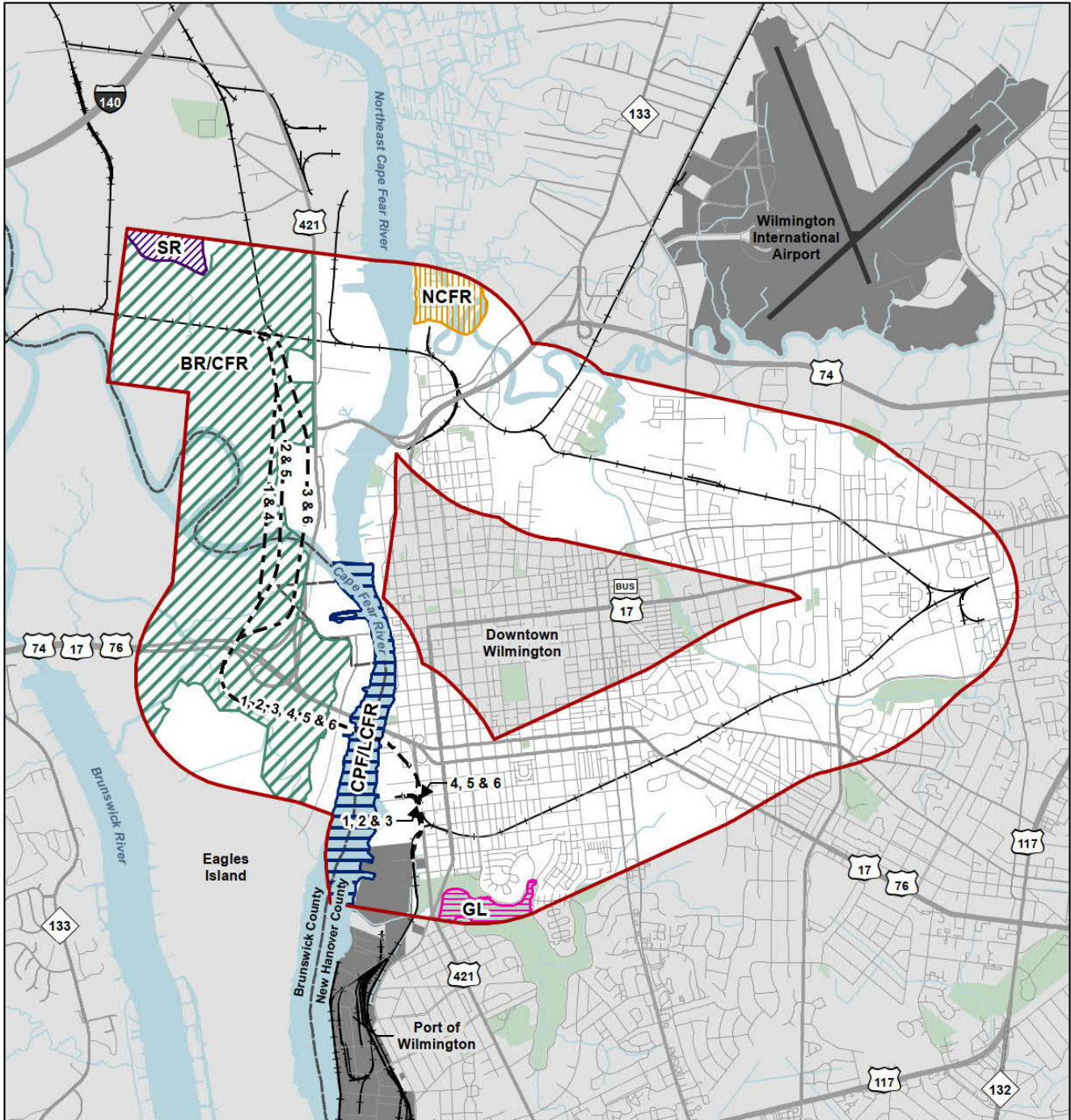
## CONSERVATION AREAS

The Project would result in impacts to conservation areas (Figure 15). All six Build Alternatives would impact the Eagles Island Natural Area Dedicated Nature Preserve, a conservation area owned by the NC Department of Agriculture: Division of Soil and Water Conservation. Within the Eagles Island Natural Area Dedicated Nature Preserve, the *Final Phase 1 Restoration Plan and Environmental Assessment for the Kerr-McGee Chemical Corp.* Site proposes the restoration of Alligator Creek and adjacent tidal wetlands, habitat restoration, invasive species removal, and proposes new public access to the site as one of its alternatives<sup>27</sup>. All six Build Alternatives would impact this proposed restoration project. All six Build Alternatives would also impact the North Carolina Coastal Land Trust Easement, a conservation easement site held by the North Carolina Coastal Land Trust. However, Alternatives 2 and 5 use approximately 3,500 feet of former railroad right-of-way, which is excluded from the conservation area, thus reducing impacts to the conservation easement site held by the North Carolina Coastal Land Trust.

In addition, all six Build Alternatives would impact the NC Division of Mitigation Services Easement, a mitigation site for impacts associated with local NCDOT roadway projects, owned by the NCDOT<sup>26</sup>. No Section 6(f) Land and Water Conservation Fund (LWCF) Resources and no Voluntary or Enhanced Voluntary Agricultural Districts would be impacted by the Project. Although farmland soils may be disturbed by the Project, no existing agricultural activities would be disturbed. Further detail regarding conservation resources in the Study Area can be found in the *Human Environment Technical Study* included in Appendix C.

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<sup>27</sup> NOAA, National Marine Fisheries Service (NMFS). 2020. North Carolina Threatened and Endangered Species and Critical Habitats Under NOAA Fisheries Jurisdiction. <https://www.fisheries.noaa.gov/southeast/consultations/north-carolina>



**Wilmington Rail  
Realignment Project**

**New Hanover County and  
Brunswick County, NC**

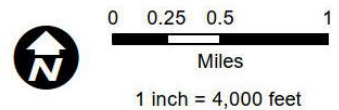
Source: NC FRIS Data

**Legend**

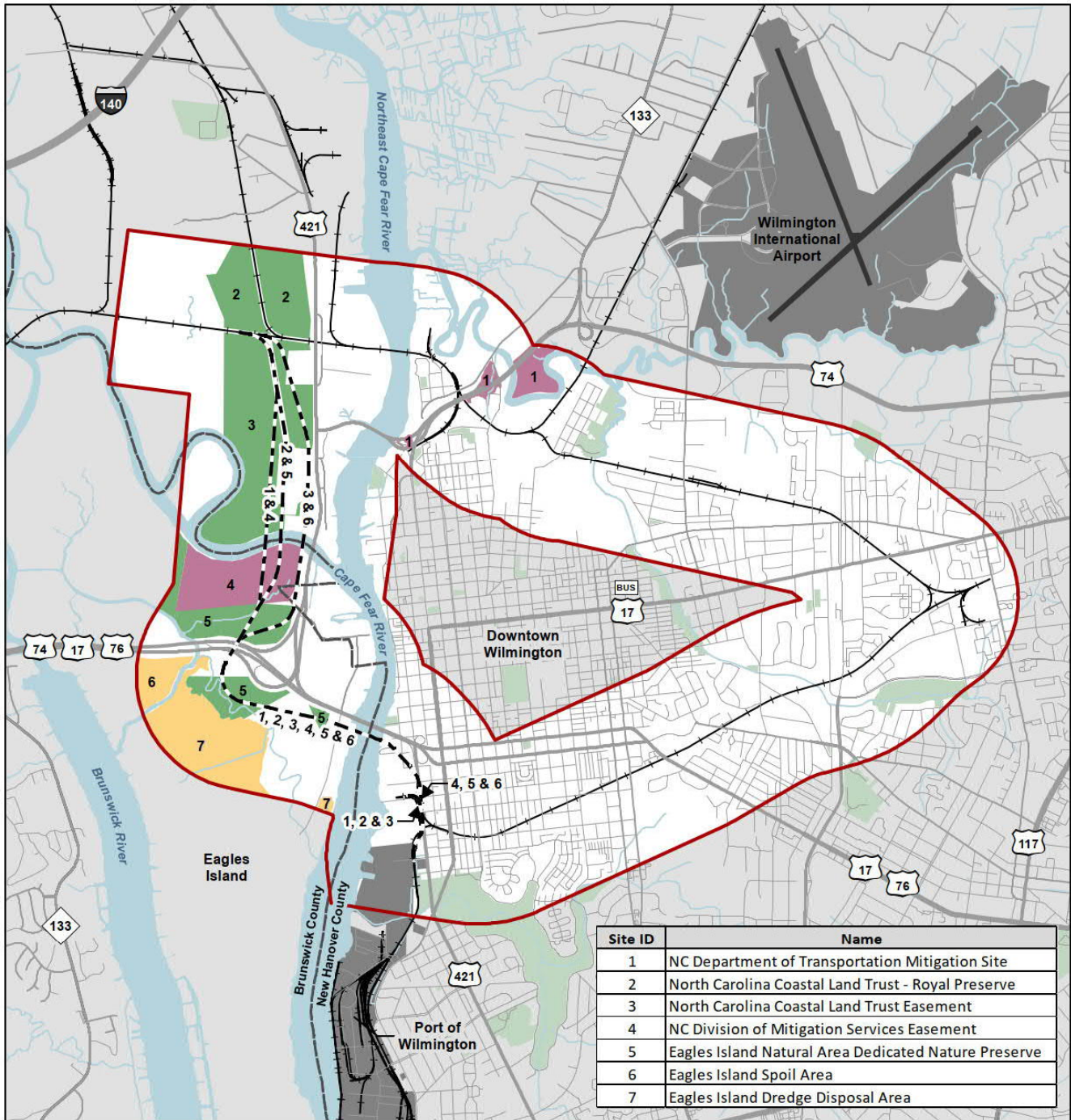
- Study Area
- County Boundary
- Park
- Railroad
- Proposed Alternatives
- 421 Sand Ridge (SR)
- Brunswick River/Cape Fear River Marshes (BR/CFR)
- CPF/Lower Cape Fear River Aquatic Habitat (CPF/LCFR)
- Greenfield Lake (GL)
- Northeast Cape Fear River Floodplain (NCFR)

**Figure 14  
Natural Heritage Natural Areas**

**Date: June 2021**







**Wilmington Rail  
Realignment Project**

**New Hanover County and  
Brunswick County, NC**

Source: NC OneMap - Managed Areas

**Legend**

- Study Area
- County Boundary
- Park
- Conservation Area
- Mitigation Site
- Spoil/Disposal Area
- Railroad
- Proposed Alternatives

**Figure 15  
Conservation Areas  
and Mitigation Sites**

**Date: June 2021**



0 0.25 0.5 1  
Miles

1 inch = 4,000 feet



## PROTECTED SPECIES

### *Threatened and Endangered Species*

As of April 12, 2021, the US Fish and Wildlife Service (USFWS) lists 16 federally protected species under the Endangered Species Act (ESA) for Brunswick County<sup>28</sup>. As of October 8, 2020, the USFWS lists 16 federally protected species under the ESA for New Hanover County<sup>29</sup>. The National Oceanic Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS) lists two sturgeon species for North Carolina that are federally protected species under the ESA and are species that occur in ocean, brackish, and fresh waters. The NMFS also lists seven oceanic species protected under the ESA that includes five whale species, oceanic whitetip shark, and giant manta ray<sup>27</sup>. Table 13 includes the listed species for Brunswick and New Hanover counties.

Field investigations were conducted to determine if suitable habitat for each threatened and endangered (T&E) species listed in Table 13 was present. Suitable habitat was identified for the following species: Golden sedge, Rough-leaved loosestrife, and Cooley's meadowrue (plant species); northern-long eared bat and West Indian manatee (mammal species); wood stork and black rail (bird species); and Shortnose sturgeon and Atlantic sturgeon (fish species). For the three plant species, the evaluation occurred outside of the optimal survey window and therefore presence of the species could not be confirmed. Future surveys for these plant species will be conducted during the NEPA phase of the Project. The Programmatic Biological Opinion on the Final 4(d) Rule for northern long-eared bat<sup>30</sup> will be followed to satisfy Section 7 consultation with USFWS. Construction activities in suitable West Indian Manatee habitat will adhere to the USFWS *Guidelines for Avoiding Impacts to the West Indian Manatee: Precautionary Measures for Construction Activities in North Carolina Waters*<sup>31</sup>. Additional field surveys are currently being conducted for the black rail. The nearest wood stork rookery is located nearly 40 miles from the Project, therefore additional field surveys for this species are not anticipated. Survey requirements for wood stork will be coordinated with USFWS. While presence for the sturgeon species is assumed where suitable habitat is present, the extent of effects to the sturgeon would be determined through future coordination with NMFS. Habitat requirements for each species are based on the most current available information from referenced literature, NCDOT, USFWS, and NMFS. Additional details regarding field investigations performed at the time of the report are documented in the *Natural Resources Technical Report* in Appendix I.

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<sup>28</sup> USFWS. 2021a. Endangered Species, Threatened Species, and Candidate Species, Brunswick County, North Carolina. <https://www.fws.gov/raleigh/species/cntylist/brunswick.html>

<sup>29</sup> USFWS. 2021b. Endangered Species, Threatened Species, and Candidate Species, New Hanover County, North Carolina. [https://www.fws.gov/raleigh/species/cntylist/new\\_hanover.html](https://www.fws.gov/raleigh/species/cntylist/new_hanover.html)

<sup>30</sup> USFWS. 2016. Programmatic Biological Opinion on the Final 4(d) Rule for northern long-eared bat. <https://www.fws.gov/midwest/endangered/mammals/nleb/pdf/BOnlebFinal4d.pdf>.

<sup>31</sup> US Department of Interior. Guidelines for Avoiding Impacts to The West Indian Manatee. [https://saw-reg.usace.army.mil/ESA/manatee\\_guidelines.pdf](https://saw-reg.usace.army.mil/ESA/manatee_guidelines.pdf)

All six Build Alternatives cross the same habitats and would likely have the same potential to affect any of the species identified as “unresolved” in Table 13. As such, consideration of T&E species is not a key differentiator for identifying a Preferred Alternative. Once a Preferred Alternative is identified, coordination with the USFWS and NMFS will continue throughout the NEPA process to determine effects on identified species and to meet the requirements of the ESA. Section 7 consultation with USFWS will be required after T&E species surveys have been completed to determine how the Project may affect the protected species listed for Brunswick and New Hanover Counties, and what measures should be taken to avoid and minimize impacts. A preliminary effects assessment was determined for the T&E species based upon habitat assessment results in the Study Area, as shown in Table 13; however, a formal effect finding will occur as part of the Section 7 consultation process.

Table 13: ESA Federally Protected Species listed for Brunswick and New Hanover Counties

Scientific Name	Common Name	Federal Status <sup>1</sup>	County <sup>2</sup>	Potential Suitable Habitat Present	Anticipated Effect
Plants					
<i>Amaranthus pumilus</i>	Seabeach amaranth	T	B, NH	No	NE
<i>Carex lutea</i>	Golden sedge	E	NH	Yes	Unresolved
<i>Lysimachia asperulaefolia</i>	Rough-leaved loosestrife	E	B, NH	Yes	Unresolved
<i>Thalictrum cooleyi</i>	Cooley's meadowrue	E	B, NH	Yes	Unresolved
Mammals					
<i>Myotis septentrionalis</i>	Northern long-eared bat	T	B, NH	Yes	MA – Subject to Final 4(d) Rule
<i>Trichechus manatus</i>	West Indian manatee	E	B, NH	Yes	MA-NLAA
<i>Balaenoptera borealis</i>	Sei Whale*	E	B, NH	No	NE
<i>Balaenoptera musculus</i>	Blue Whale*	E	B, NH	No	NE
<i>Balaenoptera physalus</i>	Fin Whale*	E	B, NH	No	NE
<i>Eubalaena glacialis</i>	North Atlantic Right Whale*	E	B, NH	No	NE
<i>Physeter macrocephalus</i>	Sperm Whale*	E	B, NH	No	NE
Birds					
<i>Calidris canutus rufa</i>	Red knot	T	B, NH	No	NE
<i>Charadrius melodus</i>	Piping plover	T	B, NH	No	NE
<i>Laterallus jamaicensis</i>	Black rail	T	NH	Yes	Unresolved
<i>Mycteria americana</i>	Wood stork	T	B	Yes	MA-NLAA
<i>Picoides borealis</i>	Red-cockaded woodpecker	E	B, NH	No	NE
Reptiles					

Scientific Name	Common Name	Federal Status <sup>1</sup>	County <sup>2</sup>	Potential Suitable Habitat Present	Anticipated Effect
<i>Alligator mississippiensis</i>	American alligator	T(S/A)	B, NH	Yes	Not required
<i>Caretta</i>	Loggerhead sea turtle	T	B, NH	No	NE
<i>Chelonia mydas</i>	Green sea turtle	T	B, NH	No	NE
<i>Dermochelys coriacea</i>	Leatherback sea turtle	E	B, NH	No	NE
<i>Eretmochelys imbricate</i>	Hawksbill sea turtle	E	B, NH	No	NE
<i>Lepidochelys kempii</i>	Kemp's ridley sea turtle	E	B, NH	No	NE
Fish					
<i>Acipenser brevirostrum</i>	Shortnose sturgeon*	E	B, NH	Yes	Unresolved
<i>Acipenser oxyrinchus</i>	Atlantic sturgeon*	E	B, NH	Yes	Unresolved
<i>Carcharhinus longimanus</i>	Oceanic whitetip shark*	T	B, NH	No	NE
<i>Menidia extensa</i>	Waccamaw silverside	T	B	No	NE
<i>Manta birostris</i>	Giant manta ray*	T	B, NH	No	NE

<sup>1</sup>T – Threatened; E – Endangered; T(S/A) — Threatened due to similarity of appearance

<sup>2</sup>B – Brunswick County; NH – New Hanover County

<sup>3</sup>NE — No Effect; MA — May Affect; MA-NLAA — May Affect – Not Likely to Adversely Affect

\* — Species listed by NMFS only

### *Bald and Golden Eagle Protection Act*

The bald eagle is protected under the Bald and Golden Eagle Protection Act and enforced by the USFWS. A desktop-GIS assessment was performed on February 18, 2021 and identified suitable habitat within the Build Alternatives and the area within a 1.0-mile radius of the area. Water bodies large enough or sufficiently open to be considered potential feeding sources were identified. Therefore, a survey will be conducted within the Build Alternative and the area within 660 feet of the Build Alternatives. The NCDOT Bald Eagle Survey Protocol was referenced to establish the distance from the Build Alternatives to conduct the surveys<sup>32</sup>. This guidance is based on the USFWS National Bald Eagle Management Guidelines. Coordination with the USFWS occurred in January 2021 to verify the appropriate distance. A review of the NHP database on February 18, 2021 revealed two known occurrences of this species: one nest within Alternatives 1, 2, 4, and 6 and one within 1.0 mile of the Build Alternatives, located west of Alternatives 1, 2, 4, and 6. On March 4, 2021, the bald eagle nest documented outside of the Build Alternatives was observed with an individual circling the nest. This nest is located within the 660-foot survey area. A bald eagle nest survey will be conducted in the future and results will be provided in future environmental documentation. Additional details regarding field investigations performed at the time of the report are documented in the *Natural Resources*

<sup>32</sup> NCDOT. 2015a. NCDOT Guidelines to Assess Potential Project Impacts to the Bald Eagle and Survey Protocols. July 20, 2015.

<https://connect.ncdot.gov/resources/Environmental/Compliance%20Guides%20and%20Procedures/NCDOT%20Guidelines%20and%20Survey%20protocols%20for%20bald%20eagle%207-20-15.pdf>

*Technical Report* in Appendix I. Coordination with the USFWS is expected and a Bald and Golden Eagle Protection Act permit may be required for any activity that results in the taking of bald eagles, as defined by the Act, including disturbance of nesting bald eagles or removal of a nest. Alternatives 1, 2, 4, and 6 are closer to the documented bald eagle nest and may require an Eagle Act permit.

*Essential Fish Habitat*

NMFS has identified the Cape Fear River, Alligator Creek, and surrounding marshes as Essential Fish Habitat (EFH). Table 14 lists the fish species managed by NMFS that may occur in the Build Alternatives, including the life stages which are reported to occur. Due to the presence of EFH in the Build Alternatives, coordination with NMFS is anticipated for this Project.

Table 14: Managed Fish Species Reported to Occur in the Build Alternatives

Species	Life Stage
Coastal Migratory	All
Snapper Grouper	All
Atlantic Butterfish	Adult
Bluefish	Adult, Juvenile
Summer Flounder	Larvae, Juvenile, Adult
Spinner Shark	Neonate

All Build Alternatives would impact designated critical habitat for the Atlantic sturgeon, anadromous fish spawning area (AFSA), EFH, primary nursery areas (PNA), and areas of environmental concern (AECs) in the form of Public Trust Waters located west of the Cape Fear River.

JURISDICTIONAL WATERS OF THE US

Twenty-nine jurisdictional streams and 11 jurisdictional wetlands were identified within the Build Alternatives. The locations of these streams and wetlands are shown on Figure 16 and Figure 17. Characteristics of jurisdictional features within the Build Alternatives are described in detail in the *Wilmington Rail Realignment Natural Resources Technical Report* (Appendix I).

Additionally, there are Coastal Area Management Act (CAMA) AECs present within the Build Alternatives, including Public Trust Areas, Estuarine Waters, Coastal Shorelines, and Coastal Wetlands. Determination of Coastal Wetland AECs presence and CAMA jurisdiction should be performed by the NC Division of Coastal Management (NCDCM). A CAMA major permit from the NCDCM will be required for impacts to designated AECs within the Build Alternatives corridors.

Impacts to jurisdictional streams and wetlands are summarized in Table 15. Overall, Alternatives 1 and 4 have more impacts to wetlands, high-quality wetlands, coastal wetland AECs, linear feet of streams, high-quality streams, and Primary Nursery Areas. Alternatives 2 and 5 generally have the lowest impacts of these resources. The quality of wetlands and



streams were based on results from the NC Wetland Assessment Methodology (NC WAM)<sup>33</sup> and NC Stream Assessment Methodology (NC SAM)<sup>34</sup>.

Based on the number and size of jurisdictional wetlands and streams in the Build Alternatives, consultation with USACE will be required to determine the applicability of relevant permits, including Section 404 and 401 permits.

The Cape Fear River has been designated by the USACE as a Navigable Water under Section 10 of the Rivers and Harbors Act. A Section 10 Permit will be required for construction of structures such as piers or excavation/placement of fill material in or affecting navigable waterways, including the Cape Fear River.

Table 15: Jurisdictional Stream and Wetland Impacts

Metric Category	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6
Total acreage of wetlands	61	60	60	61	60	60
Total acreage of high-quality wetlands	54	46	46	54	46	46
Total acreage of medium-quality wetlands	7	9	9	7	9	9
Total acreage of low-quality wetlands	<1	5	5	<1	5	5
Total acreage of Coastal Wetland AECs	45	39	40	45	39	40
Total linear feet of streams	2,344	1,608	1,527	2,344	1,608	1,527
Total acreage of streams	10	9	7	10	9	7
Total linear feet of high-quality streams	2,144	1,408	1,327	2,142	1,408	1,327
Total linear feet of medium-quality streams	0	200	200	200	200	200
Total linear feet of ditches	190	190	190	180	180	180
Total acreage of ditches	<1	<1	<1	<1	<1	<1
Total acreage of Primary Nursery Areas (PNA) <sup>1</sup>	19	6	3	19	6	3
Presence of EFH <sup>2</sup>	Yes	Yes	Yes	Yes	Yes	Yes

<sup>1</sup>GIS data source: NC DEQ Primary Fish Nursery Areas layer from NCDOT Project ATLAS.

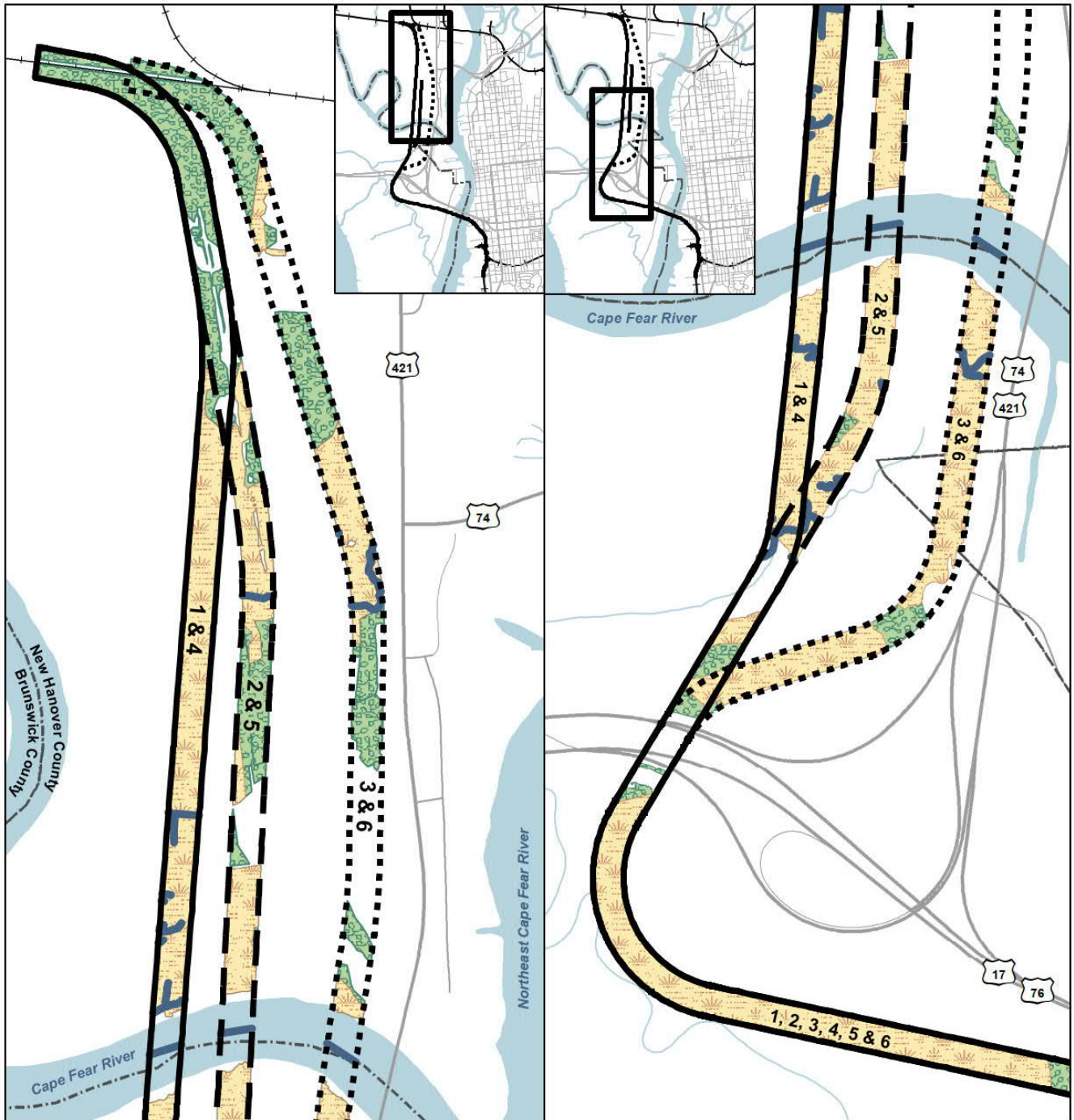
<sup>2</sup>GIS data source: Nationwide EFH shapefile from NOAA NMFS GIS Data for Essential Fish Habitat. An Essential Fish Habitat Assessment is anticipated at a future date.

<sup>33</sup> NC Wetland Functional Assessment Team. October 2010. N.C. Wetland Assessment Method (NC WAM) User Manual.

<https://files.nc.gov/ncdeq/Water%20Quality/Surface%20Water%20Protection/PDU/NC%20WAM/NC%20WAM%20Users%20Manual%20and%20appendices%20v4.1.pdf>

<sup>34</sup> NC Stream Functional Assessment Team. March 2013. N.C. Stream Assessment Method (NC SAM) Draft User Manual.

[https://www.saw.usace.army.mil/Portals/59/docs/regulatory/publicnotices/2013/NCSAM\\_Draft\\_User\\_Manual\\_130318.pdf](https://www.saw.usace.army.mil/Portals/59/docs/regulatory/publicnotices/2013/NCSAM_Draft_User_Manual_130318.pdf)



**Wilmington Rail  
Realignment Project**

**New Hanover County and  
Brunswick County, NC**

Source: WSP Field Delineations

**Legend**

- County Boundary
- Alternatives 1 & 4 Impact Area
- Alternatives 2 & 5 Impact Area
- Alternatives 3 & 6 Impact Area
- Wetland
- Coastal Wetland AEC
- Railroad
- Stream

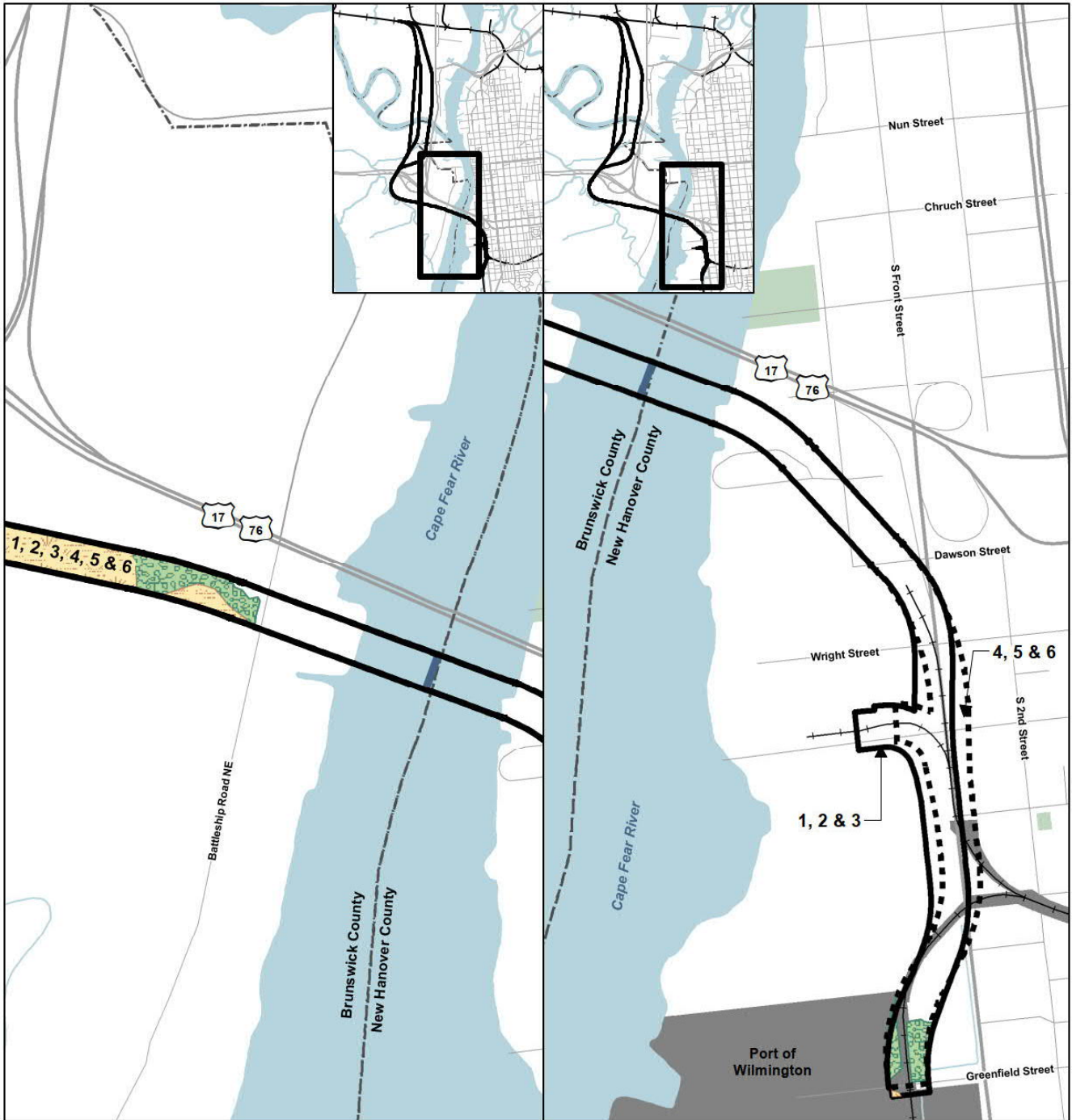
**Figure 16  
Jurisdictional Features 1**

Date: June 2021



0 250 500 1,000  
Feet

1 inch = 850 feet



**Wilmington Rail  
Realignment Project**

**New Hanover County and  
Brunswick County, NC**

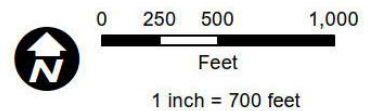
Source: WSP Field Delineations

**Legend**

- County Boundary
- Park
- Alternatives 1, 2 & 3 Impact Area
- Alternatives 4, 5 & 6 Impact Area
- Coastal Wetland AEC
- Wetland
- Railroad
- Stream

**Figure 17  
Jurisdictional Features 2**

Date: June 2021





## 5.0 PRELIMINARY CONCLUSIONS

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### 5.1 COMPARISON OF ALTERNATIVES

Table 16 provides a comparison of the alternatives for the various characteristics evaluated. While many of the characteristics evaluated are similar across all the Build Alternatives there are some key differences to note across the following criteria:

- Improves operational efficiency

All Build Alternatives provide an advantage over the No-Build Alternative for operational efficiency. Under the Build Alternatives, the bypass proposes to reduce the travel distance by half between the Port of Wilmington and Davis Yard compared to the No-Build Alternative. This results in more efficient train movements and travel time savings for freight traffic. All Build Alternatives provide the same level of improved operational efficiency for freight traffic.

- Minimizes public at-grade crossings

The No-Build Alternative assumes that no bypass or rerouting of existing and future freight traffic would occur. Freight operations would continue through downtown Wilmington. The traffic analysis completed for the Future No-Build Condition indicates increased AADT and vehicle delays at existing at-grade crossings, assuming current freight operations. It is expected that freight operations would gradually increase (more frequency and longer trains) by 2040. This combined with already predicted traffic delays and exposure under the No-Build Future Condition would likely result in decreased mobility throughout the City with more delays at public at-grade crossings. In addition, safety concerns would rise due to increased train frequencies and potential exposures at each of the at-grade crossings. The Build Alternatives significantly reduce the risk of exposures throughout the City.

Among the Build Alternatives, there is likely one common at-grade crossing of Dawson Street. Alternatives 4, 5, and 6 have three additional crossings of S. Front Street within a 1,500-foot span. Alternatives 1, 2, and 3 are more desirable regarding meeting the criterion of minimizing at-grade crossings.

- Consistency with Planned Isabel Holmes Bridge Flyovers Project

All alternatives, except for Alternatives 3 and 6, would accommodate the planned Isabel Holmes Bridge Flyovers Project. Alternatives 3 and 6 are incompatible with the planned improvements for that project.

- Minimizes crossings of major utility lines

A major transmission line crosses the Study Area in the vicinity of all Build Alternatives. Crossing the utility line requires certain horizontal and vertical clearances that could result in relocation of the transmission line support towers. Alternatives 2, 3, 5 and 6 have three crossings of the utility line whereas Alternatives 1 and 4 only have one crossing. Fewer crossings are more desirable from a potential cost perspective.

- Minimizes impacts to water resources

The No-Build Alternative would not introduce any new impacts to water resources as no physical improvements occur because of the Project. All Build Alternatives propose track on structure for a majority of the project route to minimize impacts to water resources. Alternatives 2 and 5 incorporate the most track feet of the out-of-service rail bed, which was noted as potentially more desirable during the Screening Phase by resource agencies. By reusing the out-of-service rail bed, impacts to high-quality wetlands may be reduced. Alternatives 2 and 5 impact 77% of the total high-quality wetlands identified in the impact area compared to 87% for Alternatives 1 and 4. Additionally, Alternatives 1, 2, 4 and 5 have fewer acres of SFHA than Alternatives 3 and 6. Alternatives 3 and 6 have the least impact on total linear feet of streams and Alternatives 1 and 4 have the greatest impact.

Potential impacts to water resources is a critical consideration for this Project. Eagles Island is a mix of marsh, open water and upland areas. Impacts to water resources require regulatory approval and permitting. High-quality and coastal wetlands have higher mitigation requirements. Alternatives 2 and 5 present the least impacts to these two resources and are likely more acceptable from a permitting perspective.

- Minimizes impacts to the human environment

The No-Build Alternative traverses downtown Wilmington through developed areas and established communities compared to the Build Alternatives which bypass the City. The location of the Build Alternatives is primarily in industrial areas with sparse residences. All alternatives are within areas identified to have environmental justice populations. However, the Build Alternatives minimize impacts to EJ populations by removing freight operations out of the more populated City. The Build Alternatives promote community cohesion and safety and would be a benefit to those living in the City. The Build Alternatives are similar in the number of potential parcel impacts, however Alternative 6 would have the highest total number of parcels potentially impacted. The number of noise and vibration-sensitive receptors are considerably lower for the Build Alternatives than for the No-Build.

All alternatives are within the Wilmington Historic District. All of the Build Alternatives have generally the same number of parcels within the historic district within the 1/4-mile

APE. When considering archaeological potential, Alternatives 2 and 5 have a slightly higher probability to encounter archaeological resources over the other Build Alternatives. This is due to a small undisturbed area associated with Point Peter.

- Minimizes impacts to natural resources

Due to the natural setting of Eagles Island, all Build Alternatives have a greater potential to affect natural resources, including conservation areas, more than the No-Build Alternative. Alternatives 2 and 5 have the least acreage of conservation area impacted. Alternatives 3 and 6 have the least acreage of Natural Heritage Natural Areas. All Build Alternatives cross essential fish habitat and primary nursery areas.

Protected species are listed for the counties for which the Study Area is included. Alternatives 1, 2, 4 and 6 may require an Eagle Act permit due to the proximity of a known and active eagle's nest. Additional studies are being conducted to determine the presence of black rail, a newly listed endangered species, in the vicinity of the Build Alternatives.

Table 16: Comparison of Alternatives

Criterion	Metric	No-Build*	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6
Improves operational Efficiency	Length of new track/length of existing track (miles)	0/8	4/0	4/0	4/0	4/0	4/0	4/0
	Number of sharp mainline curves (8 deg or greater)	5	1	1	3	2	2	4
	Number of turnouts	7	4	4	4	3	3	3
Minimizes public grade crossings	Number of public at-grade crossings	30	1	1	1	4	4	4
	Number of grade separations	5	2	2	3	2	2	3
Minimizes impacts to Water Resources	Number of bridges over water	3	3	3	2	3	3	2
	Length of track on proposed structure (TF)	n/a	11,049	11,149	12,299	11,049	11,149	12,299
	Reuse of out-of-service railbed (TF)	n/a	1,847	3,354	n/a	1,847	3,354	n/a
	Acres within Special Flood Hazard Area (SFHA)	-	82	83	86	82	83	85



Criterion	Metric	No-Build*	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6
	Total Acreage of Wetlands	-	61	60	60	61	60	60
	% of Total High-Quality Wetlands	-	87%	77%	77%	87%	77%	77%
	% of Total Coastal Wetlands		74%	65%	67%	74%	65%	67%
	Total linear feet of Streams	-	2,344	1,608	1,527	2,344	1,608	1,527
Consistency with Planned Isabel Holmes Bridge Flyovers	Avoids impacts to planned bridge interchange at U-5731 US-421?	n/a	Yes	Yes	No	Yes	Yes	No
Minimizes Crossings of Major Utility Lines	Number of major Transmission Line crossings	n/a	1	3	3	1	3	3
Minimizes Impacts to Human Environment	EJ community presence	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Total # of Bus Routes impacted	-	2	2	2	2	2	2
	Total # of Parcels potentially impacted	-	38	40	48	43	45	53
	Total # of noise-sensitive parcels (all categories)	1,851	227	233	263	226	229	261
	Total # of vibration-sensitive parcels (all categories)	253	7	7	7	18	18	18
	# of Known Hazardous Material Sites	-	16	16	18	16	16	18
	# of Parcels within Wilmington Historic District within ¼ mile APE	-	20	20	21	23	23	24
	Percentage of High Probability areas for Archaeology	-	0.9%	1.4%	0.9%	0.9%	1.4%	0.9%
Minimizes Impacts Natural Resources	Acres of Total Conservation Areas	-	36	22	32	36	22	32
	Acres of NCDOT Mitigation Areas	-	8	9	3	8	9	3
	Acres of Impact to NHNA (Natural Heritage Natural Areas)	-	74	65	61	74	65	61

Criterion	Metric	No-Build*	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6
	May require Eagle Act Permit	-	x	x	-	x	-	X
	Crosses Essential Fish Habitat (EFH)	-	Yes	Yes	Yes	Yes	Yes	Yes
	Total acreage of Primary Nursery Areas	-	19	6	3	19	6	3

\*Impacts were not calculated for the No-Build as no improvements are proposed. However existing conditions for some resources are shown to establish baseline conditions for comparison as changes in freight operations under future No-Build conditions would potentially affect these resources.

## 5.2 DRAFT RECOMMENDATIONS

Based on the comparison presented above, two alternatives emerge as candidates for the Preferred Alternative: Alternative 1 and Alternative 2. It is recommended that Alternatives 3, 4, 5 and 6 be dropped from further consideration as the Preferred Alternative. Alternatives 4 and 5 do not meet the criterion to minimize public grade crossings, as both alternatives introduce multiple at-grade crossings along S. Front Street. While Alternatives 4 and 5 reduce the number of public at-grade crossings compared to the No-Build Alternative, they perform worse when compared against other Build Alternatives. Alternatives 3 and 6 do not meet the criterion of consistency with the planned Isabel Holmes Bridge Flyovers Project since both alternatives would directly impact the planned interchange project. Additionally, Alternatives 3 and 6 propose more track on structure and impact more parcels of land than other alternatives.

Alternatives 1 and 2 are similar in that they both have (potentially) only one at-grade crossing along S. Front Street and both accommodate the planned Isabel Holmes Bridge Flyovers Project. They differ in the location of their alignment through the northern portion of the Project on Eagles Island connecting to the CSXT SE line to Davis/Navassa Yard. Alternative 1 is further to the west and is further away from the New Hanover County Sheriff's Department shooting range. Additionally, Alternative 1 has only one crossing of major utility transmission lines. Alternative 2 cuts through the western portion of the shooting range property, and through the middle of the rifle range, as well as three crossings of major utility transmission lines. In doing so, this allows Alternative 2 to use more of the out-of-service railbed than Alternative 1. By using more of the out-of-service railbed, Alternative 2 supports less impacts to water and natural resources than Alternative 1. Alternative 2 has less impacts to high quality wetlands, coastal wetlands, and primary nursery areas than Alternative 1.

Potential impacts identified at this stage of project development are for planning purposes. The analysis considered a 200-foot swath centered on the centerline of each Build Alternative. It did not differentiate between at-grade (railroad on embankment) and elevated (railroad on structure) features for resource impacts. As planning for the Project progresses, impact areas

will be refined to reflect a narrower width and would take the use of proposed elevated features into consideration focusing on potential areas of impact associated with areas of fill, piers and support structures.



## 6.0 FINAL RECOMMENDATIONS

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### 6.1 AGENCY AND PUBLIC COMMENTS

Agencies and public stakeholders were provided an opportunity to comment on the Draft Alternatives Analysis Report. FRA held an agency coordination meeting on June 23, 2021. During that meeting FRA provided an overview of the findings of the Draft Alternatives Analysis Report. Similarly, the public was provided an opportunity to review the report online during a month-long virtual open house from June 28 to July 26, 2021. The outreach methods utilized for this open house were similar to the methods described in Section 3.2 for the first virtual open house.

Supporting documentation for the agency meeting and the virtual open house as well as comments received on the Draft Alternatives Analysis Report are provided in Appendix J. A complete list of all stakeholder meetings is included in the Project's PIP. The PIP is available on the Project website at <https://www.wilmingtonnc.gov/>.

Comments received from agencies and the public during the comment period as well as the response from the City and FRA are summarized in the following sections.

#### 6.1.1 NC Historic Preservation Office (NCHPO)

The NCHPO commented on the potential for the Project to affect above-ground structures and archaeological resources of historical significance. The NCHPO noted that all Build Alternatives will affect the USS North Carolina Battleship, a National Historic Landmark (NHL) and World War II Memorial, and the Wilmington National Register Historic District. In addition, the comment stated that consideration of the Seaboard Air Line Railway/Atlantic Coast Railroad District, a NRHP eligible resource, is missing from the analysis and will be affected by the Project.

The NCHPO also noted that archaeological potential exists on Eagles Island and any new railroad bed or bridge should be assessed for the potential to encounter archaeological resources. The Cape Fear River bottom should be assessed for NRHP eligible submerged resources that could be affected by bridge construction.

#### CITY/FRA RESPONSE:

The City and FRA have noted in the Alternatives Analysis the potential effects to the USS North Carolina Battleship and Wilmington National Register Historic District and will continue coordination with the NCHPO to ensure that archaeological and above ground structures are assessed to determine potential effects. Additionally, the City and FRA will include the consideration of the Seaboard Air Line Railway/Atlantic Coast Railroad District in future analysis of the Project to determine potential effects and any appropriate mitigation. If unavoidable

adverse effects are identified to any of these resources, appropriate mitigation measures will be developed in coordination with Section 106 consulting parties including the NCHPO.

### 6.1.2 New Hanover County Soil & Water Conservation District (NHSWCD)

NHSWCD noted that all proposed alternatives cross the Eagles Island Natural Area Dedicated Nature Preserve property owned by NHSWCD and have the potential to result in direct impacts. “The property is part of a District policy to hold the property north of the Cape Fear Memorial Bridge to Brunswick River causeway held in public ownership. This particular parcel is linked to other parcels owned in fee or in partnership by the District as part of protecting an area where the ecological succession of rice culture and naval stores manufacturing can be observed scientifically and by the public.” NHSWCD commented on the excavation pond created by NCDOT and associated recreational potential that has been explored for an elevated walkway.

The comment also noted general impacts to the historic and ecological values of Eagles Island and that construction of a rail line will jeopardize these resources.

#### CITY/FRA RESPONSE:

As planning for the Project progresses, the City/FRA will continue to coordinate with NHSWCD to better understand potential effects on District-owned property. The Project team is also coordinating with state and federal regulatory agencies to determine effects on the historic and ecological assets located on Eagles Island as well as any appropriate mitigation.

### 6.1.3 North Carolina Coastal Land Trust (NCCLT)

The North Carolina Coastal Land Trust noted all proposed alternatives affect a conservation easement held and managed by NCCLT on Eagles Island. It submitted comments on the Draft Alternatives Analysis Report recommending that FRA and the City explore variations of Alternative 3 that would minimize fragmentation of the conservation easement, keep the rail line closer to the existing US 421/NCDOT STIP U-5731, and would not use the existing rail corridor.

#### CITY/FRA RESPONSE:

The City and FRA considered a potential refinement to Alternative 3 that tried to meet these goals by shifting the alignment for Alternative 3 (and Alternative 6) west to avoid the proposed Isabel Holmes Bridge Flyovers project (NCDOT STIP U-5731) and avoid using the out-of-service railbed, as shown in Exhibit 3. The Project team evaluated the potential impacts associated with the refinement in this section using GIS overlays of the alternative and data layers for identified resources.

Table 17 provides a comparison of Alternatives 1, 2 and both the refined and original Alternative 3 for this section of the alignment for select resources.

Exhibit 3: Conceptual Revised Alternatives 3 & 6 Alignment



Based on the preliminary analysis presented in Table 17, the refined Alternative 3 does not appear to provide any advantages over the original Alternative 3 when compared to Alternatives 1 and 2. The refined Alternative 3 appears to have a greater total acreage of wetland impacts, SFHA, and North Carolina Coastal Land Trust impacts than the original Alternative 3.

Table 17: Alternatives Comparison of Select Resources

Resource	Alternative 1	Alternative 2	Alternative 3 (refined)	Alternative 3 (original)
Total Wetland Acres	38	37	39	37
Total High-Quality Wetland Acres	32	24	27	25

Resource	Alternative 1	Alternative 2	Alternative 3 (refined)	Alternative 3 (original)
Total Coastal Wetland Acres	27	20	21	21
Total FEMA SFHA Acres	48	48	54	51
North Carolina Coastal Land Trust (total approximate acres)*	21	6*	15	14

Notes: Table represent a comparison for each alternative only for Section III; it is not meant to be an end-to-end total/comparison. The proposed refinements to Alternative 3, Section III do not change impacts in other sections. Approximate acreage is rounded to the nearest whole number.

\*Acreage does not include transportation easement that exists on out-of-service railbed.

As planning for the Preferred Alternative progresses, additional refinements will be considered to further reduce or avoid impacts. Much of the proposed alignment will be elevated throughout Eagles Island allowing natural drainage and flow to continue as well as allowing species to continue to traverse the area.

#### 6.1.4 General Public

Two separate anonymous public comments were received during the comment period. One made a recommendation to consider relocating the Port of Wilmington near Southport instead of spending money on rerouting the rail around Wilmington. The comment also stated concern over dredging that the impacts on surge flooding in the City. The comment also stated that there was no need to spend money on the Cape Fear Crossing toll bridge.

The other comment shared support for the rerouting of the freight trains and for the train corridor to be turned into public transit or a greenway for recreation and that consideration of affordable housing along transit routes be given should the existing rail line be used for transit. The individual also expressed concern for potential effects on wildlife and wetlands and the preservation of habitat, trees, native plants, and natural drainage and water management features. In addition, the comment mentioned the desire to keep the bridge over the river public and not to privatize with tolls.

#### CITY/FRA RESPONSE:

Consideration of moving the Port of Wilmington, the Cape Fear Memorial Bridge Project, and future use of and development along the rail line through the City is outside of the scope of this Project. The purpose of this Project is to provide for improved safety, regional transportation mobility, and freight operations between the Port of Wilmington and Davis/Navassa Yard. The criteria used to evaluate potential alternatives and identify a Preferred Alternative presented in this Alternatives Analysis consider impacts to both the built and natural environment. As



planning for the Project progresses, consideration of the built environment and natural features and ways to avoid or minimize effects on those resources will continue to be incorporated.

## 6.2 PREFERRED ALTERNATIVE

Based on the data collected and analyzed for this Alternatives Analysis process, the City and FRA recommend Alternative 2 as the Preferred Alternative. Key advantages of this alternative in comparison to the other Build Alternatives are:

- Supports the Purpose and Need to reduce at-grade crossings: Alternative 2 includes one at-grade crossing of Dawson Street. In comparison Alternatives 4, 5, and 6 include 3 additional at-grade crossings.
- Maximizes use of the out-of-service railbed: By using more of the out-of-service railbed, Alternative 2 supports less impacts to water and natural resources.
- Minimizes the use of conservation lands: By using more of the out-of-service railbed, Alternative 2 uses less acreage of conservation lands held by the North Carolina Coastal Land Trust.
- Results in less impact to coastal and high-quality wetlands: Alternative 2 impacts 77% of the total high-quality wetlands identified in the impact area compared to 87%.

## 6.3 NEXT STEPS

The Project will now advance from the "Pre-NEPA" phase to the "NEPA" phase consistent with FRA's project development process. FRA will prepare an Environmental Assessment (EA) to evaluate the Preferred Alternative in comparison to the No-Build Alternative and build upon the findings presented in the Alternatives Analysis. More detailed analysis and engineering will be prepared for the Preferred Alternative as necessary to further assess effects on various environmental resources and develop mitigation measures, as appropriate. Additional investigations and consultation will be required to meet applicable federal regulatory requirements including but not limited to the Clean Water Act, Section 7 of the Endangered Species Act, and Section 106 on the NHPA. As planning for the Project progresses, outreach will continue with all stakeholders throughout the NEPA process.

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