

**DETAILED STUDY ALTERNATIVES CARRIED FORWARD
AND BRIDGING DECISIONS AND ALIGNMENT REVIEW**

Replacement of Bridge Number 640013 (Cape Fear Memorial Bridge)
over the Cape Fear River

New Hanover and Brunswick Counties

STIP Project HB-0039

North Carolina Department of Transportation

Division 3



MERGER CONCURRENCE POINT NUMBER 2 and 2A

April 11, 2024 / 10:00 AM

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Appendices

- Figures (listed below)
- Preliminary Designs
- Proposed Bridge Profiles

Figures (included with packet)

Vicinity Map

Environmental Features Map

Alternatives Map

Jurisdictional Features Map

1. Introduction

The purpose of this meeting is to reach concurrence on CP 2 and 2A, Detailed Study Alternatives and Major Hydraulic Crossings.

Lead federal agency: Federal Highway Administration (FHWA)

Primary points of contact for the subject project are:

Agency	Name
FHWA	Seth Wilcher
U.S. Army Corps of Engineers (USACE)	Thomas Steffens
North Carolina Division of Water Resources (NCDWR)	Amy Chapman
North Carolina Department of Transportation (NCDOT)	Trace Howell

1.1 Project Description

NCDOT proposes to replace Bridge # 640013 over the Cape Fear River on US 421 in New Hanover and Brunswick Counties. NCDOT identified three alternatives for consideration in project development as listed below. Each alternative includes the following typical section: three 12-foot lanes in each direction separated by a 22-foot median including 11-foot inside shoulders, 15-foot multi-use path on the north side of the bridge, and 12-foot outside paved shoulders (see image below).

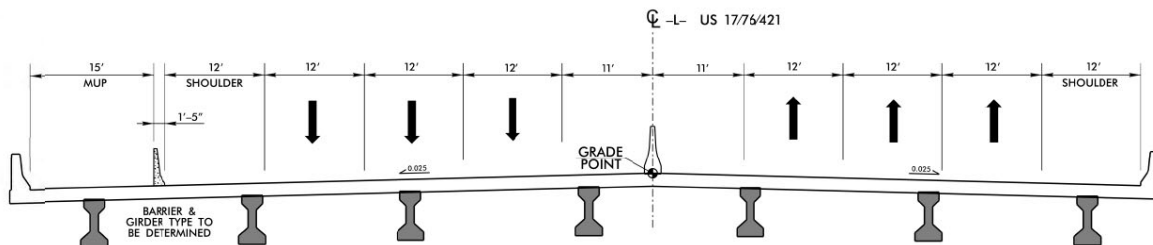


Image 1. Proposed bridge typical section

- Alternative A: Movable span 65-135' vertical clearance
- Alternative B: Fixed span 135' vertical clearance with trumpet interchange improvements
- Alternative C: Fixed span 65' vertical clearance

Each alternative would modify the existing eastern loop ramps at S. Front Street and tie into the current one-way pair of Wooster Street and Dawson Street in downtown Wilmington. Across the river, the bridging of Eagle Island wetlands would extend to the US 17/US 74/ US 421 interchange, with possible ramp modifications to that interchange with Alternative B. The proposed study area shown in Figure 1 encompasses all such modifications.

The existing bridge is approximately 0.66 miles in length with a proposed design speed of 50 miles per hour over the river. The project is programmed in the 2024-2033 State Transportation Improvement Program (STIP) as project HB-0039 for preliminary engineering only. The project location is shown in Figure 1.

1.2 Cost Estimate and Merger Plan

The Wilmington Metropolitan Planning Organization (WMPO) *Cape Fear Moving Forward 2045* Metropolitan Transportation Plan (MTP) was adopted November 18, 2020. The MTP identified the subject project as “US 76/421/17/17 BUS/Cape Fear Memorial Bridge Replacement”. The project is ranked 58th out of 79 projects in the Fiscally-Constrained Roadway Project List, and is identified as RW-127 with a planning year of 2040. The Plan describes the Cape Fear Memorial Bridge Replacement as a targeted infrastructure improvement.

As noted above, the project is included in the current STIP as project HB-0039 and is being managed by NCDOT Division 3. The current cost estimates for the project are shown in **Table 1**. The proposed project schedule is included in **Table 2** and is based on the Merger Plan. The schedule and cost estimates are draft and subject to change.

Table 1. Cost Estimates

Phase	Estimated Costs		
	Alternative A: 65-135' Vertical Clearance Movable Structure	Alternative B: 135' Vertical Clearance Fixed Structure	Alternative C: 65' Vertical Clearance Fixed Structure
Right of Way	\$19,700,000	\$48,600,000	\$19,700,000*
Utilities	\$2,000,000	\$3,700,000	\$2,000,000
Construction	\$744,200,000	\$400,600,000	\$247,700,000
Total	\$765,900,000	\$452,900,000	\$255,388,000

NOTE: All cost estimates are preliminary and subject to change.

*Should property values upstream of the existing bridge be affected by Alternative C, the right of way cost estimate is anticipated to increase but is not known at this time.

Table 2. Project Schedule*

Milestone	Anticipated Date
Public Meeting	Summer 2024
CP 3 (LEDPA Determination)	Fall 2024
CP 4A	Winter 2024/2025
CP 4B	TBD
CP 4C	TBD
Begin ROW Acquisition	Post Year
Begin Construction	Post Year

*Draft, subject to change

2. Summary of CP 1 Project Purpose and Need and Study Area Defined

The Merger team met on December 14, 2023 to discuss CP 1, Purpose and Need, and Study Area. The Merger team subsequently concurred via electronic signature on March 6, 2024. The final merger packet as presented at the meeting and concurred upon is located [here](#). The Project Study Area is shown in Figure 1 and there have been no changes to the study area since CP 1.

Concurrence Point 2: Detailed Study Alternatives

4. Summary of Alternatives Considered

4.1 No Build Alternative

The No-Build Alternative only includes minor restoration activities to ensure the safety, maintenance, and continued operation of the existing highway. It does not require additional right of way or any improvements to the highway that would generate impacts to human or natural resources. Although it will not provide increased mobility and connectivity required to meet the Purpose and Need of the project, the No-Build Alternative will be carried forward to provide a basis for comparison with other alternatives carried forward for detailed study for this proposed action.

4.2 Build Alternatives

NCDOT proposes three alternatives for consideration in project development as listed below and depicted in Figures 3a and 3b. Each alternative includes the following typical section: three 12-foot lanes in each direction separated by a 22-foot median including 11-foot inside shoulders, 15-foot multi-use path on the north side of the bridge, and 12-foot outside paved shoulders.

- Alternative A: Movable Structure 65-135' vertical clearance
- Alternative B: Fixed Structure, 135' vertical clearance
- Alternative C: Fixed Structure, 65' vertical clearance

Each alternative would slightly modify the existing eastern loop ramps at S. Front Street and tie into the current one-way pair of Wooster Street and Dawson Street in downtown Wilmington. Across the river, the bridging of Eagles Island wetlands would extend to the US 17/US 76/US 421 interchange, with possible ramp modifications to that interchange with Alternative B.

4.3. Alternatives Eliminated

At present, no alternatives have been eliminated. The NCDOT recommends moving forward with all three build alternatives, Alternatives A, B, and C, for future study and evaluation as well as the No-Build alternative.

5. Analysis of Build Alternatives

Table 3 shows environmental features within the Project Study Area of each alternative being carried forward. Measurements were quantified using slope stakes plus 40 feet. Streams and wetlands represent field delineated resources, though they have not been verified by the agencies at the time of this packet.

Table 3. Resource Presence in Project Study Area

	Alternative A (65-135' movable)	Alternative B (135' fixed)	Alternative C (65' fixed)
Length [bridge length] (mile)	1.47 [1.24]	1.85 [1.31]	1.47 [1.24]
Natural Environment¹			
100-Year Floodplain (acre)	3.3	28.1	3.3
Section 404 Wetlands (acre)	1.11	10.40	1.11
Section 404/CAMA Wetlands (acre)	0	0.11	0
Human Environment			
Parcels	26	72	26
Churches/Cemeteries (#)	1 (Healing Waters Holy Temple Church) ²	1 (Healing Waters Holy Temple Church) ²	1 (Healing Waters Holy Temple Church) ²
Community Resources (#)	1 (Dollar General)	1 (Dollar General)	1 (Dollar General)
Presence of Historic Resources (yes/no) ³	Yes	Yes	Yes
Section 4(f) (yes/no) ⁴	TBD	TBD	TBD
Environmental Justice Populations (yes/no) ⁵	Yes	Yes	Yes
Physical Environment¹			
Hazardous Material Sites (#)	2	2	2

NOTES:

1. Measurements quantified using a 40-foot buffer of the slope stakes of the roadway approaches. Bridged areas are not included at this time.
2. No impacts are anticipated to Healing Waters Holy Temple Church with any of the alternatives.
3. All three alternatives fall within the National Register (NR) Wilmington Historic District. The CFMB is a contributing resource within this district and has been recommended for individual eligibility. Additionally, the USS North Carolina NR-listed resource is located approximately 0.6 miles north of the project on the west side of the Cape Fear River.
4. Section 106 effects have not been determined at this time. The final determination of resources eligible for NRHP listing and therefore also Section 4(f) properties will be determined by NCHPO.
5. All three alternatives intersect six census block groups that exceed the threshold for Environmental Justice for both minority and poverty populations, two in Brunswick County and four in New Hanover County.

6. Summary of Public Involvement

A Public Involvement Plan (PIP) has been developed for the project. A wide range of methods are planned for public engagement and participation at all stages of the project, including an informal, drop-in style public meeting, a local officials’ informational meeting, small group meetings with stakeholders, and a formal public hearing with opportunities to submit formal comments for the public record. Additional information and materials will be generated and distributed via the project website, social media, and a project-specific hotline and e-mail address. It is anticipated the public meeting will be held in summer 2024.

Concurrence Point 2A: Major Hydraulic Crossings

7. Water Resources

Water resources in the study area are part of the Cape Fear River basin [U.S. Geological Survey (USGS) Hydrologic Unit Code 03030005]. One stream was identified in the study area, the Cape Fear Memorial River (Table 4).

Table 4. Streams in the study area

Stream Name	Map ID	NCDWR Index Number	Best Usage Classification	Bank Height (ft)	Bankfull width (ft)	Depth (in)
Cape Fear River	Cape Fear River	18-(71)	SC	12	850-1100	20+

The Cape Fear River has not been designated as an Outstanding Resource Water (ORW). There are no designated High-Quality Waters (HQW) or water supply watersheds (WS-I or WS-II) within, or within 1.0 mile downstream of the study area. The portion of the Cape Fear River (AU segments 18-(71)a2a and 18-(71)a2b) within the project study area was identified on the North Carolina 2022 Final 303(d) list. The Brunswick River (AU segments 18-77a, and 18-77b), and Alligator Creek (AU Segment 29-33-1-1) located within a mile of the project study area were identified on the Final 2022 303(d) list.

Three wetlands were identified within the study area (Table 5). The location of these wetlands is shown on Figure 4. All wetlands in the study area are located within the Cape Fear River basin, USGS Hydrologic Unit Code 03030005.

Table 5. Characteristics of wetlands in the study area

Map ID	NCWAM Classification	Forested	NCWAM Rating	Hydrologic Classification	404/401 or 401	CAMA	Area (ac.) in Study Area
8WA	Salt/Brackish Marsh	N	High	Tidal	404/401	Y	2.49
9WA	Salt/Brackish Marsh	N	High	Tidal	404/401	Y	13.14
9WB	Estuarine Woody Wetland	Y	High	Tidal	404/401	N	66.03
						Total	81.66

The Cape Fear River has been designated as an anadromous fish spawning area by the North Carolina Division of Marine Fisheries (NCDMF) and the North Carolina Wildlife Resource Commission (NCWRC). Also, the Cape Fear River is identified as a primary nursery area by NCDMF. The Cape Fear River is also identified as a sturgeon spawning water by NMFS. An in-water construction moratorium is in effect from February 1 through June 30 for these waters. The Cape Fear River has been designated by the United States Army Corps of Engineers (USACE) as a Navigable Water under Section 10 of the Rivers and Harbors Act. Multiple Coastal Area Management Act (CAMA) Areas of Environmental Concern (AEC) were identified in the study area and are displayed in Figure 4.

8. Major Hydraulic Crossings

Major hydraulic crossings are those with a contributing drainage area requiring conveyance greater than 30 square feet or more. One potential major hydraulic crossing was identified for the proposed project. All of the proposed alternatives are hydraulically adequate. The existing structure was designed for ship passage and is well above any increased surface elevations from significant rainfall events. There is no current or historical flooding issues in the project area according to Division staff. More information can be found in the March 2024 Preliminary Hydraulic Planning Report in the project files.

9. Avoidance and Minimization

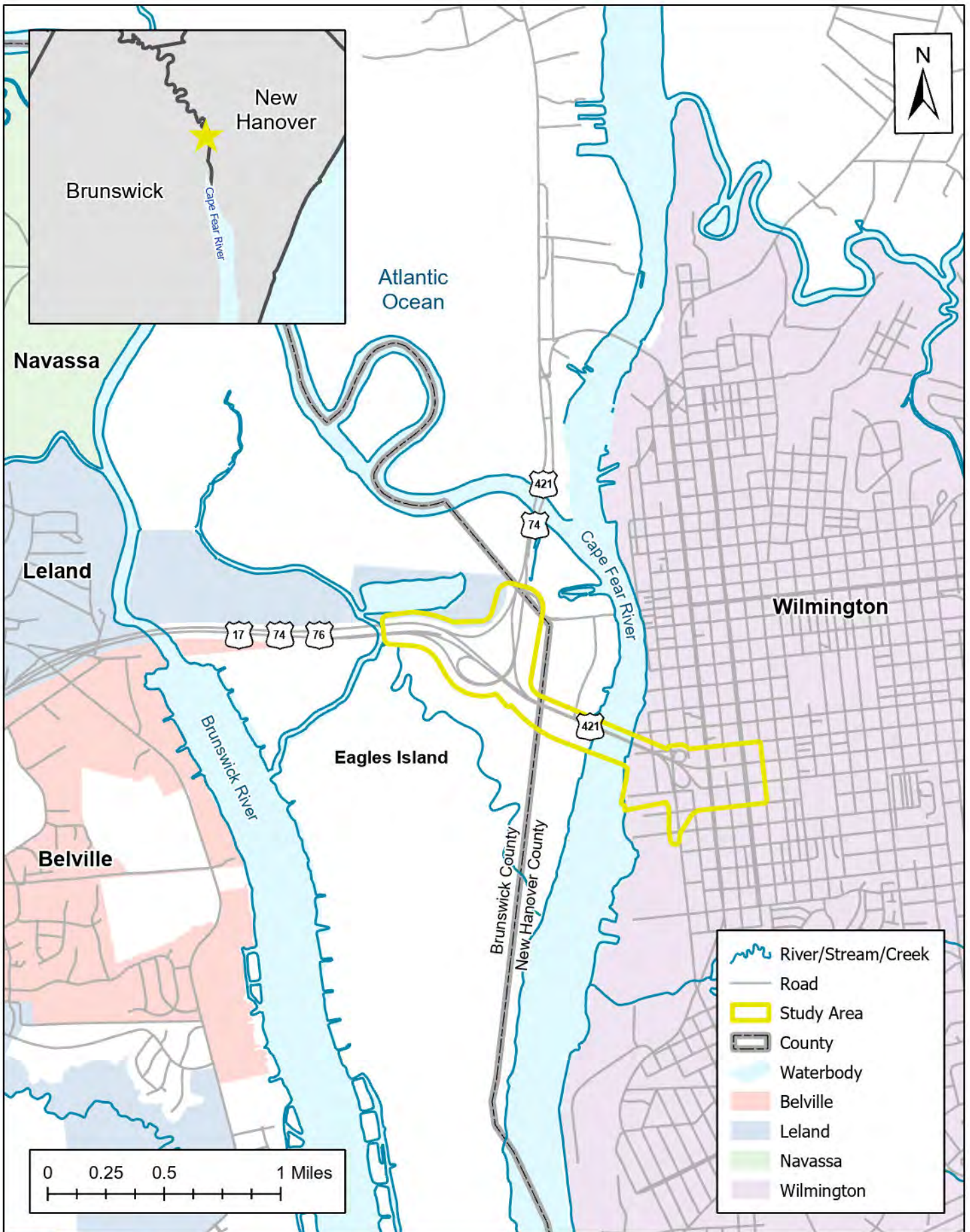
Avoidance and minimization measures will be implemented throughout the project development process. The following are avoidance and minimization measures to date:

- Alternatives shifted to the south of the existing bridge to avoid Dram Tree Park
- Utilizing existing fill section of roadway approaches to minimize impacts

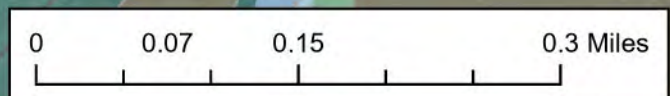
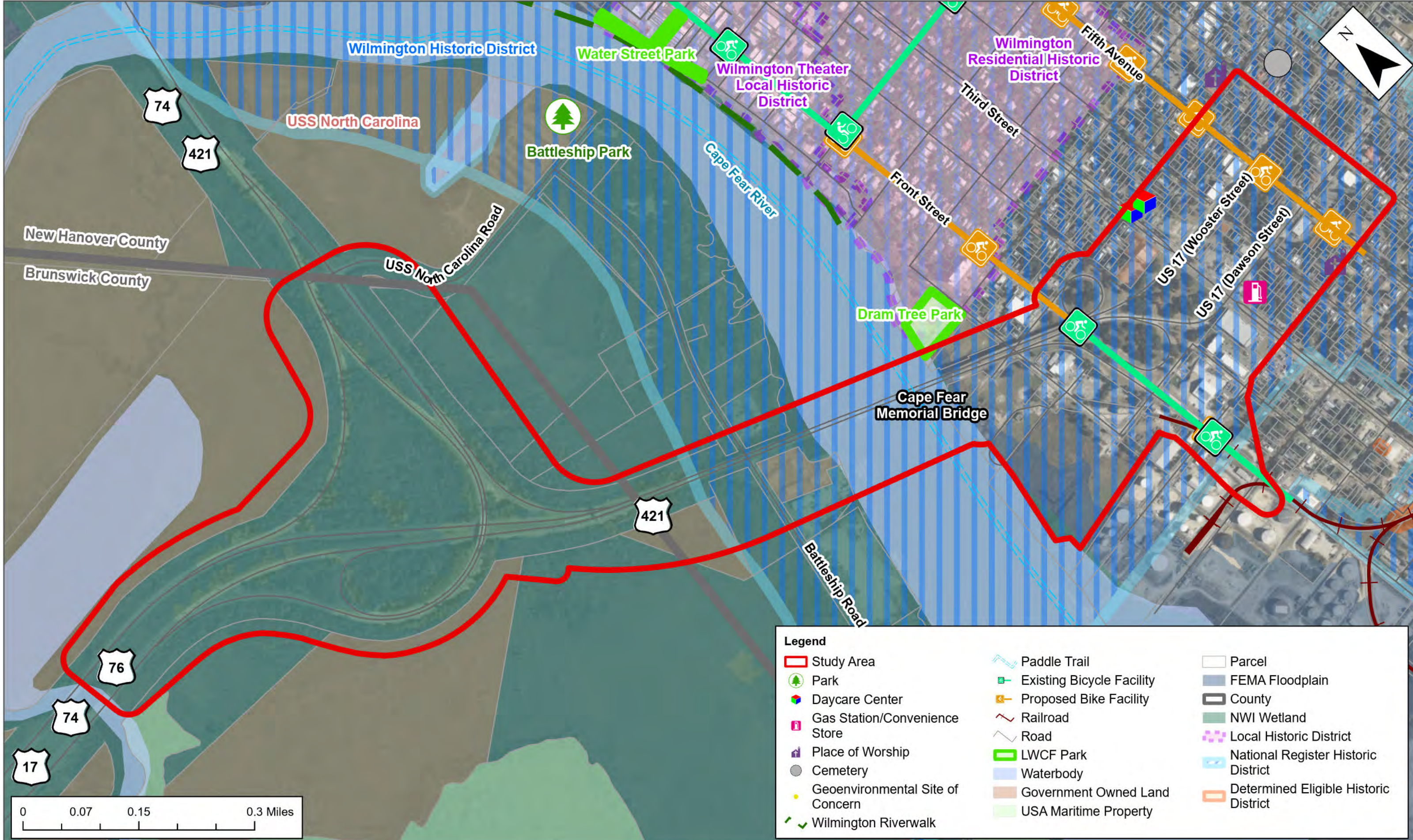
10. Merger Plan Review/Next Steps

Based on the Merger Plan for the project, NCDOT proposes that the CP 3 (LEDPA/Preferred Alternative Selection) Meeting take place in the fall of 2024. Prior to the next Merger Meeting, NCDOT is expected to conduct public involvement, coordinate with US Coast Guard on their navigation studies, consult with SHPO for Section 106 effects, coordination with US Army Corps of Engineers for Section 408, and complete a detailed alternative analysis.

It is anticipated that the CP 3 meeting will be held within the current calendar year; Merger Team members will be notified of any changes that require a revision of this timetable through an updated Merger Plan, which will be updated throughout the project development process and serve as a living document.

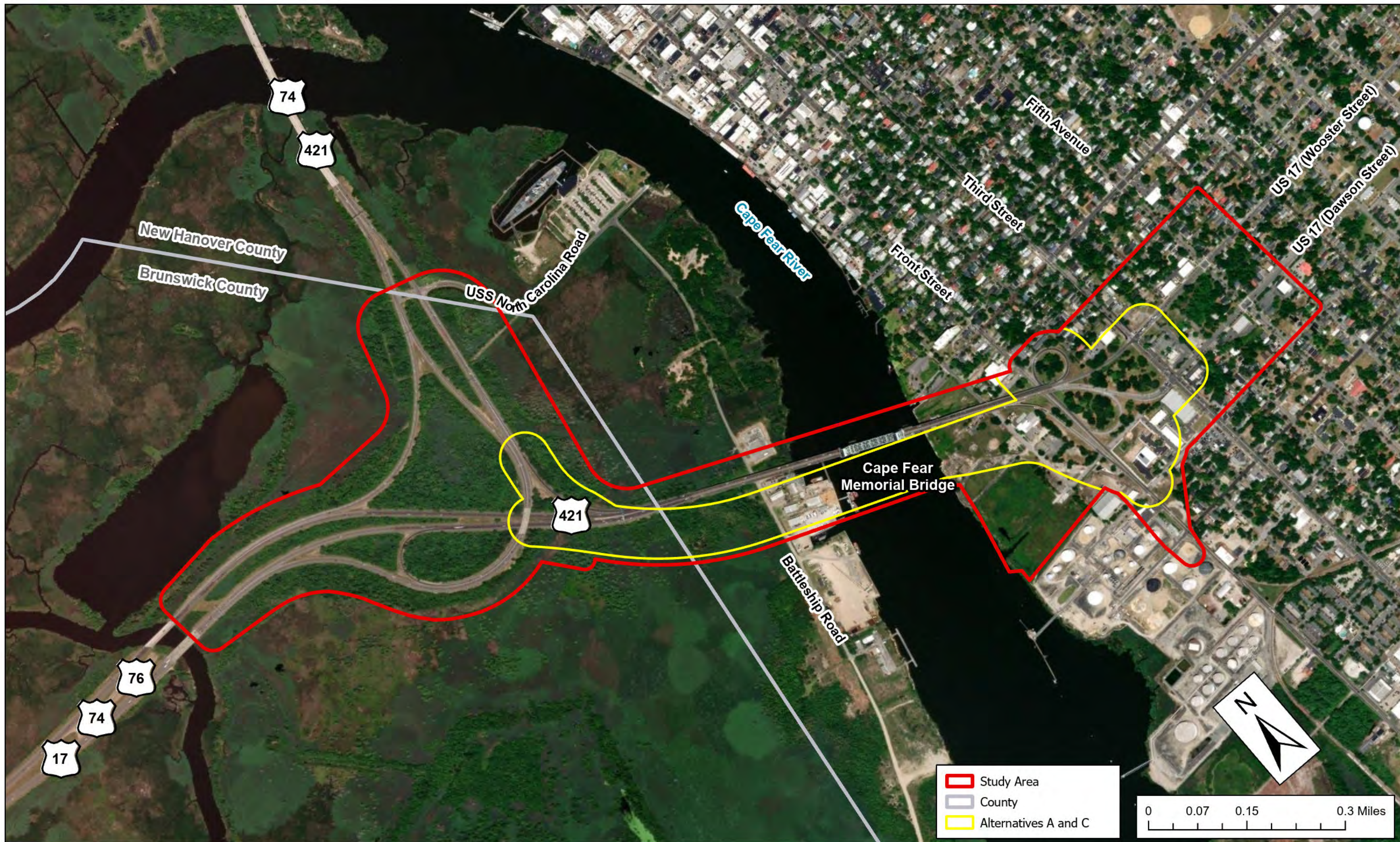


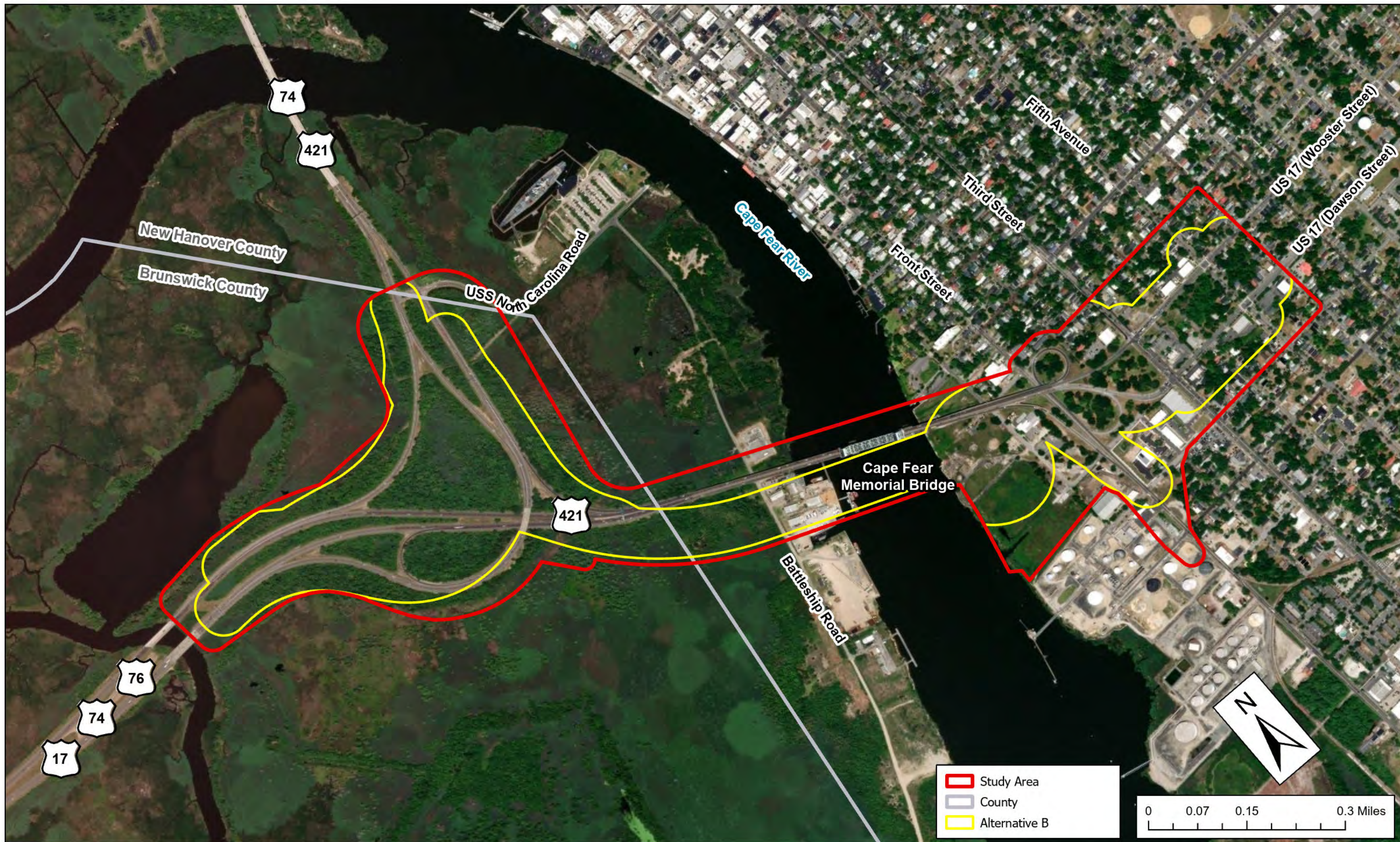
VICINITY MAP
 HB-0039 | BRUNSWICK & NEW HANOVER COUNTY
 FIGURE 1

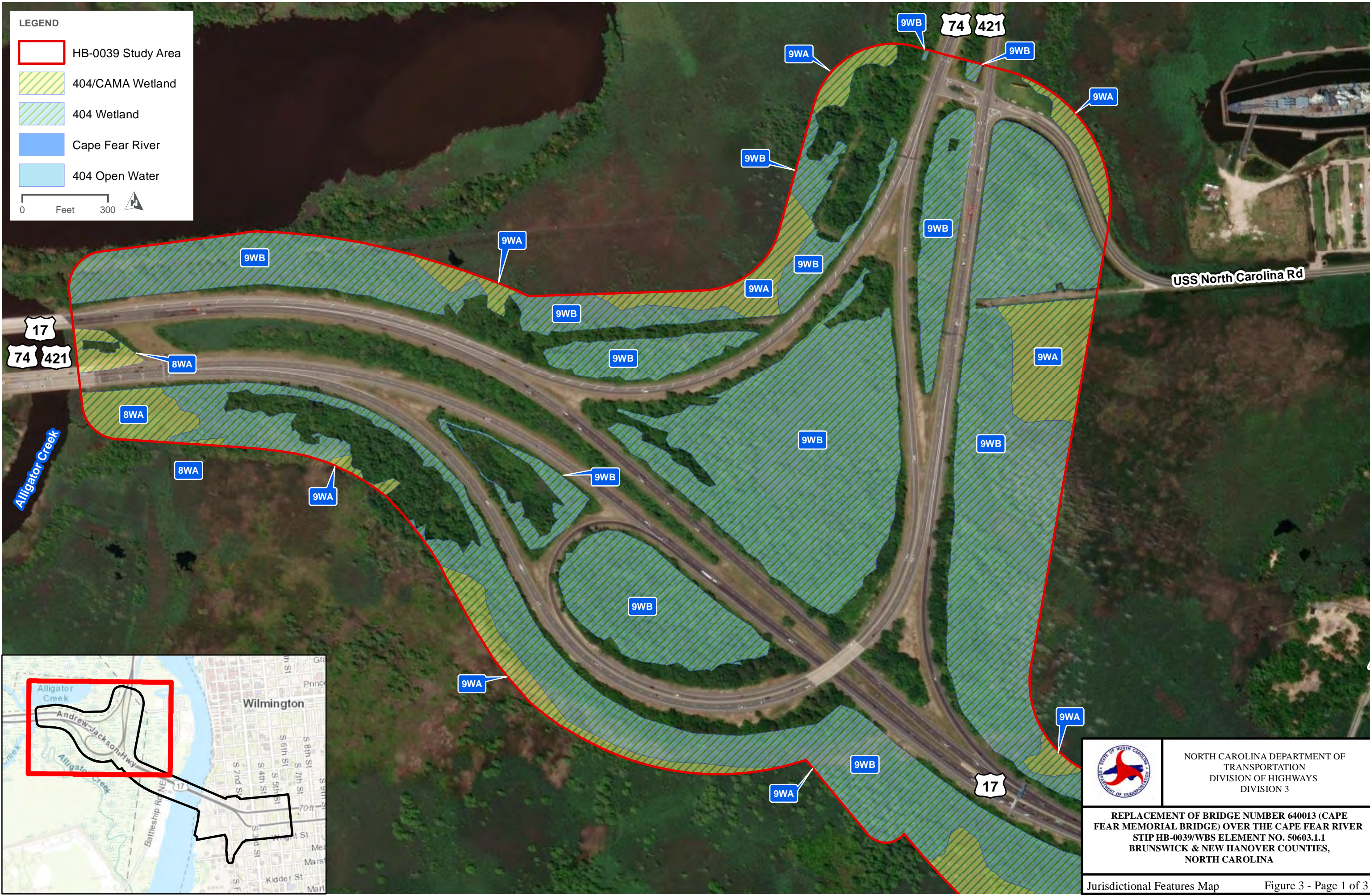


Legend					
	Study Area		Paddle Trail		Parcel
	Park		Existing Bicycle Facility		FEMA Floodplain
	Daycare Center		Proposed Bike Facility		County
	Gas Station/Convenience Store		Railroad		NWI Wetland
	Place of Worship		Road		Local Historic District
	Cemetery		LWCF Park		National Register Historic District
	Geoenvironmental Site of Concern		Waterbody		Determined Eligible Historic District
	Wilmington Riverwalk		Government Owned Land		
			USA Maritime Property		





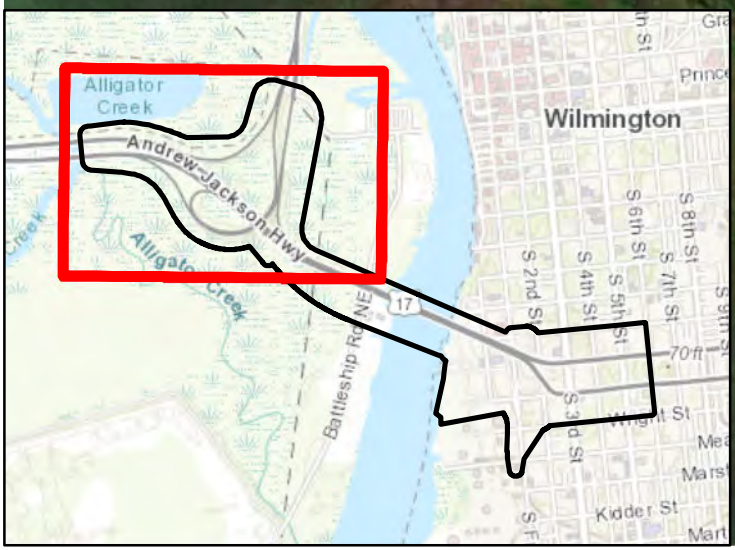





LEGEND

- HB-0039 Study Area
- 404/CAMA Wetland
- 404 Wetland
- Cape Fear River
- 404 Open Water

0 Feet 300



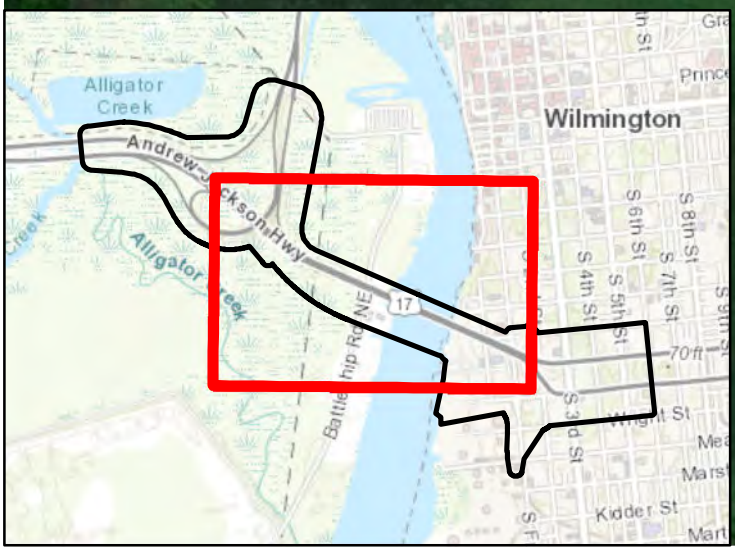
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<p>Jurisdictional Features Map Figure 3 - Page 1 of 3</p>	




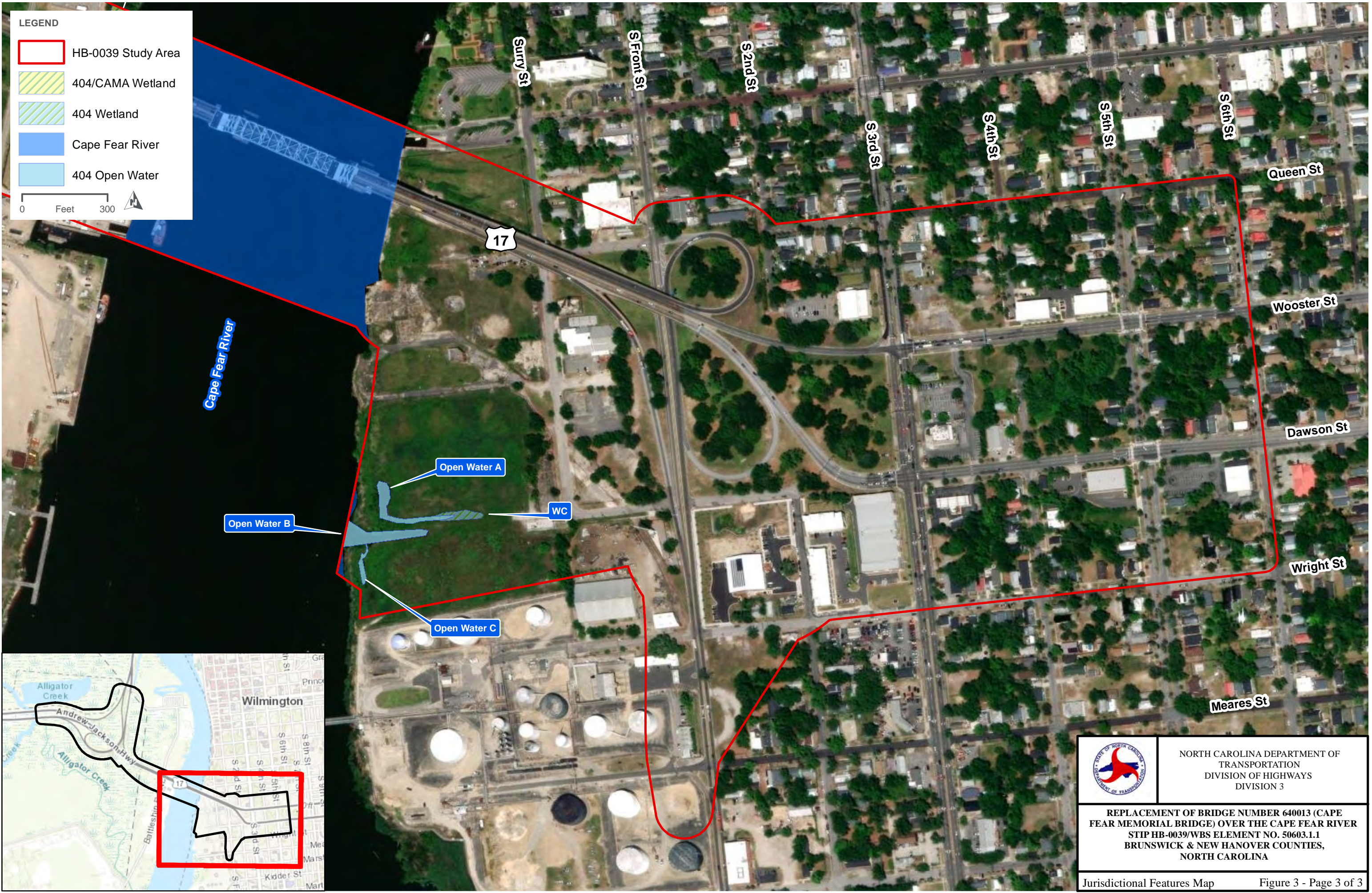
LEGEND

- HB-0039 Study Area
- 404/CAMA Wetland
- 404 Wetland
- Cape Fear River
- 404 Open Water

0 Feet 300



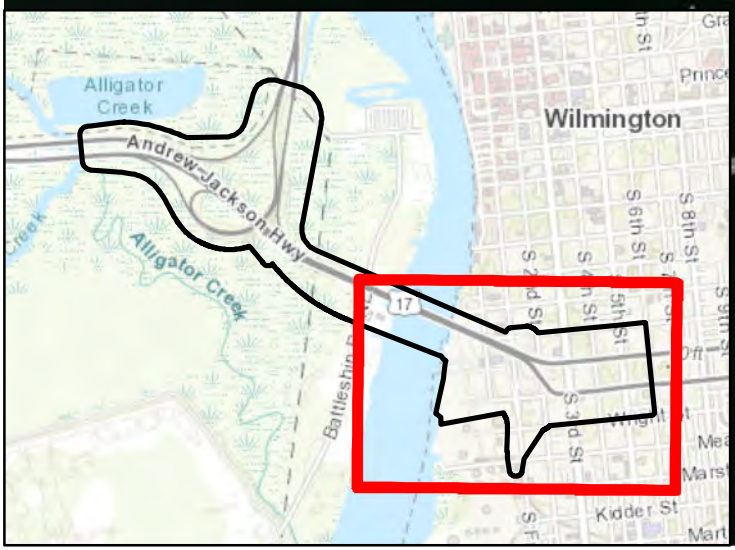
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<p>REPLACEMENT OF BRIDGE NUMBER 640013 (CAPE FEAR MEMORIAL BRIDGE) OVER THE CAPE FEAR RIVER STIP HB-0039/WBS ELEMENT NO. 50603.1.1 BRUNSWICK & NEW HANOVER COUNTIES, NORTH CAROLINA</p>	
<p>Jurisdictional Features Map</p>	<p>Figure 3 - Page 2 of 3</p>




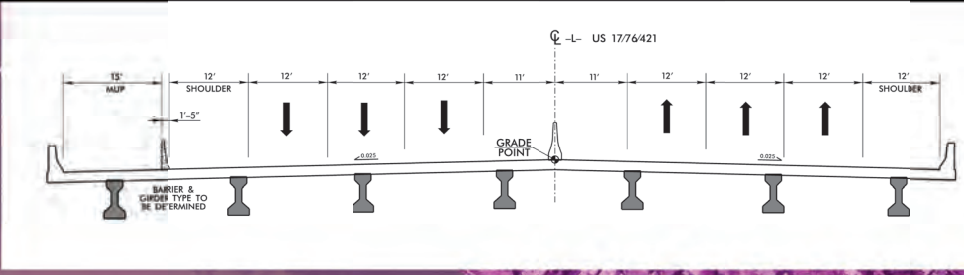
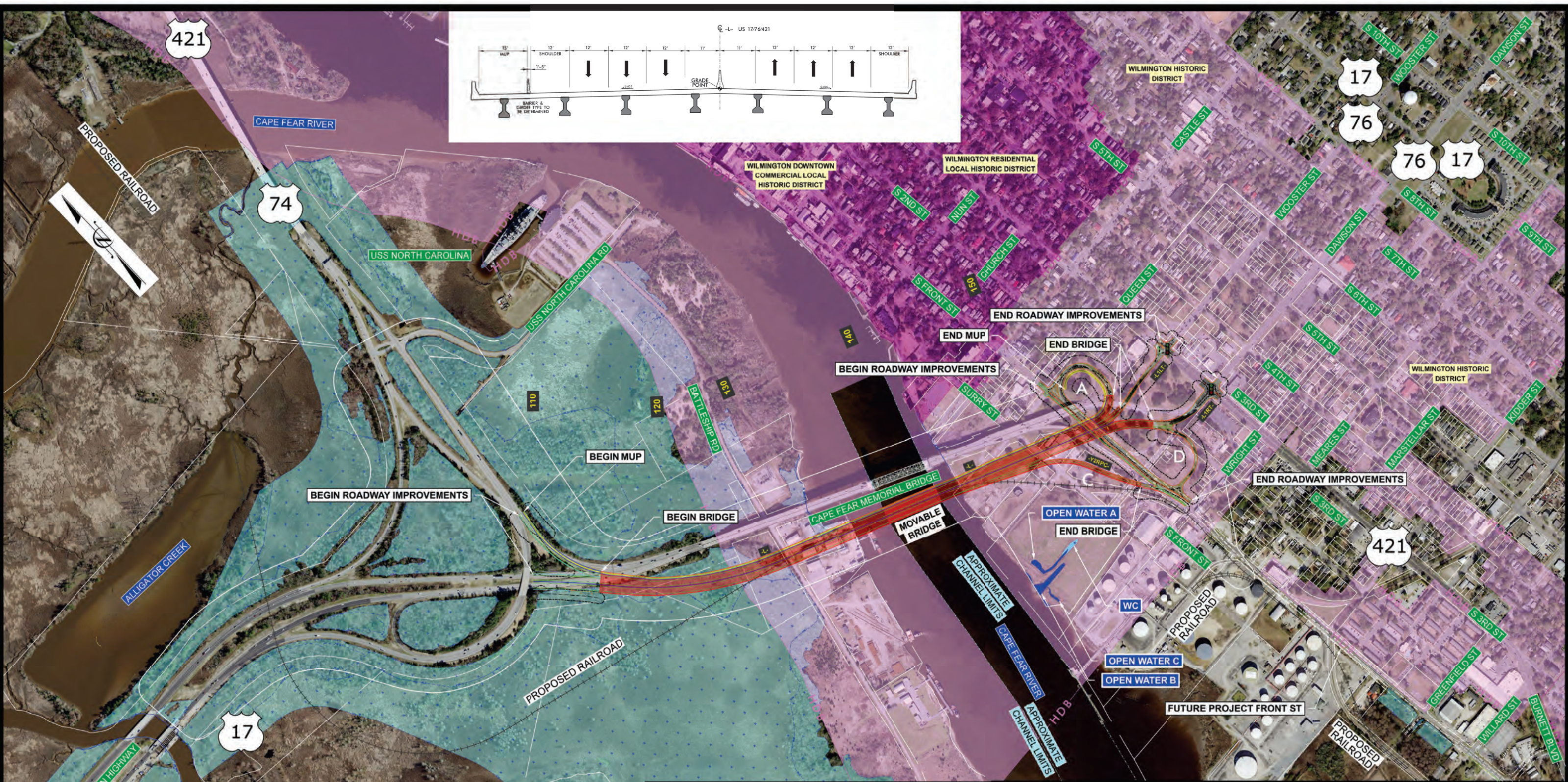
LEGEND

- HB-0039 Study Area
- 404/CAMA Wetland
- 404 Wetland
- Cape Fear River
- 404 Open Water

0 Feet 300



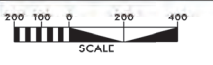
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<p>Jurisdictional Features Map</p>	<p>Figure 3 - Page 3 of 3</p>



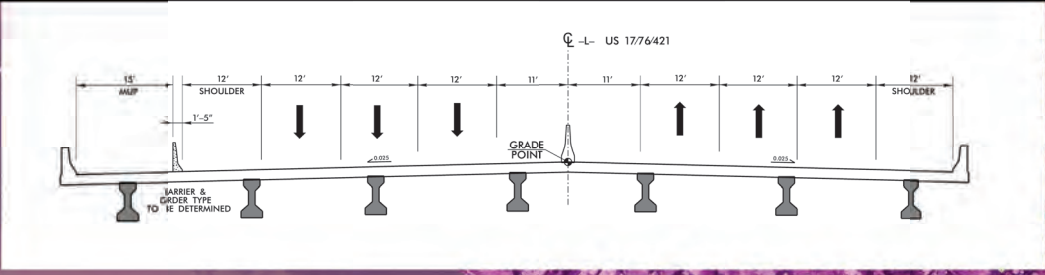
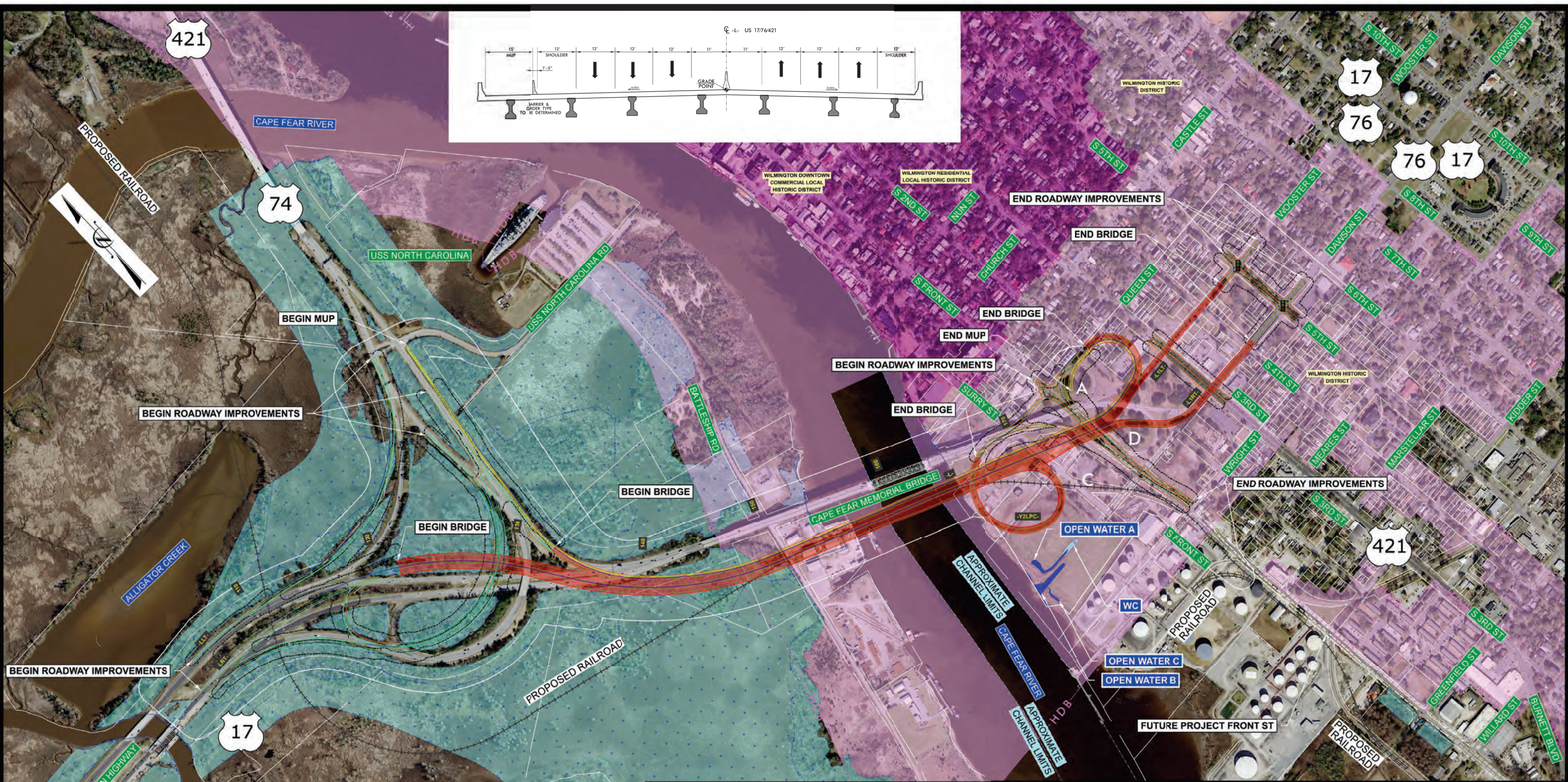
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 SUBJECT TO CHANGE

LEGEND

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	PROPOSED CURB & GUTTER, STRUCTURE		FUTURE RAILROAD REALIGNMENT
	PROPOSED BARRIER		40' SLOPE STAKE BUFFER
	PROPOSED SIDEWALK		
	EXISTING WETLANDS		
	WILMINGTON HISTORIC DISTRICT		
	WILMINGTON DOWNTOWN COMMERCIAL LOCAL HISTORIC DISTRICT & RESIDENTIAL LOCAL HISTORIC DISTRICT		



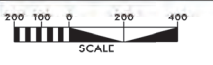
ALTERNATE A
MOVABLE STRUCTURE
(65' VERTICAL CLEARANCE)
HB-0039
(CAPE FEAR MEMORIAL BRIDGE)
NEW HANOVER AND BRUNSWICK COUNTIES



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PRELIMINARY DESIGN
 SUBJECT TO CHANGE

LEGEND

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	PROPOSED CURB & GUTTER, STRUCTURE		FUTURE RAILROAD REALIGNMENT
	PROPOSED BARRIER		40' SLOPE STAKE BUFFER
	PROPOSED SIDEWALK		
	EXISTING WETLANDS		
	WILMINGTON HISTORIC DISTRICT		
	WILMINGTON DOWNTOWN COMMERCIAL LOCAL HISTORIC DISTRICT & RESIDENTIAL LOCAL HISTORIC DISTRICT		



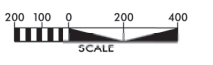
**ALTERNATE B
 FIXED STRUCTURE
 (135' VERTICAL CLEARANCE)
 HB-0039
 (CAPE FEAR MEMORIAL BRIDGE)
 NEW HANOVER AND BRUNSWICK COUNTIES**



LEGEND

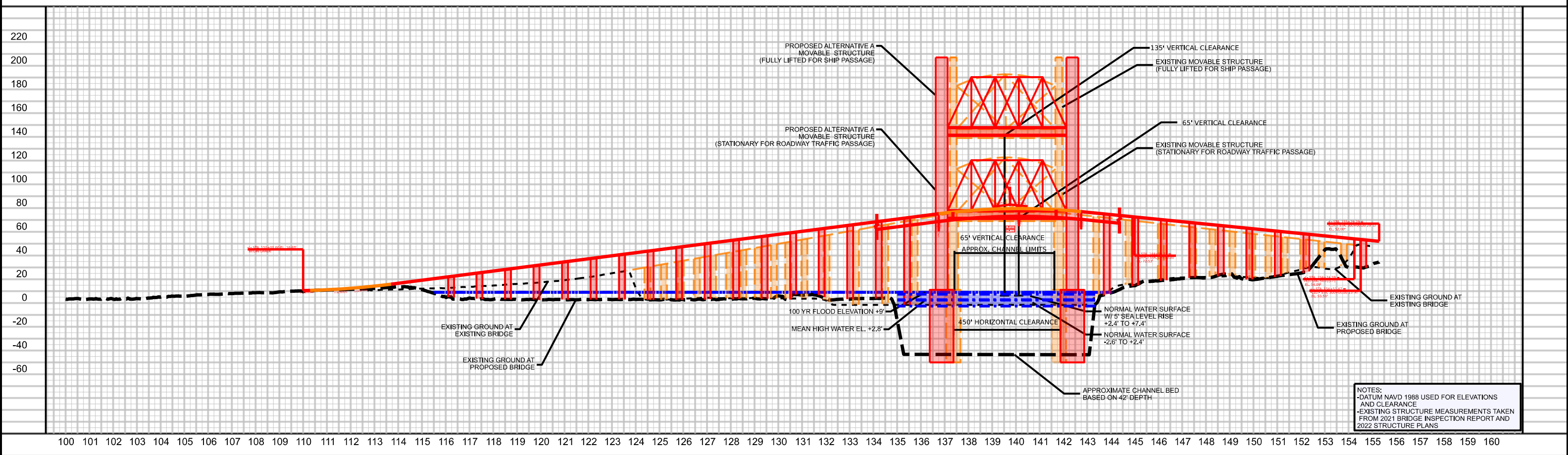
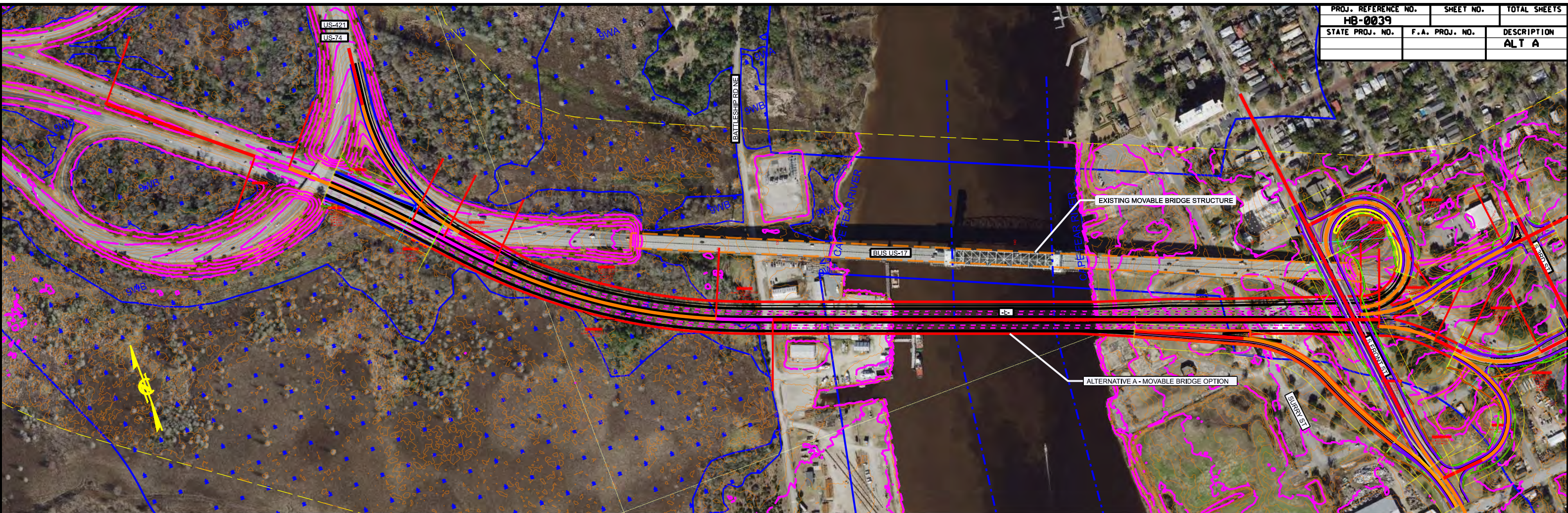
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	PROPOSED CURB & GUTTER, STRUCTURE		FUTURE RAILROAD REALIGNMENT
	PROPOSED BARRIER		40' SLOPE STAKE BUFFER
	PROPOSED SIDEWALK		
	EXISTING WETLANDS		
	WILMINGTON HISTORIC DISTRICT		
	WILMINGTON DOWNTOWN COMMERCIAL LOCAL HISTORIC DISTRICT & RESIDENTIAL LOCAL HISTORIC DISTRICT		

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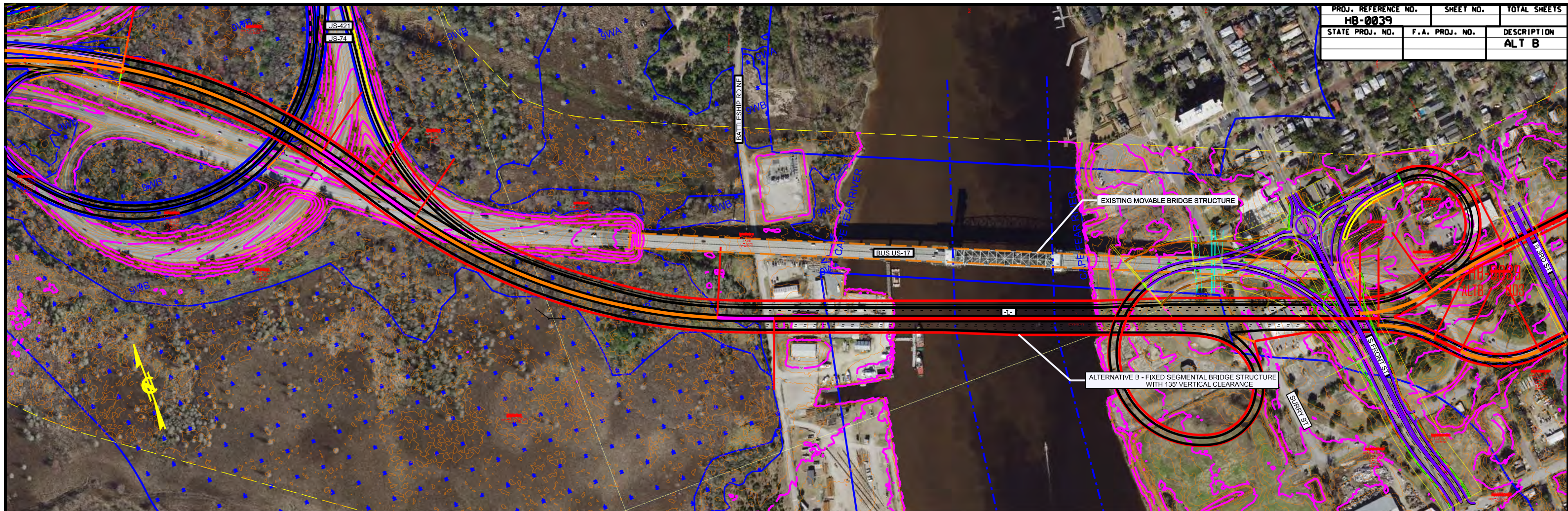
**ALTERNATE C
 FIXED STRUCTURE
 (65' VERTICAL CLEARANCE)
 HB-0039
 (CAPE FEAR MEMORIAL BRIDGE)
 NEW HANOVER AND BRUNSWICK COUNTIES**

PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
HB-0039		
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
		ALT A

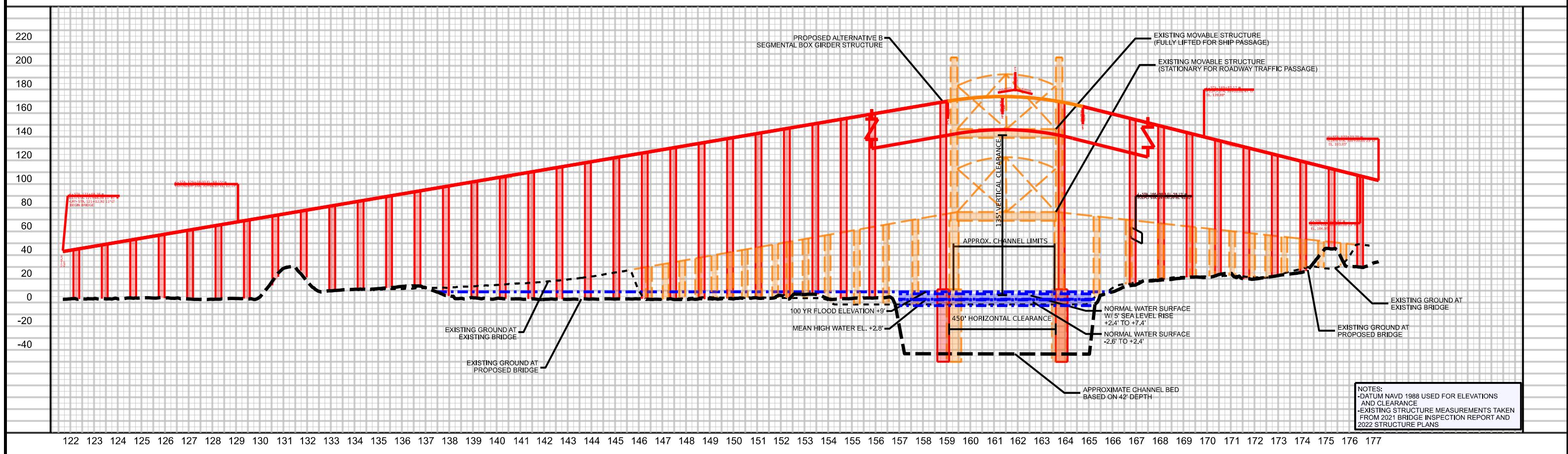


NOTES:
 -DATUM NAVD 1988 USED FOR ELEVATIONS AND CLEARANCE
 -EXISTING STRUCTURE MEASUREMENTS TAKEN FROM 2021 BRIDGE INSPECTION REPORT AND 2022 STRUCTURE PLANS

PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
HB-0039		
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
		ALT B



GRAPHIC SCALE: 1" = 200'
PRELIMINARY DESIGN
DESIGN TO CHANGE



NOTES:
 -DATUM NAVD 1988 USED FOR ELEVATIONS AND CLEARANCE
 -EXISTING STRUCTURE MEASUREMENTS TAKEN FROM 2021 BRIDGE INSPECTION REPORT AND 2022 STRUCTURE PLANS

PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
HB-0039		
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
		ALT C

