NEPA/Section 404
Concurrence Point 3:
Least Environmentally Damaging Practicable Alternative

Pre-CP 3 Meeting
May 8, 2019

STIP Project
U-4738

North Carolina Department of Transportation

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Purpose of Meeting

The purpose of today's meeting is to serve as a precursor to CP 3 to ensure the Merger Team has the proper documentation prior to the scheduled CP 3 meeting on June 19, 2019. Today's meeting will provide an opportunity for the Merger Team to discuss any questions or concerns with the project team prior to identifying the Least Environmentally Damaging Practicable Alternative (LEDPA).

1.0 Project Description

The North Carolina Department of Transportation (NCDOT) proposes to construct a new location project in Brunswick and New Hanover Counties. The project area is shown on Figure 1. The project is included in the *2018-2027 State Transportation Improvement Program* (STIP) as the proposed Cape Fear Crossing (STIP Project U-4738). The project includes a facility extending from the vicinity of US 17 Bypass and I-140 in Brunswick County to US 421 in New Hanover County, including a crossing of the Cape Fear River.

2.0 Project Purpose and Need

The purpose of the project is to improve traffic flow and enhance freight movement beginning in the vicinity of US 17 and I-140 in Brunswick County across the Cape Fear River to US 421 near the Port of Wilmington in southern New Hanover County.

3.0 Project Status

Since the last correspondence with the Merger Meeting to eliminate alternatives (CP 2 Revisited) on November 30, 2017, the project team has been preparing revised designs, traffic studies, and other various technical studies. A summary of the major milestones that have occurred since November 2017 are below:

- Prepared revised designs per the request from the Port of Wilmington to increase the navigational clearance of the proposed Cape Fear River bridge from 187 feet to 215 feet above the navigational channel. Designs were finalized in June 2018.
- The Crash Analysis Summary was finalized on 8/30/18.

- The Red-Cockaded Woodpecker Foraging Habitat Analysis was finalized on 9/26/18.
- The Air Quality Report was finalized on 10/09/18.
- A newsletter was sent on 12/21/18 to notify citizens of the remaining alternatives under study and the project schedule.
- Draft 2020-2029 STIP released with project receiving some ROW and utility funding for FY 2028. Construction is unfunded.
- The project team received final concurrence from the State Historic Preservation Office (HPO) on 2/12/19 regarding Section106 effects on historic resources in the project study area.
- The Sea Level Rise Analysis was finalized on 2/20/19.
- The DEIS was finalized on 3/25/19 and distributed to agencies on 3/29/19. The DEIS was posted to the federal register by the USEPA on 4/12/19.
- The Section 404 Permit Application was prepared for the USACE for their use in preparing a public notice for the project. The notice was published on 4/10/19 as SAW-2004-00821.
- The Corridor Public Hearings will be held on April 29th and April 30th. The project team has been cataloguing comments received to date from the hearing and DEIS. The official comment period expires on May 16, 2019 and a post hearing meeting will be held prior to the CP 3 meeting in June.
- The Draft Traffic Noise Report is currently being updated.
- Once the LEDPA is identified, an updated traffic forecast and capacity analysis will be prepared analyzing a toll and non-toll scenario. Preliminary designs will be prepared on the LEDPA.

4.0 Summary of Merger Concurrence Points to Date

- The NEPA/Section 404 Merger Team reached Concurrence Point 1 – "Purpose and Need and Study Area Defined" on 12/12/13
- The NEPA/Section 404 Merger Team reached Concurrence Point 2 – "Detailed Study Alternatives Carried Forward" on 2/10/14.
- The NEPA/Section 404 Merger Team reached Concurrence Point 2A – "Bridging Decisions and Alignment Review" on 5/30/17; final concurrence on Concurrence Point 2A was received on 8/17/17.
- The NEPA/Section 404 Merger Team reached concurrence on 11/30/17 to eliminate Alternatives C, F, P, G, J, and V Freeway. Alternatives B, Q, T, M Avoidance, N Avoidance, and V Widening were carried forward for detailed study in the DEIS.

5.0 Detailed Study Alternatives

The DEIS studied six alternatives in detail (see Figure 1). The following alternatives were concurred upon by the merger team at CP 2 Revisited on November 30, 2017:

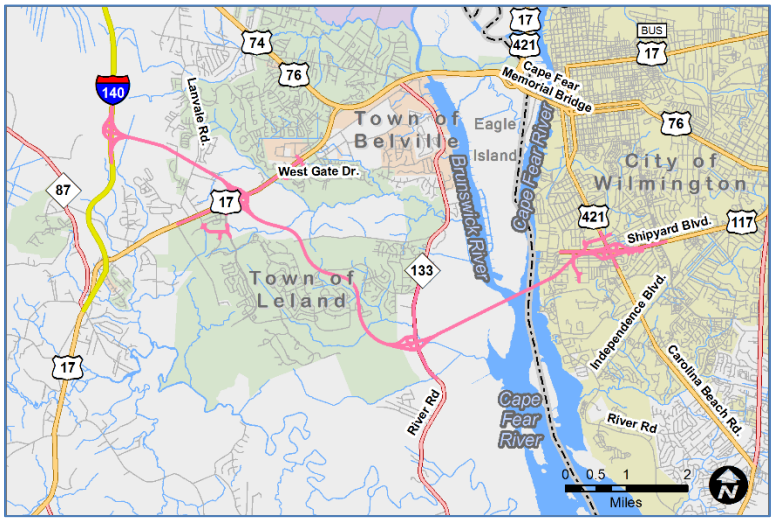
- Alternative B
- Alternative M Avoidance
- Alternative N Avoidance
- Alternative Q
- Alternative T
- Alternative V-AW

All alternatives that end at Independence Boulevard include upgrades to US 421 to Shipyard Boulevard. All alternatives include a new bridge crossing of the Cape Fear River. One alternative, Alternative V-AW, has a vertical clearance above the navigational channel of 135 feet, which is the height of the current Cape Fear Memorial Bridge lift-span bridge in its open-to-navigation position. The other five alternatives, which include a bridge crossing south of the Port of Wilmington, have a vertical clearance above the navigational channel of 215 feet. In 2017, the Port of Wilmington requested NCDOT raise the height of the proposed bridge from 187 feet to 215 feet to accommodate future larger vessels. This has been incorporated in the current designs.

Alternative V-AW would require the use of three Section 4(f) resources. With the presence of detailed study alternatives that either avoid Section 4(f) resources or have been determined to have an anticipated *de minimis* impact, FHWA approval of the selection of this alternative is unlikely due to the Section 4(f) law as codified in 49 U.S.C. §303 and 23 U.S.C. §138. Alternative V-AW was retained as a detailed study alternative despite its use of resources protected by Section 4(f) due to the possibility of additional design refinements that might reduce impacts to a *de minimis* level. However, it was later concluded that the impacts could not be reduced enough and remained adverse even after additional design refinements.

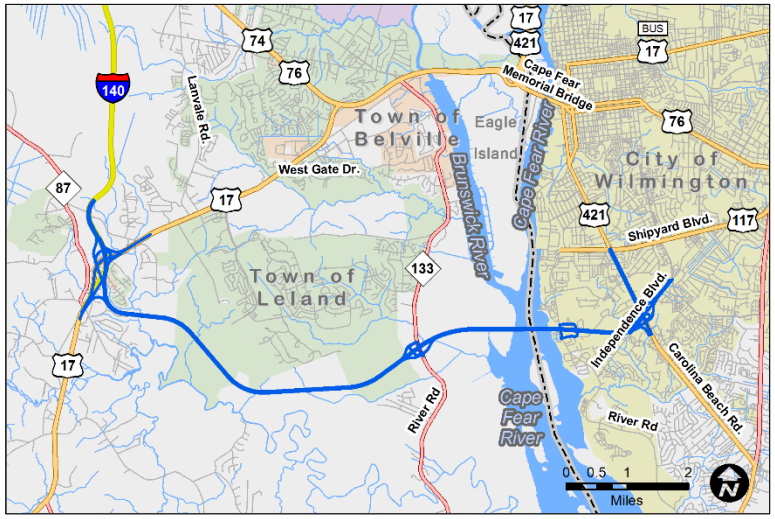
Once a preferred alternative is selected, updated traffic forecasts will be prepared as a toll road and non-toll scenario to determine if funding the project via tolls is feasible. The Wilmington MPO assumes the project will be tolled in its long-range planning.

Alternative B



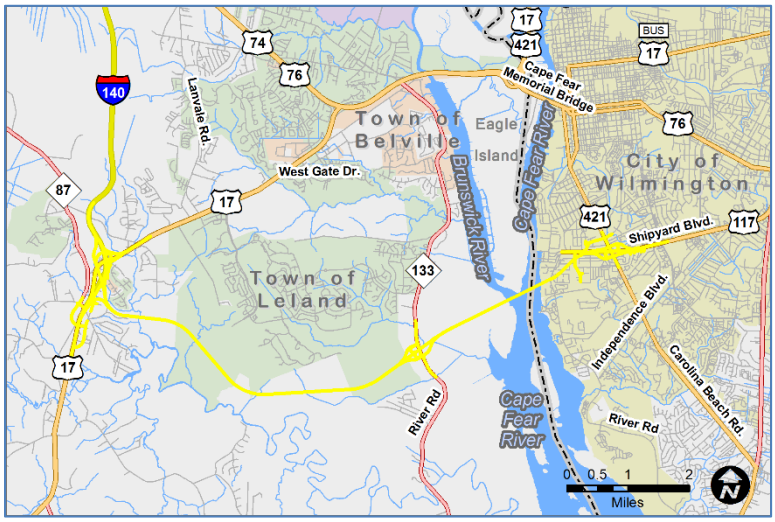
- Begins on I-140 and ends at Shipyard Boulevard
- Proposed as four-lane divided freeways for the entirety of its length
- Proposed height of bridge over the Cape Fear River navigational channel is 215 feet
- Interchanges proposed at I-140, U.S. 17, N.C. 133, and U.S. 117 (Shipyard Boulevard)

Alternative MA



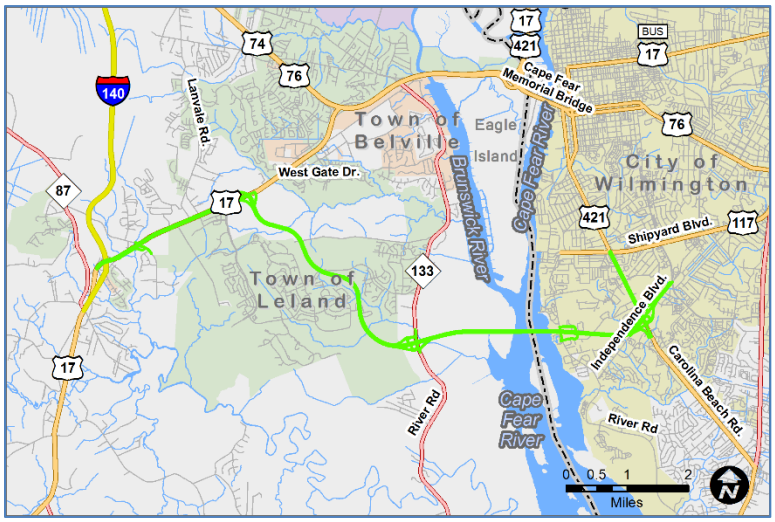
- Begins at the I-140/U.S. 17 interchange, and ends at Independence Boulevard
- Proposed as four-lane divided freeway for the entirety of its length
- Proposed height of bridge over the Cape Fear River navigational channel is 215 feet
- Interchanges proposed at I-140/U.S. 17, N.C. I-133, River Road, and Independence Boulevard

Alternative NA



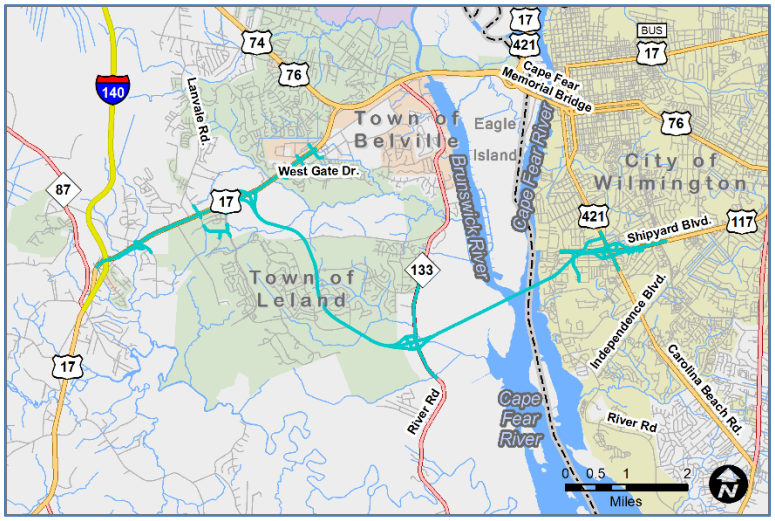
- Begins at the I-140/U.S. 17 interchange, and ends at Shipyard Boulevard
- Proposed as four-lane divided freeway for the entirety of its length
- Proposed height of bridge over the Cape Fear River navigational channel is 215 feet
- Interchanges proposed at I-140/U.S. 17, N.C. 133, and U.S. 117 (Shipyard Boulevard)

Alternative Q



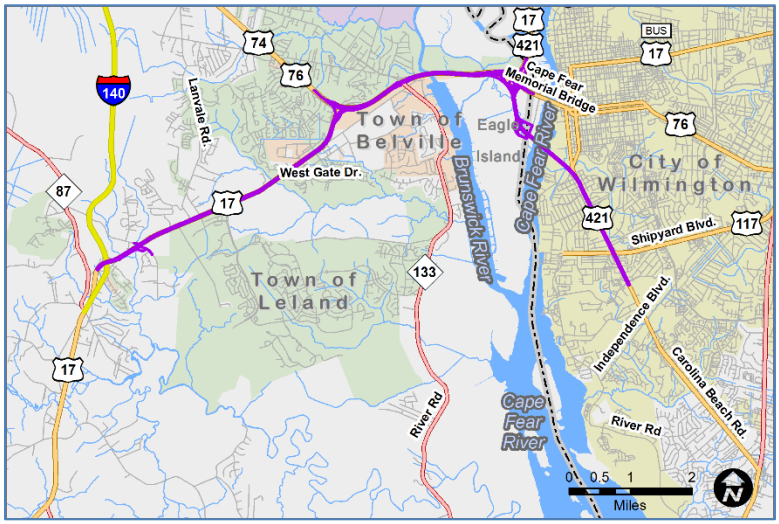
- Begins at the I-140/U.S. 17 interchange, and ends at Independence Boulevard
- Includes upgrade of U.S. 17 for 2 miles as six-lane widening, then new location for the rest of its length
- Proposed height of bridge over the Cape Fear River navigational channel is 215 feet
- Interchanges proposed at I-140, U.S. 17, N.C. 133, River Road, and Independence Boulevard

Alternative T



- Begins at the I-140/U.S. 17 interchange, and ends at Shipyard Boulevard
- Includes upgrade of U.S. 17 for 2 miles as six-lane widening, then new location for the rest of its length
- Proposed height of bridge over the Cape Fear River navigational channel is 215 feet
- Interchanges proposed at I-140, U.S. 17, N.C. 133, and U.S. 117 (Shipyard Boulevard)

Alternative V-AW



- Begins at the I-140/U.S. 17 interchange, and ends at Shipyard Boulevard
- Upgrades U.S. 17 to the U.S. 17 / U.S. 421 interchange
- Proposed height of bridge over the Cape Fear River navigational channel is 135 feet
- Proposed as six-lane widening on U.S. 17 from I-140 to Lanvale Road, eight-lane roadway from Lanvale Road to U.S. 74/76 and between U.S. 74/76 and U.S. 421

6.0 Alternative Impacts Comparison

Estimated environmental impacts associated with the alternatives are provided in Table 1.

Table 1: Alternative Comparison Matrix

Resource	Alternatives					
	B	MA	NA	Q	T	V-AW
Project Features						
Length of Corridor (miles)	11.1	12.3	12.2	11.5	11.4	11.8
Construction Cost (millions $)	743	808	770	776	719	508
ROW Cost (millions $)	248	96	190	90	216	107
Number of Interchanges	5	4	4	4	4	6
Number of Railroad Crossings	2	1	2	1	2	2
Number of Major Power Easement Crossings	2	1	1	2	2	4
Socioeconomic Features						
Parks	1	0	1	0	1	3
Churches	3	4	4	3	3	3
Cemeteries	1	0	1	0	1	0
Schools	1	0	1	0	1	0
Fire Stations	0	1	0	1	0	0
Business Relocations	117	43	86	45	88	98
Residential Relocations	149	48	148	26	173	168
Total Relocations	266	91	234	71	261	266
Minority and/or Low-Income Populations Present	Yes	Yes	Yes	Yes	Yes	Yes
Travel Time Benefits						
Overall Corridor Travel Time (mm:ss)	83:52	84:57	87:56	90:48	88:09	77:29
% Decrease in Travel Time Compared to 2040 No-Build	30.41	29.51	27.04	24.66	26.86	35.71
Corridor Travel Time Savings Ranking	2	3	4	6	5	1

Table 1: Alternative Comparison Matrix

Resource	Alternatives					
	B	MA	NA	Q	T	V-AW
Physical Environment						
Potential Noise Impacts	526	390	396	433	453	276
Farmland soils (acres)[c]	454.0	553.6	469.7	416.7	346.5	151.7
Hazardous Materials Sites: High severity (#)	3	1	3	0	3	1
Hazardous Materials Sites: Low severity (#)	3	5	4	0	3	24
Floodplains – 100-year (acres)[a]	14.3	35.7	34.0	31.7	28.8	214.4
Floodplains – 500-year (acres)[a]	5.5	7.3	6.6	5.6	8.2	15.1
Floodway	2.8	2.1	2.1	2.6	2.6	0.4
Preservation Areas (acres)	29.46	31.02	30.46	21.92	21.36	139.76
Cultural Resources and 4(f)/6(f)						
Archaeological Probability[a]	250.7	481.1	370.3	380.8	273.0	318.0
Historic Properties – Section 106 adverse effect	0	0	0	0	0	3
Section 4(f) Anticipated Use	0	0	0	0	0	3
Section 4(f) Anticipated *De Minimis* Use	1	0	1	0	1	5
Section 6(f) Properties Impacted	0	0	0	0	0	2
Natural Environment						
Biotic Resources (acres)						
Coastal Plain Bottomland Hardwood - Blackwater Subtype	1.1	1.4	0.3	2.4	1.3	1.1
Coastal Plain Small Stream Swamp - Blackwater Subtype	6.7	17.0	10.1	8.8	0.5	6.8
Cutover	9.5	13.7	13.7	8.3	0.6	0.6
Cypress/Gum Swamp - Blackwater Subtype	12.1	21.7	21.7	12.1	6.5	0.0
Estuarine Woody Wetland	0.0	0.0	0.0	0.0	0.0	35.6

Table 1: Alternative Comparison Matrix

Resource	Alternatives					
	B	MA	NA	Q	T	V-AW
Maintained/Disturbed	210.3	282.3	272.6	226.9	230.0	281.0
Mesic Pine Flatwoods	102.5	239.1	200.3	145.9	111.0	39.4
Nonriverine Swamp Forest	0.1	2.2	2.2	0.0	0.0	0.0
Nonriverine Wet Hardwood Forest	11.8	5.7	5.6	8.6	13.5	21.9
Pine Plantation	145.8	47.5	41.0	101.4	87.9	0.7
Pocosin	49.1	1.6	1.6	6.2	6.4	0.6
Salt/Brackish Marsh	64.9	67.8	70.1	63.7	64.9	79.6
Small Depression Pocosin	0.1	0.6	0.4	0.2	0.2	0.0
Wet Pine Flatwoods	41.6	43.6	42.3	20.9	17.8	6.5
Xeric Sandhill Scrub	0.2	8.7	0.2	8.7	0.3	1.5
TOTAL	**655.8**	**752.8**	**682.0**	**614.0**	**540.8**	**475.2**
Forested Land (acres)[b]	371	380	325	306	245	113
Stream Crossings (#)	8	22	17	14	8	11
Streams (linear feet)[b]	2,528	8,779	5,806	4,962	1,667	2,075
Surface Waters/Ponds (acres)[b]	<0.1	0.0	0.0	<0.1	<0.1	<0.1
Wetlands (acres)[b]	98.5	64.2	58.8	45.7	39.7	140.2
CAMA Wetlands (acres)[b]	1.8	2.3	2.3	1.8	1.8	89.1
Federally-Protected Species Habitat Present	Yes	Yes	Yes	Yes	Yes	Yes

[a] Impacts calculated using the 1,000-foot corridor limits.

[b] Impacts calculated using slope stake limits plus a 40-foot buffer.

[c] Farmland soils impacts include prime farmland, farmland of statewide importance, farmland of unique importance, and prime farmland if drained.

7.0 Project Schedule/Cost

The project is funded for planning and environmental studies only; right-of-way acquisition and construction are both unfunded in the 2018-2027 STIP.

The schedule is as follows:

Draft Environmental Impact Statement –Signed March 25, 2019
Corridor Public Hearing – April 29th and 30th, 2019
Concurrence on Least Environmentally Damaging Practicable Alternative (CP 3) – Summer 2019
Final Environmental Impact Statement – Spring 2020
Record of Decision – Summer 2020

Preliminary cost estimates for the detailed study alternatives are presented in Table 2.

Table 2: Cost Estimates for Detailed Study Alternatives

Alternative	Estimated Construction Cost (millions)	Estimated Right-of-Way Cost (millions)	Estimated Utility Relocation Cost (millions)	Total Cost (millions)
Alternative B	$743.30	$248.21	$3.60	$995.11
Alternative M Avoidance	$808.13	$96.48	$2.03	$906.64
Alternative N Avoidance	$770.17	$189.27	$2.03	$961.47
Alternative Q	$775.61	$90.04	$2.03	$867.68
Alternative T	$718.93	$215.58	$2.03	$936.54
Alternative V-AW	$507.67	$107.03	$4.48	$619.18

8.0 Public Involvement

Two Citizens Informational Workshops (CIWs) were held for the project in April 2006 to introduce the project, provide information to the public, and solicit feedback. Two additional CIWs were held in March 2011 in New Hanover and Brunswick Counties to present the project purpose and need and preliminary alternatives, and to solicit input from the public on these topics.

A newsletter was mailed to the project mailing list on April 2, 2014 to notify the public of the selection of the initial 12 detailed study alternatives, as well as the next steps in the project development process. Newsletter No. 3 was mailed to the project mailing list in December 2018 to inform citizens of the detailed study alternatives eliminated from further consideration and provide a project update. A large number of comments, most notably from citizens in Brunswick Forest in Leland, were received subsequent to this mailing.

Following publication of the DEIS in March 2019, flyers and door hangers were distributed in low-income/minority neighborhoods and postcards were mailed to the project study area in mid-April 2019

informing the public of the April 29-30, 2019 Corridor Public Hearings. Due to the size of the study area, two dates and two locations were selected, one in New Hanover County (April 29th) and one in Brunswick County (April 30th). A Pre-Hearing Open House and Formal Public Hearing will take place at both locations to present the corridor alternatives as seen in the DEIS, solicit comments on the DEIS and corridor alternatives, and to review the next steps. The public comment period for the DEIS is scheduled to conclude on May 16, 2019.

In addition to the project postcard, flyers, and door-hangers, outreach efforts announcing the public involvement opportunities for the project included the NCDOT Public Hearing Notice, radio and newspaper advertisement, postings on the project website and the WMPO website, and the USACE Public Notice.

9.0 Wetlands, Streams and Ponds

Jurisdictional wetlands, streams and ponds are located in the study corridors. Named streams within the project corridors include Cape Fear River, Piney Branch, Morgan Branch, Jackeys Creek, Alligator Creek, Brunswick River, Bishop Branch, Mallory Creek, Little Mallory Creek, Goodland Branch and Greenfield Creek. These streams are considered jurisdictional surface waters under Section 404 of the Clean Water Act. Unnamed tributaries to these streams and unnamed tributaries to Barnards Creek, Greenfield Lake, Town Creek and Sturgeon Creek were also located within the project corridor and are considered jurisdictional surface waters under Section 404 of the Clean Water Act.

The project lies within the Cape Fear River Basin. The North Carolina Division of Marine Fisheries (NCDMF) and the North Carolina Wildlife Resources Commission (NCWRC) have identified the Cape Fear River, the Brunswick River, and Alligator Creek in the study corridor as anadromous fish spawning areas. Additionally, the Cape Fear and Brunswick rivers are identified as primary nursery areas by the NCDMF. These waters are also identified as sturgeon spawning waters by the National Marine Fisheries Service (NMFS). Based on these designations, an in-water construction moratorium is in effect for these waters from February 1 through June 30.

There are no designated High Quality Waters (HQW), Outstanding Resource Waters (ORW), or water supply watersheds (WS-I or WS-II) within one mile downstream of the study area. The Cape Fear River and Brunswick River have been designated by the USACE as Navigable Waters under Section 10 of the Rivers and Harbors Act.

Total impacts by alternative for streams, wetlands and ponds are shown in Table 3. Characteristics of the jurisdictional streams are included in Table 4. Characteristics of jurisdictional wetlands are provided in Table 5. Figures depicting the impacts of jurisdictional resources are included in Figures 2 through Figure 13.

Table 3: Jurisdictional Impacts

	Alternative					
	B	M Avoidance	N Avoidance	Q	T	V-AW
Jurisdictional Stream Impacts						
Total Stream Crossings (#)	8	22	17	14	8	11
Total Stream Length (linear feet)	2,528	8,779	5,806	4,962	1,667	2,075
Potential Minimized Stream Impacts (linear feet)[a]	1,273	5,446	4,236	2,376	847	526
Jurisdictional Wetland Impacts						
Riparian Wetlands (acres)	16.1	26.3	21.8	20.3	13.5	35.4
Non-Riparian Wetlands (acres)	82.4	37.9	37.0	25.4	26.2	104.8
Total Wetland (acres)	**98.5**	**64.2**	**58.8**	**45.7**	**39.7**	**140.2**
CAMA AECs (acres)	1.8	2.3	2.3	1.8	1.8	89.1
Average wetland rating	34	31	34	30	32	33
Jurisdictional Pond Impacts						
Total Pond (acres)	0.05	0.00	0.00	0.04	0.04	0.05

Note: Impacts were calculated using the functional design construction slope stake limits plus 40 feet.
a The project team investigated areas where additional avoidance and minimization measures could be incorporated to further reduce impacts to streams. This is based upon a cursory review of the functional designs. During design refinements of the LEDPA, these measures can be further investigated and incorporated where feasible.

Jurisdictional areas identified during original field investigations were verified by Brad Shaver of the U.S. Army Corps of Engineers (USACE) and Mason Herndon of the NC Division of Water Resources (NCDWR) during numerous field visits held between December 17, 2013 and March 19, 2014. Jurisdictional areas identified during investigations of additional extended study areas were verified on March 30, 2017.

Table 4: Physical and Jurisdictional Characteristics of Impacted Streams in the Study Area

Map ID	Stream Name	DWQ Index Number	Best Usage Classification	Bank Height (feet)	Bankful Width (feet)	Water Depth (inches)	Channel Substrate	Velocity	Clarity	Length in Study Area (feet)	Jurisdictional Classification	Compensatory Mitigation Required
1SB	UT to Jackeys Creek	18-77-3	C;Sw	0.5–1	0.5	2–6	Sand	Slow	Slightly Turbid	1,218	Perennial	Yes
2SC	UT to Piney Branch	18-77-3-1	C;Sw	4–8	3–4	4–6	Silt/Sand	Moderate	Slightly Turbid	1,226	Intermittent	Yes
										464	Perennial	
Piney Branch	Piney Branch	18-77-3-1	C;Sw	3–5	3–7	6–12	Sand	Moderate	Clear	1,345	Perennial	Yes
3SB	UT to Mallory Creek	18-78	C;Sw	3–4	2–3	6–12	Silt/Sand	Moderate	Clear	1,121	Intermittent	Yes
5SA	UT to Barnards Creek	18-80	C;Sw	0.5	2–4	2–6	Silt/Sand	Slow	Clear	717	Intermittent	Yes
5SB	UT to Barnards Creek	18-80	C;Sw	4–6	2–4	2–6	Silt/Sand	Slow	Slightly Turbid	730	Intermittent	Yes
5SF	UT to Barnards Creek	18-80	C;Sw	0.5–2	2–3	2–8	Sand	Moderate	Slightly Turbid	938	Intermittent	Yes
5SG	UT to Barnards Creek	18-80	C;Sw	0.5	3–4	24–36	Sand	Moderate	Slightly Turbid	2,923	Perennial	Yes
5SZ	UT to Barnards Creek	18-80	C;Sw	0.5–2	3–5	2–8	Sand	Moderate	Slightly Turbid	423	Intermittent	Yes
										824	Perennial	
Morgan Branch	Morgan Branch	18-81-7	C;Sw	2–7	4–40	12–>120	Silt/Sand	Moderate	Slightly Turbid	2,517	Perennial	Yes
Jackeys Creek	Jackeys Creek	18-77-3	C;Sw	1–2	6–10	10–24	Sand	Slow	Turbid	601	Perennial	Yes
7SB	UT to Jackeys Creek	18-77-3	C;Sw	1–2	1–2	4–6	Sand	Slow	Slightly Turbid	237	Perennial	Yes
8SA	UT to Brunswick River	18-77	SC	0.5–1	4–5	6–18	Silt/Sand	Slow	Slightly Turbid	708	Perennial	Yes

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Alligator Creek	Alligator Creek	18-75	SC;Sw	4–10	100	>120	Silt/Sand	Moderate	Turbid	1,138	Perennial	Yes
Brunswick River	Brunswick River	18-77	SC	4–10	300	>120	Silt/Sand	Moderate	Turbid	1,079	Perennial	Yes
Bishop Branch	Bishop Branch	18-81-7-1	C;Sw	1–2	5–10	10–24	Silt/Sand	Moderate	Turbid	5,865	Perennial	Yes
10SA	UT to Morgan Branch	18-81-7	C;Sw	1–2	2–4	6–10	Sand	Slow	Slightly Turbid	473	Perennial	Yes
10SB	UT to Bishop Branch	18-81-7-1	C;Sw	0.5–1.5	2–4	6–12	Silt	Slow	Turbid	2,685	Intermittent	Yes
10SE	UT to Bishop Branch	18-81-7-1	C;Sw	0.5–1	5–6	6–12	Sand	Slow	Turbid	1,453	Perennial	Yes
										222	Intermittent	
10SF[a]	UT to Bishop Branch	18-81-7-1	C;Sw	—	—	—	—	—	—	1,387	Perennial	Yes
10SG	UT to Morgan Branch	18-81-7	C;Sw	0.5	2–4	1–5	Sand	Moderate	Slightly Turbid	1,387	Perennial	Yes
10SH	UT to Morgan Branch	18-81-7	C;Sw	0.5	2–4	1–5	Sand	Slow	Slightly Turbid	877	Perennial	Yes
10SO[b]	UT to Morgan Branch	18-81-7	C;Sw	—	—	—	—	—	—	281	Intermittent	Yes
13SA	UT to Greenfield Lake	18-76-1	C;Sw	0.5–1	1–2	4	Sand	Slow	Clear	451	Perennial	Yes
Mallory Creek[b]	Mallory Creek	18-78	C;Sw	2–10	8–25	12–96	Silt/Sand	Moderate	Slightly Turbid	7,857	Perennial	Yes
Little Mallory Creek	Little Mallory Creek	18-78-1	C;Sw	2–10	2–30	4–96	Silt/Sand	Moderate	Slightly Turbid	2,527	Perennial	Yes
Goodland Branch	Goodland Branch	18-81-8	C;Sw	—	—	—	—	—	—	1,358	Perennial	Yes

Table 4: Physical and Jurisdictional Characteristics of Impacted Streams in the Study Area

Map ID	Stream Name	DWQ Index Number	Best Usage Classification	Bank Height (feet)	Bankful Width (feet)	Water Depth (inches)	Channel Substrate	Velocity	Clarity	Length in Study Area (feet)	Jurisdictional Classification	Compensatory Mitigation Required
20SC	UT to Goodland Branch	18-81-8	C;Sw	0.5–1	2–3	0–6	Silt/Sand	Slow	Clear	1,175	Intermittent	Yes
20SD	UT to Goodland Branch	18-81-8	C;Sw	0.5–1	3–4	0–6	Silt/Sand	Slow	Clear	214	Intermittent	Yes
20SE	UT to Goodland Branch	18-81-8	C;Sw	0.5–1	3–4	0–6	Silt/Sand	Slow	Clear	1,469	Perennial	Yes
20SF	UT to Goodland Branch	18-81-8	C;Sw	0.5–1	2–3	0–6	Silt/Sand	Moderate	Clear	581	Intermittent	Yes
20SY	UT to Town Creek	18-81	C;Sw	0.5–1	3–5	4–12	Silt/Sand	Slow	Slightly Turbid	612	Perennial	Yes
Greenfield Creek	Greenfield Creek	18-76	SC;Sw	4–6	10–15	12–24	Silt/Sand	Moderate	Turbid	1,080	Perennial	Yes
26SC	UT to Greenfield Creek	18-76	SC;Sw	4–5	10	12–24	Si/Sa/G	Moderate	Slightly Turbid	114	Perennial	Yes
5XSA	UT to Piney Branch	18-77-3-1	C;Sw	1–2	3–4	6–12	Silt/Sand	Moderate	Clear	845	Perennial	Yes
29XSB	UT to Sturgeon Creek	18-77-1	C;Sw	1–1.5	3–4	2–8	Silt/Sand	Moderate	Clear	236	Perennial	Yes

Source: NCDOT (2017c).

UT = Unnamed Tributary

[a] Feature added from R-2633A delineations after field surveys were completed.

[b] Feature partially drawn from GIS/topographic map due to flooded site conditions at time of field surveys.'

Table 5: Jurisdictional Characteristics of Impacted Wetlands

Map ID	NCWAM Classification	Hydrologic Classification	DWQ Wetland Rating	Alternative B	Alternative MA	Alternative NA	Alternative Q	Alternative T	Alternative V-AW
1WR	Pocosin	Non-riparian	32	36.6	0.0	0.0	0.0	0.0	0.0
1WS	Pocosin	Non-riparian	24	0.9	0.0	0.0	0.0	0.0	0.0
1WV	Headwater Forest	Non-riparian	23	0.6	0.0	0.0	0.0	0.0	0.0
1WW	Pocosin	Non-riparian	31	0.8	0.0	0.0	0.0	0.0	0.0
1WY	Pine Flat	Non-riparian	40	8.8	0.0	0.0	0.0	0.0	0.0
1WZ	Pocosin	Non-riparian	27	0.2	0.0	0.0	0.0	0.0	0.0
2WA	Pine Flat	Non-riparian	31	26.9	0.0	0.0	15.8	16.1	4.4
2WB	Headwater Forest	Non-riparian	13	2.8	0.0	0.0	1.4	1.5	1.2
2WC	Bottomland Hardwood Forest	Riparian	47	1.3	0.0	0.0	1.3	1.2	0.0
3WA	Headwater Forest Riverine Swamp Forest	Riparian	64	1.1	0.0	0.0	1.1	0.0	0.0
3WB	Pocosin	Non-riparian	14	<0.1	0.0	0.0	0.0	0.0	0.0
3WC	Headwater Forest	Riparian	25	0.5	0.0	0.0	0.5	0.0	0.0
3WD	Pocosin	Non-riparian	18	0.0	0.0	0.0	0.0	0.3	0.0
3WE	Pocosin	Non-riparian	4	0.0	0.0	0.0	0.0	0.1	0.0
3WF	Pocosin	Non-riparian	4	0.0	0.0	0.0	0.0	<0.1	0.0
3WG	Non-Riverine Swamp Forest	Riparian	59	0.0	0.0	0.0	0.0	0.9	0.0
5WD	Headwater Forest	Non-riparian	16	0.0	0.0	0.0	0.0	0.0	0.0

Table 5: Jurisdictional Characteristics of Impacted Wetlands

Map ID	NCWAM Classification	Hydrologic Classification	DWQ Wetland Rating	Alternative B	Alternative MA	Alternative NA	Alternative Q	Alternative T	Alternative V-AW
5WF	Headwater Forest	Non-riparian	8	0.0	1.2	0.0	1.2	0.0	0.0
5WG	Headwater Forest	Non-riparian	8	0.0	<0.1	0.0	<0.1	0.0	0.0
5WH	Headwater Forest	Riparian	37	0.0	0.1	0.0	0.1	0.0	0.0
5WI	Headwater Forest	Riparian	13	0.0	0.3	0.0	0.3	0.0	0.0
5WJ	Pine Flat	Non-riparian	30	0.0	0.8	0.0	0.8	0.0	0.0
5WK	Pocosin	Non-riparian	4	0.0	0.3	0.0	0.3	0.0	0.0
5WL	Bottomland Hardwood Forest	Riparian	42	0.0	<0.1	0.0	<0.1	0.0	0.0
5WM	Pocosin	Non-riparian	10	0.0	1.8	0.0	1.8	0.0	0.0
5WO	Salt/Brackish Marsh	Tidal	56	0.0	0.1	0.0	0.1	0.0	0.0
5WP	Headwater Forest	Riparian	18	0.0	0.4	0.0	0.4	0.0	0.0
5WQ	Headwater Forest	Riparian	18	0.0	<0.1	0.0	<0.1	0.0	0.0
6WA[a]	Seep	Riparian	10	0.0	0.2	0.0	0.2	0.0	0.0
6WC	Bottomland Hardwood Forest	Riparian	28	0.0	0.0	0.0	<0.1	<0.1	<0.1
6WE	Pocosin	Non-riparian	14	0.0	0.0	0.0	0.3	0.3	0.4
6WG	Pocosin	Non-riparian	26	0.0	0.0	0.0	0.5	0.6	0.6
7WA	Headwater Forest	Non-riparian	10	5.5	0.0	0.0	5.5	5.5	0.0
7WB	Hardwood Flat	Non-riparian	47	0.0	0.0	0.0	0.0	0.0	0.6
7WD	Pocosin	Non-riparian	24	0.0	0.0	0.0	0.0	0.0	9.2

Table 5: Jurisdictional Characteristics of Impacted Wetlands

Map ID	NCWAM Classification	Hydrologic Classification	DWQ Wetland Rating	Alternative B	Alternative MA	Alternative NA	Alternative Q	Alternative T	Alternative V-AW
7WE	Headwater Forest	Non-riparian	26	0.0	0.0	0.0	0.0	0.0	0.8
7WF	Bottomland Hardwood Forest	Riparian	49	0.0	0.0	0.0	0.0	0.0	1.4
7WG	Headwater Forest	Riparian	16	0.5	0.0	0.0	0.5	0.5	0.6
8WA	Salt/Brackish Marsh	Tidal	70	<0.1	0.0	0.0	<0.1	<0.1	<0.1
8WB	Headwater Forest	Riparian	28	0.0	0.0	0.0	0.0	0.0	17.2
8WC	Non-Riverine Swamp Forest	Riparian	20	0.0	0.0	0.0	0.0	0.0	<0.1
8WE	Basin Wetland	Non-riparian	11	0.0	0.0	0.0	0.0	0.0	0.4
9WA	Salt/Brackish Marsh	Tidal	70	0.0	0.0	0.0	0.0	0.0	0.1
9WB	Estuarine Woody Wetland	Tidal	74	0.0	0.0	0.0	0.0	0.0	72.2
10WA	Riverine Swamp Forest	Riparian	68	0.0	0.0	0.0	0.0	0.0	29.4
10WB	Riverine Swamp Forest	Riparian	60	0.0	5.2	5.2	0.0	0.0	0.0
10WC	Bottomland Hardwood Forest	Riparian	33	0.0	2.0	2.0	0.9	0.9	0.9
10WD	Headwater Forest	Non-riparian	10	0.0	<0.1	<0.1	0.0	0.0	0.0
10WE	Bottomland Hardwood Forest	Riparian	35	0.0	1.2	1.2	0.0	0.0	0.0
10WF	Pocosin	Non-riparian	20	0.0	0.4	0.4	0.0	0.0	0.0
10WG	Headwater Forest	Riparian	28	0.0	1.9	1.9	0.0	0.0	0.0

Table 5: Jurisdictional Characteristics of Impacted Wetlands

Map ID	NCWAM Classification	Hydrologic Classification	DWQ Wetland Rating	Alternative B	Alternative MA	Alternative NA	Alternative Q	Alternative T	Alternative V-AW
10WH/WI	Headwater Forest	Riparian	31	0.0	0.1	0.1	0.0	0.0	0.0
10WJ	Headwater Forest	Riparian	31	0.0	0.3	0.3	0.0	0.0	0.0
10WP	Pocosin	Non-riparian	26	0.0	<0.1	<0.1	0.0	0.0	0.0
14WA	Headwater Forest	Riparian	27	<0.1	0.0	0.0	0.0	0.0	0.0
14WB	Headwater Forest	Non-riparian	20	0.0	1.2	1.2	0.0	0.0	0.0
15WA	Riverine Swamp Forest	Riparian	64	0.0	0.3	0.3	0.0	0.0	0.0
20WA	Riverine Swamp Forest	Riparian	43	6.7	1.5	1.5	6.7	4.3	0.0
20WB	Headwater Forest	Non-riparian	24	0.0	0.7	0.7	0.0	0.0	0.0
20WC	Headwater Forest	Non-riparian	39	0.0	0.2	0.2	0.0	0.0	0.0
20WD	Pine Flat	Non-riparian	56	0.0	1.5	1.5	0.0	0.0	0.0
20WF	Pocosin	Non-riparian	53	0.0	1.9	1.9	0.0	0.0	0.0
	Pine Flat			0.0	0.2	0.0	0.0	0.0	0.0
20WG	Bottomland Hardwood Forest	Riparian	53	0.0	13.2	0.0	0.0	0.0	0.0
20WH	Riverine Swamp Forest	Riparian	30	0.0	0.0	13.2	0.0	0.0	0.0
20WI	Riverine Swamp Forest	Riparian	30	0.0	0.0	0.2	0.0	0.0	0.0
20WK	Headwater Forest	Riparian	21	0.0	2.3	2.3	0.0	0.0	0.0
20WL	Pine Flat	Non-riparian	46	0.0	1.2	1.2	0.0	0.0	0.0

Table 5: Jurisdictional Characteristics of Impacted Wetlands

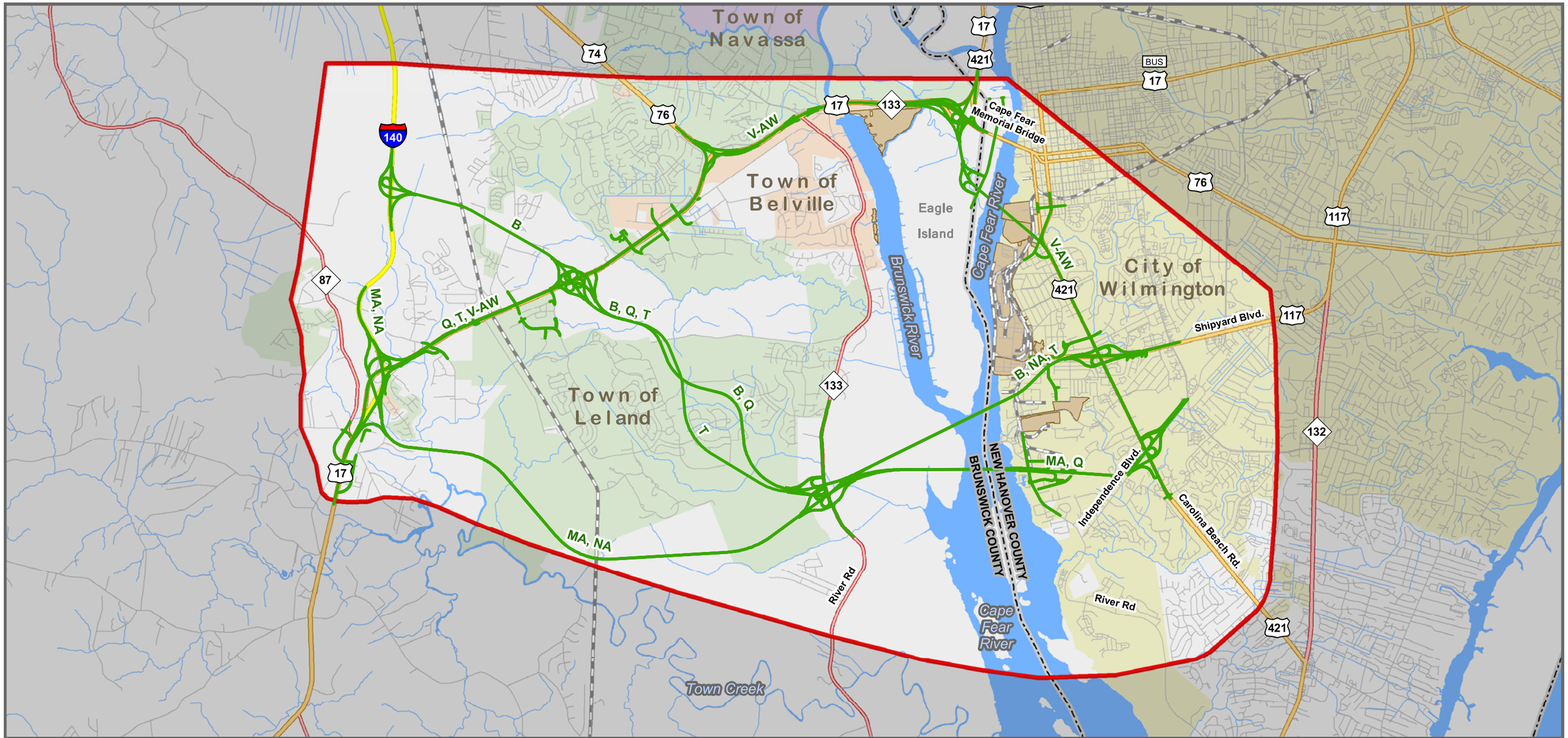
Map ID	NCWAM Classification	Hydrologic Classification	DWQ Wetland Rating	Alternative B	Alternative MA	Alternative NA	Alternative Q	Alternative T	Alternative V-AW
20WM	Headwater Forest	Non-riparian	17	0.0	1.1	1.1	0.0	0.0	0.0
20WZ	Pine Flat	Non-riparian	36	0.0	0.6	0.6	0.0	0.0	0.0
21WA	Headwater Forest	Non-riparian	22	0.0	7.9	7.9	0.0	0.0	0.0
21WB	Headwater Forest	Non-riparian	16	0.0	0.6	0.6	0.0	0.0	0.0
21WD	Headwater Forest	Non-riparian	36	0.0	3.6	3.6	0.0	0.0	0.0
21WE	Headwater Forest	Non-riparian	32	0.0	0.8	0.8	<0.1	0.1	0.0
21WF	Salt/Brackish Marsh	Tidal	64	0.2	0.2	0.2	0.2	0.2	0.0
21WG	Pine Flat	Non-riparian	17	0.0	<0.1	<0.1	0.0	0.0	0.0
21WK	Pocosin	Non-riparian	22	0.1	0.1	0.1	0.1	0.1	0.0
22WA	Salt/Brackish Marsh	Tidal	64	0.5	1.0	1.0	0.5	0.5	0.0
3XWA	Headwater Forest	Riparian	27	0.0	4.2	4.2	0.0	0.0	0.0
3XWC	Non-Tidal Freshwater Marsh	Riparian	49	0.0	1.5	1.5	0.0	0.0	0.0
5XWA	Headwater Forest	Riparian	26	2.1	1.7	1.7	2.1	2.1	0.1
13XWB	Basin Wetland	Non-riparian	13	0.0	0.0	0.0	0.5	0.5	0.5
21XWA	Pine Flat	Non-riparian	20	0.0	0.0	0.0	0.0	0.0	0.2
29XWA	Headwater Forest	Riparian	44	0.1	0.0	0.0	0.1	0.1	0.0
47XWA	Headwater Forest	Riparian	47	0.0	0.1	0.0	0.1	0.0	0.0
51XWA	Bottomland Hardwood Forest	Riparian	28	0.0	0.0	0.0	<0.1	<0.1	0.0

Table 5: Jurisdictional Characteristics of Impacted Wetlands

Map ID	NCWAM Classification	Hydrologic Classification	DWQ Wetland Rating	Alternative B	Alternative MA	Alternative NA	Alternative Q	Alternative T	Alternative V-AW
51XWB	Bottomland Hardwood Forest	Non-riparian	20	0.0	0.0	0.0	0.0	0.0	<0.1
52XWA	Headwater Forest	Non-riparian	23	0.0	0.0	0.0	0.0	0.0	<0.1

Source: NCDOT (2017c).

Figures



Legend

- Project Study Area
- Alternatives Centerline
- Railroad
- Port of Wilmington
- County Boundary

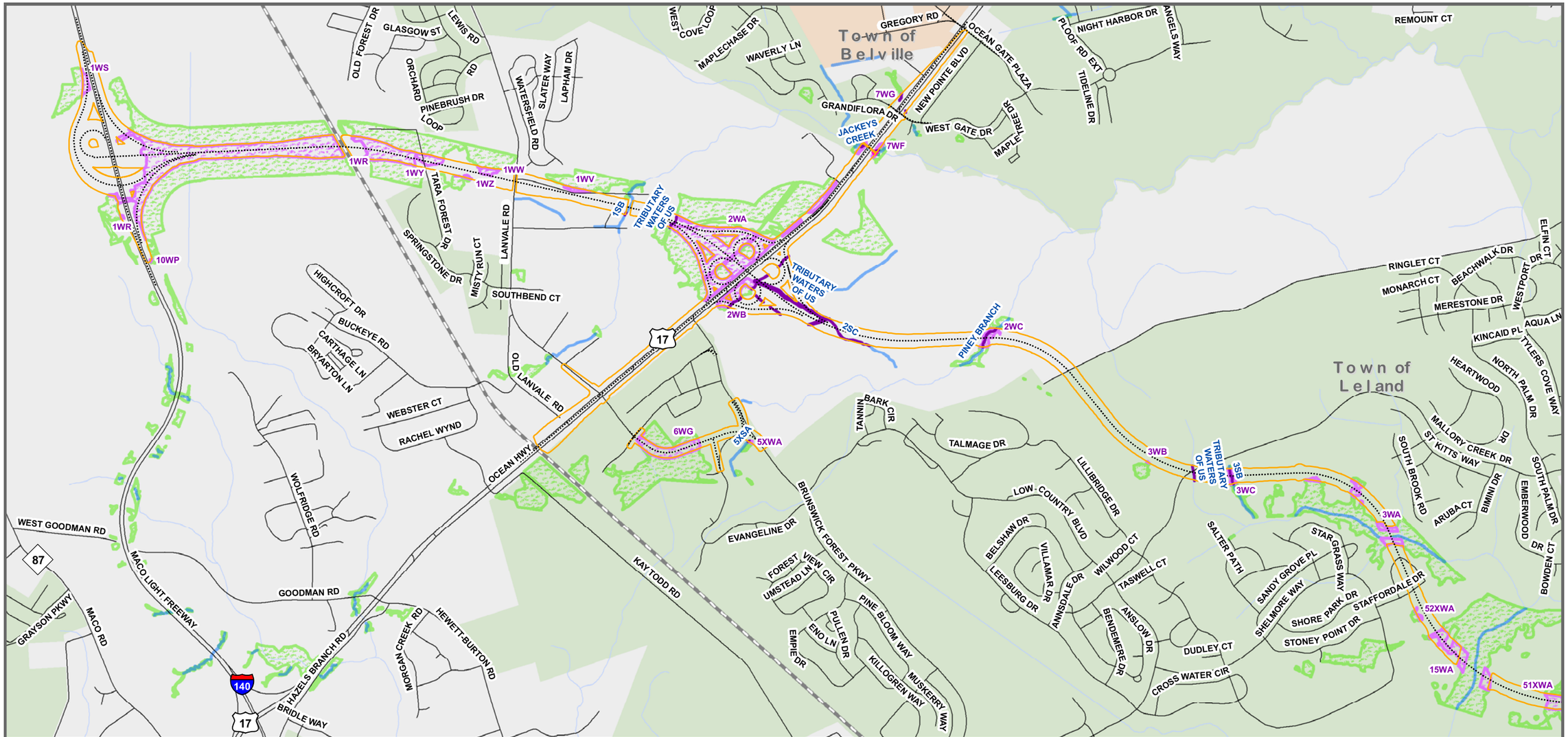
FIGURE 1
CURRENT DETAILED STUDY ALTERNATIVES - OVERVIEW

0 0.5 1 2
Miles

Date: March 2019
This map is for reference only.
Sources: ESRI Inc., CGIA, NCDOT, and AECOM.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

PROPOSED CAPE FEAR CROSSING
BRUNSWICK AND NEW HANOVER COUNTIES
STIP PROJECT U-4738



Legend

- Project Study Area
- Alternative B Centerline
- Alternative B Slope Stakes Plus 40 Feet
- Port of Wilmington
- Delineated Streams
- Delineated Ponds
- Delineated Wetlands
- CAMA Wetland
- Stream Impact
- Pond Impact
- Wetland Impact
- CAMA Wetland Impact

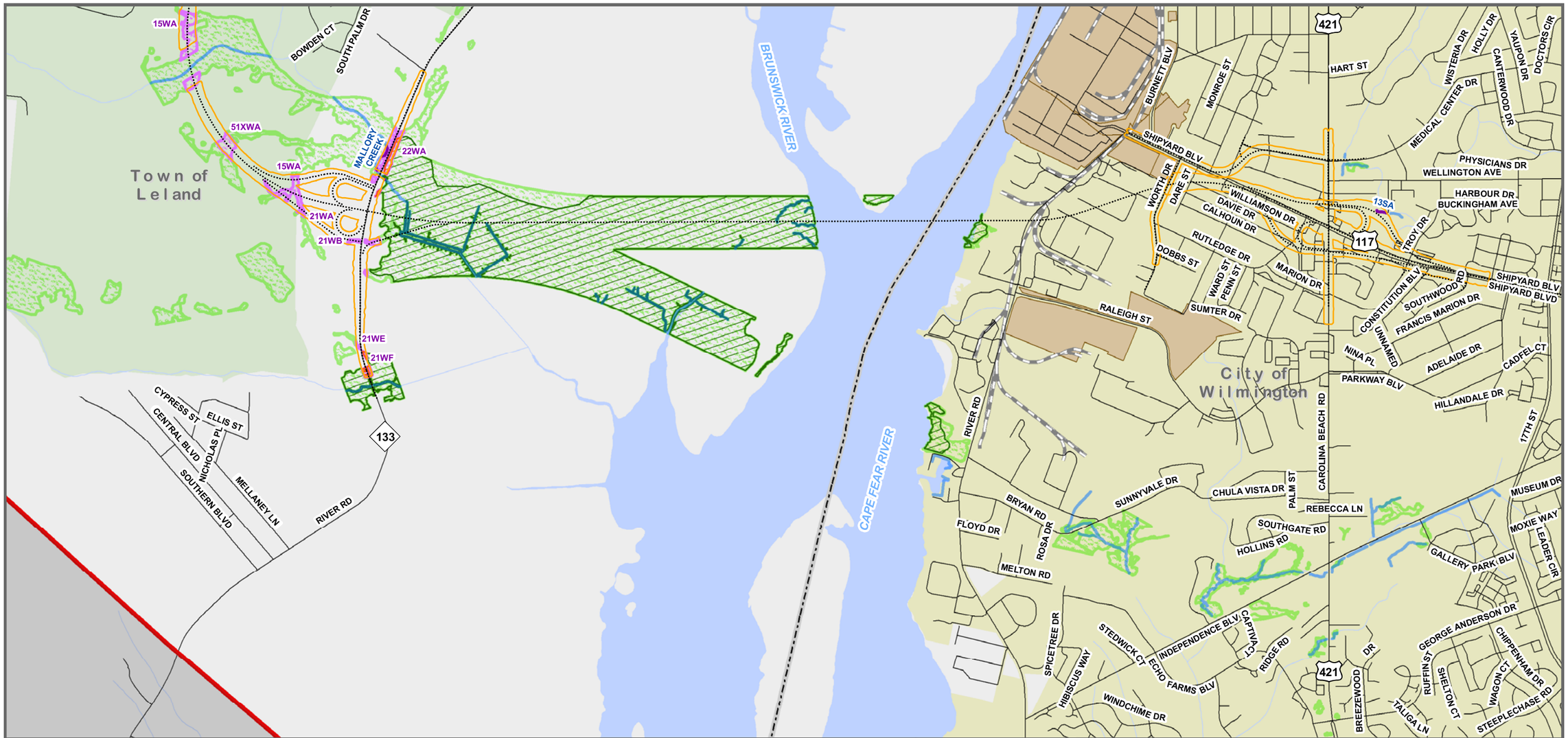
FIGURE 2
STREAMS, PONDS, AND WETLANDS IMPACTS - ALTERNATIVE B

0 500 1,000 2,000
Feet

Date: April 2019
This map is for reference only.
Sources: ESRI Inc., CGIA, NCDOT, and AECOM.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

PROPOSED CAPE FEAR CROSSING
BRUNSWICK AND NEW HANOVER COUNTIES
STIP PROJECT U-4738



Legend

- Project Study Area
- Alternative B Centerline
- Alternative B Slope Stakes Plus 40 Feet
- Port of Wilmington
- Delineated Streams
- Delineated Ponds
- Delineated Wetlands
- CAMA Wetland
- Stream Impact
- Pond Impact
- Wetland Impact
- CAMA Wetland Impact

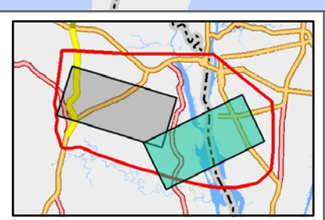


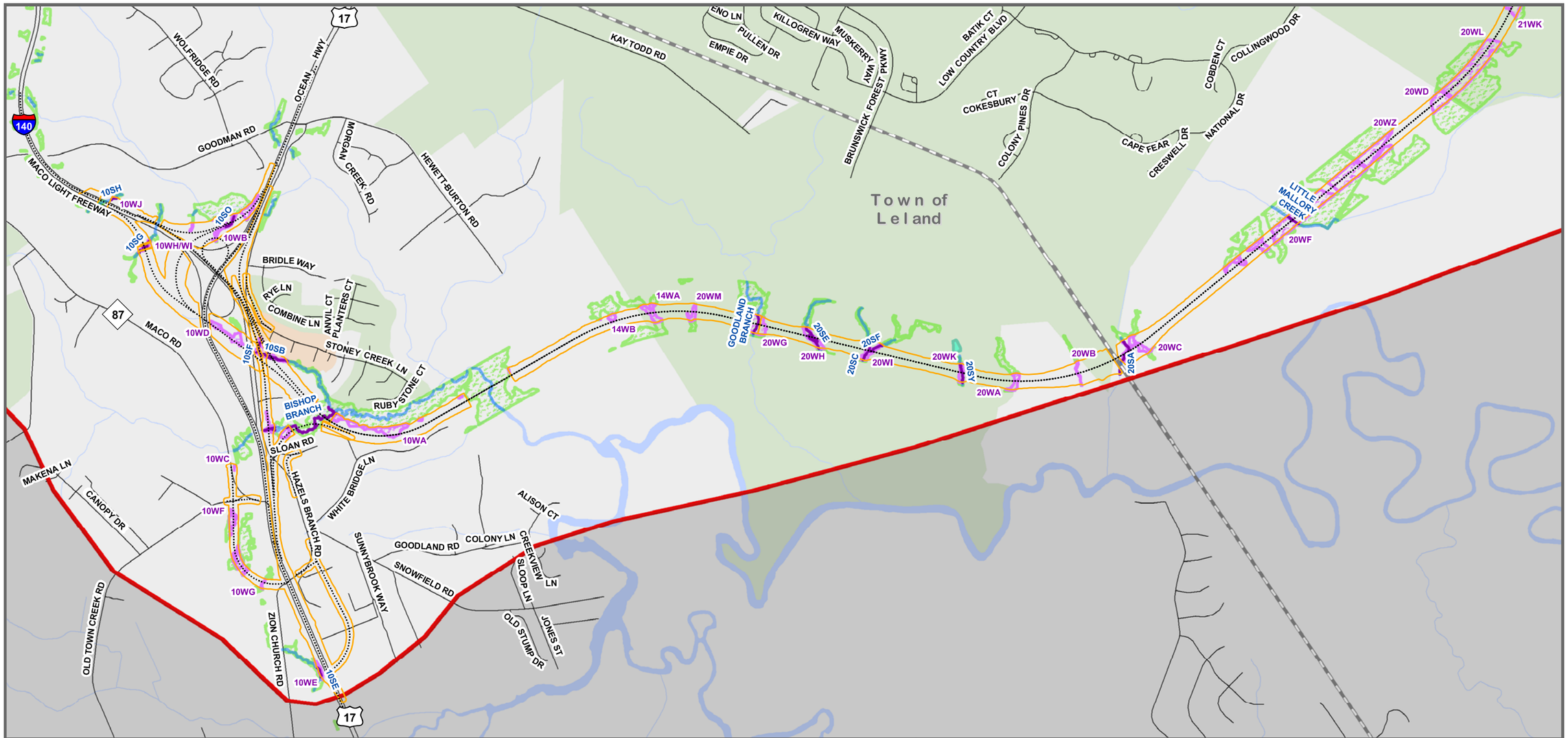
FIGURE 3
STREAMS, PONDS, AND WETLANDS IMPACTS - ALTERNATIVE B

0 500 1,000 2,000
Feet

Date: April 2019
This map is for reference only.
Sources: ESRI Inc., CGIA, NCDOT, and AECOM.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

PROPOSED CAPE FEAR CROSSING
BRUNSWICK AND NEW HANOVER COUNTIES
STIP PROJECT U-4738



Legend

- Project Study Area
- Alternative M Avoidance Centerline
- Alternative M Avoidance Slope Stakes Plus 40 Feet
- Port of Wilmington
- Delineated Streams
- Delineated Ponds
- Delineated Wetlands
- CAMA Wetland
- Stream Impact
- Pond Impact
- Wetland Impact
- CAMA Wetland Impact

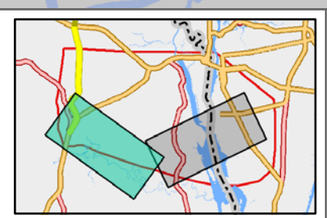


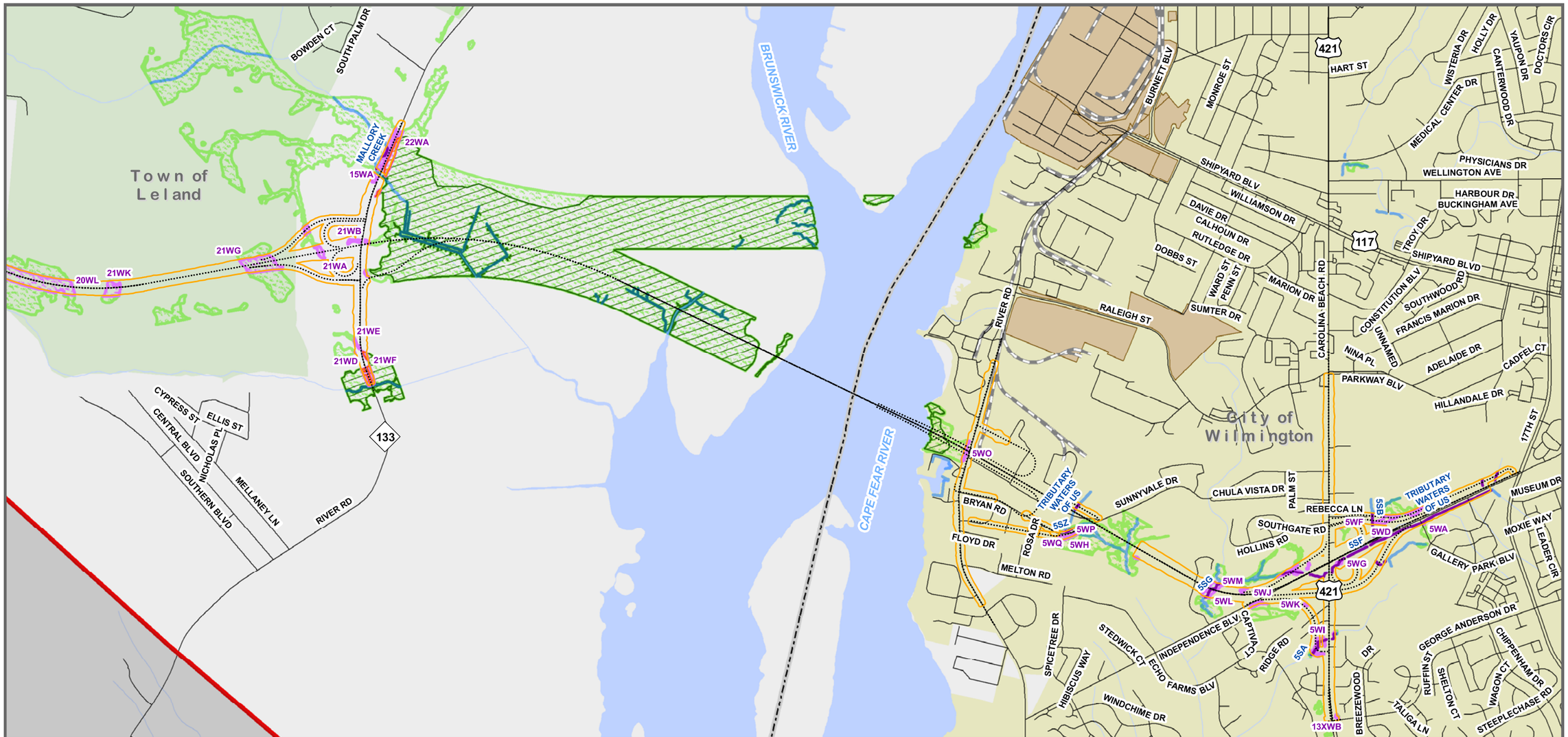
FIGURE 4
STREAMS, PONDS, AND WETLANDS IMPACTS - ALTERNATIVE M AVOIDANCE

0 500 1,000 2,000
Feet

Date: April 2019
This map is for reference only.
Sources: ESRI Inc., CGIA, NCDOT, and AECOM.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

PROPOSED CAPE FEAR CROSSING
BRUNSWICK AND NEW HANOVER COUNTIES
STIP PROJECT U-4738



Legend

- Project Study Area
- Alternative M Avoidance Centerline
- Alternative M Avoidance Slope Stakes Plus 40 Feet
- Port of Wilmington
- Delineated Streams
- Delineated Ponds
- Delineated Wetlands
- CAMA Wetland
- Stream Impact
- Pond Impact
- Wetland Impact
- CAMA Wetland Impact

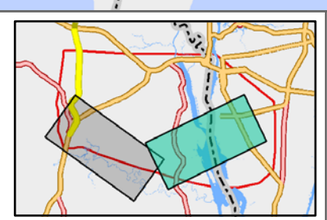


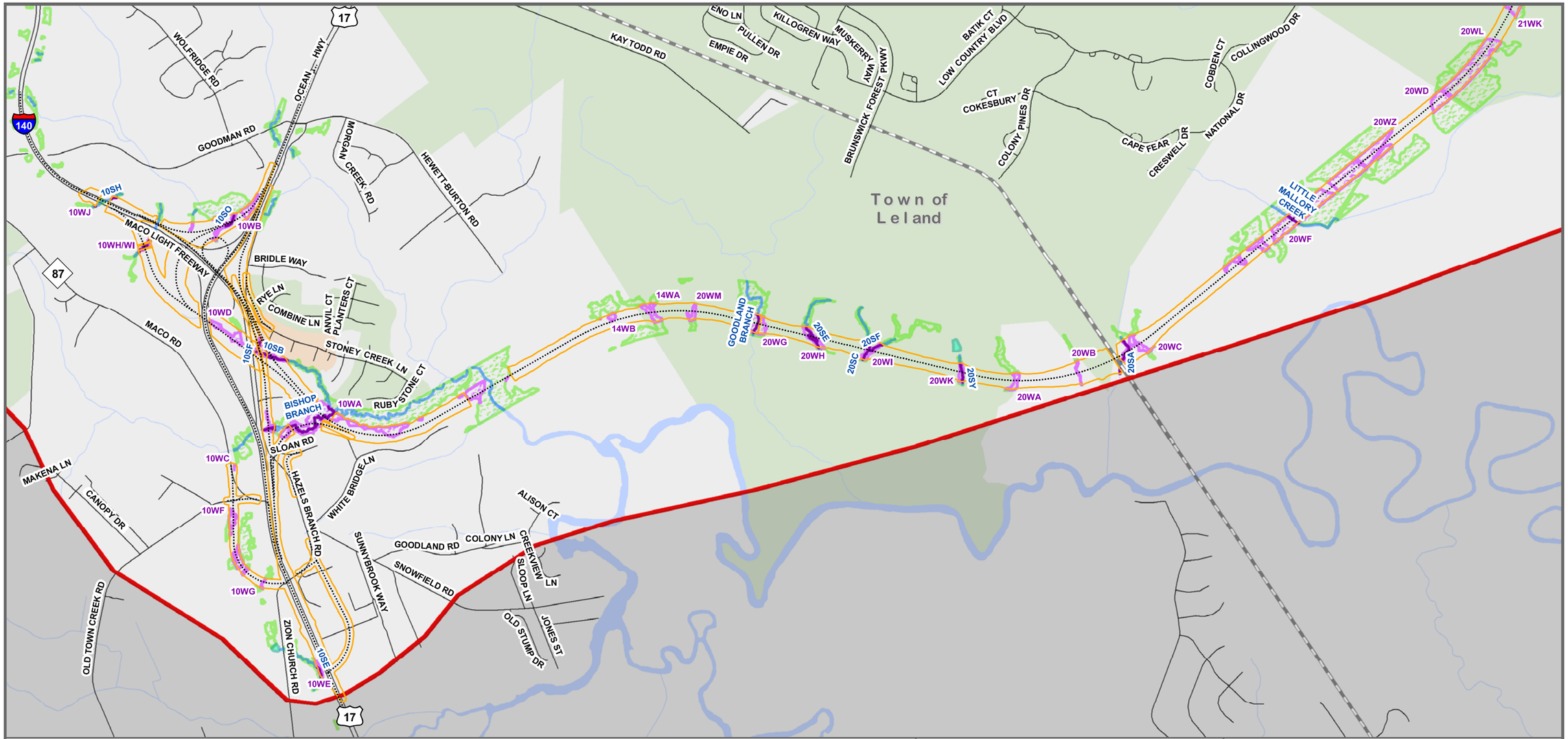
FIGURE 5
STREAMS, PONDS, AND WETLANDS IMPACTS - ALTERNATIVE M AVOIDANCE

0 500 1,000 2,000
Feet

Date: April 2019
This map is for reference only.
Sources: ESRI Inc., CGIA, NCDOT, and AECOM.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

PROPOSED CAPE FEAR CROSSING
BRUNSWICK AND NEW HANOVER COUNTIES
STIP PROJECT U-4738



Legend

- Project Study Area
- Alternative N Avoidance Centerline
- Alternative N Avoidance Slope Stakes Plus 40 Feet
- Port of Wilmington
- Delineated Streams
- Delineated Ponds
- Delineated Wetlands
- CAMA Wetland
- Stream Impact
- Pond Impact
- Wetland Impact
- CAMA Wetland Impact

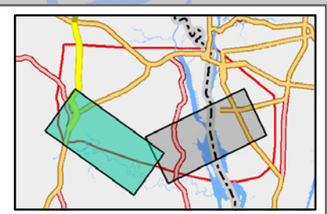


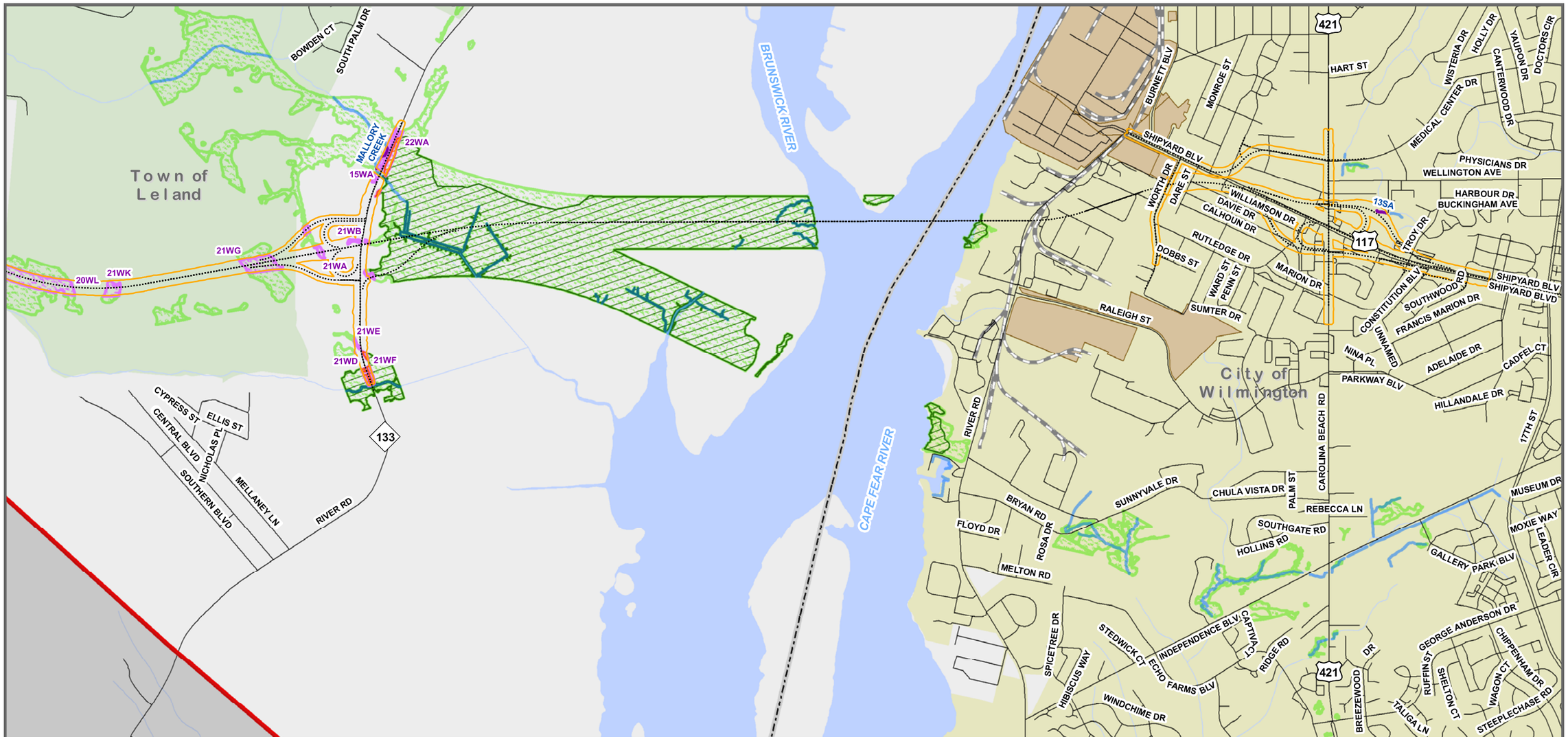
FIGURE 6
STREAMS, PONDS, AND WETLANDS IMPACTS - ALTERNATIVE N AVOIDANCE

0 500 1,000 2,000
Feet

Date: April 2019
This map is for reference only.
Sources: ESRI Inc., CGIA, NCDOT, and AECOM.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

PROPOSED CAPE FEAR CROSSING
BRUNSWICK AND NEW HANOVER COUNTIES
STIP PROJECT U-4738



Legend

- Project Study Area
- Alternative N Avoidance Centerline
- Alternative N Avoidance Slope Stakes Plus 40 Feet
- Port of Wilmington
- Delineated Streams
- Delineated Ponds
- Delineated Wetlands
- CAMA Wetland
- Stream Impact
- Pond Impact
- Wetland Impact
- CAMA Wetland Impact

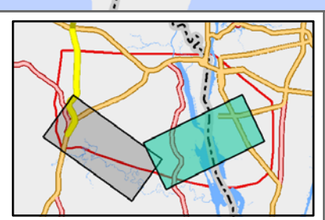


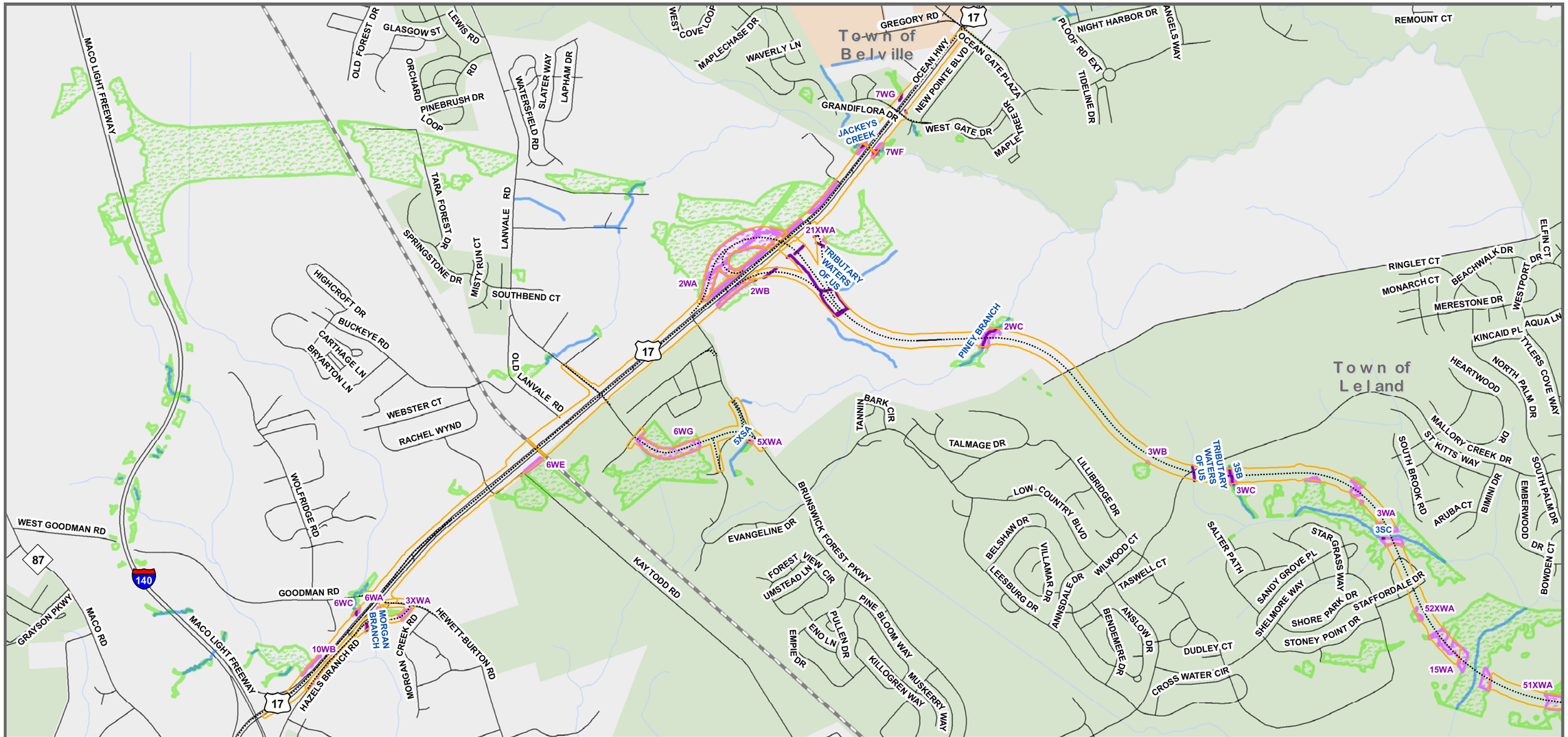
FIGURE 7
STREAMS, PONDS, AND WETLANDS IMPACTS - ALTERNATIVE N AVOIDANCE

0 500 1,000 2,000
Feet

Date: April 2019
This map is for reference only.
Sources: ESRI Inc., CGIA, NCDOT, and AECOM.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

PROPOSED CAPE FEAR CROSSING
BRUNSWICK AND NEW HANOVER COUNTIES
STIP PROJECT U-4738



Legend

- Project Study Area
- Alternative Q Centerline
- Alternative Q Slope Stakes Plus 40 Feet
- Port of Wilmington
- Delineated Streams
- Delineated Ponds
- Delineated Wetlands
- CAMA Wetland
- Stream Impact
- Pond Impact
- Wetland Impact
- CAMA Wetland Impact

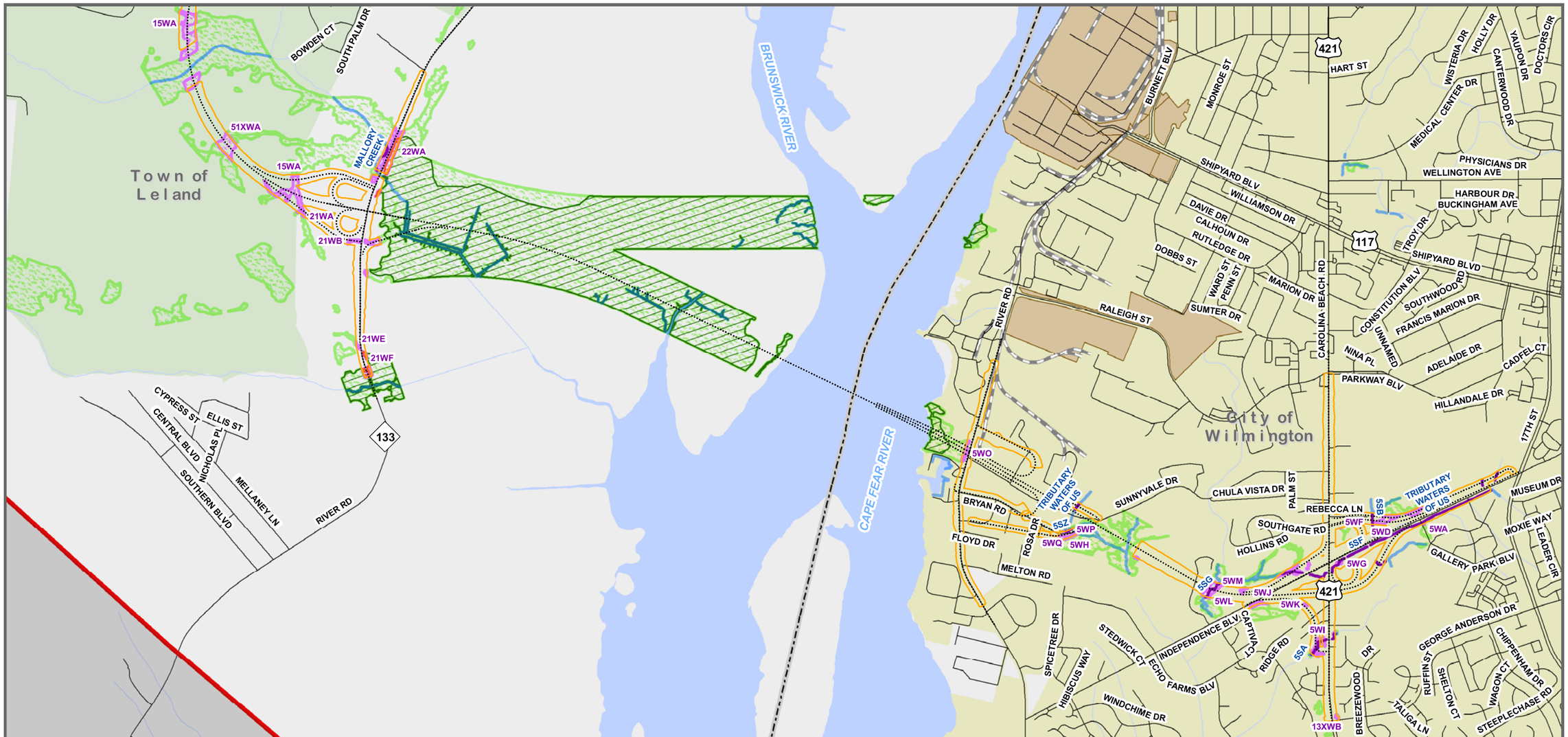
FIGURE 8
STREAMS, PONDS, AND WETLANDS IMPACTS - ALTERNATIVE Q

0 500 1,000 2,000
Feet

Date: April 2019
This map is for reference only.
Sources: ESRI Inc., CGIA, NCDOT, and AECOM.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

PROPOSED CAPE FEAR CROSSING
BRUNSWICK AND NEW HANOVER COUNTIES
STIP PROJECT U-4738



Legend

- Project Study Area
- Alternative Q Centerline
- Alternative Q Slope Stakes Plus 40 Feet
- Port of Wilmington
- Delineated Streams
- Delineated Ponds
- Delineated Wetlands
- CAMA Wetland
- Stream Impact
- Pond Impact
- Wetland Impact
- CAMA Wetland Impact

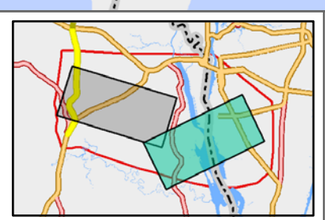


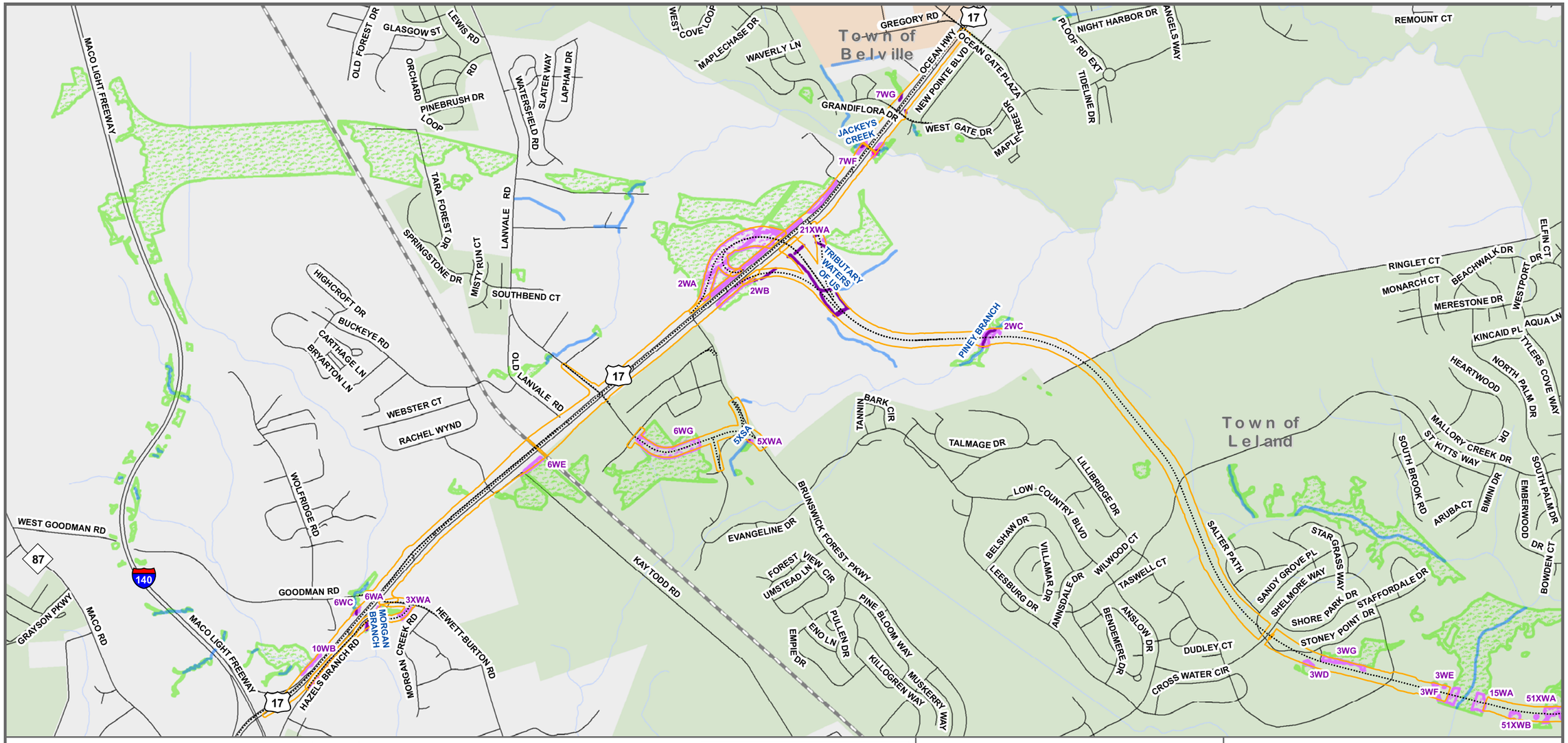
FIGURE 9
STREAMS, PONDS, AND WETLANDS IMPACTS - ALTERNATIVE Q

0 500 1,000 2,000
Feet

Date: April 2019
This map is for reference only.
Sources: ESRI Inc., CGIA, NCDOT, and AECOM.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

PROPOSED CAPE FEAR CROSSING
BRUNSWICK AND NEW HANOVER COUNTIES
STIP PROJECT U-4738



Legend

- Project Study Area
- Alternative T Centerline
- Alternative T Slope Stakes Plus 40 Feet
- Port of Wilmington
- Delineated Streams
- Delineated Ponds
- Delineated Wetlands
- CAMA Wetland
- Stream Impact
- Pond Impact
- Wetland Impact
- CAMA Wetland Impact

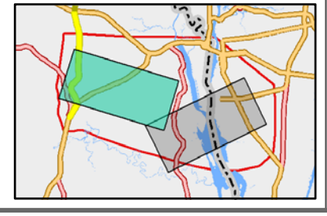


FIGURE 10
STREAMS, PONDS, AND WETLANDS IMPACTS - ALTERNATIVE T

0 500 1,000 2,000
Feet

Date: April 2019
This map is for reference only.
Sources: ESRI Inc., CGIA, NCDOT, and AECOM.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
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BRUNSWICK AND NEW HANOVER COUNTIES
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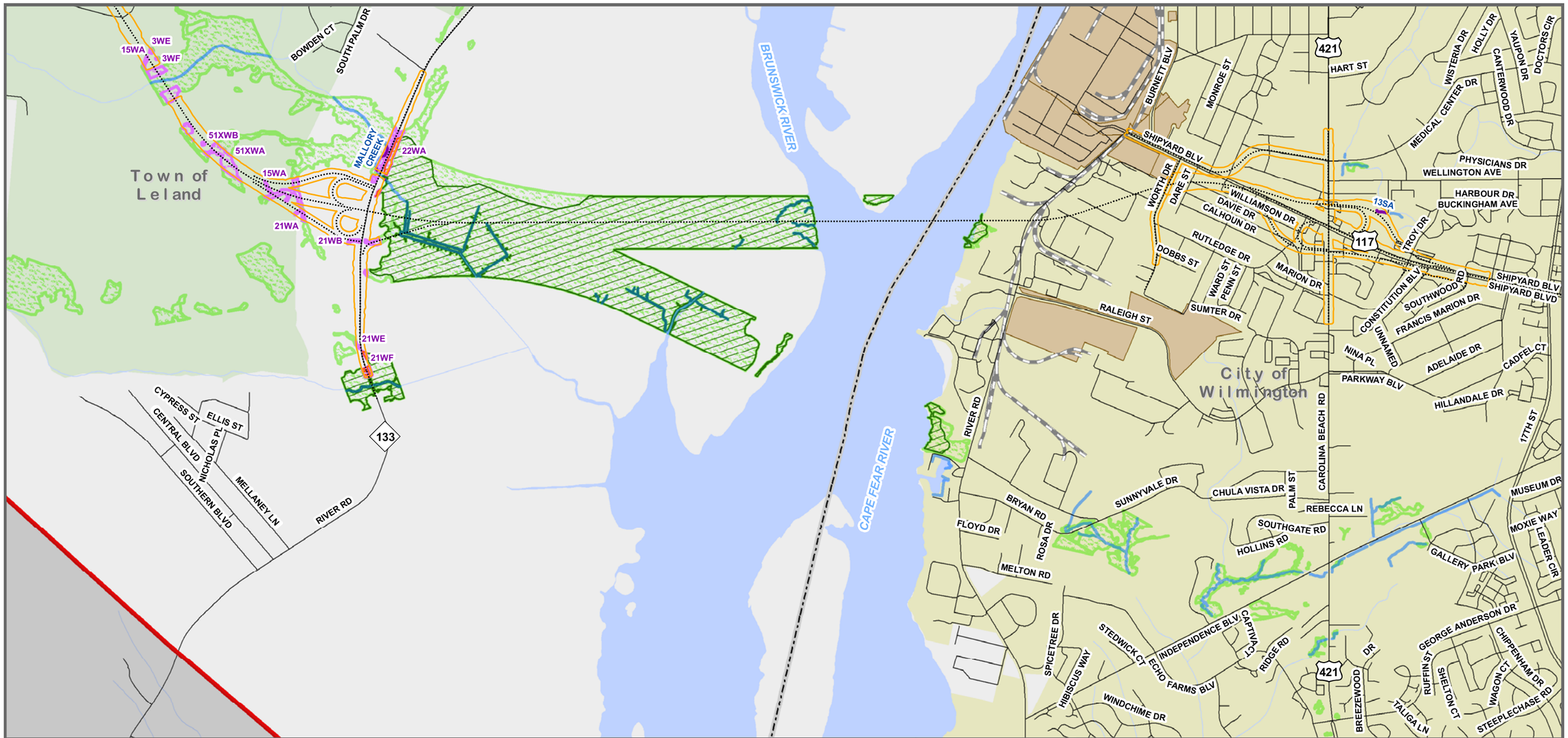

Legend

- Project Study Area
- Alternative T Centerline
- Alternative T Slope Stakes Plus 40 Feet
- Port of Wilmington
- Delineated Streams
- Delineated Ponds
- Delineated Wetlands
- CAMA Wetland
- Stream Impact
- Pond Impact
- Wetland Impact
- CAMA Wetland Impact

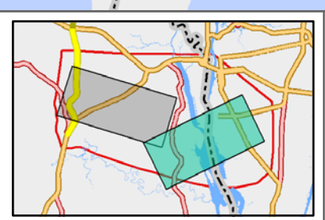

FIGURE 11
STREAMS, PONDS, AND WETLANDS IMPACTS - ALTERNATIVE T

0 500 1,000 2,000
Feet

Date: April 2019
This map is for reference only.
Sources: ESRI Inc., CGIA, NCDOT, and AECOM.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
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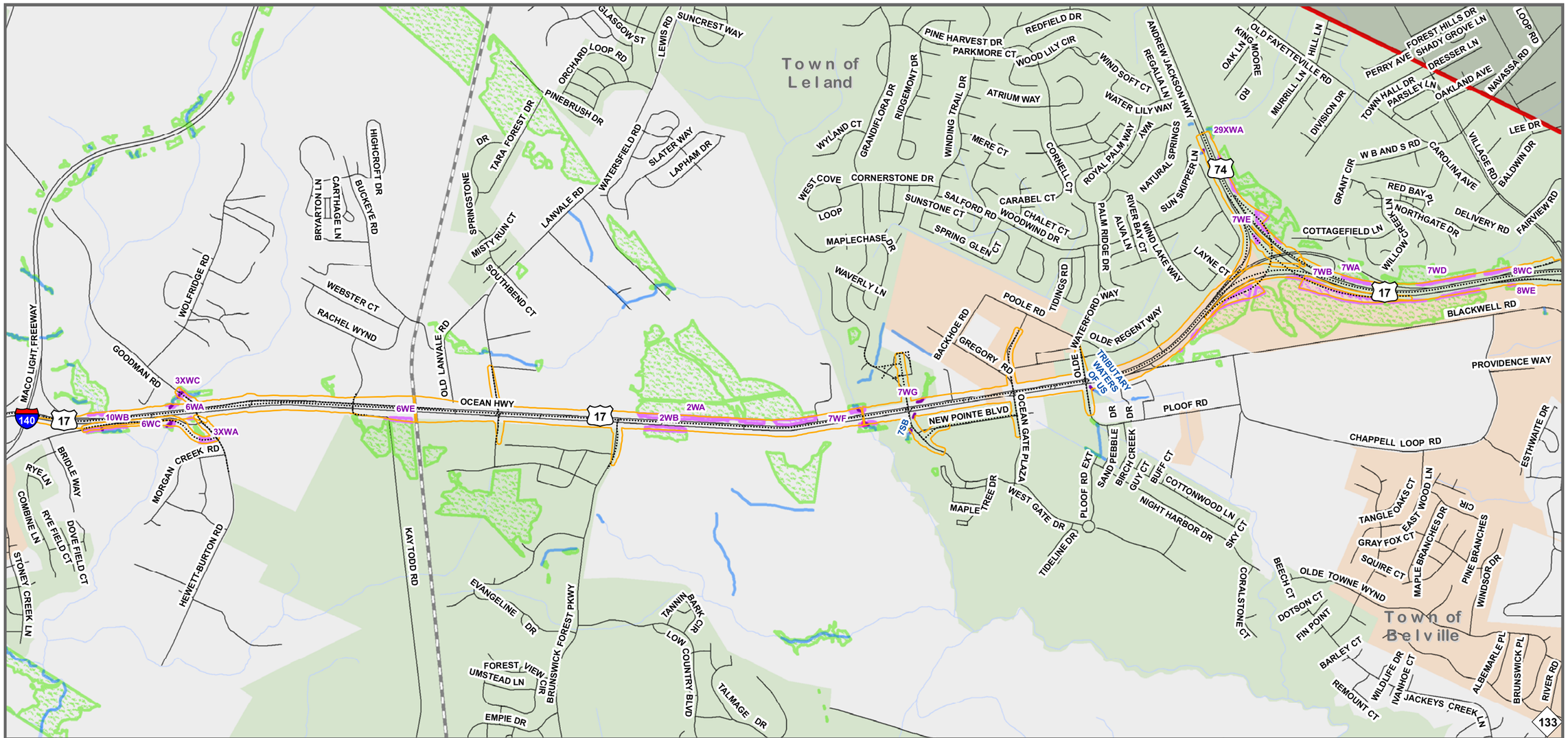

Legend

- Project Study Area
- Alternative V-AW Centerline
- Alternative V-AW Slope Stakes Plus 40 Feet
- Port of Wilmington
- Delineated Streams
- Delineated Ponds
- Delineated Wetlands
- CAMA Wetland
- Stream Impact
- Pond Impact
- Wetland Impact
- CAMA Wetland Impact

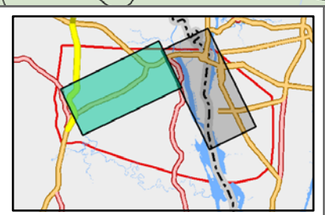

FIGURE 12
STREAMS, PONDS, AND WETLANDS IMPACTS - ALTERNATIVE V-AW

0 500 1,000 2,000

Feet

Date: April 2019
This map is for reference only.
Sources: ESRI Inc., CGIA, NCDOT, and AECOM.

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BRUNSWICK AND NEW HANOVER COUNTIES
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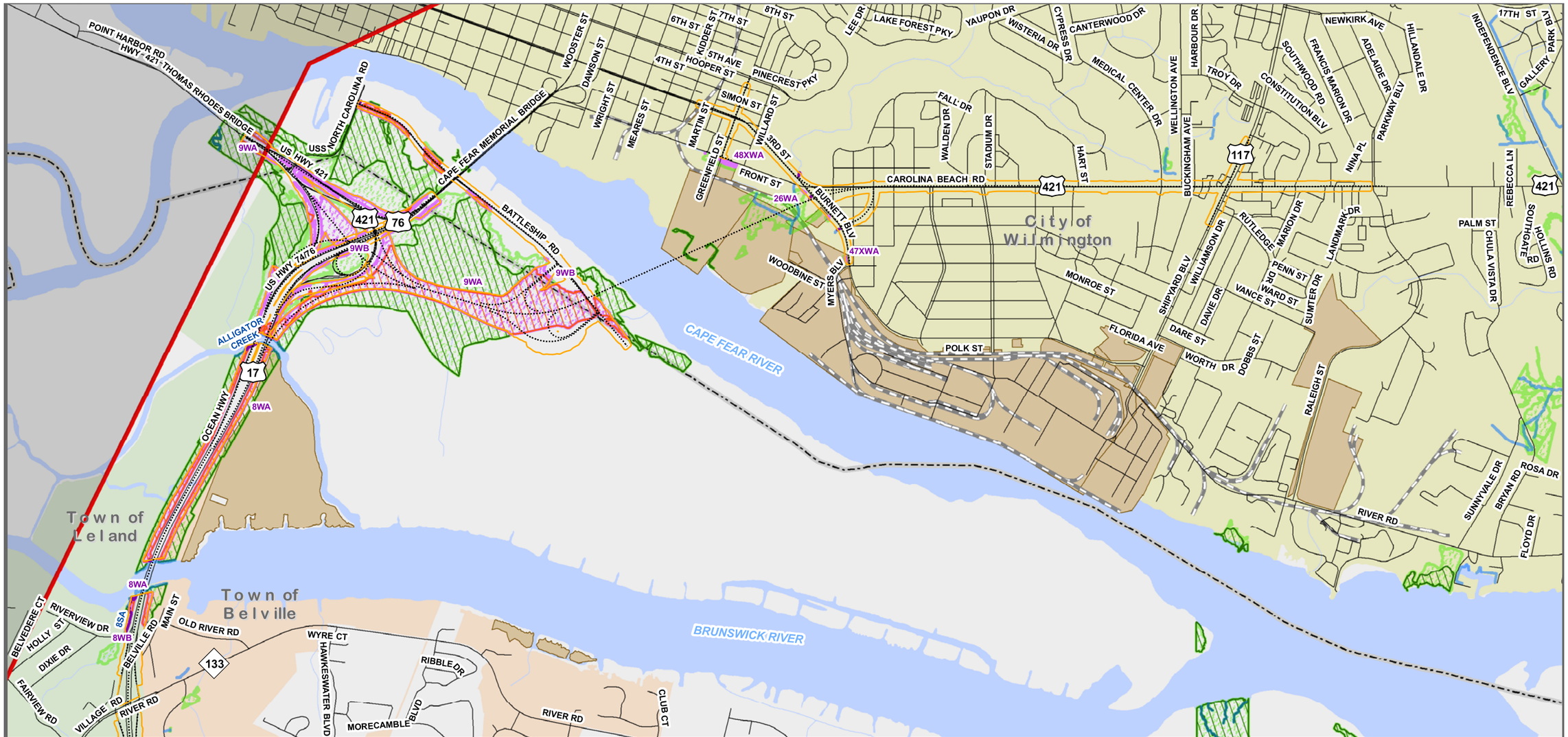

Legend

- Project Study Area
- Alternative V-AW Centerline
- Alternative V-AW Slope Stakes Plus 40 Feet
- Port of Wilmington
- Delineated Streams
- Delineated Ponds
- Delineated Wetlands
- CAMA Wetland
- Stream Impact
- Pond Impact
- Wetland Impact
- CAMA Wetland Impact

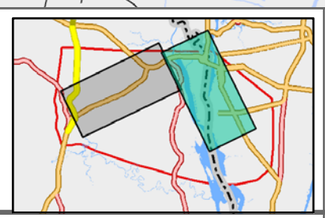

FIGURE 13
STREAMS, PONDS, AND WETLANDS IMPACTS - ALTERNATIVE V-AW

0 500 1,000 2,000

Feet

Date: April 2019

This map is for reference only.

Sources: ESRI Inc., CGIA, NCDOT, and AECOM.

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BRUNSWICK AND NEW HANOVER COUNTIES
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