DETAILED STUDY ALTERNATIVES CARRIED FORWARD

I-85 Widening Improvements from US 321 in Gastonia to NC 273 in Mount Holly
and
NC 7 Minor Improvements from I-85 to US 29/74

Gaston County

STIP Project Nos. I-5719/U-3608

North Carolina Department of Transportation

MERGER CONCURRENCE POINT 2

January 23, 2019

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1. Project Overview

1.1. Proposed Action

North Carolina Department of Transportation (NCDOT) State Transportation Improvement Program (STIP) Project No. I-5719 is located on I-85 in Gaston County. FHWA is the lead federal agency for the proposed action. The project is programmed to widen I-85 from the US 321 interchange (Exit #17) in Gastonia to the NC 273 interchange (Exit #27) in Belmont/Mt. Holly, about 9.8 miles. The project connects "logical termini", including the eight-lane section beginning at NC 273, and the vital US 321 highway. The proposed project would include widening the existing interstate from six to eight lanes, with most of the mainline widening occurring within existing right of way. The proposed project would also include upgrading interchanges and relocating/replacing railroad bridges. **Figure 1** shows the project location.

There are eight interchanges, six roadway bridges, and four railroad bridges within the project limits. Since there is not enough clearance to widen I-85 under the existing bridges and interchanges, NCDOT will evaluate different design options to accommodate the widening. STIP Project No. U-3608 will be included in the environmental review and study for I-5719, as it would not be constructed independently of I-5719 and is predicated on the I-85 widening. U-3608 would improve NC 7 from I-85 to US 29 in Belmont, approximately one quarter of a mile. The proposed project would consist of design modifications and tie-ins for associated interchange modifications at Exit #26.

The proposed projects are included in the NCDOT 2018-2027 STIP and in the 2040 Gaston-Cleveland-Lincoln Metropolitan Planning Organization (GCLMPO) 2040 Metropolitan Transportation Plan (adopted March 2014, amended August 2015).

The project study area is in central Gaston County. The proposed project study area boundaries consist of a generally 1000-feet wide swath that follows existing I-85 along its footprint from west of US 321 to east of NC 273. The project study area includes the municipalities of Gastonia, Lowell, McAdenville, Belmont, and Mt. Holly. Expanded study areas were outlined around interchanges and incorporated into the I-85 project study area.

1.2. Recap of Concurrence Point 1 – Purpose and Need and Study Area Defined

I-85 is a critical controlled-access north-south interstate that traverses Gaston County in the east-west direction. I-85 is a major provider of travel for central and southern North Carolina and the southeastern United States for the movement of both people and goods. Locally, it serves as the main facility for residents and business as well as providing direct access to the region's major airport, Charlotte-Douglas International. Northeast of the project corridor, I-85 combines with I 40 to become the major east-west corridor for the region as well as North Carolina. With its current traffic demand, I-85 is at or approaching capacity and is anticipated to operate over capacity by design year 2040. A summary of the project needs and purpose is provided below and supported by existing and predicted project study area conditions discussed in *Concurrence Point 1 – Purpose and Need and Study Area Defined Merger Packet (May 2018).*

- **(PRIMARY Need) Existing and Projected Capacity Deficiencies and Mobility** – Heavy traffic conditions occur daily along I-85 within the project study area, resulting in frequent congestion and delays that hinder east-west mobility within central/eastern Gaston County.

Motorists on I-85 in the project study area frequently experience congestion, which is projected to worsen through 2040. Traffic volumes within the project study area are projected to increase by 15 to 24 percent between 2016 and 2040. By 2040, all segments in both directions are projected to be LOS F during one or both peak periods.

- **(SECONDARY Need) Roadway Deficiencies** – The freeway mainline segments and interchanges in the project study area have physical or geometric condition issues and substandard design elements.

  Congestion experienced along I-85 in the project study area is not only a function of capacity deficiencies, but also roadway deficiencies. The freeway and interchanges in this section of I-85 have substandard design elements such as poor sight distances, narrow median shoulders, and poor entrance/exit ramp designs.

  Several bridges are classified as functionally obsolete, and nearly all the bridges that cross over I-85 within the project study area do not have the horizontal or vertical clearance required to accommodate widening improvements.

- **(SECONDARY Need) Inability to Serve High-Speed Regional Travel Consistent with the Designations and Goals of State and Local Transportation Plans** – Congestion and frequent incidents on I-85 inhibit regional travel and diminish the ability of I-85 to function as a Strategic Highway Corridor and Intrastate Corridor. Due to its statewide and regional importance, I-85 has been designated as a Strategic Highway Corridor (SHC) by NCDOT and is part of the North Carolina Intrastate System. Both designations call for this corridor to serve high-speed regional travel. The existing study area corridor of I-85 is designated as part of the National Highway System's (NHS) Strategic Highway Network (STRAHNET). Existing and projected poor LOS along the I-85 project study corridor diminish the roadway's ability to function as part of the STRAHNET.

  GCLMPO, as documented in their *2040 Metropolitan Transportation Plan (MTP)*, has identified improvements to I-85 as a top priority project.

- **Increased Crash Incidents** – Traffic congestion occurs daily, with I-85 travelers experiencing a high number of incidents that cause delays and augment congested conditions. This portion of I-85 exceeds the NCDOT 2012-2014 statewide urban interstates critical crash rates for non-fatal injury crashes. The total number of crashes increased by 62% between 2012 (432) and 2015 (700).

PROJECT PURPOSE: The purpose of the proposed improvements to I-85 is to reduce congestion and improve mobility in this growing area of Gaston County. The project purpose is based on the following needs identified within the project study area:

- To address capacity deficiencies and improve east-west mobility in central/eastern Gaston County.
- To address roadway deficiencies, including substandard design elements.
- To improve traffic flow on I-85 for high-speed, regional travel.
- To enhance the overall travel safety in the project study area. (Desirable project outcome)

2. Concurrence Point 2 – Detailed Study Alternatives Carried Forward

The alternatives development process includes consideration the No-Build Alternative and an analysis of a reasonable range of Build Alternatives for the Improve Existing Alternative (mainline widening "best fit" and interchange and bridge options). Other alternatives considered but omitted early on are also discussed in this section.

2.1 Alternatives Considered

As part of the initial screening of alternatives, general approaches to meet the project purpose and need were assessed. For the project, only the Improve Existing Roadway approach passed the first screening as well as the No-Build Alternative.

No-Build Alternative or "no action" – This option would not construct any improvements to I-85 as part of I-5719/U-3608. The No-Build assumes that other separate projects in the STIP would be implemented, as they are independent of the proposed project. The No-Build option is not consistent with the purpose and need for the project nor local plans. The No-Build is being retained through the process as a baseline comparative alternative in accordance with the NEPA (40 CFR 1502.14(d)) and FHWA guidance (FHWA Technical Advisory T 6640.8A; p. 16).

New Location Highway Alternative – This would involve building a new highway somewhere near the vicinity of I-85 or upgrading nearby roadways to freeways.

Due to the urbanized, densely developed nature of the area, this alternative would have substantial impacts to the human environment and was therefore eliminated from further study.

Transportation System Management (TSM) – TSM alternatives typically provide a combination of low-cost, minor improvements to increase capacity and enhance traffic flow. TSM measures could include intersection realignment and traffic signals, ramp metering, and minor improvements to ramp acceleration/deceleration lanes.

Although TSM measures such as ramp metering could improve conditions in the project study area, this option alone would not provide a level of benefit comparable to the proposed interstate widening and interchange improvements.

Transportation Demand Management (TDM) – TDM usually does not involve major capital improvements and emphasizes regional means of reducing vehicle trips and vehicle miles traveled as well as increasing vehicle occupancy. Alternatives include a combination of measures that change travel behavior to reduce demand for additional highway capacity. TDM measures include employer-based measures such as staggered work hours or flex time and ridesharing such as carpools and vanpools. Other examples include electronic traveler information systems or converting existing lanes to high-occupancy vehicles (HOV) lanes.

TDM measures would not result in a notable capacity increase or improvement in traffic flow along the project study area and would not address roadway deficiencies.

Mass Transit – This option can include expansion of existing bus and/or passenger rail transit service. Increased transit would provide benefits by offering additional options for commuters. However, this alternative was eliminated from further study for this project because if would not address the

substantial congested conditions caused by capacity constraints, nor would it address roadway deficiencies. Enhancing bus transit opportunities would have minimal effect on reducing existing and projected traffic volumes on i-85 because of the limited ability of transit to address the large volume of interstate traffic that travels through the corridor. The Mass Transit option would not divert enough people from private vehicles to transit to create a noticeable reduction in traffic volumes on I-85.

Improve Existing Roadway – This option includes capacity improvements, including the addition of through travel lanes and auxiliary lanes. Improve the existing corridor would meet all the elements of the purpose and need. This approach was carried forward to identify options for improving the corridor, including the roadway typical section, alignment, and interchange and bridges (roadway and rail).

2.2 Build Alternatives

For the Improve Existing Roadway option, there are three elements of design:

- I-85 Mainline
- I-85 Interchanges
- I-85 Grade Separations (Roadway and Railroad Bridges)

2.2.1 I-85 Mainline

An additional through lane in each direction of I-85 is proposed for a total of four through-lanes in each direction with a grass or hard median in the center, depending on available right-of-way. The mainline can be widened entirely to one side or the other or by widening symmetrically around the existing roadway centerline. This "best-fit" 8-Lane Widening Alternative would widen I-85 along the full project corridor to an 8-lane facility. Since there is one "best-fit" option for widening the mainline that will be combined with interchange alternatives, the project study team completed no additional screening of mainline options. The mainline alignment functional design will be further developed during preliminary design along with the interchange and bridge options proposed for detailed study. In areas where additional right-of-way would be required, advanced designs will further incorporate avoidance/minimization measures, which will be presented at CP 2A.

It is anticipated that the two additional lanes (one in each direction) will be constructed within the existing right of way. The proposed typical section for I-85 is an eight-lane, median-divided freeway with 12-foot travel lanes and 14-foot outside paved shoulders (12-foot paved). The northbound and southbound lanes will be divided by a 26-foot median, which will include a two-foot concrete barrier and 12-foot paved shoulders on either side of the barrier.

Auxiliary lanes may be proposed on I-85 within the project study area in areas where they can improve operating conditions for vehicles entering and exiting I-85.

The proposed design speed is 65 mph for I-85. The design speeds for the intersecting roadways vary, depending on the roadway.

2.2.2 I-85 Interchanges and Grade Separations (Roadway and Railroad)

There are eight interchanges in the project corridor each with unique challenges and constraints that warrant a review of several design options. Numerous design options (e.g. interchange forms) are under examination and will consider traffic operation benefits, constructability, potential costs, and environmental constraints.

In addition to interchanges in the project corridor, there are six roadway bridges, four railroad bridges and the I-85 bridge over the South Fork Catawba River. The Team is also evaluating various design options at these locations. **Table 1** includes the design options currently under consideration.

Table 1: Potential Design Options for Interchanges and Grade Separations

INTERCHANGES	
Location/Exit #	**Design Options**
Exit #17: US 321 Interchange	N/A (Modify design under const. for STIP I-5000 to accommodate widening and evaluating needed laneage for flyunder ramp).
Exit #19: E. Ozark Avenue (NC 7) Interchange	Keep existing interchange form Single quadrant Interchange/displaced
Exit #20: N. New Hope Road (NC 279) Interchange	Improve Existing Compressed Diamond DDI
Exit #21: Cox Road (SR 2200) Interchange	Improve Existing Offset DDI
Exit #22: S. Main Street (SR 2329) Interchange	Partial Clover B DDI
Exit #23: McAdenville Road (Main Street/NC 7) Interchange	Improve Existing DDI
Exit #26: Belmont-Mount Holly Road (SR 2093) Interchange	Montcross
Exit #27: NC 273 (Beaty Drive) Interchange	Improve existing ParCloB DDI
ROADWAY BRIDGES	
Dr. MLK Jr. Way & Marietta Street (SR 2278) Bridge	Replace in place Replace to east
Modena Street Bridge	Replace in place Replace to west
Aberdeen Road Bridge	Replace to east
S. Church Street (SR 2339) Bridge	Replace in place
Groves Street (SR 2213) Bridge	Replace in place
Hickory Grove Road (SR 2000) Bridge	Replace to east Replace to west
RAILROAD/OTHER BRIDGES	
Railroad Bridge (NCDOT-Owned/P&N Operated) west of Exit #19	Replace in place Replace to east
Railroad Bridge (Norfolk Southern) east of Exit #19/Ozark	Replace in place
Railroad Bridge (Norfolk Southern) west of Groves Street Bridge	Replace in place Replace permanently to east
Railroad Bridge (NCDOT-Owned/P&N-Operated) near Exit #26	Replace in place
South Fork Catawba River Bridge	N/A

2.2.3 Screening of Interchanges and Grade Separations

The Team (PMU, Division, Rail, Congestion Management, Hydraulics, Structures, GCLMPO) conducted a series of screening, beginning with preliminary sketch level designs (basic engineering line drawings of interchange form design options) and a qualitative assessment. The Team also assessed alignment locations, including replace-in-place options and realignment of bridges over I-85.

Additional screening included development of more design detail for potential design options of interchange forms and roadway and railroad bridges. Functional designs were developed then overlaid with environmental features on available aerial mapping to add a quantitative comparison of potential impacts. Environmental impacts within the interchange and grade separated areas were estimated based on GIS data and information provided by field surveys and resource agencies. The impact areas for the design options were calculated using an impact area of slope stake limits plus 40 feet. Comparative impacts are tabulated and summarized in matrices by location. **(See supporting tables and mapping).** *Note: Streams and wetlands represent field delineated resources although there are areas where additional minor field surveys are needed, including NC 7 Interchange (Exit #19) and Belmont-Mount Holly Road Interchange (Exit #26). Stream impacts will be updated/provided at CP 2A.*

The functional designs for each interchange form and grade separation were evaluated and compared to determine if the number of options can be further reduced. The comparison included a quantitative and qualitative estimate of environmental impacts. The Team met in December 2018 to review the design option screening results and to identify which design options to recommend for advancement to preliminary design. *Note: Conceptual designs and impacts summaries will be presented for public input in spring 2019. Public input and any additional design options introduced will be presented at CP2A.*

2.2.4 Interchanges and Grade Separations Retained

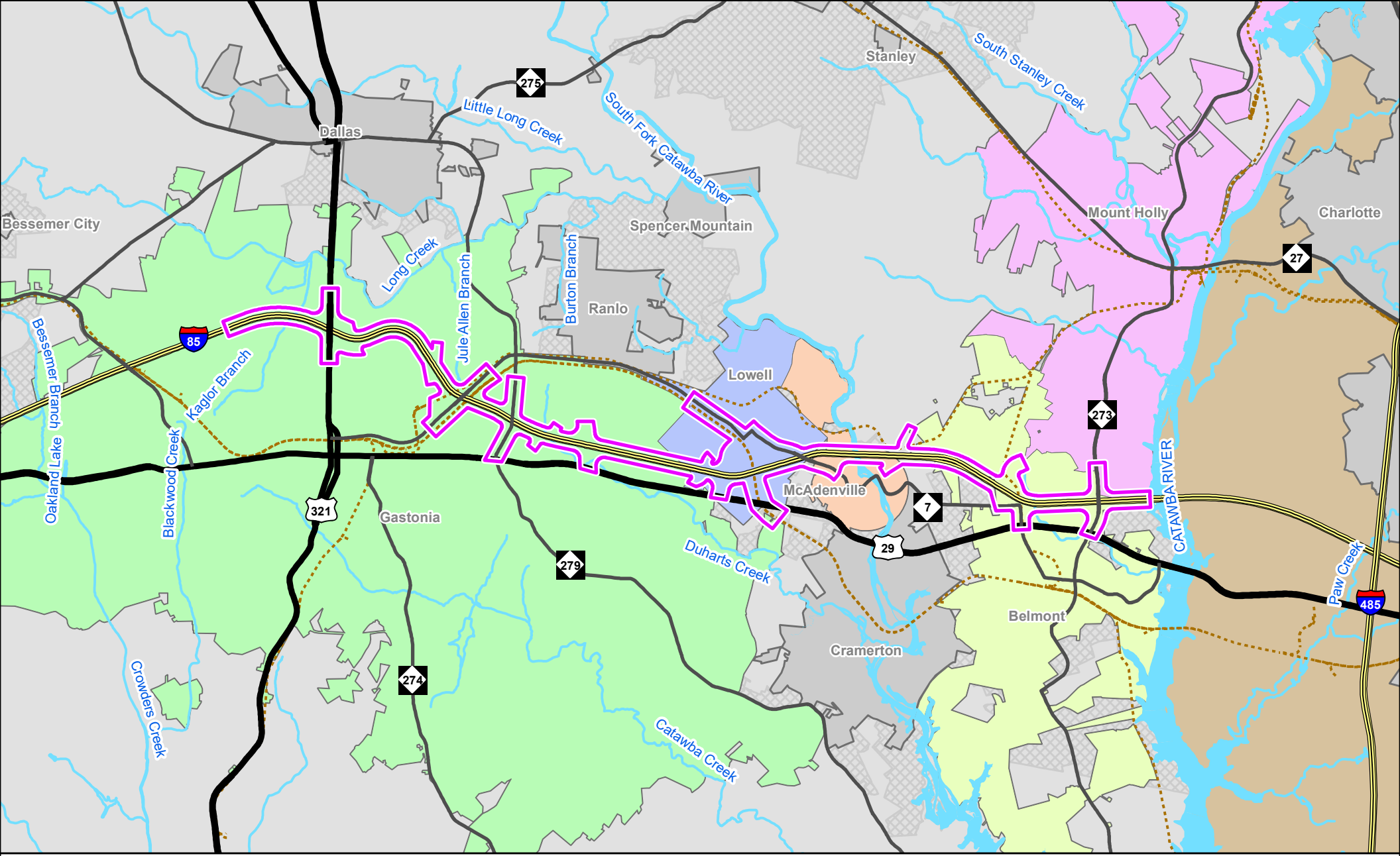
The Team agreed on the following at the December 2018 design options screening review meeting:

- Eliminated one interchange form from additional consideration at Exit #22 (S. Main Street)
- Eliminated one grade separation option at Aberdeen Road bridge
- Reintroduced a second grade separation option for the Grove Street bridge

The Team determined that at this time all options (excluding those noted above) will be recommended for additional study, pending input from the Merger Team. Based on this study and concurrence from the Merger Team, the remaining screening (design options traffic analysis) and retained options will be presented to the public for input at a March 2019 public meeting following completion of the Phase II Build traffic analyses (e.g. analysis of individual interchange forms). A summary of public input, and any recommendations for eliminating design options based on detailed traffic analyses and public input will be provided to the Merger Team at the CP 2A meeting.

3. Project Schedule

- Project Technical Studies/Reports – through 2019
- Public Meeting – March 2019
- CP2A – August 2019
- Design Public Hearing – November 2019
- CP 3 – November 2019
- Final Environmental Document (Federal CE) – December 2019
- Design-Build Let – 2020



Legend

- Study Area
- ETJ
- Gaston County
- Mecklenburg County
- Stream
- Interstate
- US Route
- NC Route
- Railroad
- Belmont
- Gastonia
- Lowell
- McAdenville
- Mount Holly
- Other Municipality

N

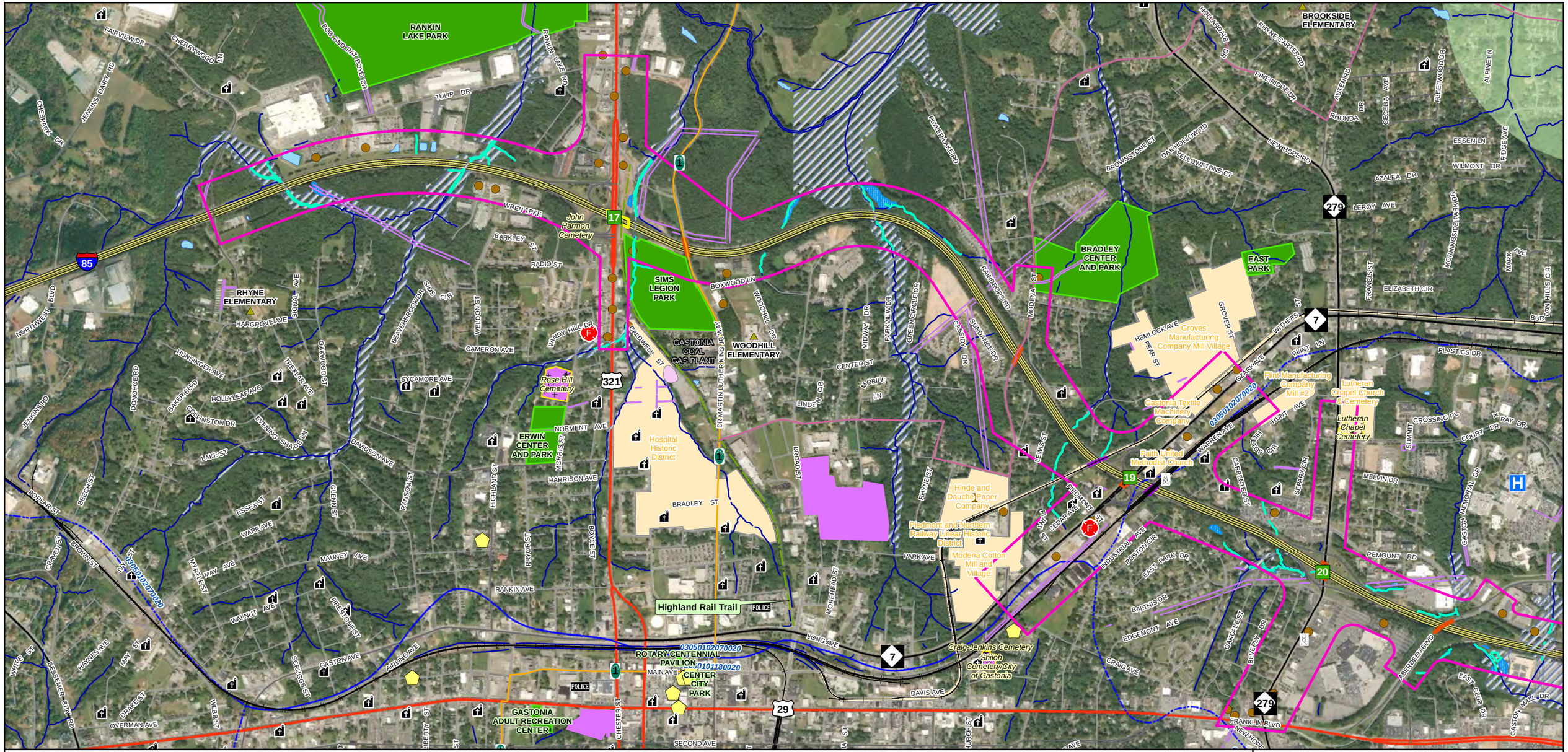
0 0.5 1 2 3 Miles

Project Location

STIP Project Nos. I-5719 and U-3608
I-85 Widening and NC 7 Improvements

Gaston & Mecklenburg Counties

April 2018



Legend

- APE
- County Boundary
- Park
- Open Water
- Stream/Creek
- Exit
- Interstate
- US Route
- NC Route
- Local Road
- RailRoad
- Easement
- Signed Local Bicycle Route
- Unsigned Bicycle Connector
- Moderate Bicycle Suitability
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- School
- Cemetery
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- 303d Listed (2014)
- Field Delineated Jurisdictional Stream
- Field Delineated Wetland
- Water Supply Watershed - Critical
- Water Supply Watershed - Protected
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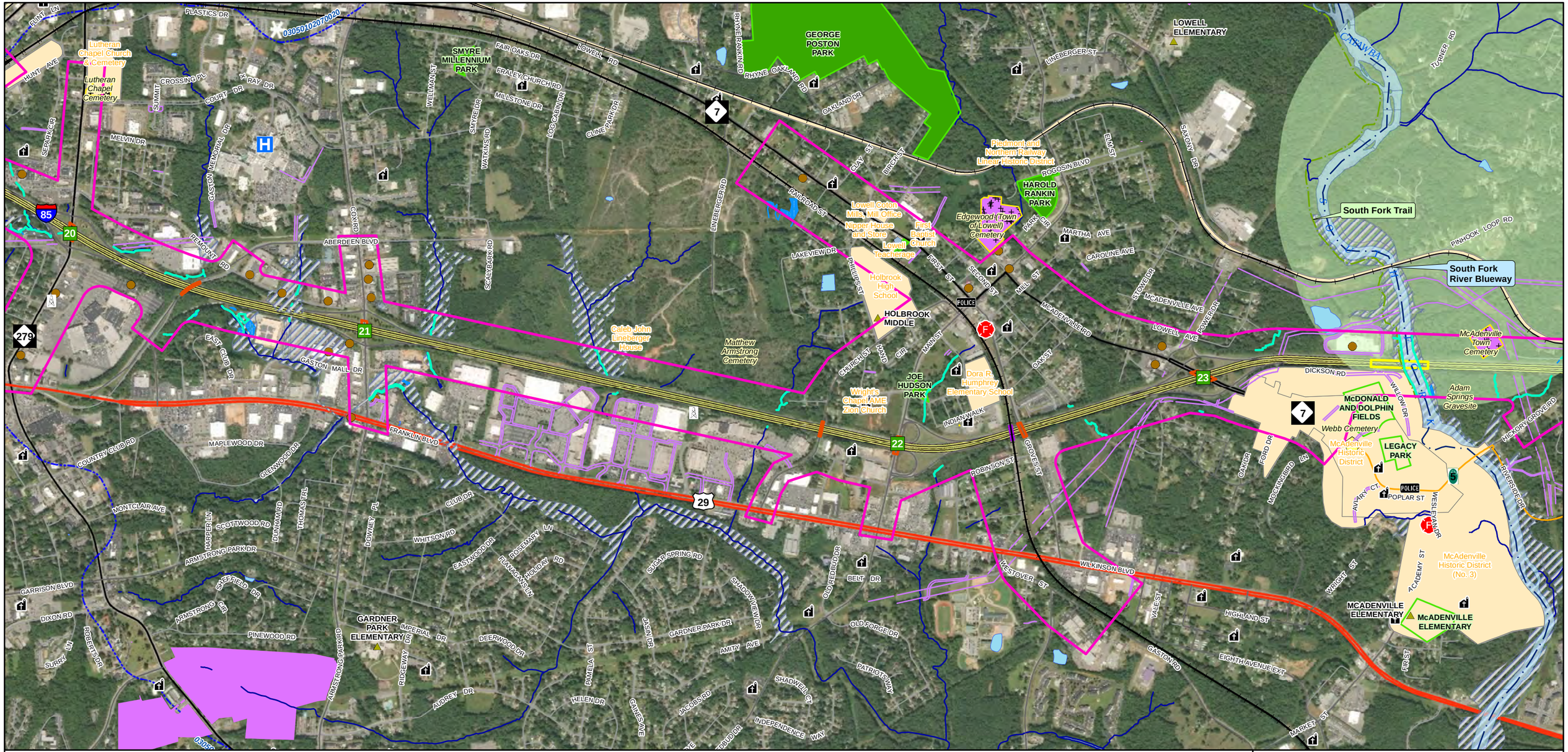
- Zone AE Floodplain (FEMA)
- Zone X (FEMA)

Environmental Features Map

I-85 Widening
STIP Project I-5719
Gaston County

0 1,500 3,000
Feet
1 in = 1,500 ft



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STIP Project I-5719
Gaston County

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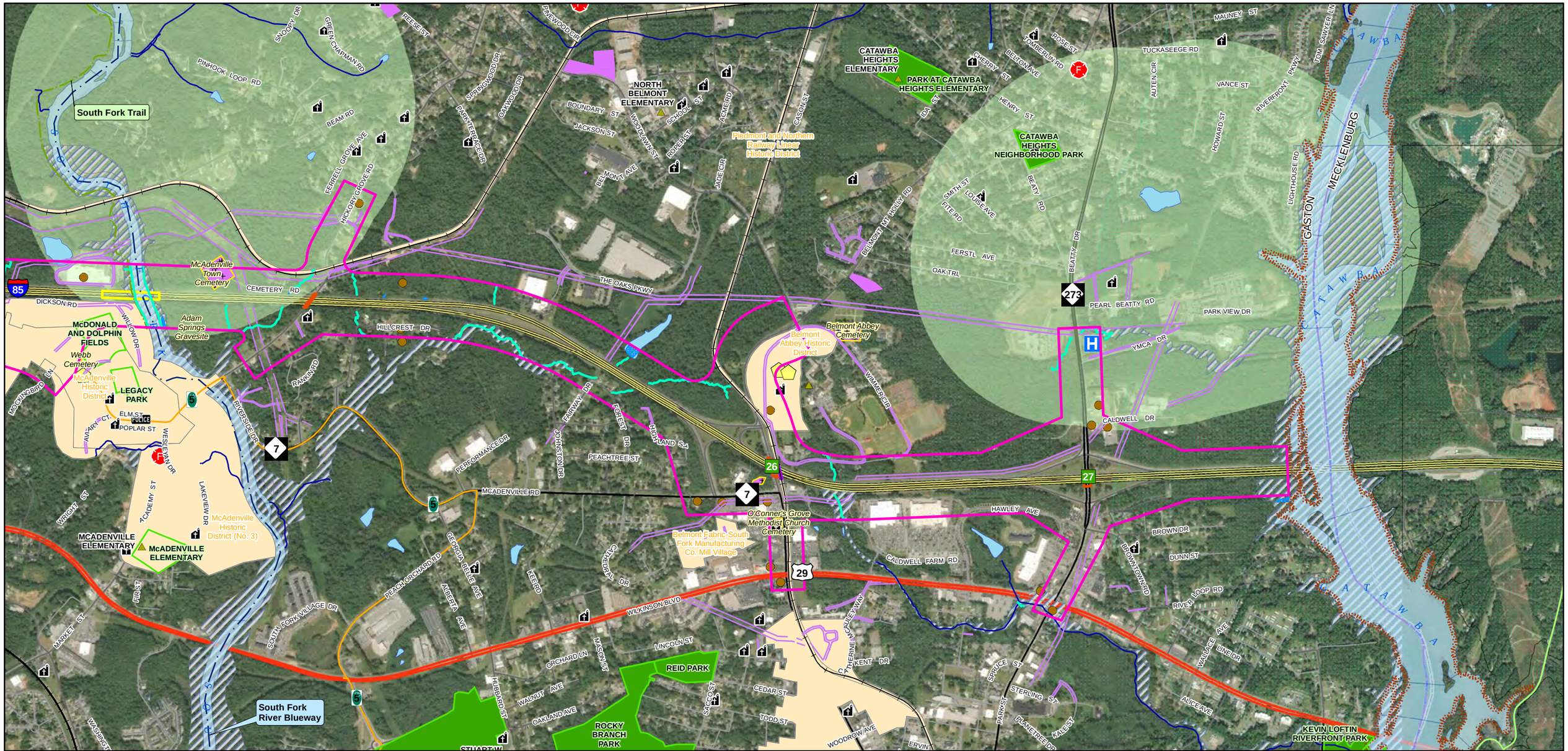

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Environmental Features Map

I-85 Widening
STIP Project I-5719
Gaston County

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Feet
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Section 404/NEPA Merger Project Team Meeting Agreement

Concurrence Point Number 2: Detailed Study Alternatives Carried Forward

Project Name/Description: STIP Project No. I-5719: Widen existing interstate (I-85) from six to eight lanes, upgrade interchanges, and relocate/replace roadway and railroad bridges from US 321 to NC 273 in Gaston County
STIP Project No. U-3608: Improve NC 7 from I-85 to US 29/74

- No-Build
- Best Fit Alignment: Widen I-85 along the full project corridor to an 8-lane facility with a combination of symmetrical and "best fit" widening alignments of the current roadway location. "Best Fit" locations will be evaluated and selected to avoid/minimize impacts.

The Merger Team has concurred on this date of **January 23, 2019**, on the above identified detailed study alternatives to be carried forward for STIP Project Nos. I-5719/U-3608.

USACE _____ FHWA _____

USEPA _____ NCDOT _____

USFWS _____ NCHPO _____

NCDWR _____ GCLMPO _____

NCWRC _____