

INFORMATIONAL UPDATE ON REVISED DESIGN FOR SELECTED ALTERNATIVE

NC 49 from John Kirk Drive to I-485 (widen existing roadway);
realign Back Creek Church Road (SR 2827) on new location to the NC 49
and Mallard Creek Church Road (SR 2833) intersection; close existing
at-grade rail crossing at NC 49 and Back Creek Church Road

Charlotte, Mecklenburg County

STIP PROJECT U-5768

North Carolina Department of Transportation
and
Charlotte Department of Transportation



AUGUST 21, 2024

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Figure 2. Preferred Alternative Map

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1. Meeting/Packet Purpose

The purpose of this packet/meeting is to inform the Merger Team of the events and considerations that have occurred since the Concurrence Point (CP) 4B meeting in September 2021. This packet provides a project overview including background information and a brief history of the project through CP 4B, as well as information on the design option currently under consideration for the Preferred Alternative.

Changes have been made to the design since the last Merger Team meeting. The Back Creek Church Road typical section has been reduced from four lanes to two lanes in an effort to reduce costs. The proposed at grade crossing of NC 49 and Back Creek Church Road/Mallard Creek Church Road has been converted to a grade-separated crossing. There have been changes at the intersection of NC 49 and John Kirk Drive based on input from the City of Charlotte. The Merger Team's input on these changes will inform project next steps. No concurrence is being requested at this meeting.

2. Project Description

The North Carolina Department of Transportation (NCDOT), in coordination with the Charlotte Department of Transportation (CDOT), proposes to widen NC 49 (University City Boulevard) from John Kirk Drive to I-485. The project will also realign SR 2827 (Back Creek Church Road) (BCCR) to intersect with NC 49 at SR 2833 (Mallard Creek Church Road). The current at-grade intersection of BCCR and North Carolina Railroad/Norfolk Southern Railroad (NCRR/NS) just south of NC 49 will be closed in conjunction with these improvements. The project study area is shown in Figure 1, the preferred alternative is shown in Figure 2, and a more detailed map of changes along the proposed Back Creek Church Road section south of Hanberry Boulevard is shown in Figure 3.

The project will be constructed using both state and local (City of Charlotte) funds. The U.S. Army Corps of Engineers (USACE) is the lead federal agency for this proposed project. A State Environmental Assessment/Finding of No Significant Impact (SEA/FONSI) was signed in November 2019.

3. Project History

NC 49 Improvements

With N.C. 49 currently carrying a substantial traffic volume and projected to carry higher traffic volumes in the future, safety is an important consideration for the project. Without improvements, the number of crashes in this area is expected to grow. Traffic crashes are often considered to indicate deficiencies in the capacity of a transportation facility.

NCDOT-reported crash data was obtained for the project area (along N.C. 49 from 100 feet west of John Kirk Drive to 150 feet east of the I-485 outer loop, including Y-line approaches) for the period from October 1, 2010 through September 30, 2015. To provide a context for the crash rates, NCDOT examined urban, four-lane, median-divided facilities similar to the N.C. 49 mainline and provided statewide average crash rates for those facilities. NCDOT also developed a critical rate analysis (a statistical analysis using a 95 percent level of confidence to determine if the crash rate exceeded the statewide average by an amount greater than would be anticipated by chance).

There were 820 reported crashes along the project corridor from October 1, 2010 to September 30, 2015. Of those crashes, the majority (527) involved rear-end, slow, or stop collisions. This type of crash is expected to occur where a combination of high traffic volumes and a large number of slowing, stopping, and/or turning movements cause interruptions to the traffic flow. The most accidents were

reported during the months of August, September, and October (more than 85 for each month), and the fewest were reported in March, June, July, and December (fewer than 59 for each month). Of the reported crashes on N.C. 49 for the period outlined above, 147 crashes took place at the intersection of N.C. 49 with S.R. 2800 (Pavilion Boulevard)/ S.R. 2827 (Back Creek Church Road).

EASTERN CIRCUMFERENTIAL ROAD (ECR)

In 1989, the Charlotte-Mecklenburg Technical Coordinating Committee published the Eastern Circumferential Alignment Study. That study investigated potential alignments for the future Eastern Circumferential Road (ECR). ECR would serve as a connection between the University of North Carolina at Charlotte/U.S. 29 North area and U.S. 74 East (Independence Boulevard) at its intersection with Sardis Road North. The ECR was envisioned to provide adequate thoroughfare spacing in eastern Mecklenburg County. The recommended alignment for the ECR as presented in that study followed Back Creek Church Road (S.R. 2827) south of the project area, and it proposed the realignment of Back Creek Church Road (S.R. 2827) on new location to tie into N.C. 49 opposite Mallard Creek Church Road. That recommendation was based on the consideration of likely impacts to homes, businesses, schools, churches, floodplains, parks, and natural areas.

The relocation of Back Creek Church Road recommended under the U-5768 project aligns with the recommendation from the 1989 study. The City has reserved a proposed corridor for ECR that includes the proposed realignment of Back Creek Church Road.

STIP PROJECT P-5208

In October 2011, the Federal Highway Administration, the Federal Railroad Administration, and NCDOT approved an Environmental Assessment (EA) for STIP Project P-5208. The Finding of No Significant Impact (FONSI) for the project was approved in June 2012. That project proposed the construction of an additional railroad track adjacent to the existing track along the North Carolina Railroad (NCRR)/Norfolk-Southern Railway (NS), from south of NC 49 near Concord to Orr Road in Charlotte. The improvements performed as part of P-5208 were designed to be compatible with the NCDOT Southeast High Speed Rail Project (SEHSR). The Tier II SEHSR Record of Decision (ROD) was signed on December 21, 2016.

The EA for P-5208 noted that the existing Back Creek Church Road (S.R. 2827) railroad crossing just south of N.C. 49 was considered as a candidate for closure according to NCDOT's Rail-Highway Grade Crossing Consolidation Selection Process. Under that process, NCDOT recommends closing at-grade crossings to enhance the overall safety of the SEHSR corridor where there are viable options to do so. The EA also noted the following: Back Creek Church Road is a major through route and has a high volume of roadway traffic; there is a short distance between the at-grade railroad crossing; and there are few connecting roadways that can provide access to nearby crossings of the railroad. Under P-5208, a grade separation was constructed over the future relocation of Back Creek Church Road to accommodate the future road closure. Closing Back Creek Church Road (S.R. 2827) was not considered prudent without a suitable nearby railroad crossing.

As noted in the P-5208 EA, two alternatives were considered for grade-separating the roadway:

1. Constructing a bridge on Back Creek Church Road (S.R. 2827) over NC 49 and the railroad and
2. Constructing a railroad bridge over Back Creek Church Road (S.R. 2827).

Due to topographic constraints, access requirements, and potential impacts to nearby residential and business properties, neither alternative was considered prudent, and both were eliminated from further

consideration. In simplest terms, raising the grade to construct a bridge over existing Back Creek Church Road would require replacement of both of the railroad bridges over I-485. Based on these considerations, Project P-5208 included the construction of a railroad bridge over the future ECR just south of the Mallard Creek Church Road (S.R. 2833)/N.C. 49 intersection to allow for the closing of the existing at-grade crossing at Back Creek Church Road (S.R. 2827) near N.C. 49. The existing crossing was improved as part of Project P-3814A, with additional interim improvements as part of P-5208, to enhance safety.

4. Merger History

3.1 Merger Screening – Scoping

The project start of study letter was sent on August 4, 2014. NCDOT internal scoping took place on November 3, 2015, and the External Scoping Meeting/Merger Screening was held on December 9, 2015. The consensus at that meeting was that the project should follow the Section 404/NEPA Merger Process but could be removed from the process in the future, if appropriate.

Subsequent to the external scoping meeting, NCDOT coordinated with USACE with regards to the project purpose and segmentation for the proposed realignment of Back Creek Church Road. A technical memorandum on the issue was provided for the Merger Team on June 24, 2016 to clarify this issue. Subsequent outreach to USACE indicated the memorandum was acceptable.

3.2 Concurrence Point 1 – Purpose and Need and Study Area Defined

The first Merger Meeting for the project was held on November 16, 2017, with the goal of reaching agreement on Concurrence Points 1 and 2 (Purpose and Need and Study Area Defined, and Design Options for Detailed Study). The Merger Team was able to reach agreement on Purpose and Need; however, additional alternatives were proposed and concurrence was not reached on the project study area. CP 1 concurrence was reached on July 19, 2018 (combined with CP 2). The study area was later expanded due to traffic storage needs and concurred upon on August 14, 2019.

Purpose and Need of Proposed Project

The needs to be addressed by this project include:

- NC 49 is currently operating at or close to congested levels.
- From April 2000 through March 2016, there were six highway vehicle/train crashes at the NCRR/NS at-grade rail crossing on BCCR just south of NC 49. Current typical train traffic as reported by Norfolk Southern is 38 trains per day, and train volumes are expected to double in the future, as this crossing is located within the proposed NCDOT Southeast High Speed Rail corridor.
- With the proposed closing of the BCCR railroad crossing, the existing network connectivity between the Rocky River area to the south and NC 49 would be lost.
- Traffic volumes and lack of accommodations along NC 49 limit bicycle and pedestrian activity along regionally important multi-modal transportation routes. CDOT, University of North Carolina at Charlotte (UNCC), and University City Partners (UCP) have cited the need to accommodate pedestrians and bicycles in any proposed improvement.

The primary purposes of the proposed project are to reduce traffic congestion, improve traffic flow, and enhance traffic operations on NC 49. Another purpose is to improve safety and enhance train and vehicle operations.

The screening criteria for this are:

- Achieve an overall Level of Service (LOS) D for intersections along the project corridor in the design year (2040).
- Maintain connectivity from within the existing road network.
- Safely accommodate multi-modal uses of the corridor.

3.3 Concurrence Point 2 – Detailed Study Alternatives Carried Forward

The second Merger Meeting was held on July 19, 2018. At this meeting, concurrence was achieved for Concurrence Points 1 and 2. Alternatives carried forward were:

- No-Build Alternative.
- Alternative 1 (Yellow Option) Best-fit widening along NC 49; relocation of BCCR to NC 49 at Mallard Creek Church Road using the railroad bridge constructed as part of STIP Project P-5208; and traffic flow and connectivity improvements to Old Concord Road (SR 2930) and Thomas Combs Drive.
- Alternative 2 (Purple Option) includes the same improvements as above to NC 49, Old Concord Road, and Thomas Combs Drive, with the relocation of BCCR north of the existing Back Creek crossing to NC 49 at Mallard Creek Road using the railroad bridge constructed as part of STIP Project P-5208.

3.4 Concurrence Point 2A - Major Crossing Structures and Alignment Review

The third Merger Meeting was held on June 13, 2019 with the goal of reaching agreement on Concurrence Point 2A. This meeting primarily focused on the proposed Back Creek Church Road realignment, as that portion of the project included major stream crossings. During the meeting, there was a request for additional information on the bridging and culvert options of one crossing. The information was provided to the team on June 20th, and subsequent meeting was held on June 24th. Formal concurrence and the concurrence form signatures were obtained on July 10, 2019. Agreed upon major crossing structures are:

- Site 1 (Alternative 1) construct a new three-span bridge approximately 220 feet long.
- Site 2 (Alternative 1) construct a new reinforced concrete box culvert extending approximately 150 feet.
- Site 3 (Alternative 2) replace the existing bridge with a single-span bridge approximately 70 feet long (based on the hydraulics report). NCDOT will coordinate with Mecklenburg County and CDOT and will revise the length to 90 feet to accommodate the proposed Back Creek Greenway, contingent on a municipal agreement.
- Site 4 (Alternatives 1 and 2), if the project construction limits are expanded and extension or replacement of the culvert at Site 4 is required, the Merger Team will be informed and will have an opportunity to agree upon an appropriate crossing structure.

3.5 Concurrence Point 3 – Least Environmentally Damaging Practicable Alternative (LEDPA)

The Merger Team met on August 14, 2019 to select the Least Environmentally Damaging Practicable Alternative (LEDPA). Build Alternative 1 (Yellow Option) was selected as the LEDPA. This alternative had less of an impact on the proposed Back Creek Park, wetlands, and avoided impacts within a Duke Energy Easement and a stream restoration site conservation easement.

This alternative includes a best-fit widening along NC 49, relocation of SR 2827 (Back Creek Church Road) to NC 49 at SR 2833 (Mallard Creek Church Road) using the railroad bridge constructed as part of STIP Project P-5208, and traffic flow and connectivity improvements to SR 2939 (Old Concord Road) and Thomas Combs Drive.

3.6 Concurrence Point 4A – Avoidance and Minimization

The Merger Team was provided a summary of avoidance and minimization measures for the project on July 1, 2021. Based on the summary provided, the Merger Team concurred with the following avoidance and minimization measures for STIP Project No. U-5768:

- **Section 404 Avoidance and Minimization Measures**
 - Reduced stream impacts by 250 feet by bridging Back Creek at CP 2A
 - Revised horizontal alignment to avoid impacts to an unnamed tributary of Back Creek (Stream SM) by 60 feet at CP 3
 - Added superelevation to BCCR to reduce stream impacts
 - Used 2:1 slopes on BCCR to reduce stream impacts
 - Moved the BCCR structure over Back Creek to minimize impacts to an unnamed tributary to Back Creek (Stream SC)
 - Overall stream impacts reduced from 2,570 feet at CP 3 to 1,280 feet at CP 4A
 - Overall wetland impacts reduced from 0.8 acre at CP 3 to 0.4 acre at CP 4A.
- **Human Environment Avoidance and Minimization Measures**
 - Chosen alternative minimizes impacts to residential parcels
 - Chosen alternative minimizes impacts to a proposed park while accommodating a proposed greenway
 - Chosen alternative is more compatible with utility easement
 - Reduced profile of BCCR bridge over Back Creek to reduce park impacts necessitated by moving stream to minimize Stream SC impacts
- **Additional Avoidance and Minimization Measures**
 - NCDOT will continue to explore design changes to minimize impacts to natural human environment resources. NCDOT is also currently examining design modifications to reduce utility impacts.

Concurrence was reached by the Merger Team on CP 4A on August 6th, 2021.

3.7 Concurrence Point 4B – Hydraulic Design Review

The Merger Team met virtually on September 15, 2021 to review the hydraulic design plans with the intent of incorporating the Merger Team's comments into the drainage design. Plans were reviewed sheet by sheet with the team noting project impacts, as well as avoidance and minimization measures, as applicable. A field meeting was requested by the USACE once CP 4C plans were available.

5. Project Cost and Schedule

The U-5768 project is a joint project between NCDOT and the City of Charlotte. The project is currently funded in the 2024-2033 State Transportation Improvement Program (STIP) for \$89,700,000. The project is funded for right of way acquisition in 2026 and construction in 2029.

Funding Type	Estimated Cost ¹
Right of Way	\$29,399,000
Utility Relocation	\$7,500,000
Construction	\$80,400,000
Total	\$117,299,000

¹Cost estimates current as of 11/13/2023. Estimates subject to change.

Local funding will be provided by the City of Charlotte for the realignment of Back Creek Church Road. The City's cost share has increased over the years; thus, the City is looking for opportunities to reduce costs.

6. Design Revisions

Since the Merger Team last met in 2021, design changes have been made in an effort to reduce the overall project cost, particularly the City of Charlotte funded cost to reconstruct Back Creek Church Road. The typical section on Back Creek Church Road has been reduced from a four-lane section to a two-lane section. Bicycle and pedestrian accommodations are still proposed. A two-lane bridge is proposed over Back Creek. This design revision reduces the estimated cost for the Back Creek Church Road portion of the project from \$34.7 million to \$24.9 million (as of late 2023/early 2024).

Other design modifications include the grade separation of NC 49 over Mallard Creek Church Road/realigned Back Creek Church Road and modifications to the NC 49 and John Kirk Drive intersection. The previously proposed at-grade option had a higher estimated cost due to the right of way required, therefore the grade-separated option is now preferred. Bicyclists and pedestrian accommodations will be included in the grade separated option. At the NC 49 and John Kirk Drive intersection, a conventional signal with dual left turn lanes where needed is proposed. The proposed improvements to John Kirk Drive include converting the existing full movement intersection with Van Landingham Rd to right-in/right-out (RIRO) for increased traffic efficiency.

Design revisions at 49 over Mallard Creek Church Road/realigned Back Creek Church Road and the NC 49 and John Kirk Drive intersection are within the existing slope stake limit buffers. Changes to the design in these locations are not anticipated to incur additional stream or wetland impacts.

A summary of the design changes relevant to each concurrence point are included below.

5.1 Concurrence Point 1

All proposed improvements are still within the previously concurred upon study area. While there are some peak hour issues at the non-signalized intersection with existing Back Creek Church Road, the overall level of service is acceptable. The purpose and need of the project are still met because:

- The design revisions allow an overall Level of Service (LOS) D for intersections along the project corridor in the design year (2040). There are some modeled future year service issues at the

proposed stop-controlled intersection of existing Back Creek Church Road with the new, realigned facility. If future conditions warrant, a traffic signal could be added at this site.

- Connectivity is maintained from within the existing road network.
- Multi-modal uses are safely accommodated, as bicycle and pedestrian accommodations are still included throughout.

5.2 Concurrence Point 2

The revised Back Creek Church Road design still follows the same alignment as the originally proposed Alternative 1 (Yellow Option). All other proposed improvements from Alternative 1 remain unchanged.

5.3 Concurrence Point 2A

The revised Back Creek Church Road design still follows the same alignment as the originally proposed Alternative 1, and the new location roadway will cross Back Creek at the same previously proposed location on a three-span bridge.

5.4 Concurrence Point 3

There were three options carried forward, the No-Build Option, Alternative 1 (Yellow) and Alternative 2 (Purple). The proposed revisions are not applicable to the No-Build Option. Reducing the typical section for Alternative 2 (Purple) would still leave this option with greater impacts to the proposed park, would require work in an existing Duke Power easement, and impact a stream restoration site. For Alternative 1 (Yellow) the reduced typical section reduces stream and wetland impacts, reduces park impacts, avoids construction in the Duke Power Easement, and avoids the stream restoration site. Alternative 1 (Yellow) also allows future expansion of Back Creek Church Road should future conditions warrant a change. Any such expansion would require USACE permitting for potential stream and wetland impacts.

Reducing the Back Creek Church Road (BCCR) typical section to a two-lane section supports Build Alternative 1 (Yellow) as the LEDPA, as impacts to the environment have reduced relative to those discussed at the CP 4A meeting. A summary of impacts is shown below.

Table 2. Natural Environment Impacts of BCCR Design Revision¹

Resource	Two-Lane BCCR	Four-Lane BCCR
Streams ²	890 feet	1,266 feet
Wetlands ²	0.1 acre	0.3 acre
Proposed Park ³	0.6 acre	2.0 acres

¹ Preliminary designs, subject to change.

² Calculated using slope stakes limits + 25 feet buffer

³ Calculated using ROW Limits

Design refinements are still underway based on coordination between NCDOT, the City, and the project team. The two-lane typical section on Back Creek Church Road is anticipated to be reduced further in width, due to changes in the proposed shoulder. This change is anticipated to further reduce impacts.

5.5 Concurrence Point 4A

Reducing the Back Creek Church Road typical section to a two-lane section is an additional avoidance and minimization measure for the U-5768 project. Streams, wetlands, and impacts to parks have been reduced by approximately one-third, as shown in Table 2.

5.6 Concurrency Point 4B

Based on the revisions to the project typical section and other revisions, the hydraulic design will be revised. The Merger Team will have an opportunity to review the updated hydraulic design when available at a CP 4B meeting.