



**COMPLETE
540**
*Triangle Expressway
Southeast Extension*

Record of Decision

Complete 540 - Triangle Expressway Southeast Extension

June 2018



Administrative Action

RECORD OF DECISION

Complete 540
(Triangle Expressway, Southeast Extension)

STIP Project Nos. R-2721, R-2828, and R-2829
State Project Nos. 6.401078, 6.401079, and 6.401080
Federal Aid Project Nos. STP-0540(19), STP-0540(20), and STP-0540(21)
WBS Nos. 37673.1.TA2, 35516.1.TA2, and 35517.1.TA1

Based on the reasons explained in this document, and on consideration of all the social, economic, and environmental evaluations contained in the Final Environmental Impact Statement (EIS), with the input received from other agencies, organizations, and the public, the North Carolina Department of Transportation and the Federal Highway Administration determined that the Final EIS Preferred Alternative (identified as Detailed Study Alternative 2) is hereby the Selected Alternative for the Complete 540 project. It is the decision of the Federal Highway Administration to adopt this alternative as the Selected Alternative for this project and grant Location and Design Concept Acceptance.

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1. INTRODUCTION

This Record of Decision (ROD) describes the Selected Alternative for the Complete 540 project (Triangle Expressway Southeast Extension). In accordance with the National Environmental Policy Act (NEPA), the North Carolina State Environmental Policy Act (SEPA, G.S. 113A, Article 1), and the requirements set forth by the Council on Environmental Quality (CEQ) (40 CFR 1505.2), this ROD identifies: 1) the Selected Alternative; 2) all alternatives considered by the Federal Highway Administration; 3) measures adopted to avoid and minimize environmental harm; 4) monitoring and enforcement programs for the implementation of mitigation measures; and, 5) comments on the [Final Environmental Impact Statement \(EIS\)](#).

This ROD pertains to the Final EIS, which, along with study's [Draft EIS](#) and supporting technical documents, is incorporated as part of the ROD by reference (as established in 40 CFR 1502.21).

2. OVERVIEW

This document records the decision made by the Federal Highway Administration (FHWA) and the North Carolina Department of Transportation (NCDOT) on the alternative selected to construct the southeast extension of the Triangle Expressway. This transportation improvement is included in the Capital Area Metropolitan Planning Organization's (CAMPO) Metropolitan Transportation Plan for the area and is listed in the current State Transportation Improvement Program.

Project Description

This project will be a new, limited-access highway from NC 55 Bypass in Apex, to US 64/264 (I-495/87) in Knightdale, completing the outer loop circumferential highway that partially encircles the greater Raleigh area today. The existing 540 route consists of a 27-mile freeway segment east and north of Raleigh (I-540) and a 16-mile toll segment west of Raleigh (NC 540). The Complete 540 project will continue the toll facility south and southeast of Raleigh.

Project Background and Setting

This proposed project has been under consideration for many years. An "outer loop" around the northern half of Raleigh, beyond what is now the I-440 Beltline, was first included on long range plans in the mid-1970s. By the mid-1980s, the pace of development in the area led NCDOT to expand the northern outer loop idea to a full loop around all of Raleigh. In the mid-1990s, initial planning for this remaining segment of the 540 outer loop had been completed. In 2009, the Triangle Expressway, Southeast Extension study began. The name of the study was later changed to include "Complete 540."

The study area for Complete 540 encompassed approximately 200 square miles in a broad area south of the town of Cary and south and east of the city of Raleigh. This area was primarily in Wake County, with a smaller portion in northwestern Johnston County. Land uses in this area have changed from undeveloped/rural to primarily low density residential. In particular, the study area towns of Apex, Holly Springs, Fuquay-Varina, Garner, and Raleigh have experienced this transition over the past ten to fifteen years.

Purpose and Need Summary

Two primary purposes were established, based on general transportation problems in greater Raleigh and specific, localized needs in the study area: (1) improve mobility within or through the study area during peak travel periods; and (2) reduce forecast congestion on the existing roadway network within the project study area. A secondary purpose was to improve system linkage in the regional roadway network.

The transportation problems that formed the basis for these purposes are the need for more route choices in the area and the need to reduce traffic congestion on the existing roadway network.

More Route Choices—Much of the growth that has occurred in the Triangle Region over the past few decades has been in developments that include mostly low-density, single-family residences. One outcome of this kind of land use is the burden it places on local roads. These developments often have few connection points to the area's larger roadway network, meaning that the traffic they generate is funneled onto

the same limited number of roads. The traffic congestion this creates becomes worse when residential areas are far removed from major employment locations, with several of these developments needing to access the same roadways. The result is a need to improve mobility by providing additional route choices for those who live or work in, or travel through, the study area.

Reducing Congestion on the existing roadway network—Many of the roads south and east of Raleigh are moderately to severely congested during the morning and evening peak travel times, with those conditions expected to worsen over the next several years. CAMPO's Metropolitan Transportation Plan identifies several future transportation projects, including the Complete 540 project, intended to help ease this increase in traffic congestion.

3. STAKEHOLDER INVOLVEMENT

The study included an extensive process for informing and involving environmental resource and regulatory agencies, local governments, and the public. Details about this process, and details of the information summarized below, can be found in the study's [Stakeholder Involvement Report \(2018\)](#), which is incorporated in this ROD by reference.

Environmental Resource and Regulatory Agency Coordination

NCDOT prepared a detailed plan to guide the required coordination with federal, state, and local agencies. The plan identified the Federal Highway Administration as the project's lead agency and the US Army Corps of Engineers (USACE) as a formal cooperating agency. Participating agencies included the US Environmental Protection Agency (USEPA), the US Fish and Wildlife Service (USFWS), the National Marine Fisheries Service (NMFS), the NC Division of Cultural Resources, the NC Department of Environmental Quality (NCDEQ), the North Carolina Wildlife Resources Commission (NCWRC), and CAMPO.

NCDOT's plan identified roles and responsibilities at key steps in the NEPA process. Because this project followed the "6002"^(a) process

(a) Section 6002 of MAP-21, the Moving Ahead for Progress in the 21st Century Act of 2012 (P.L. 112-141).

instead of the formal "merger"^(b) process, the plan also established procedures for agencies to raise formal issues of concern and procedures for resolving those issues.

The study's formal scoping meeting was held on February 16, 2010. The key topics identified included the project's potential effect on the federally endangered Dwarf Wedgemussel, water quality, and jurisdictional wetlands and streams.

As documented in the study's Stakeholder Involvement Report (2018), the study included an extensive process for informing and involving the public, local governments, and environmental resource and regulatory agencies. The main method for government representatives and agencies to receive information and provide comments was through inter-agency meetings. No formal issues of concern were identified at any of the meetings that were held over the course of the project.

Public Involvement

An initial set of public meetings took place in the fall of 2010. Three were held on consecutive afternoons and evenings at three locations in the study area, with the same information presented at each. Approximately 1,200 individuals attended these meetings and approximately 2,100 public comments were submitted during or following the meetings.

A second series of public meetings was held in October 2013 to present the corridors selected as detailed study alternatives and to provide an opportunity for the public to ask questions and provide comments. Three events were held on consecutive afternoons and evenings at three different study area locations, with the same information presented at each. Approximately 1,700 individuals attended these meetings and approximately 1,000 comments were received during or following these meetings.

In December 2015, three public information meetings and one formal corridor public hearing were held, in conjunction with the release of the Draft EIS. Information was presented about the Detailed Study Alternatives and the impact assessments prepared for them. The public

(b) The process merging the requirements of the National Environmental Policy Act and Section 404 of the Clean Water Act.

hearing provided an opportunity for stakeholders to make formal statements about the content of the Draft EIS.

In February 2018, a similar set of three public meetings and one formal design public hearing was held. In this case the main focus was the preliminary design plans prepared for the Preferred Alternative.

Comments received in conjunction with the study's public meetings and public hearings are summarized in the Stakeholder Involvement Report (2018), along with NCDOT/FHWA responses to those comments.

Additional public information and outreach techniques that took place throughout the study included newsletters mailed to each address in the study area, a project website, a toll-free information line, and smaller scale meetings with groups such as homeowners associations.

Local Government Involvement

NCDOT provided project updates at many of CAMPO's Executive Board and Technical Coordinating Committee meetings. In addition, in 2014 CAMPO established the "540 Working Group," which included individuals from many local jurisdictions. Several Working Group meetings were held in the time before the selection of the Preferred Alternative. NCDOT also met several times with local government staff and elected officials to provide more detailed information about the study and to answer questions and receive comments.

4. DECISION

The alternative chosen by FHWA and NCDOT as the Selected Alternative for the Complete 540 project is the Preferred Alternative identified in the Final EIS, known as "Detailed Study Alternative 2" (see Exhibit 1.)

This alternative comprises the Orange, Green (partial) and Mint Corridor segments. The Orange segment follows the alignment of the corridor protected in the 1990s by North Carolina's "Map Act" (since repealed, in 2016) in the western portion of the study area (east of I-40). The Green segment follows a path also established, but not protected, in the 1990s. The Mint segment shifts away from the Green segment for a short distance to minimize impacts.

The Selected Alternative is 28.4 miles in length, from NC 55 Bypass to US 64/264 (I-495/87). It will have six travel lanes, a 70-foot wide median, and a posted speed limit of 70 mph. Interchanges will be located at NC 55 Bypass, Holly Springs Road, Bells Lake Road, US 401, Old Stage Road, NC 50, I-40/US 70 (Clayton Bypass), White Oak Road, Rock Quarry Road, US 70 Business, Auburn Knightdale Road, Poole Road, and US 64/264 (I-495/87).

The State Transportation Improvement Program (STIP) for years 2018 through 2027 divides the Complete 540 project into three construction projects. The first is between US 401 and I-40. The second is from NC 55 Bypass and US 401. The third is from I-40 to US 64/264 (I-495/87).

Basis for Selection as Preferred Alternative

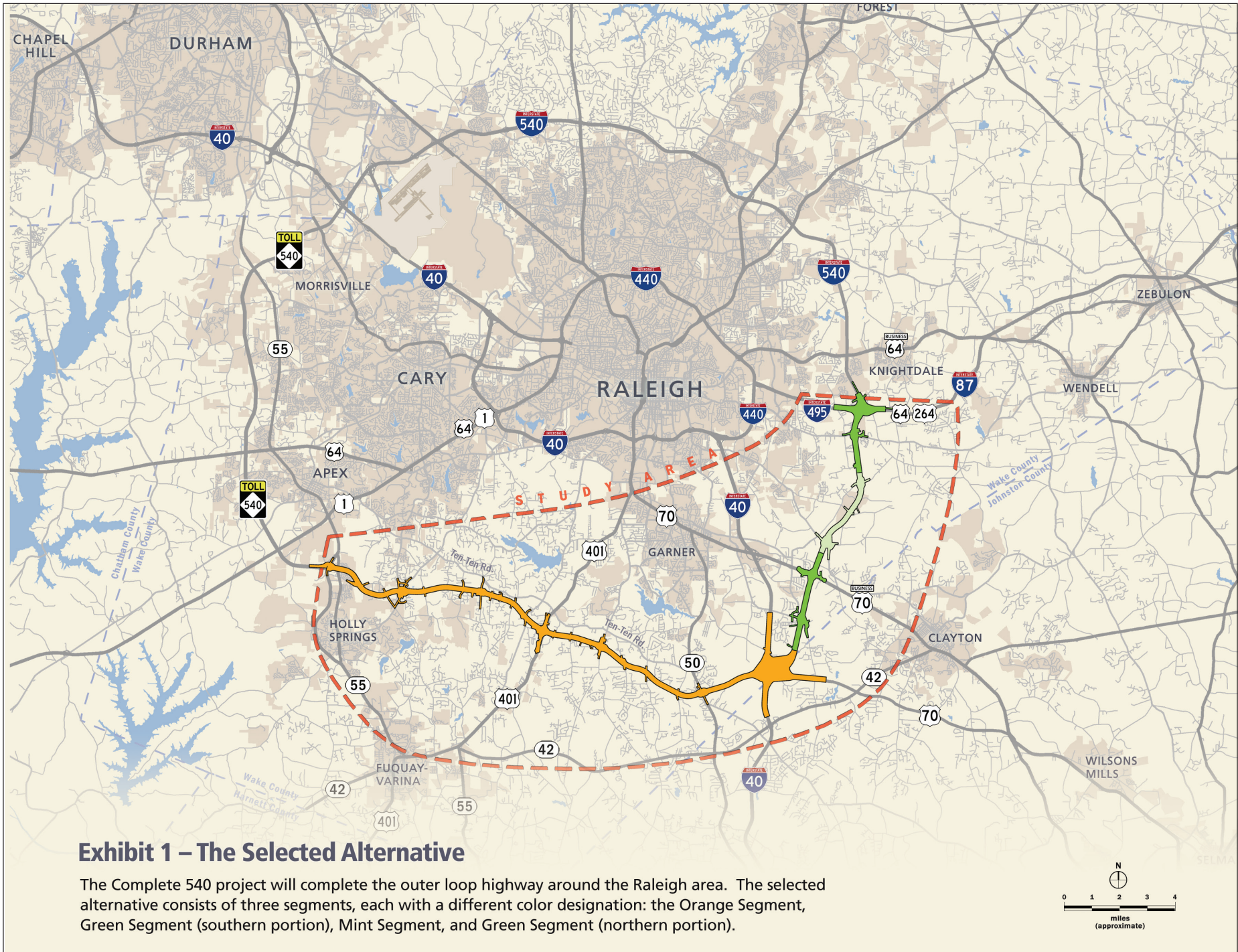
The Selected Alternative was shown to be the most practical solution for meeting the primary purposes of the project, which are to improve mobility and reduce traffic congestion south and east of the Raleigh area during peak travel periods. The Selected Alternative would also achieve the secondary purpose of the project, which is to improve system linkage in the regional roadway network.

Detailed Study Alternative 2 was selected as the Preferred Alternative by NCDOT and FHWA, and was endorsed by the study's interagency group because it meets both of the project's primary purposes, meets the project's secondary purpose, and is the best balance between benefits and environmental impacts.

Impacts of the Selected Alternative

A summary of impact descriptions is provided in the following paragraphs. Detailed explanations of the benefits and impacts of the Preferred Alternative are contained in the Final EIS.

Environmental Justice and Civil Rights — NCDOT and FHWA carried out a process to identify and address disproportionately high and adverse environmental effects of the Complete 540 project on minority populations and low-income populations. This effort resulted in the conclusion that there are no environmental justice concerns associated with the Selected Alternative, nor will any concentrated minority or low



income populations receive disproportionate high and adverse effects as a result of the Selected Alternative.^(c)

Relocations — Based on the preliminary design plans, the Selected Alternative will affect 1,825 acres of land on 858 parcels and will require 217 relocations. The relocations include 209 residences, 5 businesses, and 3 non-profit organizations.

Barrier, Access, and Neighborhood Effects — Two residential developments will be affected by the Selected Alternative. The Woodcreek subdivision was developed in anticipation of the proposed project being constructed. The project's design will include a pedestrian underpass to connect the smaller northern portion of the development to the main southern portion. At Deerfield Park subdivision, the project will include a bridge over Complete 540 to connect the two portions of this development that will be bisected by the project. Three other neighborhoods will experience substantial access changes or a relatively large number of property relocations.

Community Facility Impacts — The Selected Alternative will require the acquisition of approximately 3.3 acres of land from the northwest corner of Wake Technical Community College. No campus buildings will be affected. The Selected Alternative will also require land acquisition at six church locations: no church functions will be affected at any of these locations.

Historic Architecture Resources — On December 10, 2014, the State Historic Preservation Office (HPO) concurred with NCDOT's finding that the Preferred Alternative (now the Selected Alternative) will have no effect on 23 of the 25 properties in the project's Area of Potential Effect that are listed on or are eligible for listing on the *National Register of Historic Places* (NRHP). For the two properties that will be affected, the HPO concurred with NCDOT and FHWA that the Selected Alternative will result in "no adverse effect" to each property. At one of these sites (Panther Branch School), NCDOT has established a commitment to coordinate with the HPO and the property owner about the use and

(c) This conclusion is based on analyses documented in the "Community Impact Assessment", "Indirect and Cumulative Effects Memorandum (Quantitative ICE Assessment Memo #4)", and "First Tier Alternative Concepts Screening & Traffic Reassessment" documents.

design of a retaining wall to eliminate the need for permanent easement or right-of-way at this location.

Archaeological Resources — One prehistoric archaeological site was identified that qualifies for the NRHP, under Criterion D only. This site is of importance for the data that it contains and does not require preservation in place. The eligibility of this site for the NRHP has been confirmed through coordination with the HPO. NCDOT investigated shifting the highway alignment to avoid this site but found that such a change will result in additional direct impacts to wetlands, streams, and existing residential neighborhoods. While bridging the site could potentially avoid direct effects on this site, a review of the proposed designs and the topography in this area showed that bridging the site will require significant design revisions if nearby wetlands and a nearby subdivision were to be avoided. Because these design revisions will increase the overall project footprint in this area and result in an undesirable partial vertical curve on the bridge, NCDOT concluded they should not be implemented. In accordance with Section 106 of the NRHP, a Memorandum of Agreement between NCDOT, the NC HPO, and FHWA has been completed for this site. Prior to any construction activity in the area of this site, NCDOT will recover the data from this site and document this recovery to the satisfaction of the HPO.

Final Section 4(f) Evaluation — Two parcels qualifying for protection under Section 4(f) will be affected by the Selected Alternative, but FHWA has determined they will be *de minimis* impacts.

At Middle Creek School Park, the Selected Alternative will cross a narrow strip of land along the northern edge of the parcel, affecting about 2.8 acres of this 105-acre site. Because the affected area is only a small percentage of the total parcel, and because the function and use of the park will not be altered, FHWA has determined that it will be a *de minimis* impact.

The Selected Alternative will cross the Neuse River Trail, a 28-mile pedestrian and bicycle path that is part of Raleigh's Capital Area Greenway System. Because the Selected Alternative will not permanently affect access to the trail or adversely affect the trail's recreational activities, features, or attributes, and, because trail use will be accommodated during construction, FHWA has determined that this crossing will be a *de minimis* impact.

Before making *de minimis* determinations for these properties, NCDOT and FHWA consulted with the officials who have jurisdiction over these properties to ensure such determinations could be made. The City of Raleigh concurred with the FHWA *de minimis* determination relative to the Neuse River Trail. Likewise, the Town of Cary concurred with the *de minimis* determination for the Middle Creek School Park. Copies of concurrence letters to this effect can be found in the project's Stakeholder Involvement Report. In addition, other local governments, environmental resource and regulatory agencies, and the public, were given the opportunity to review and comment on the project's potential effects on these resources during the comment period for the Draft EIS. With one exception, there was no opposition expressed to the proposed *de minimis* determinations for these resources from any of these groups or individuals. Questions and concerns relative to these *de minimis* determinations and these park properties were addressed in the response to comments on the Draft EIS and on the Final EIS in the Stakeholder Involvement Report. Information about the evaluation of the potential impacts of the project on these recreational resources, and about FHWA's determination that their recreational activities, features, and attributes will not be adversely affected by the project, was included in an appendix to the Draft EIS and is further addressed in the Final EIS.

In addition to the two park facilities, the Selected Alternative will affect one archaeological site that has been determined to be eligible for the NRHP. As noted previously, the HPO has determined that the archaeological site is of importance only for the data it contains and does not require preservation in place. Because the site does not warrant preservation in place, Section 4(f) does not apply to it. The Selected Alternative will not result in "use" of any NRHP-eligible or listed historic architectural sites under Section 4(f).

Traffic Noise — In 2017, NCDOT updated the May 2015 Traffic Noise Analysis to evaluate the preliminary designs associated with the Preferred Alternative. The analysis accounts for a change in the project's design year, from 2035 to 2040, and the availability of traffic data for the 2016 existing condition and the 2040 Build condition. Also, prior to the FEIS being completed, minor revisions to the preliminary design of the Preferred Alternative have occurred to reduce impacts, and NCDOT has updated its noise policy since the 2015 report was prepared.

In total, 2,660 receptors were evaluated along the Selected Alternative (2,639 residences, four schools, eight recreational facilities, eight churches, and one business), with 132 receptors predicted to experience NAC^(d) impacts, 473 receptors predicted to experience substantial increase impact, and 213 receptors predicted to experience both types of impact. With the exception of four recreational areas, all of the affected receptors are residences. No schools, churches, or commercial properties are predicted to experience traffic noise impacts as a result of construction of the Selected Alternative.

The updated analysis resulted in 279 additional impacted receptors being identified along the Selected Alternative, compared to the May 2015 analysis. This increase is attributable to the change that occurred in the NCDOT noise policy relative to "substantial increase and the land development that has occurred in the project area in the interval between the two studies."

NCDOT examined various forms of noise abatement (including traffic management, alteration of roadway alignments, creation of buffer zones, and installation of building insulation) and found that none will be a feasible solution. Abatement in the form of noise barriers was considered at 42 locations where traffic noise impacts were predicted. Of these, 22 barriers were preliminarily found to be both feasible and reasonable and are, therefore, likely to be constructed. Another 20 barriers were evaluated and preliminarily found to not be feasible and reasonable. Of the 818 impacted receptors, 497 will benefit from the implementation of these 22 barriers, including two of the four affected recreational areas and 495 impacted residences. These barriers will also benefit 222 additional receptors that did not have an identified noise impact. Of the other 20 barriers, three were preliminarily found to be not feasible and 17 not reasonable. These 20 barriers are not likely to be constructed. In summary, by constructing the 22 feasible and reasonable barriers, 323 residences and two recreation areas will remain with projected traffic noise related impacts. A final determination of noise barrier feasibility and reasonableness will be made upon (1) completion of the Selected Alternative's design plans, (2) completion of a Design Noise Report for each construction segment, and (3) after the public involvement

^(d) Noise Abatement Criteria. (Criteria established by the Federal Highway Administration for determining when a receptor is said to experience a noise impact.)

process for noise walls (ballot process) has been completed for each construction segment.

Air Quality — Both Wake County and Johnston County are in attainment with respect to the USEPA’s National Ambient Air Quality Standards. Because carbon monoxide (CO) regional and project-level conformity requirements in North Carolina have ended, a project level CO microscale analysis is no longer required in North Carolina as part of the NEPA process. As noted in the Draft EIS, the project does not require a detailed study for particulate matter. Complete 540 is in the MPO’s (CAMPO) long range plan and TIP with a consistent design concept and scope as the selected alternative.

A qualitative analysis of Mobile Source Air Toxics (MSATs) was completed for the Selected Alternative. This analysis predicted that constructing the Preferred Alternative would result in reduced MSAT emissions in the immediate area of the project, compared to a No-Build scenario, as a result of USEPA’s MSAT reduction programs. For possible air quality concerns during construction, no substantial long-term effects will occur if currently adopted rules for open burning and dust control are followed. The project is not expected to create any adverse effects on the air quality of this attainment area.

Land Use and Economics — Because the corridor now identified as the Orange Corridor segment was set aside in the 1990s as the path of a future highway and protected from development, most local governments in the area have written their land use plans in anticipation of this roadway being built.^(e) As a result, planners representing the towns in the study area have stated that the Selected Alternative, which includes the Orange Corridor segment, will not conflict with their future growth and development objectives. Because the Selected Alternative also includes the majority of the Green Corridor segment, which was also identified in the 1990s as a potential future highway route, the Selected Alternative will not conflict with local land use plans.

The Selected Alternative will require five business relocations. One is a greenhouse on Benson Road. Three are on US 70 Business and include

(e) As documented in: Indirect and Cumulative Effects Memorandum (Quantitative ICE Assessment Memo #4) (2017) and Qualitative Indirect and Cumulative Effects Report (2014).

a manufactured home sales office, an auto collision repair shop, and a metal/parts salvage operation. The fourth is a stormwater management business along White Oak Road. In addition, the Selected Alternative will affect operations at a private rugby facility on Poole Road.

Two communication towers will also be affected. One is on Poole Road and is used for cellular communications; the other is on Rock Quarry Road and is used for a variety of communications functions.

Water Resources — As indicated in the Final EIS (page 53), the Preferred Alternative (now Selected Alternative) could affect water resources in a number of different ways. To keep potential effects to a minimum, a sediment and erosion control plan will be developed during the final design stage and implemented during construction. This plan will be prepared in accordance with NCDEQ and NCDOT guidance and the NC Design Standards for Sensitive Watersheds.

Streams — The current design for the Selected Alternative will affect 57,756 linear feet of streams. This is the total length after minimization measures were incorporated into the Preferred Alternative’s design. The total impact on streams may vary slightly as further refinements are made to the project’s design plans.

Wetlands — The current design for the Selected Alternative will affect 69.0 acres of wetlands. This is the total area after minimization measures were incorporated into the Preferred Alternative’s design. The total impact on wetlands may vary slightly as further refinements are made to the project’s design plans.

Wetland Finding - The rationale for choosing the Selected Alternative was based on many factors, including its impact on wetlands, streams, and ponds. Measures to minimize harm to wetlands have been incorporated into the project through the use of horizontal and vertical alignment refinements and bridging across sensitive wetland areas. Based on the analysis for the project, there is no practicable alternative to completely avoid impacts to wetlands. The Selected Alternative includes all practicable measures to minimize harm to wetlands. These findings have been coordinated with environmental resource and regulatory agencies without any stated issues of concern.

Floodplains and Floodways — The Selected Alternative will unavoidably affect 61.2 acres of 100-year floodplains. This is the total area after minimization measures were incorporated into the Preferred Alternative’s design.

Floodplain Finding - The study area’s floodplains are associated with its three principal streams: Middle Creek, Swift Creek, and the Neuse River. Although efforts have been made to minimize effects on these floodplains, the Selected Alternative will unavoidably impact 100-year and 500-year floodplains where it crosses these streams or their tributaries. Efforts have been made to minimize the effects on floodplains through bridging at the more substantial floodplain crossings. Additionally, where practicable, stream crossings will be perpendicular or nearly perpendicular to each stream, which will minimize impacts to the associated floodplains. Bridges and culverts along the project will be sized to ensure compliance with Federal Emergency Management Agency (FEMA) requirements and NC floodplain requirements. The selection of the Selected Alternative was based on a consideration of the effects it will have on natural, human, and physical environments, compared to the other alternatives, and on comments received on the Draft EIS and Final EIS. NCDOT and FHWA have determined that there is no other practicable alternative that will further reduce impacts to floodplains.

Terrestrial Habitat — The Selected Alternative will contribute to habitat fragmentation in places where it crosses larger tracts of undeveloped land. In conjunction with environmental resource and regulatory agencies, mitigation in the form of bridging was considered at each location where such fragmentation would occur. For larger streams and some larger tracts of vegetated wetland areas that will be divided, bridges to help support wildlife movement are being included.

Protected Species — NCDOT and FHWA prepared a [Biological Assessment](#) for ESA listed species under the jurisdiction of the US Fish and Wildlife Service (USFWS) that could potentially be affected by the project. Those species include: the Red-Cockaded Woodpecker, Michaux’s Sumac, the Rough-Leaved Loosestrife, the Tar River Spiny mussel, the Cape Fear Shiner, the Dwarf Wedgemussel, and the Yellow Lance (a mussel species). NCDOT and FHWA in consultation with USFWS have incorporated mitigative measures to avoid, minimize, and compensate where appropriate the project’s effects on ESA listed species.

The USFWS reviewed the BA and prepared a [Biological Opinion](#)^(f) documenting its analysis and conclusions on each of these species. USFWS opinion is that the project may have an adverse effect on the mussel species; however, the project would not result in jeopardizing the continued existence of any listed species or cause adverse modification or destruction of designated critical habitat. Those conclusions are summarized as follows:

- Dwarf Wedgemussel— The Biological Conclusion for the Dwarf Wedgemussel is May Affect, Likely to Adversely Affect. Through coordination with USFWS, NCDOT conducted additional freshwater mussel studies to help provide information needed to assess the species’ viability in its study area habitat (the Swift Creek Watershed). These studies noted that while the relative abundance of freshwater mussel species in the Swift Creek watershed has been declining, there is evidence that this decline has leveled off and that the Dwarf Wedgemussel may be reproducing in the watershed. The studies further noted that while urbanization in the Swift Creek watershed has led to habitat degradation in the Creek, some areas of Swift Creek continue to provide high quality mussel habitat. Also, as noted in the discussion of indirect and cumulative effects, there are concerns about concentrations of copper in Swift Creek at levels that may be harmful to freshwater mussels. At the time of this writing, the effectiveness of existing conservation measures to protect mussel viability in the Swift Creek watershed is unclear because they have not been in place long enough for their effectiveness to be ascertained.

The species viability study conducted for the Complete 540 project concluded that while there is potential for the Dwarf Wedgemussel to persist in Swift Creek, its long-term viability is uncertain, and many of the threats to the species’ long-term viability in Swift Creek will remain, regardless of whether the project is constructed. Management and propagation efforts are underway to help achieve long term viability of this species (see Section 6, below). In the Biological

(f) A Biological Opinion documents the USFWS official position on whether a proposed federal action is likely to jeopardize the continued existence of endangered or threatened species or result in the destruction or adverse modification of the designated critical habitat for an endangered or threatened species.

Opinion, USFWS concluded that Complete 540 is not likely to jeopardize the continued existence of this species.

- Yellow Lance— Although this mussel species was not under federal protection when the Draft EIS was written, the USFWS subsequently listed this species as threatened (in April 2018). In response, NCDOT conducted field surveys for this species in the project area, the results of which are documented in the Complete 540 Aquatic Species Survey Report. The Yellow Lance was also evaluated in the Biological Assessment. The effects information described above for the Dwarf Wedgemussel also applies to the Yellow Lance, and the Biological Conclusion for this species is also May Affect, Likely to Adversely Affect. Conservation measures similar to those for the Dwarf Wedgemussel, including propagation, will also be used to offset the project's potential effects on the Yellow Lance (see Section 6, below). In the Biological Opinion, USFWS concluded that Complete 540 is not likely to jeopardize the continued existence of this species.
- Michaux's Sumac—The Biological Conclusion for this species is *May Affect, Not Likely to Adversely Affect*. In the Biological Opinion, USFWS concurred with this conclusion.
- Cape Fear Shiner—The Biological Conclusion for this species is *May Affect, Not Likely to Adversely Affect*. In the Biological Opinion, USFWS concurred with this conclusion.
- Rough-Leaved Loosestrife—The Biological Conclusion for this species is *No Effect*.
- Red-Cockaded Woodpecker—The Biological Conclusion for this species is *No Effect*.
- Tar River Spiny mussel—The Biological Conclusion for this species is *No Effect*.

Atlantic Sturgeon— In April 2012, the National Marine Fisheries Service listed the Atlantic Sturgeon as endangered and, in September 2017 NMFS designated as critical habitat the entire length of the Neuse River within the project study area. All of the project's Detailed Study Alternatives, including the Selected Alternative, cross the Neuse River.

In response to the NMFS critical habitat designation, NCDOT conducted a physical and biological features survey of critical habitat for the Atlan-

tic Sturgeon in the vicinity of the proposed project's crossing of the Neuse River. The survey found that potential Atlantic Sturgeon habitat at the crossing is poor quality and there are no concentrations of physical and biological features within the footprint or immediate vicinity of the crossing location. Likewise, no such features were found within the 850-foot-wide survey area, neither upstream nor downstream of the crossing location.

NCDOT and FHWA prepared a [Biological Assessment for Atlantic Sturgeon](#) and its designated critical habitat for the Complete 540 project. Based on the coordination with NMFS, NCDOT and FHWA have committed to a list of measures to help avoid and minimize the project's potential effects on the sturgeon and its habitat. The Assessment indicates that the direct and indirect effects of the project would not result in adverse effects to the Atlantic Sturgeon and its critical habitat. Therefore, NCDOT and FHWA determined that the project May Affect but is Not Likely to Adversely Affect the Atlantic Sturgeon and its critical habitat in the project's action area. NMFS concurred with this determination.^(g)

Bald Eagle—While the Bald Eagle is no longer federally listed as endangered, it is still protected by the Bald Eagle and Golden Eagle Protection Act of 1962. After a review of existing information about the presence of this species in the study area, and after field surveys were conducted (in 2018) along the Selected Alternative, NCDOT has concluded the project will be in compliance with the protections established in this Act and the Bald Eagle will not be affected.

Farmlands — While most of the soil types the study area are classified as prime, unique, local or of statewide importance, the Farmland Conservation Impact Rating score for the Selected Alternative did not exceed the threshold for required mitigation of farmland impacts. One Voluntary Agriculture District (VAD) farm will be affected, located on New Bethel Church Road, just north of the Clayton Bypass. This 45 acre wooded parcel is part of a large, multi-parcel, multi-location district that extends into an adjacent 53 acre parcel in Johnston County. Approximately 23 acres will be required for project right-of-way at the northern edge of the property.

(g) May 21, 2018 letter from [National Marine Fisheries Service](#) to NCDOT.

Major Drainage Structures — There are 39 locations along the Selected Alternative where a major drainage structure will be needed. Culverts will be used at 26 of these and bridges at the remaining 13. Of those bridges, 8 are either longer than will otherwise be necessary, or are bridges instead of culverts, to avoid or minimize stream and wetland impacts.

Hazardous Materials and Contamination Sites — The Selected Alternative will require right-of-way acquisition at four potential contamination sites: two gas stations, an automotive salvage yard, and an auto repair shop. Because the project will not affect the underground storage tank fields at either gas station, NCDOT does not anticipate the need for relocation or remediation at these locations. Additionally, the project will not require acquisition of any known hazardous waste sites or landfills.

Sprayfields — The right-of-way for the Selected Alternative will affect approximately 11 acres of a 600-acre City of Raleigh sprayfield on Wrenn Road. This site treats wastewater from the Dempsey E. Benton Water Treatment Plant, located on NC 50. An additional 6 acres of this site, along Swift Creek, will be landlocked by the project and will be offered for acquisition.

Major Utility Installations — There are underground petroleum pipelines and overhead electrical transmission lines at various locations along the Selected Alternative. NCDOT expects that all affected pipelines and electric lines will be relocated prior to starting construction activities in these areas.

Communications Towers — The Selected Alternative will require the relocation of two communications towers; one near Rock Quarry Road and another near Poole Road.

Indirect and Cumulative Effects — To analyze the potential indirect and cumulative effects (ICE) of the Preferred Alternative, NCDOT conducted a quantitative analysis of those effects based on comprehensive data that included a new 2040 No-Build land use forecast. The results of these analyses are contained in a series of ICE technical reports and were described in Chapter 5 of the Final EIS.

Key results are that substantial new development will occur in the study area by 2040 under the No-Build scenario, with about 73,000 additional

acres in southern Wake County and parts of Johnston and Harnett Counties converted from undeveloped or agricultural uses to uses classified as developed by 2040. Under this scenario, the proportion of developed land in the area studied will increase from 39 percent under current conditions to about 66 percent by 2040.

The quantitative ICE analysis of the Preferred Alternative also concluded that the Complete 540 project will likely cause about 1,400 additional acres to be converted to developed land uses under the Build scenario as compared to the No-Build scenario. This represents an increase of approximately 2 percent increase over the 73,000 acres predicted to be converted under the No-Build scenario. This supports the finding of the qualitative ICE analysis, suggesting that constructing the project will lead to land use patterns consistent with those envisioned in local land use plans.

Another component of the quantitative ICE analysis was to use the modeled future land use patterns under the Build and No-Build scenarios to predict the relative amounts of impervious surface under the two scenarios. Greater impervious surface coverage in an area can lead to increased stormwater runoff and negative effects on surface water quality. The model results suggest that there would be small differences in the 2040 Build and No-Build scenarios for most of the water quality indicators examined. Watersheds in the study area that currently contain populations of Dwarf Wedgemussel or Yellow Lance are experiencing, and will continue to experience, growth pressures that may lead to negative effects on water quality, with or without the Complete 540 project. While the model results suggest that the project could lead to increased concentrations of suspended solids and copper, two contaminants that can be harmful to freshwater mussels, the predicted increases are small in comparison to the overall anticipated increases by 2040 that would result from growth predicted to occur without the project.

A further conclusion reached as a result of the quantitative ICE analysis concerned the effect that the project's induced development could have on traffic conditions in the Future Land Use Study Area (FLUSA). Because the amount of development and other land use changes actually induced by the project is expected to be quite small compared to the overall development expected to occur in the FLUSA, it follows that changes in traffic volumes, travel times, and travel distances caused by

this induced development will be small as well. This conclusion was verified by the quantitative ICE results. For example, when comparing trip productions and attractions between the Base Year and the 2040 Build and No-Build Scenarios, the compounded annual growth rate varies by one-tenth of one percent.

Costs—At the time the Final EIS was prepared, the Preferred Alternative was estimated to cost between \$2.0 billion and \$2.3 billion, with a planning level estimate of \$2.24 billion, expressed in anticipated year-of-expenditure dollars. This total project cost estimate included construction of the project (\$1.58 billion), right-of-way acquisition and relocation (\$322 million), utility relocation (\$61 million), agency expenses and reserve funds (\$156 million), environmental mitigation (\$65 million), and prior expenditures (\$53 million).

In the time since the Final EIS was completed, FHWA conducted a separate cost estimate review, following a process used for all major FHWA projects (i.e., those costing more than \$500 million). This review estimated the cost of the Selected Alternative to be between \$1.74 billion to \$2.35 billion, with a 70 percent confidence estimate of \$2.12 billion. Additional information on the cost estimate review process can be found in Section 8, below, in FHWA's Cost Estimate Review Report (May 2018).

A summary of the impacts associated with the Selected Alternative is shown on Exhibit 2.

NCDOT intends to implement the project using the design-build method, which allows the design, environmental permitting, right-of-way acquisition, utility relocation, and construction to take place under one contract. This method encourages innovative approaches to reduce overall construction time, save taxpayers money, lessen environmental impacts, and alleviate driving delays for motorists.

5. ALTERNATIVES CONSIDERED

NCDOT evaluated a broad range of alternatives for meeting the project purposes, including the No-Build alternative. A detailed discussion of these alternatives is included in study's Alternatives Development and Analysis Report ([prepared in 2014](#); [reassessed in 2017](#)), which is incorporated as part of this ROD by reference.

Alternative Concepts

Early in the study, NCDOT identified and evaluated several broad concepts that could potentially meet the project purposes:

(1) Transportation Demand Management—strategies to reduce the need for individuals to use the roadway system during periods of peak traffic congestion.

(2) Transportation System Management—low-cost minor improvements to roadways to increase the capacity or efficiency of the overall roadway system.

(3) Mass Transit and Multi-Modal options—expanding bus and rail passenger service in the project area or combining expanded transit service with the roadway projects included in CAMPO's Metropolitan Transportation Plan, but excluding the Complete 540 project.

(4) Expansion of Existing Roadways—major reconstruction of extensive portions of existing roads in the study area. (Three combinations of existing roadways having the greatest potential to meet the project purposes were examined.)

(5) Hybrid Options—combining the expansion of certain existing roadways with a limited amount of new highway construction. (Three hybrid alternatives having the greatest potential to meet the project purposes were examined.)

(6) New Highway Option—constructing a new, limited-access facility, similar in design to the existing Triangle Expressway (NC 540).

(7) No-Build Option—construction of each of the transportation improvements identified in CAMPO's Metropolitan Transportation Plan, excluding the Complete 540 project. (This option was retained as a viable alternative throughout the planning study.)

Screening of Alternative Concepts

As documented in the study's Alternatives Development and Analysis Report, NCDOT analyzed each of these concepts and compared them using measures of effectiveness established for the planning study.

Using both qualitative and quantitative methods, these concepts were screened to determine if they would meet the primary purposes of

Exhibit 2 Impacts Associated with the Selected Alternative

Environmental Factors	Effect/Impact		
Environmental Justice	None	Non-Riparian Wetlands (acres)	4.3
Land (acres)	1,825	Ponds (acres)	24.6
Parcels (each)	858	Ponds (number affected)	39
Relocations (residential, business, non-profit)	217	Floodway (acres)	15.4
Business Relocations	5	100 Year Floodplain (acres)	61.2
Bisected Neighborhoods	2	500 Year Floodplain (acres)	76.2
Churches (land only impacts)	6	Underhill Wetland Mitigation Site (acres)	0.5
Historic Resources	None with adverse effects	Bald Eagle	None
Archaeological Resources	1 site with adverse effects	Red-Cockaded Woodpecker	No Effect
Section 4(f) Resources	2 parks, both <i>de minimis</i> impacts	Michaux's Sumac	(see note 1)
Noise	818 receptors	Rough-leaved Loosestrife	No Effect
Air Quality	None	Tar River Spiny mussel	No Effect
Communication Towers	2	Cape Fear Shiner	(see note 1)
Private Recreation Areas	1	Dwarf Wedgemussel	(see note 2)
Streams (linear feet)	57,756	Yellow Lance	(see note 2)
Streams (number of crossings)	140	Atlantic Sturgeon	(see note 1)
Stream Buffer Zone 1 (acres)	99.8	Potential Contamination Sites	4
Stream Buffer Zone 2 (acres)	63.2	Cost (\$ billion, at 70% confidence level)	2.12
Wetlands (acres)	69.0		
Wetlands (number affected)	156		
Riparian Wetlands (acres)	64.7		

Note 1: May Affect, Not Likely to Adversely Affect

Note 2: May Affect, Likely to Adversely Affect

The impacts reported in this table are subject to adjustments as the design plans for the individual construction projects are further refined.

the project. The result was that only two of these were found to both improve mobility and reduce traffic congestion according to the criteria established to measure these purposes: one hybrid concept, and building an entirely new highway. Those options were then developed in greater detail.

Upon examining the Hybrid option alternative, one of the three was found to achieve both of the project's primary purposes. It was later dismissed, however, because of its level of environmental and community impacts. As a result, the New Highway and No-Build options were the only options found to warrant more detailed evaluation.

Preliminary Highway Corridor Alternatives

NCDOT developed several new highway alternative corridors and a hybrid alternative corridor. The corridors were developed with a width of 1000 feet. Numerous individual corridor segments were established, with their locations based on key features of the human, natural, and physical environments. These segments could be connected in a variety of ways to make unique route alternatives connecting the two project termini (NC 55 Bypass in Apex, and US 64/264 Bypass (I-495/87) in Knightdale).

NCDOT compiled preliminary information about the potential effects of each alternative on the study area's social, environmental, and physical features (e.g., wetlands, streams, floodplains, endangered species, and social features such as potential relocations of homes and businesses, etc.). Using this information, the alternatives were screened to eliminate those that would result in higher impacts.

In the fall of 2010, NCDOT presented this information to environmental resource and regulatory agencies, local governments and to the public, resulting in various changes to the alternatives, with new segments being added to avoid or minimize impacts to resources, and some segments dropped from further consideration due to high potential impacts without offsetting benefits. Also dropped from further consideration was the hybrid concept alternative because it would require a large number of residential relocations and substantial impacts to wetlands without offering any offsetting advantage over the new highway alternatives.

The new set of corridors that emerged was then subject to additional review and analysis. Based on the comments and suggestions made during additional agency, government, and public reviews, including a round of public information meetings in the fall of 2013, ten individual corridor segments (forming seventeen unique end-to-end alternatives) were selected for detailed study. A map of the seventeen Detailed Study Alternatives can be viewed on Exhibit 3.

Detailed Study Alternatives

The screening of preliminary corridors resulted in seventeen new highway alternatives being retained as "Detailed Study Alternatives," each consisting of a unique combination of two or more corridor segments. Ten individual corridor segments were developed, each with an identifying color.

Orange Corridor Segment— An advantage of this segment was that it contained little or no development because it followed a corridor that was protected in the mid-1990s.

Lilac Corridor Segment—This option was developed to reduce potential effects on wetlands.

Purple and Blue Corridor Segments—Although these segments were assigned two different colors, they functioned as one segment. Being farther south than the other segments, they would have possibly served traffic better in growing areas near Fuquay-Varina. They also would connect to other segments developed to better avoid wetland areas.

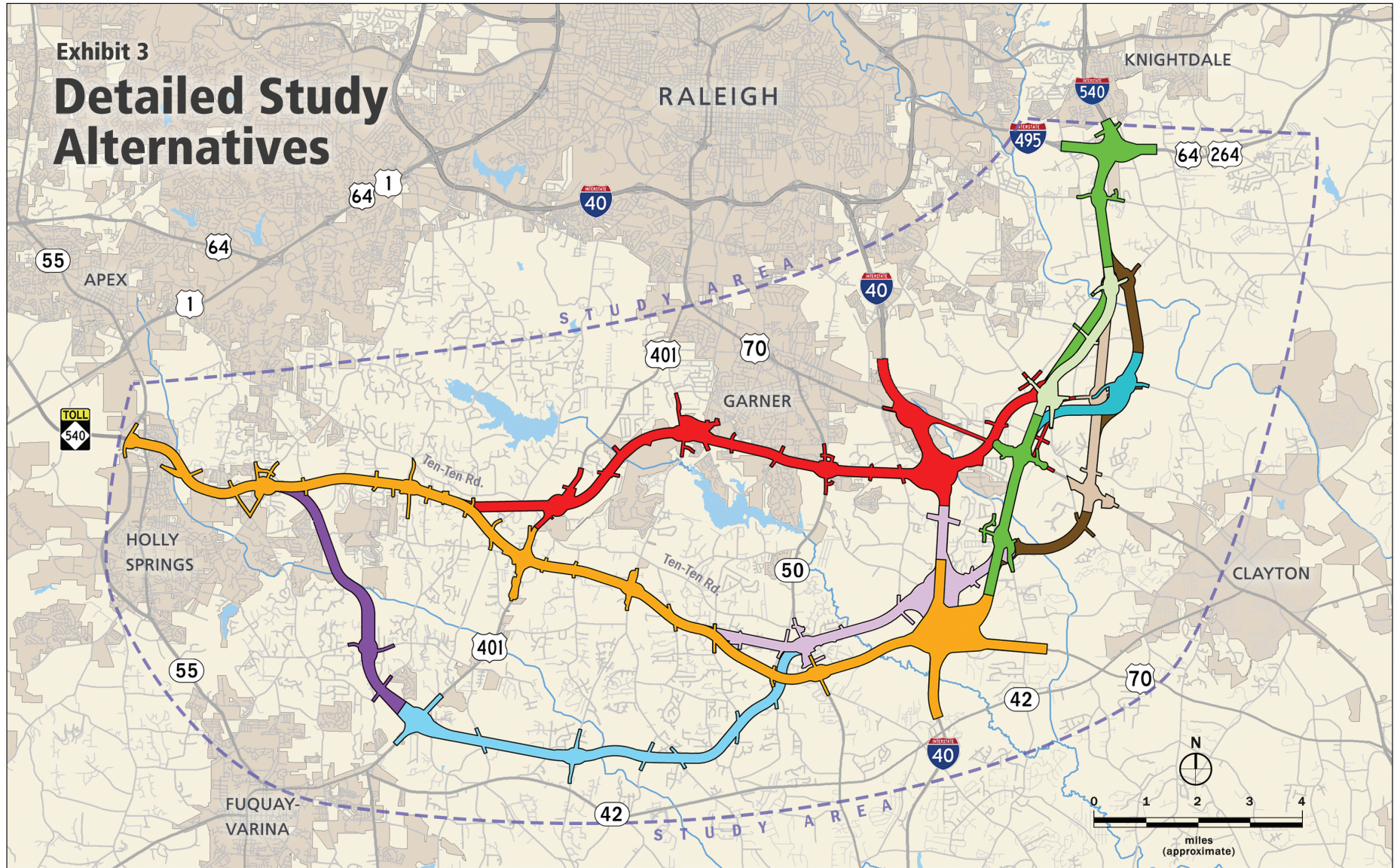
Red Corridor Segment—The Red Corridor segment was developed to avoid the habitat area for the federally endangered Dwarf Wedgemussel and to better avoid wetland areas.

Green Corridor Segment—This segment followed a corridor first established in the mid-1990s. Although it was not protected from development, its prior identification as a possible route led to its being included in the Complete 540 study.

Mint Corridor Segment —This was developed to avoid a substantial publicly-owned natural resource that would have been affected by the Green Segment.

Exhibit 3

Detailed Study Alternatives



Segment Colors

O Orange	L Lilac	B Brown
Pu Purple	G Green	M Mint
Bl Blue	Tl Teal	
R Red	T Tan	

Segment Combinations for the 17 Detailed Study Alternatives

1	O G	5	O G Tl B G	9	O Pu Bl L G M G	13	O L G	17	O L G Tl B G
2	O G M G	6	O R G	10	O Pu Bl L B T G	14	O L G M G		
3	O B T G	7	O R M G	11	O Pu Bl L B G	15	O L B T G		
4	O B G	8	O Pu Bl L G	12	O Pu Bl L G Tl B G	16	O L B G		

Tan Corridor Segment—The Tan Corridor segment was developed in an attempt to avoid some of the property impacts associated with the Green and Mint Segments.

Brown Corridor Segment—This segment was developed to further avoid property impacts associated with the Green, Mint, and Tan Segments.

Teal Corridor Segment—This short segment was developed to allow a connection between the Green and Brown Segments.

Each of the seventeen end-to-end alternatives formed by combinations of these segments was screened against the full range of impact categories described in the previous section. The seventeen alternatives are shown in Exhibit 3; impacts are addressed in the Draft EIS.

6. MEASURES TO MINIMIZE HARM

Avoidance, Minimization, and Mitigation for Water Resources

Through the use of minimization techniques, NCDOT has eliminated or reduced impacts to streams and wetlands to the greatest extent practicable at the current stage of design. This included examining the use of bridges instead of culverts over some of the larger streams and bridging some of the larger and higher quality wetlands.

Mitigation policy for jurisdictional Waters of the United States has been established by USEPA and USACE regulations. Unavoidable impacts of the Selected Alternative to wetlands and streams will be offset using the techniques described below. All wetland, stream, and buffer mitigation will be approved by state and federal permit agencies, prior to permit authorization.

For the portion of the project between NC 55 Bypass and US 401 (STIP^(h) Project R-2721), NCDOT will follow the provisions of a 2016 Memorandum of Agreement between NCDOT and the NC Division of Mitigation Services (NCDMS) for off-site mitigation of wetland, stream, and riparian buffer impacts. NCDOT also investigated opportunities for on-site mitigation and found no suitable sites available within the project limits.

(h) State Transportation Improvement Program

For the portion of the project between US 401 and I-40 (STIP Project R-2828), NCDOT will rely on NCDMS for mitigation of impacts to wetlands and riparian buffers. Both NCDMS and private mitigation banks will be used for impacts to streams, with private mitigation banks being the preferred option. Opportunities for on-site mitigation have been investigated and a stream mitigation site has been identified. Efforts are underway to further consider the use of this site for stream mitigation.

For the portion of the project between I-40 and US 64/US 264 (STIP Project R-2829), NCDOT anticipates that impacts will be offset by compensatory mitigation, most likely through NCDMS. No specific approach has been established because the current anticipated construction start date (2027) is more than five years in the future.

Underhill Wetland Mitigation Site — This 84.5-acre parcel, which is located adjacent to and south of Swift Creek in the Complete 540 project area, was purchased by NCDOT in 1998 as part of the wetland mitigation efforts for NCDOT's US 70 Clayton Bypass project. The parcel has a small arm of land adjacent to Swift Creek that extends northward, crossing most of the right-of-way width of the Selected Alternative. The Selected Alternative will span this portion of the property with dual bridges, which will be built approximately 20 feet above ground level and designed to prohibit direct stormwater drainage into the mitigation site and Swift Creek. Approximately one-half acre of this site will be affected. To further aid in the protection of the Underhill Site and Swift Creek, NCDOT will follow the design standards established in the NC Design Standards for Sensitive Watersheds.

Avoidance, Minimization, and Mitigation for Endangered Species

Through the use of minimization and mitigation (conservation) techniques, NCDOT has reduced impacts to endangered species to the greatest extent practicable at the current stage of design.

Management and propagation efforts are underway to help achieve long term viability of the Dwarf Wedgemussel and Yellow Lance. To achieve the propagation activities that are proposed for these species, NCDOT has agreed to provide funding to retrofit and upgrade an existing research facility in the A.E. Finley Center at the Historic Yates Mill County Park. This facility is currently owned by Wake County and leased and operated by North Carolina State University for the purpose of propa-

gating aquatic species and conducting research. The purpose of this new facility, which will be called the Yates Mill Aquatic Conservation Center (YMACC), will be to promote the long-term survival of certain aquatic species in streams throughout North Carolina by producing juveniles for reintroduction to the wild. NCDOT has committed to provide funding and has entered into a funding agreement with Wake County for construction of the YMACC. NCDOT has entered into a separate funding agreement with North Carolina Wildlife Resources Commission for operation and maintenance of the North Carolina Non-Game Aquatic Species Program, with these funds earmarked for NCSU to operate the YMACC. These agreements are available at www.ncdot.gov/projects/complete540 and are incorporated as part of this ROD by reference.

7. MONITORING AND ENFORCEMENT PROGRAMS

Coordination will be maintained with environmental resource and regulatory agencies during final design, permitting, right-of-way acquisition, and construction to ensure that the avoidance, minimization, and compensatory mitigation commitments will be implemented.

NCDOT and FHWA will enforce pertinent specifications and contract provisions in accordance with the Environmental Impact Statement and the welfare of the public.

8. ACTIVITIES AFTER THE FINAL EIS COMMENT PERIOD

In the time following the comment period for the Final EIS, several activities related to NEPA compliance occurred, as noted below.

1) All comments received on the Final EIS were evaluated. Responses and analyses, as appropriate, were prepared for all substantive comments, as documented in the study's Stakeholder Involvement Report (see Section 9 of this ROD).

2) NCDOT and FHWA completed formal consultation with the US Fish and Wildlife Service regarding the project's effects on Dwarf Wedgemussel and Yellow Lance (see [USFWS Biological Opinion, April 10, 2018](#)).

3) NCDOT and FHWA completed informal consultation with National Marine Fisheries Service regarding the project's effects on the Atlantic Sturgeon (see [NMFS concurrence letter to NCDOT, May 21, 2018](#)).

4) NCDOT and FHWA entered into a formal Memorandum of Agreement (MOA) with the NC Office of State Archaeology relative to data recovery of materials in a site determined eligible for NRHP. In coordinating this MOA, NCDOT consulted with the Catawba Indian Nation, which has endorsed the MOA.

5) NCDOT and FHWA undertook a sensitivity analysis to investigate whether the recently updated regional travel demand model (from TRM V5 to TRM V6) would yield substantially different traffic results or would warrant additional project analyses. The sensitivity analysis reaffirmed (and strengthened) the conclusions reached for the project. It also indicated that the degree of variation between the two analyses was small enough that new traffic analyses are not required (see [May 2018 TRM V5 and TRM V6 Sensitivity Analysis Memo](#)).

6) NCDOT and FHWA undertook a sensitivity analysis to investigate whether indirect and cumulative impacts on water quality (as measured by areas of impervious surface) would be affected by the updated dwelling unit and employment forecasts associated with CAMPO's new 2045 Metropolitan Transportation Plan, which was adopted subsequent to the project's previous indirect and cumulative effects analysis. The sensitivity analysis concluded that the difference between the earlier and new totals was insufficient to warrant additional investigations, and that the results and conclusions of the quantitative indirect and cumulative effects analyses would remain consistent using the updated data (see [May 2018 Connect 2045 Regional Forecasts Memo](#)).

7) In March 2018, FHWA and NCDOT conducted a cost estimate review workshop to verify the accuracy and reasonableness of the Final EIS cost estimate and to develop a probability range for the estimate. During the workshop, the review team identified adjustments to the base estimate, based on the more advanced stage of the project's design. The team also removed contingencies from the base estimate and added known threats and opportunities, in accordance with FHWA guidance. A "Monte Carlo" simulation model was used to determine the probability ranges for costs, which is a standard methodology used by FHWA to arrive at a 70 percent confidence level for costs. Using this procedure,

the total cost of the project at the 70 percent confidence level is now estimated at \$2.12 billion, based on the anticipated year of expenditures. The full range of estimated costs is from \$1.74 billion to \$2.35 billion (see May 2018 FHWA Cost Estimate Review Report).

8) An existing pedestrian pathway was analyzed (at a development called Woodcreek). This pathway would have been severed by the Selected Alternative but will now be accommodated through the use a pedestrian culvert under the Complete 540 roadway.

9) In May 2018, NCDOT prepared a document summarizing the various traffic analyses conducted during the Complete 540 study. The document explains the objectives, methods, and outcomes of each analysis, and how each was tied to the NEPA process. This document was prepared for general reference purposes (see [Summary of Traffic Forecasts and Analyses Conducted for the Proposed Complete 540 Project, May 2018](#)).

10) The design public hearing for the project was held in late February along with a series of public meetings. Based on the results of the design public hearing, NCDOT furthered design activities for the portion of the project between NC 55 Bypass and US 401 (R-2721). Two design-build construction contracts are anticipated for this portion of the project. The current design effort includes complete hydraulic design and sufficient roadway design to produce right-of-way plans and a permit application. As a part of this effort, meetings have been held with environmental resource and regulatory review agencies concerning hydraulic design and permitting. The permit application will be more detailed for the NC 55 Bypass to US 401 portion of the project (R-2721) and will be at a corridor level for the remaining portions of the project (R-2828 and R-2829).

9. COMMENTS ON THE FINAL EIS

The Final EIS was signed on December 21, 2017. The Notice of Availability was posted in the Federal Register on December 29, 2017 and the comment period ended on February 1, 2018.

Chapter 6 of the Final EIS contains a list of the federal, state, and local agencies that received copies of the document. Comments received

on the Final EIS and NCDOT/FHWA responses to those comments are contained in the study's Stakeholder Involvement Report, which is incorporated as part of this ROD by reference.

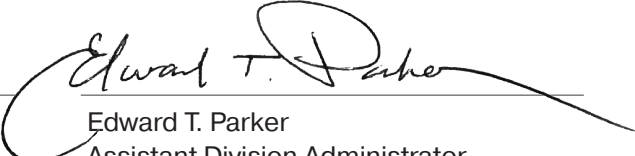
10. CONCLUSION

The Final EIS conforms with the applicable provisions of 23 CFR 771 and satisfactorily covers the anticipated environmental impacts including human, physical, cultural, and natural effects. All correspondence received between the Final EIS and the date this ROD was signed have been reviewed and, based on that review, FHWA finds that no new substantive issues or impacts have been identified. Therefore, the Final EIS remains valid.

The environmental record for the Complete 540 project includes the previously referenced Draft EIS (November 2015) and Final EIS (December 2017). These documents, incorporated reference, constitute the statements required by the National Environmental Policy Act (NEPA) and Title 23 of the United States Code (USC).

Having carefully considered the environmental record noted above, the mitigation measures as required herein, the written and oral comments offered by other agencies and the public on this record and the written responses to comments, it is FHWA's decision to adopt the Preferred Alternative (identified as Detailed Study Alternative 2 in the Final EIS), as the proposed action for the project. Specifically, FHWA has determined that implementation of this Selected Alternative as described in this ROD is in the best overall public interest. FHWA finds that all practicable measures to minimize environmental harm were incorporated into the design of the project and FHWA will ensure that the commitments outlined herein will be implemented as part of final design, construction, and post-construction monitoring.

06/06/2018
Date


Edward T. Parker
Assistant Division Administrator,
Federal Highway Administration

PROJECT COMMITMENTS

Complete 540 Triangle Expressway Southeast Extension Wake and Johnston Counties, North Carolina

STIP Project Nos. R-2721, R-2828, and R-2829
State Project Nos. 6.401078, 6.401079, and 6.401080
Federal Aid Project Nos. STP-0540(19), STP-0540(20), and STP-0540(21)
WBS Nos. 37673.1.TA2, 35516.1.TA2, and 35517.1.TA1

This “Green Sheet” identifies the project commitments made to avoid, minimize, or mitigate project impacts beyond those required to comply with applicable federal and state requirements and regulations.

During the National Environmental Policy Act (NEPA) process, commitments are made to avoid, minimize, or mitigate project impacts. Commitments result from public comment or through the requirements of, or agreements with, environmental resource and regulatory agencies.

In addition to compliance with applicable federal and state requirements and regulations, such as Section 404 Individual Permit Conditions, Nationwide Permit Conditions, Regional Conditions, and State Consistency Conditions; North Carolina Department of Transportation (NCDOT) Guidelines for Best Management Practices for the Protection of Surface Waters; General Certification Conditions and Section 401 Conditions of Certification, and the Endangered Species Act, the following table lists special project commitments that have been agreed to by the NCDOT.

Item	Resource	Project Commitment	Project Stage	Applicable STIP Project*
1	Historic Architectural Resources	NCDOT will coordinate with the NC State Historic Preservation Office and the property owner(s) relative to potential retaining wall design to eliminate the need for permanent easement or right-of-way from the Panther Branch School.	Final Design	R-2828
2	Archaeological Resources	NCDOT will conduct an archaeological survey of the Preferred Alternative and will coordinate the results with the NC State Historic Preservation Office and the NC Office of State Archaeology.	Completed	R-2721, R-2828, and R-2829

* **R-2721**: NC 55 Bypass to US 401; **R-2828**: US 401 to I-40; **R-2829**: I-40 to US 64/264 Bypass (I-495/I-87)

PROJECT COMMITMENTS (continued)

3	Archaeological Resources	NCDOT will establish a Memorandum of Agreement with the NC State Historic Preservation Office in order to take into account the project's effect on archaeological resources.	Completed	R-2828
4	Archaeological Resources	NCDOT will coordinate with the NC Office of State Archaeology relative to data recovery of materials in the one site determined eligible for the <i>National Register of Historic Places</i> based on the information contained at the site.	Final Design and Construction	R-2828
5	Community Resources & Section 4(f)	NCDOT will coordinate with the Town of Cary relative to a potential Section 4(f) <i>de minimis</i> use finding for the Middle Creek School Park.	Completed	R-2721
6	Community Resources & Section 4(f)	NCDOT will coordinate with the City of Raleigh relative to a potential Section 4(f) <i>de minimis</i> use finding for the Neuse River Trail.	Completed	R-2829
7	Recreation Facility	During construction, NCDOT will accommodate trail users along the Neuse River Trail through the project construction zone.	Final Design and Construction	R-2829
8	Noise	NCDOT will prepare Design Noise Reports for the Selected Alternative during final design. All feasible and reasonable noise abatement measures will be constructed.	Final Design	R-2721, R-2828, and R-2829
9	Stormwater Management	NCDOT will utilize Design Standards in Sensitive Watersheds in the Swift Creek and the Lower Middle Creek watersheds.	Final Design and Construction	R-2721, R-2828, and R-2829
10	Migratory Birds	NCDOT will comply with requirements set forth in the Migratory Bird Treaty Act of 1918.	Final Design and Construction	R-2721, R-2828, and R-2829

PROJECT COMMITMENTS (continued)

11	Major Drainage Structures	NCDOT will perform a more detailed hydrologic and hydraulic analysis for each major drainage crossing for the Selected Alternative.	Final Design	R-2721, R-2828, and R-2829
12	Utilities	NCDOT will coordinate with the appropriate utility owners during design of the Selected Alternative for all utility conflicts, including means to avoid or minimize impacts to utilities.	Final Design	R-2721, R-2828, and R-2829
13	Indirect Effects & Cumulative Impacts	NCDOT will prepare a quantitative assessment for indirect and cumulative effects and impacts for the Selected Alternative.	Completed	R-2721, R-2828, and R-2829
14	Protected Species	NCDOT will carry out all activities for which it has been assigned responsibility in the Biological Assessment of Potential Impacts to Federally Listed Species (December 2017) and the USFWS Biological Opinion (April 2018).	Final Design and Construction	R-2721, R-2828, and R-2829
15	Protected Species	NCDOT will carry out all activities for which it has been assigned responsibility in the Biological Assessment for Atlantic Sturgeon Critical Habitat (December 2017) and the NMFS concurrence letter (May 2018).	Final Design and Construction	R-2829

Final EIS Errata

**This section includes minor corrections and clarifications to the
December 2017 Final Environmental Impact Statement**

TRAFFIC FORECAST AND ANALYSIS UPDATE

The screening of alternatives and the project-level traffic forecast were updated in light of a new version of the Triangle's regional travel demand model and the new 2040 No-Build land use scenario prepared for the quantitative ICE analysis. The ability of each of the alternative concepts to meet the project's primary purposes was subsequently re-examined. In addition, the effects on traffic conditions in the study area and environmental impacts **were** re-examined, based on the revised traffic forecast.

Project Purposes and Screening Alternative Concepts — Early in the study several different concepts were screened using measures of effectiveness from the regional model to see if they could adequately meet the two primary purposes of the project: improving mobility and reducing traffic congestion. The result of that screening was that most of these alternative concepts were found not to adequately meet the project purposes. Once the study's quantitative indirect and cumulative effects analysis was completed, this screening process was carried out again, as a check to see if **these the** revised regional model inputs would alter the previous conclusions. The screening examined the following alternative concepts:

No-Build (ICE)—**Also** includes all future CAMPO roadway and transit projects without Complete 540, but, for this concept only, the socio-economic data from the project's quantitative indirect and cumulative effects study was used in place of the CAMPO model's official socio-economic data.

No-Build—**Also** includes all future CAMPO roadway and transit projects, but without Complete 540.

New Location Highway—Includes all CAMPO roadway and transit networks with Complete 540 included, as a toll facility.

Hybrid Concepts 1, 2, and 3—These concepts include all future CAMPO roadway and transit projects, with various portions of the Complete 540 project in place, used in conjunction with upgrades to existing facilities.

Upgrade Existing Roadway Concepts 1, 2, and 3—These concepts include all future CAMPO roadway and transit projects, along with improvements to additional existing transportation facilities beyond those in the long-range transportation plan, but not the Complete 540 project.

Mass Transit—Attempting to meet the project's primary purposes through the use of bus or rail facilities.

Travel Demand Management (TDM)—Attempting to meet the project's primary purposes by seeking to reduce travel on (demand for) the local roadway network during peak travel times.

Transportation System Management (TSM)—Attempting to meet the project's primary purposes by implementing various techniques intended to increase the efficiency of the existing roadway network during peak travel times.

Using the new No-Build ICE data as a baseline, the updated screening showed that only the New Location Highway concept would adequately meet both of the project's primary purposes.

Preferred Alternative Traffic Analysis — The updated project-level traffic forecast was also used to assess how well the proposed project's interchanges would function, and if there would be any problems or deficiencies on existing or future major roadways and intersections caused by the proposed project. The results of this assessment are presented below.

Roadway segments—The assessment showed that nearly all major roadway segments in and near the project study area would operate at acceptable levels of service. This includes all new segments along the Complete 540 project.

Intersections—The vast majority of the intersections analyzed would operate at acceptable levels of service. For the few underperforming intersections, improvements were considered as part of the Preferred Alternative's preliminary design.

indirect and cumulative effects. Surveys conducted by NCDOT for the project revealed that there are no known occurrences of this species in the action area that extends into Harnett County. Because there will be no direct or indirect effects in any areas known to support Rough-leaved Loosestrife, and because there are no records noting any occurrences within or near the action area, the Biological Conclusion for this species is *No Effect*.

Northern Long-Eared Bat—As described in the Draft EIS, the USFWS has in place a programmatic Biological Opinion for this species for NCDOT projects in eastern North Carolina. Under this Biological Opinion, the Biological Conclusion for this species is *May Affect, Likely to Adversely Affect*. In response, NCDOT has programmatically agreed to conservation measures designed to minimize adverse effects and benefit or promote the recovery of this species, where applicable. Because the USFWS has not listed this species as protected in Wake, Johnston, or Harnett Counties, it does not need to be addressed in the Biological Assessment **and the Biological Conclusion for this project.**

Bald Eagle—As stated in the Draft EIS, while the Bald Eagle is no longer federally listed as endangered, it is still protected by the Bald Eagle and Golden Eagle Protection Act of 1962. After a review of existing information about the presence of this species in the study area, and after field surveys were conducted along the Preferred Alternative, NCDOT has concluded the project would be in compliance with the protections established in this Act and the Bald Eagle would not be affected.

Tar River Spiny mussel—Although the Draft EIS indicated that the Biological Conclusion for this species was unresolved, the species is not known to occur and has not been found in the action area for the Preferred Alternative. Additionally, NCDOT conducted surveys for this species, and none were found. The Biological Conclusion is *No Effect*.

Cape Fear Shiner—This species was not mentioned in the Draft EIS because it is not known to occur within Wake or Johnston Counties. The action area established for this species does, however, encompass additional watershed areas that could potentially be affected by the project's indirect and cumulative effects, including locations in Harnett

County, where historic occurrences of this species have been recorded and the species is listed by the USFWS. The project's Biological Assessment concluded that the potential effects of the Preferred Alternative would be insignificant in the Harnett County portion of the action area and, for this reason, the Biological Conclusion is *May Affect, Not Likely to Adversely Affect*.

Dwarf Wedgemussel—At the time the Draft EIS was written, the Biological Conclusion for this species was unresolved. Through coordination with USFWS, NCDOT agreed to complete additional freshwater mussel studies to help provide information needed to assess the species' viability in the Swift Creek Watershed. These studies noted that while the relative abundance of freshwater mussel species in the Swift Creek watershed has been declining, there is evidence that this decline has leveled off and that the Dwarf Wedgemussel may be reproducing in the watershed. The studies further noted that while rapid urbanization in the Swift Creek watershed has led to relatively rapid habitat degradation in the Creek, some areas of Swift Creek continue to provide high quality mussel habitat. Also, as noted in the discussion of indirect and cumulative effects, there are concerns about concentrations of copper in Swift Creek at levels that may be harmful to freshwater mussels. At the time of this writing, the effectiveness of existing conservation measures to protect mussel viability in the Swift Creek watershed is unclear because they have not been in place long enough for their effectiveness to be determined.

The species viability study conducted for the Complete 540 project concluded that while there is potential for the Dwarf Wedgemussel to persist in Swift Creek, its long-term viability is tenuous. The Biological Conclusion for the Dwarf Wedgemussel is *May Affect, Likely to Adversely Affect*. It is important to note, however, that many of the factors threatening long-term Dwarf Wedgemussel viability in Swift Creek will remain, regardless of whether the project is constructed. Ongoing management and propagation efforts (as explained in the graphic on the next page) are proposed to help achieve long term viability of this species.

To achieve the propagation activities that are proposed for the Dwarf Wedgemussel, NCDOT has agreed to provide funding to retrofit and