Section 3

PROJECT RECOMMENDATIONS

The DCHC MPO is recommending twenty-eight (28) wildlife crossing projects located throughout its planning area as part of this plan. Five (5) projects are recommended for Chatham County, ten (10) are in Durham County (two (2) reside in the City of Durham), and thirteen (13) are in Orange County. Table 3.1 outlines the full list of recommended projects across all jurisdictions. Project recommendations assigned two project IDs signify two separate structures at the site. Rather than listing projects in priority order, each project sheet on the subsequent pages describes the site's significance, which can be referred to as structure replacements or retrofits are considered.

Project recommendations in Section 3 are organized by County, corridors, and additional sites for future consideration. Appendix H: Project Sheet Descriptions may be referred to as a guide.

Project ID	Project Name	Jurisdiction
ChathamCo1 / ChathamCo2	US 15-501 over Pokeberry Creek	Chatham County
ChathamCo3	Big Woods Road over Bush Creek	Chatham County
ChathamCo4	Manns Chapel Road over Wilkinson Creek	Chatham County
ChathamCo5	Lystra Road over Overcup Creek / Jordan Lake	Chatham County
ChathamCo6	Jack Bennett Road over Herndon Creek	Chatham County
DurhamCo1	Cole Mill Road over Eno River	Durham County
DurhamCo2	Rivermont Road over Nancy Rhodes Creek	Durham County
DurhamCo3	US 501 (Roxboro Road) over Eno River	Durham County
DurhamCo4	Guess Road over Eno River	Durham County
DurhamCo5	Old Oxford Road over Eno River	Durham County
DurhamCo6 / DurhamCo7	NC 54 over New Hope Creek	City of Durham
DurhamCo8 / DurhamCo9	I-40 Bridge over New Hope Creek	City of Durham
DurhamCo10	Stagecoach Road over New Hope Creek	Durham County
DurhamCo11	Old Chapel Hill Road over New Hope Creek	Durham County
DurhamCo12	Farrington Road over Little Creek	Durham County
OrangeCo1	Pleasant Green Road over Eno River	Orange County
OrangeCo2	US 70 over Stony Creek	Orange County
OrangeCo3	I-85 over Stony Creek	Orange County
OrangeCo4	University Station Road over Stony Creek	Orange County
OrangeCo5	Old NC Highway 10 over Stony Creek	Orange County
OrangeCo6	Halls Mill Road over Eno River	Orange County
OrangeCo7	Jones Ferry Road over Neville Creek	Orange County
OrangeCo8	Neville Road over Phil's Creek	Orange County
OrangeCo9	NC 54 over Morgan Creek	Orange County
OrangeCo10	Damascus Church Road over Pritchard Mill Creek	Orange County
OrangeCo11	New Hope Church Road over New Hope Creek	Orange County
OrangeCo12	NC 86 over New Hope Creek	Orange County
OrangeCo13	I-40 Culvert over New Hope Creek	Orange County

Table 3: Complete list of wildlife crossing project recommendations in the DCHC MPO planning area.

Section 3.1

CHATHAM COUNTY RECOMMENDATIONS

The DCHC MPO is recommending five (5) wildlife crossing projects that reside within Chatham County as part of this plan. The list of projects can be found below, and a map showing these sites are found in Figure 3.1: Map of complete list of wildlife crossing project recommendations in Chatham County. This map also distinguishes between the MPO's planning area boundary and the boundary for Chatham County. Project recommendations assigned two project IDs signify two separate structures at the site.

Project ID	Project Name	Jurisdiction
ChathamCo1 ChathamCo2	US 15-501 over Pokeberry Creek	Chatham County
ChathamCo3	Big Woods Road over Bush Creek	Chatham County
ChathamCo4	Manns Chapel Road over Wilkinson Creek	Chatham County
ChathamCo5	Lystra Road over Overcup Creek / Jordan Lake	Chatham County
ChathamCo6	Jack Bennett Road over Herndon Creek	Chatham County

Table 3.1: Complete list of wildlife crossing project recommendations in Chatham County.

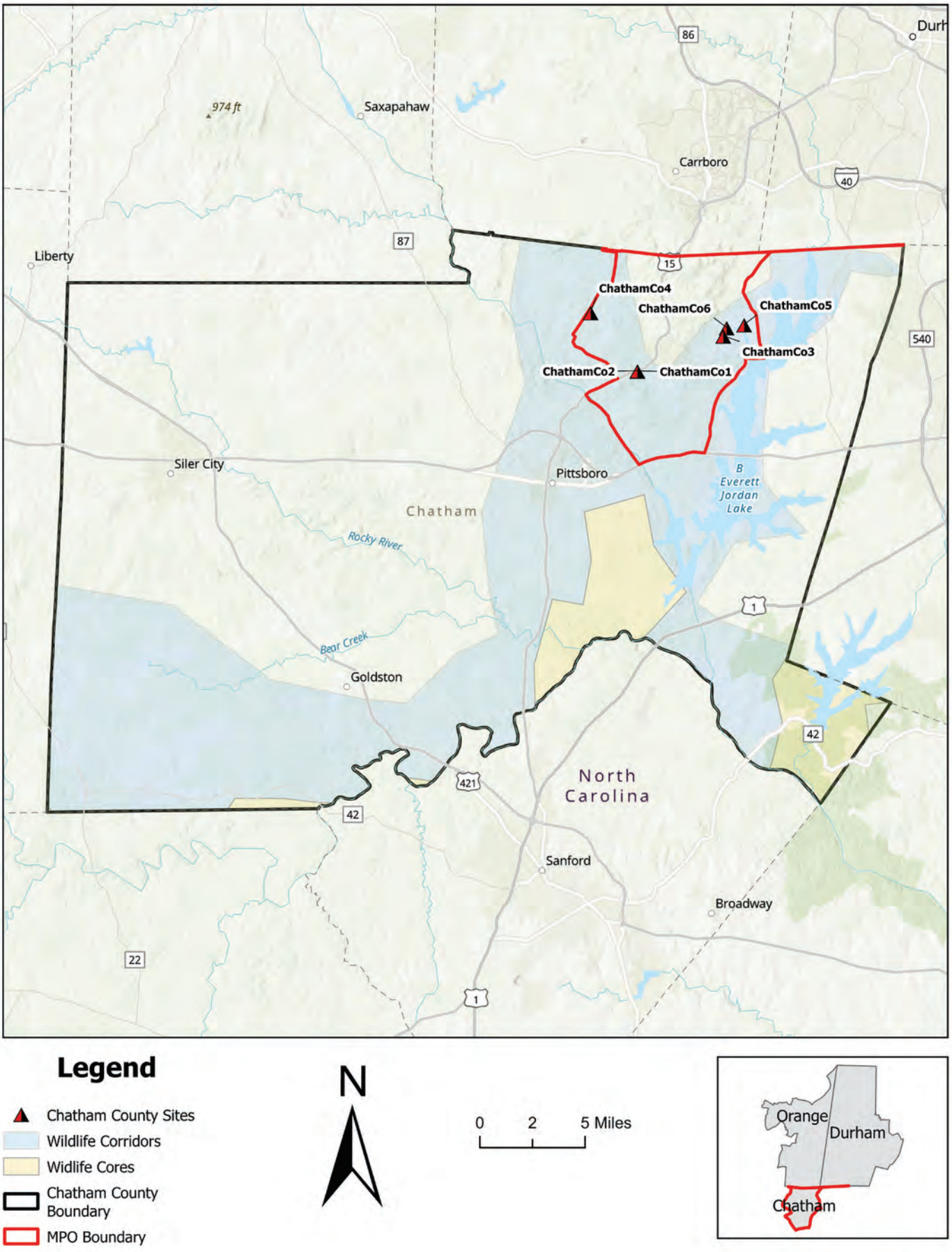


Figure 3.1: Map of complete list of wildlife crossing project recommendations in Chatham County.

Chatham County

US 15-501 over Pokeberry Creek

Summary and Problem Statement

The two bridges on US 15-501 S and N (Chapel Hill Road) over Pokeberry Creek have been identified as a priority wildlife crossing. This crossing resides within a wildlife corridor identified by Wildlands Network, and 20 WVCs have been reported within a one-mile buffer of this site. This roadway has two lanes running both north- and southbound divided by a 20-foot grass median; the divide continues through the bridge structure. The gap between the bridges provides good daylight and visibility to the creek banks below. This site has no bicycle and pedestrian facilities, has a posted speed limit of 55 mph, and garners 16,500 vehicles per day (2021 AADT).

This site has an existing good, dry bench on both sides of the stream when not flooded. The width of the spans and the cross section of the ground surface under the spans already provide adequate space and geometry for wildlife passage on dry banks on both sides of the creek. However, barriers to wildlife travel exist along this corridor and under the bridges, which encourages wildlife travel on the roadway and results in conflicts with motorists. There are areas of exposed riprap with shallow to no sediment/soil (i.e., large voids) that are creating an uneven surface that likely makes it difficult for some wildlife species to traverse. The exposed riprap areas along the streambanks (and possibly in the adjacent toe ditches running parallel to the road) should be filled with material such as fines, soil, screenings, or aggregate to make the surface more even and traversable for wildlife.

Vegetation under the bridge does not appear to be an obstacle, but vegetation downstream along the streambanks is dense, brushy, and thorny. There are also abundant invasive woody species present which should be removed, as they significantly degrade the habitat value of the corridor through the ROW. Vegetation management in at least the downstream riparian area should be explored to determine if it would help guide or attract wildlife to the riparian corridor and the crossing under the bridge. If these aspects are addressed, this crossing site may be a good candidate for fencing, depending on parcel ownership, fencing design factors, etc.

Facing east, under US 15-501 bridge at Pokeberry Creek. DCHC MPO.

Facing west, under US 15-501 bridge at Pokeberry Creek. DCHC MPO.

Aerial photograph of US 15-501 over Pokeberry Creek. Nearmap.

Site Facts

Location ID	ChathamCo1 (southbound) ChathamCo2 (northbound)
Date of Site Visit	May 24, 2024
Jurisdiction	Chatham County
Coordinates	35°47'23.7"N, 79°06'31.3"W
NCDOT Crossing/Structure Code	Southbound bridge: 180037 Northbound bridge: 180489
Existing Structure Type	Bridge (two separate structures)
Property Owner Type	Public, private
Existing Plan Alignment	2024-2033 STIP (TIP #: U-6192)
Managed and Natural Lands	N/A
Average Annual Daily Traffic (AADT) (2019)	Unavailable
Average Annual Daily Traffic (AADT) (2021)	16,500
Projected Average Weekday Traffic (AWDT)	25,694
Speed Limit	55 mph
Reported Wildlife-vehicle collisions (WVCs) within 1-mile Buffer (2018-2022) and Comprehensive Crash Cost Estimate	Non-injury crash: 19 ($475,000) Type C injury crash: 1 ($107,000) **Total crashes and cost estimate: 20 ($582,000)**
Likely Wildlife-vehicle collisions (WVCs) within 1-mile buffer (based on VDOT study revealing 8.5 times more WVCs are occurring than what DOT reports show)	Non-injury crash: 161.5 ($4,037,500) Type C injury crash: 8.5 ($909,500) **Total crashes and cost estimate: 170 ($4,947,000)**

20
Reported WVCs within 1-mile buffer (2018-2022)

$582,000
Reported WVCs cost estimate

16,500
Annual average daily traffic (2021)

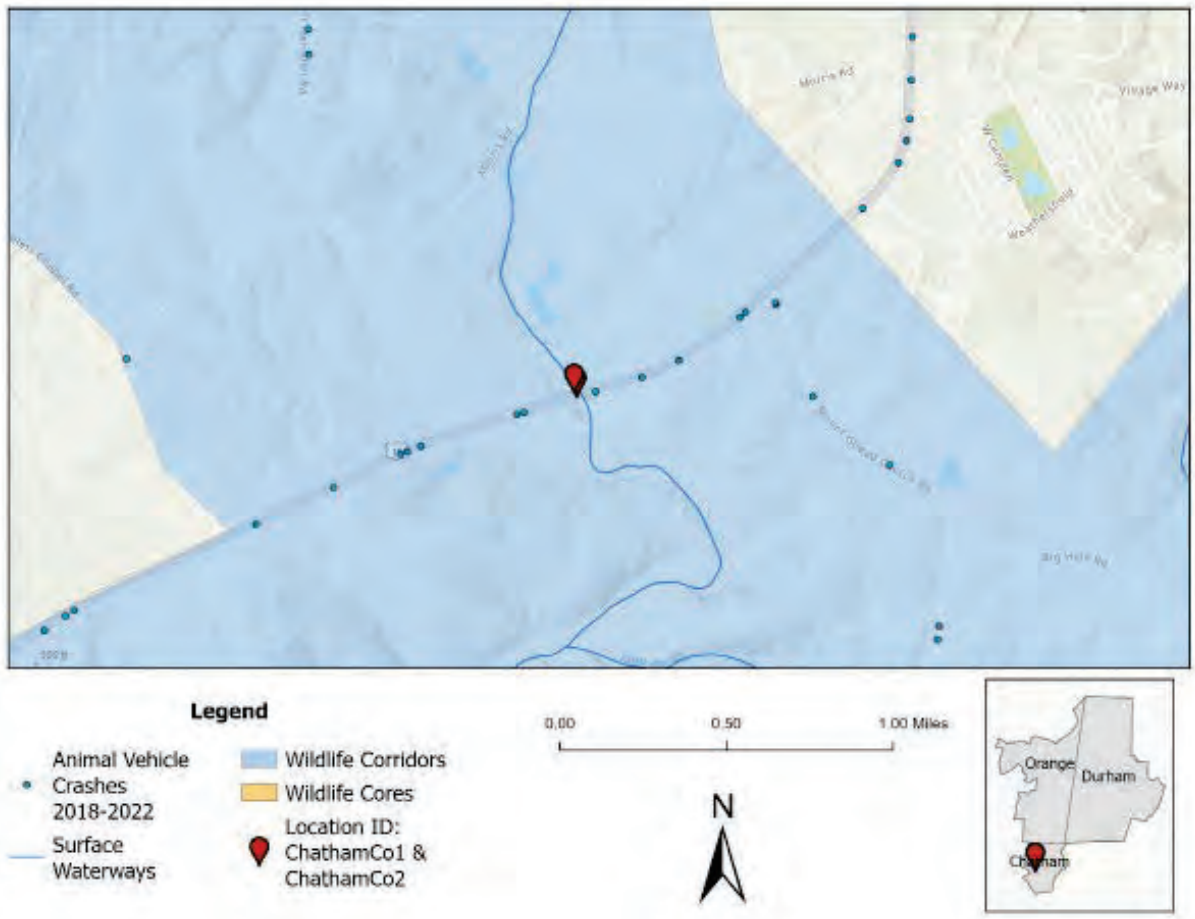
55
mph speed limit

Preferred Scenario

Fill voids in the exposed riprap under and adjacent to the spans on both sides of the creek with fine aggregate to provide a smooth natural surface for wildlife passage on the existing benches. Thin vegetation and remove invasives within the ROW immediately downstream of the bridge to increase permeability into the adjacent undisturbed habitat to allow wildlife passage. Install fencing to guide wildlife under the bridge.

Alternate Scenario

Until the riprap surface can be filled/improved, perform the selective vegetation clearing described above at a minimum.



Chatham County

Big Woods Road over Bush Creek

Summary and Problem Statement

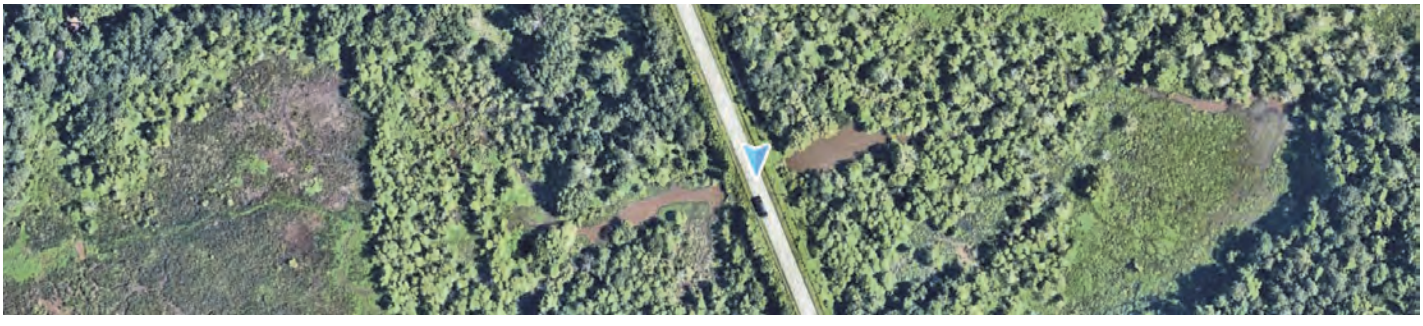
The culvert at Big Woods Road over Bush Creek has been identified as a priority wildlife crossing. This crossing resides within a wildlife corridor identified by Wildlands Network, and 8 WVCs have been reported within a one-mile buffer of this site. The bridge is a two-lane undivided roadway with no bicycle and pedestrian facilities, and has a posted speed limit of 55 mph. This site is adjacent to several managed and natural lands, which include the US Army Corps of Engineers land that includes the Bush Creek marshes area which connects nearby to Jordan Lake, and the NC Department of Natural and Cultural Resources Natural Heritage Program.

Barriers to wildlife travel exist along this corridor and through the culvert, which encourages wildlife travel on the roadway and results in conflicts with motorists. Barriers include standing water through the double box / two-bay culvert, and the placement of riprap. There are areas of suitable dry habitat approaching the underpass area on both sides of the road, even though there are also flooded wetland areas. However, there is no dry passage because both cells of the culvert are flooded to their full width, and because the riprap slope protection on the roadway embankment (causeway) extends into the standing water both up and downstream of the culvert.

Several elements of the roadway embankment (causeway) and stream culvert construction present challenges for the potential of dry passage through the culvert except potentially in times of extremely low water levels when no standing water is present. First, the culverts are not wide enough to accommodate dry wildlife passage and hydrology. Further, the placement of embankment riprap slope protection to the toe of the embankment at the adjacent floodplain elevation, cuts off dry passage from the floodplain when it is flooded. In addition, the uniform steep slope of the riprap on the embankments and the concrete wingwalls does not include a level bench that could be tied into the culvert if dry passage through them were provided.

Facing East from west side of Big Woods Road culvert. Pete Schubert.

Facing west from above Big Woods Road culvert. Pete Schubert.



Aerial photograph of Big Woods Road over Bush Creek. Nearmap.

Site Facts

Location ID	ChathamCo3
Date of Site Visit	June 13, 2024
Jurisdiction	Chatham County
Coordinates	35°48'41.8"N 79°02'36.2"W
NCDOT Crossing/Structure Code	180440
Existing Structure Type	Culvert
Property Owner Type	Public
Existing Plan Alignment	CTP Highway: Big Woods Rd CTP Pedestrian: Big Woods Rd
Managed and Natural Lands	U.S. Army Corps of Engineers, NC DNCR Natural Heritage Program
Average Annual Daily Traffic (AADT) (2019)	Unavailable
Average Annual Daily Traffic (AADT) (2021)	Unavailable
Projected Average Weekday Traffic (AWDT)	2,392
Speed Limit	55 mph
Reported Wildlife-vehicle collisions (WVCs) within 1-mile Buffer (2018-2022) and Comprehensive Crash Cost Estimate	Non-injury crash: 8 ($200,000) **Total crashes and cost estimate: 8 ($200,000)**
Likely Wildlife-vehicle collisions (WVCs) within 1-mile buffer (based on VDOT study revealing 8.5 times more WVCs are occurring than what DOT reports show)	Non-injury crash: 68 ($1,700,000) **Total crashes and cost estimate: 68 ($1,700,000)**

8
Reported WVCs within 1-mile buffer (2018-2022)

$200,000
Reported WVCs cost estimate

2,392
Projected annual daily traffic

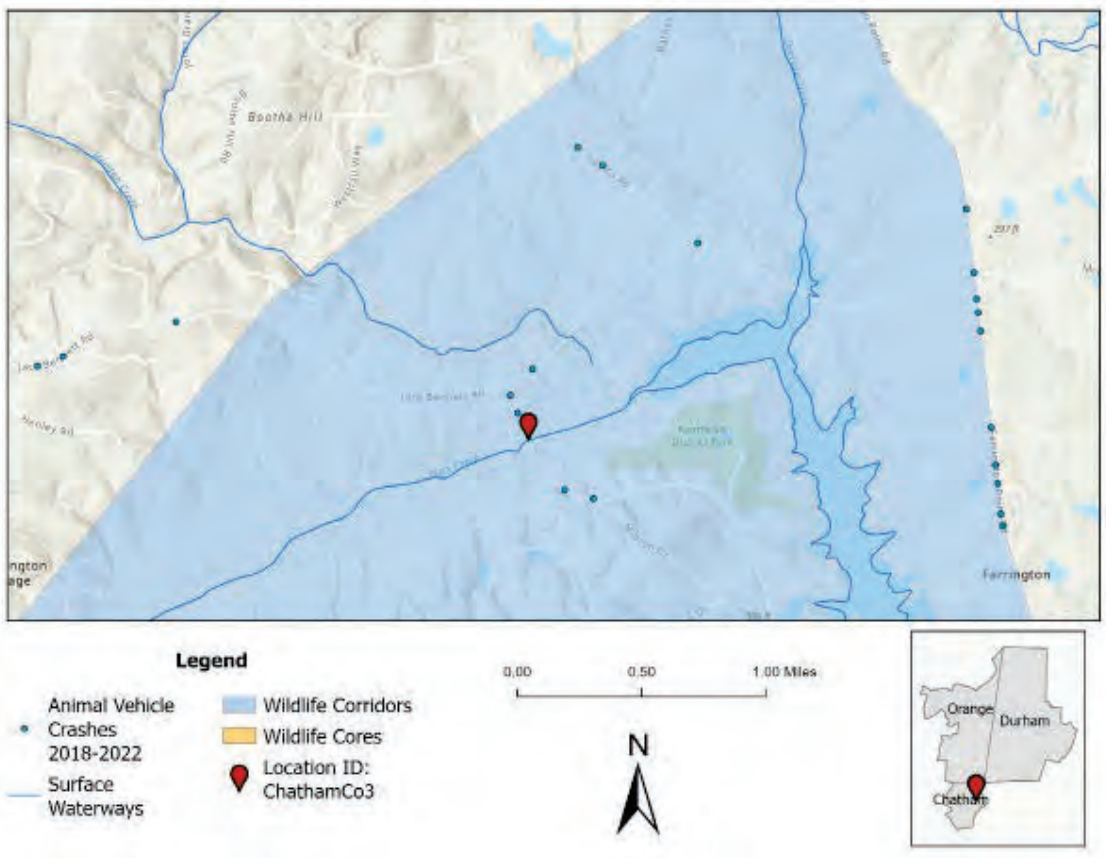
Adjacent managed natural land

Preferred Scenario

Replace the existing culverts and adjacent earthen embankments with a single span bridge of sufficient roadway length to provide both hydrologic function plus a minimum width of 8 feet at and above floodplain elevation on both sides of the creek for dry wildlife passage. Extend these dry passages on both side of the bridge up and downstream into adjacent dry habitat areas. All dry passages must be natural surface, free of open riprap.

Alternate Scenario

Construct new dry culverts through the causeway as wildlife underpasses on both sides of the existing culvert, placed so that wildlife can move from dry habitat areas on either side of the road, through these new dry culverts, to dry habitat areas on the other side of the road. These two new culverts should be at least 8 feet high and 12 feet wide, with a natural surface floor that is not normally flooded and should be straight with no offset or skew. If sufficient causeway height is not present to achieve the required height of the new dry culverts, the profile of the roadway may need to be raised in the section between the new culverts.



Chatham County

Manns Chapel Road over Wilkinson Creek

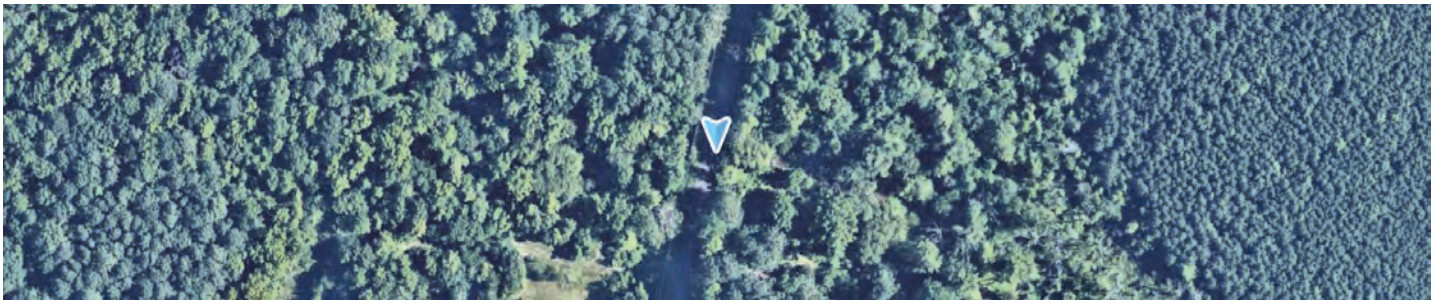
Summary and Problem Statement

The triple pipe culvert at Manns Chapel Road (SR 1532) over Wilkinson Creek has been identified as a priority wildlife crossing. This crossing resides within a wildlife corridor identified by Wildlands Network, and there have been four reported wildlife-vehicle crashes within a one-mile buffer of this site. This crossing is positioned along a two-lane road that has no bicycle and pedestrian facilities, and has a posted speed limit of 45 mph.

Barriers to wildlife travel exist along this corridor and through the culvert, which encourages wildlife travel on the roadway and results in conflicts with motorists. This site offers no dry passage for wildlife through the existing triple pipe culvert. During the relatively low water conditions on the date of site assessment, all pipe culverts were flooded with water, and debris was blocking the central culvert pipe. The three identical pipe culverts are round corrugated galvanized steel (pipe appears to be bituminous-coated on bottom) and are aging. Given the less than 6 feet of elevation difference between the road profile and the adjacent floodplain, there is no opportunity for any modification to the pipe culverts or installation of dry passage culverts adjacent to the existing culverts away from the stream channel.

East side of Manns Chapel Road culvert over Wilkinson Creek. DCHC MPO.

West side of Manns Chapel Road culvert over Wilkinson Creek. DCHC MPO.



Aerial photograph of Manns Chapel Road culvert over Wilkinson Creek. Nearmap.

Site Facts

Location ID	ChathamCo4
Date of Site Visit	May 24, 2024
Jurisdiction	Chatham County
Coordinates	35°49'33.7"N 79°08'39.6"W
NCDOT Crossing/Structure Code	180444
Existing Structure Type	Triple pipe culvert
Property Owner Type	Private
Existing Plan Alignment	CTP Highway: Highway: Manns Chapel Rd. CTP Bicycle & Pedestrian: Manns Chapel Rd.
Managed and Natural Lands	N/A
Average Annual Daily Traffic (AADT) (2019)	Unavailable
Average Annual Daily Traffic (AADT) (2021)	Unavailable
Projected Average Weekday Traffic (AWDT)	3,862
Speed Limit	45 mph
Reported Wildlife-vehicle collisions (WVCs) within 1-mile Buffer (2018-2022) and Comprehensive Crash Cost Estimate	Non-injury crash: 4 ($100,000) **Total crashes and cost estimate: 4 ($100,000)**
Likely Wildlife-vehicle collisions (WVCs) within 1-mile buffer (based on VDOT study revealing 8.5 times more WVCs are occurring than what DOT reports show)	Non-injury crash: 34 ($850,000) **Total crashes and cost estimate: 34 ($850,000)**

4
Reported WVCs within 1-mile buffer (2018-2022)

$100,000
Reported WVCs cost estimate

3,862
Projected annual daily traffic

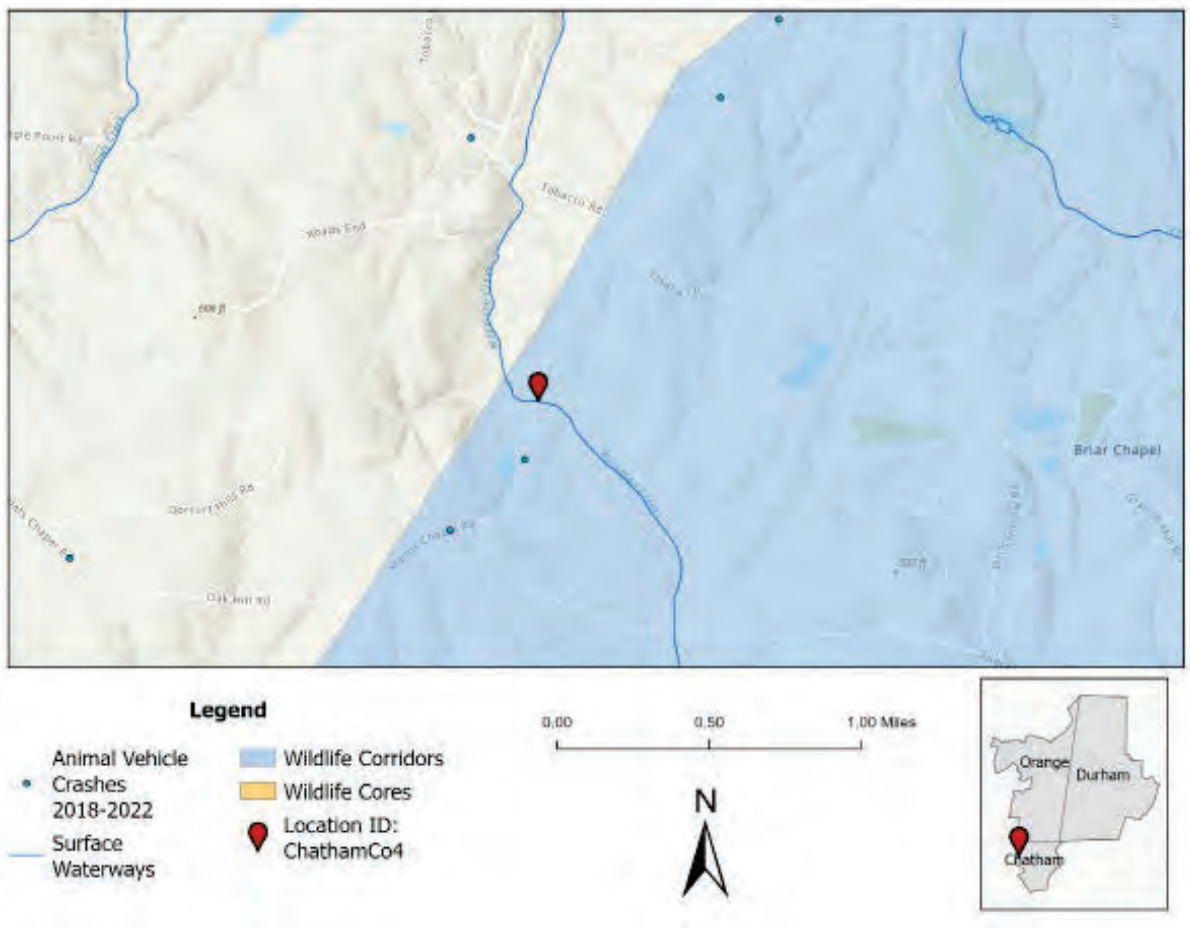
45
mph speed limit

Preferred Scenario

The triple pipe culverts should be replaced with a single bridge of sufficient span to provide dry passage for wildlife on both sides of the stream at or above floodplain elevation. The road causeway profile should be raised to provide at least 8 feet of vertical clearance between dry passages and the bottom of the bridge structure.

Alternate Scenario

The existing triple pipe culvert could be replaced with a 5-bay box culvert that provides outer cells with higher, dry passage for wildlife on both sides of the stream, with these dry passages connected to habitat up and down stream; or, a relatively short, full open-span bridge wide enough and high enough for dry passage on both sides of stream. The road causeway profile should be raised sufficiently to provide at least 8 feet of vertical clearance between the natural surface bottoms and the box culvert ceilings within dry passage bays.



Chatham County

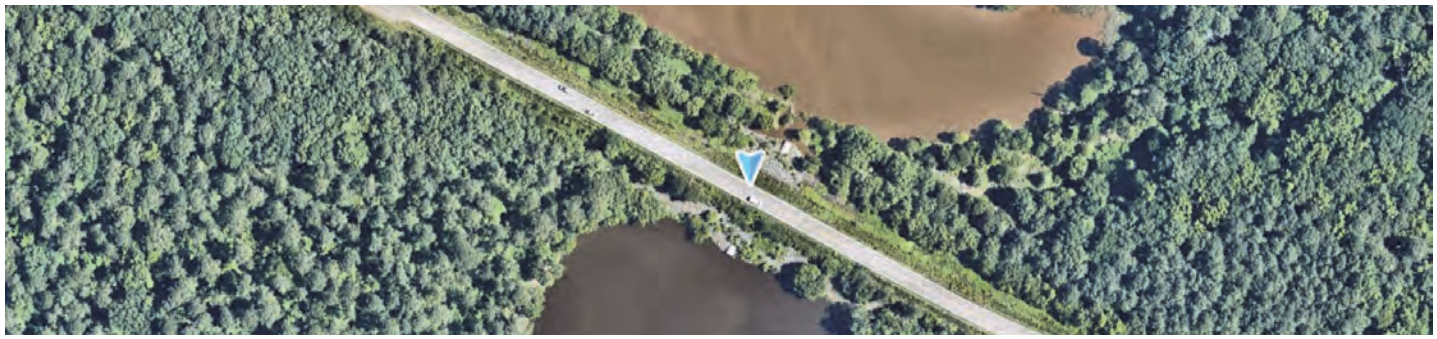
Lystra Road over Overcup Creek / Jordan Lake

Summary and Problem Statement

Lystra Road over Overcup Creek has been identified as a priority wildlife crossing. This crossing resides within a wildlife corridor identified by Wildlands Network, and there have been sixteen reported wildlife-vehicle crashes within a one-mile buffer of this site. This crossing is positioned along a two-lane road that has no bicycle and pedestrian facilities, and has a posted speed limit of 45 mph. The US Army Corps of Engineers maintains the natural managed land of Jordan Lake adjacent to this site.

Barriers to wildlife travel exist along this corridor and through the pipe, which encourages wildlife travel on the roadway and results in conflicts with motorists. The road at this site crosses the lake on a raised causeway with steep riprap slopes from the road down to the floodplain and lake. The land around this crossing has existing trails currently used by the public that are conducive to wildlife travel. However, due to the pipe's location in the middle of Overcup Creek, and the wide body of water surrounding it, the structure is not conducive for wildlife passage through a retrofit.

View of pipe from north side of Lystra Road over Overcup Creek / Jordan Lake. DCHC MPO.



Aerial photograph of Lystra Road pipe over Overcup Creek / Jordan Lake. Nearmap.

Site Facts

Location ID	ChathamCo5
Date of Site Visit	June 13, 2024
Jurisdiction	Chatham County
Coordinates	35°49'07.1"N 79°01'39.1"W
NCDOT Crossing/Structure Code	16333
Existing Structure Type	Pipe
Property Owner Type	Public
Existing Plan Alignment	2050 MTP Highway: Jack Bennet Rd/Lystra Rd CTP Highway: Jack Bennet Rd CTP Pedestrian: Jack Bennet Rd
Managed and Natural Lands	US Army Corps of Engineers
Average Annual Daily Traffic (AADT) (2019)	8,700
Average Annual Daily Traffic (AADT) (2021)	6,700
Projected Average Weekday Traffic (AWDT)	9,143
Speed Limit	45 mph
Reported Wildlife-vehicle collisions (WVCs) within 1-mile Buffer (2018-2022) and Comprehensive Crash Cost Estimate	Non-injury crash: 16 ($400,000) **Total crashes and cost estimate: 16 ($400,000)**
Likely Wildlife-vehicle collisions (WVCs) within 1-mile buffer (based on VDOT study revealing 8.5 times more WVCs are occurring than what DOT reports show)	Non-injury crash: 136 ($3,400,000) **Total crashes and cost estimate: 136 ($3,400,000)**

16
Reported WVCs within 1-mile buffer (2018-2022)

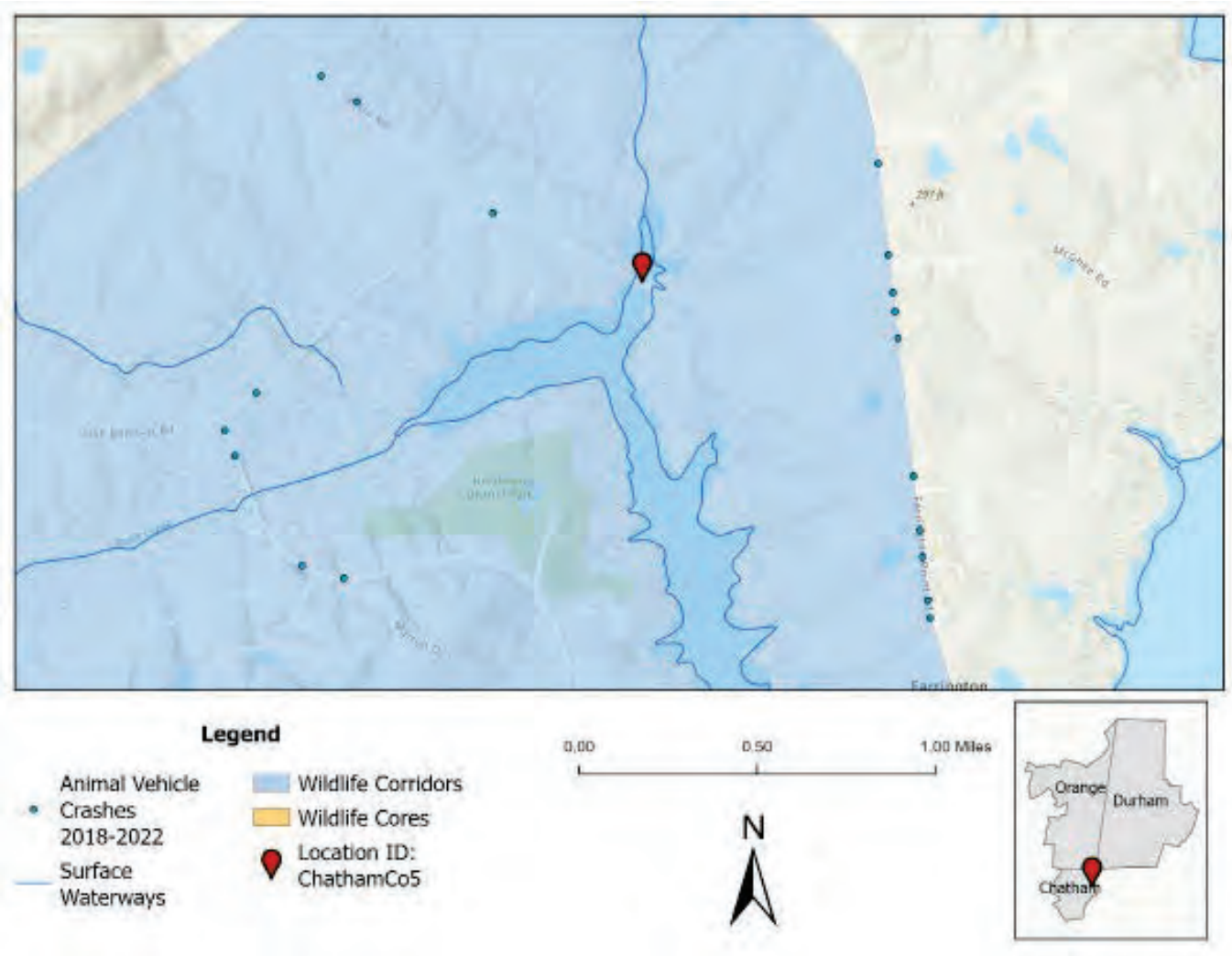
$400,000
Reported WVCs cost estimate

6,700
Annual average daily traffic (2021)

Adjacent managed natural land

Preferred Scenario

Construct dry culverts through the causeway on both sides of the lake to connect the high-quality lakeside habitat on both sides of the road. Dry culverts should be at least 12 feet wide and 8 feet high. The existing approach for wildlife to a potential underpass in these areas (visibility, slopes, etc.) is already good. This solution would also require fencing to guide wildlife to the dry culverts.



Chatham County

Jack Bennett Road over Herndon Creek

Summary and Problem Statement

Jack Bennett Road over Herndon Creek has been identified as a priority wildlife crossing. This crossing resides within a wildlife corridor identified by the Wildlands Network, and there have been eight reported wildlife-vehicle crashes within a one-mile buffer of this site. This crossing is positioned along a two-lane road that has no bicycle and pedestrian facilities, and has a posted speed limit of 55 mph. The US Army Corps of Engineers has adjacent natural and managed land within the Jordan Reservoir impoundment area, managed by the NC Wildlife Resources Commission as a gameland.

Barriers to wildlife travel exist along this corridor and under the bridge, which encourages wildlife travel on the roadway and results in conflicts with motorists. The continuous riprap slope protection along the causeway/roadway embankments and under the bridge is a major barrier to wildlife passage through the underpass and connection to habitat areas up and downstream. This riprap extends from about 10 feet below shoulder grade down to the toe of the slopes at the floodplain without a bench that could function as dry passage above the floodplain elevation. Though low water dry passage exists on the east side, none exists on the west side, and neither functions at high creek levels. A 30 feet wide partially dry natural surface floodplain exists on the north bank under the bridge, beyond the toe of the riprap slope protection that has good connectivity to adjacent up and downstream habitat, but only at low water levels. No dry passage is present on the south bank as the riprap slope protection extends to the top of the creek bank.

Under bridge at Jack Bennett Road over Herndon Creek, facing northwest. Pete Schubert.

Under bridge at Jack Bennett Road over Herndon Creek, facing southwest. Pete Schubert.

Aerial photograph of Jack Bennett Road bridge over Herndon Creek. Nearmap.

Site Facts

Location ID	ChathamCo6
Date of Site Visit	June 13, 2024
Jurisdiction	Chatham County
Coordinates	35°49'00.2"N 79°02'27.0"W
NCDOT Crossing/Structure Code	180060
Existing Structure Type	Bridge
Property Owner Type	Public
Existing Plan Alignment	2050 MTP Highway: Jack Bennet Rd/Lystra Rd CTP Highway: Jack Bennet Rd CTP Pedestrian: Jack Bennet Rd
Managed and Natural Lands	US Army Corps of Engineers
Average Annual Daily Traffic (AADT) (2019)	Unavailable
Average Annual Daily Traffic (AADT) (2021)	Unavailable
Projected Average Weekday Traffic (AWDT)	6,651
Speed Limit	55 mph
Reported Wildlife-vehicle collisions (WVCs) within 1-mile Buffer (2018-2022) and Comprehensive Crash Cost Estimate	Non-injury crash: 8 ($200,000) **Total crashes and cost estimate: 8 ($200,000)**
Likely Wildlife-vehicle collisions (WVCs) within 1-mile buffer (based on VDOT study revealing 8.5 times more WVCs are occurring than what DOT reports show)	Non-injury crash: 68 ($1,700,000) **Total crashes and cost estimate: 68 ($1,700,000)**

8
Reported WVCs within 1-mile buffer (2018-2022)

$200,000
Reported WVCs cost estimate

6,651
Projected annual daily traffic

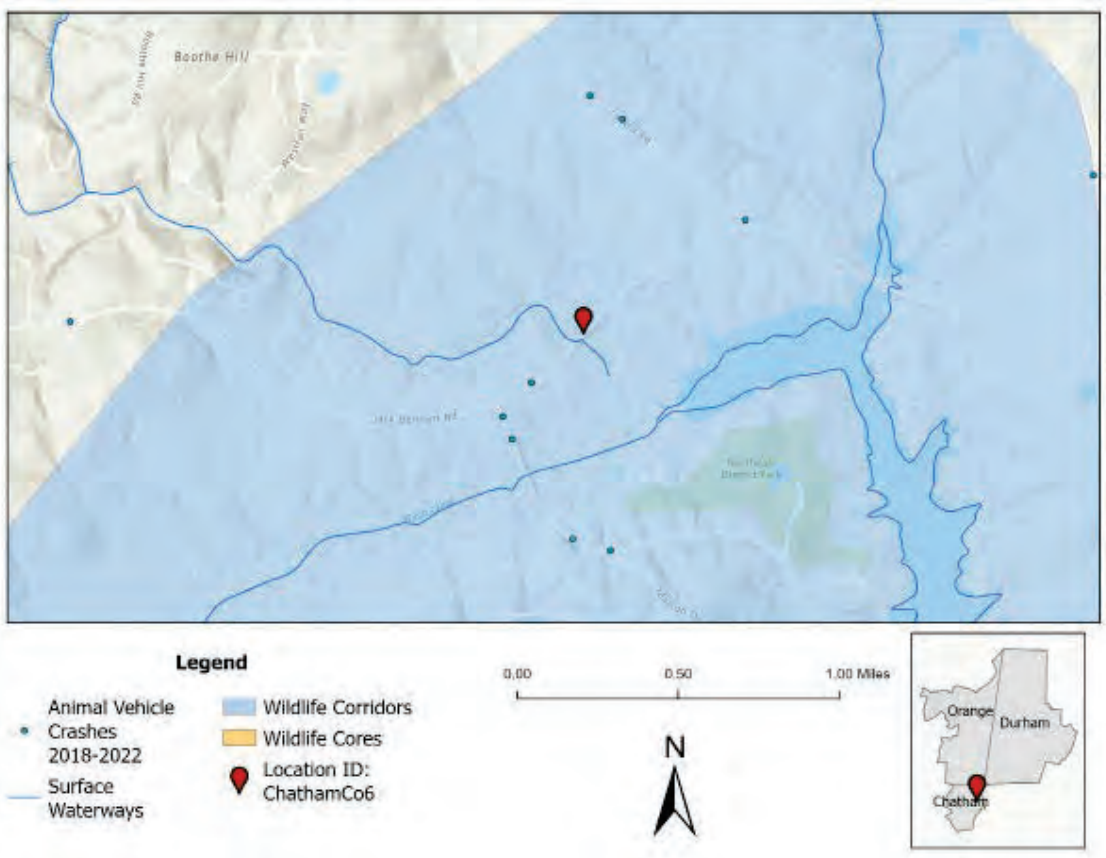
Adjacent managed natural land

Preferred Scenario

If the length of the bridge span between abutments is sufficient, grade 8 feet wide benches into the embankment/causeway slopes across the entire width of the creek floodplain on both sides of the road to create dry passages for wildlife at high water. Connect the benches under the bridge on each end, and tie them into dry habitat up and downstream. Benches should be natural surface or, if riprap is used, it must have all voids filled to provide a smooth surface.

Alternate Scenario

Construct new dry culverts through the causeway to serve as wildlife underpasses on both sides of the existing bridge span, placed so that wildlife can move from dry habitat areas on either side of the road, through these new dry culverts, to dry habitat areas on the other side of the road. These two new culverts should be at least 8 feet high and 12 feet wide, with a natural surface floor that is not normally flooded, and be straight with no offset or skew. If sufficient causeway height is not present to achieve the required height of the new dry culverts, the profile of the roadway may need to be raised in the section between the new culverts.



Section 3.2

DURHAM COUNTY RECOMMENDATIONS

The DCHC MPO is recommending ten (10) projects for Durham County (two (2) reside in the City of Durham) as part of this plan. The list of projects can be found below in Table 3.2, and a map showing these sites are found in Figure 3.2: Map of complete list of wildlife crossing project recommendations in Durham County. Project recommendations assigned two project IDs signify two separate structures at the site.

Project ID	Project Name	Jurisdiction
DurhamCo1	Cole Mill Road over Eno River	Durham County
DurhamCo2	Rivermont Road over Nancy Rhodes Creek	Durham County
DurhamCo3	US 501 (Roxboro Road) over Eno River	Durham County
DurhamCo4	Guess Road over Eno River	Durham County
DurhamCo5	Old Oxford Road over Eno River	Durham County
DurhamCo6 DurhamCo7	NC 54 over New Hope Creek	City of Durham
DurhamCo8 DurhamCo9	I-40 Bridge over New Hope Creek	City of Durham
DurhamCo10	Stagecoach Road over New Hope Creek	Durham County
DurhamCo11	Old Chapel Hill Road over New Hope Creek	Durham County
DurhamCo12	Farrington Road over Little Creek	Durham County

Table 3.2: Complete list of wildlife crossing project recommendations in Durham County.

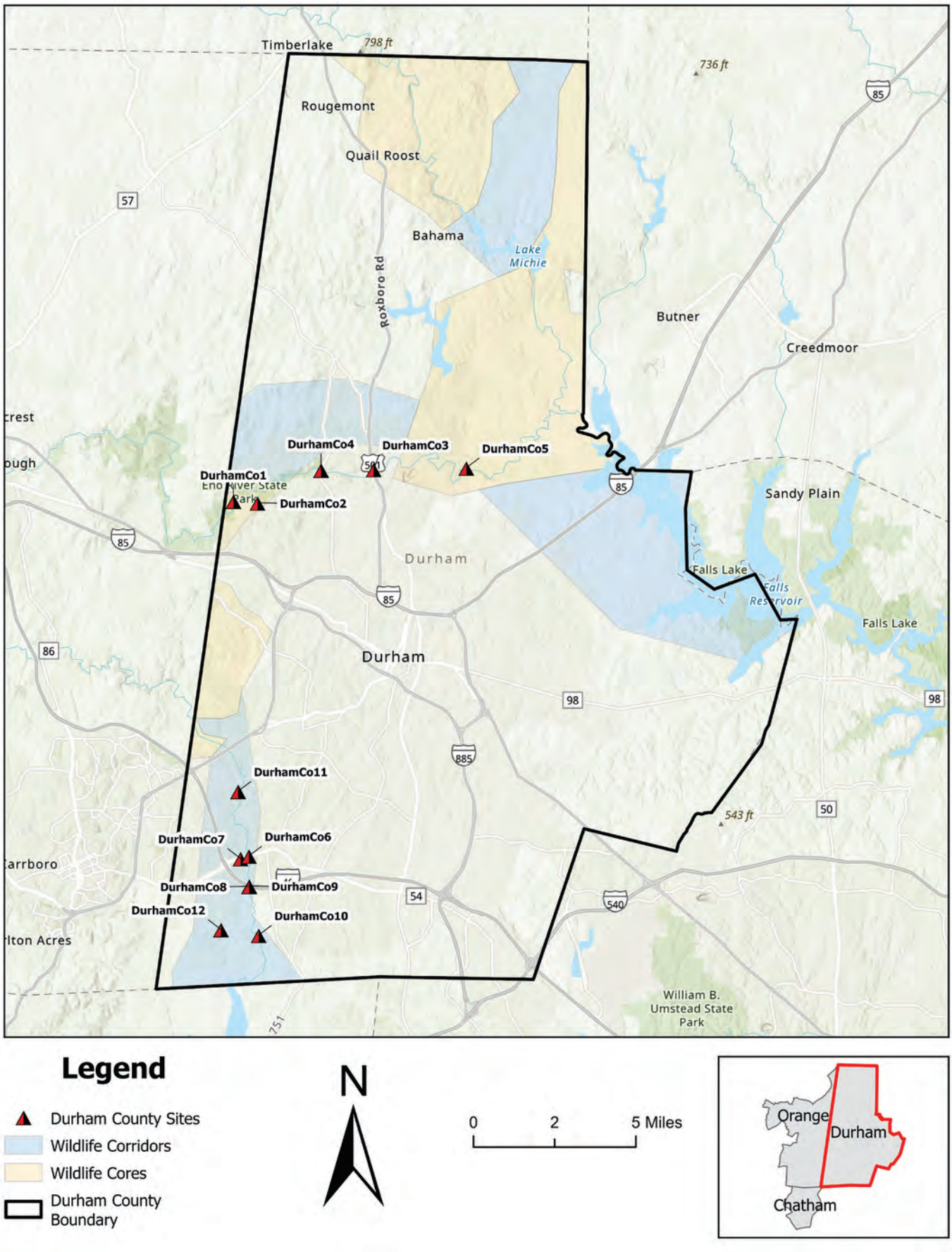


Figure 3.2: Map of complete list of wildlife crossing project recommendations in Durham County.

Durham County

Cole Mill Road over Eno River

Summary and Problem Statement

Cole Mill Road over the Eno River has been identified as a priority wildlife crossing. This crossing resides within a wildlife core identified by the Wildlands Network. The bridge at this site is a two-lane undivided with no bicycle and pedestrian facilities. This site has 10 reported WVCs within a one-mile buffer, has a posted speed limit of 45 mph, and garners 8,600 vehicles per day (2021 AADT). This site is adjacent to natural managed lands. The NC DNCR, Division of Parks and Recreation maintains Eno River State Park along the western side of the crossings, the Mountains-to-Sea Trail, the Middle Eno River Bluffs and Slope, and the Eno River Aquatic Habitat. The US Fish and Wildlife Service has identified the site as a critical habitat for the Altantic Pigtoe, Carolina Madtom, Neuse River Waterdog, and Green Floater.

Barriers to wildlife travel exist within this core and under the bridge, which encourages wildlife travel on the roadway and results in conflicts with motorists. Riprap placed on the east side of the bridge on the north bank from the top of the steep slope all the way into the river to the base of the incised bank prevents dry passage for wildlife at any elevation. A bench created midway up this riprap slope that has been choked with pea gravel has not been connected to the habitat up or downstream. The natural surface slope under the bridge is steeply sloping from abutment at the top to the riverbank. The remains of the eroded and abandoned Pea Creek Trail (wood boardwalk, steps) interfere with dry passage on the north bank from the east, and the entire north bank is steeply sloped with no benches for wildlife access or human foot traffic. On the south bank, scour has narrowed to the width of the dry passage between the toe of the steep concrete paved slope protection surrounding the abutment, and woody vegetation at the top of the eroding bank interferes with passage of both wildlife and foot traffic of the Mountains-to-Sea Trail (MST) along the south bank of the Eno River under the bridge. All replacement, repair, and/or remediation work should be closely coordinated between NCDOT staff, Eno River State Park (ERSP) staff (Pea Creek trail, ERSP lands), and NC Division of Parks and Recreation.

East side of Cole Mill Road bridge over Eno River, facing southwest. DCHC MPO.

West side of Cole Mill Road bridge over Eno River, facing northeast. DCHC MPO.

Aerial photograph of Cole Mill Road bridge over Eno River. Nearmap.

Site Facts

Location ID	DurhamCo1
Date of Site Visit	April 17, 2024
Jurisdiction	Durham County
Coordinates	36°03'33.6"N 78°58'41.0"W
NCDOT Crossing/Structure Code	310049
Existing Structure Type	Bridge
Property Owner Type	Public
Existing Plan Alignment	CTP Pedestrian: Cole Mill Rd CTP Highway: Cole Mill Rd
Managed and Natural Lands	NC DNCR Division of Parks and Recreation, US Fish and Wildlife Service
Average Annual Daily Traffic (AADT) (2019)	9,500
Average Annual Daily Traffic (AADT) (2021)	8,600
Projected Average Weekday Traffic (AWDT)	10,754
Speed Limit	45 mph
Reported Wildlife-vehicle collisions (WVCs) within 1-mile Buffer (2018-2022) and Comprehensive Crash Cost Estimate	Non-injury crash: 10 ($250,000) **Total crashes and cost estimate: 10 ($250,000)**
Likely Wildlife-vehicle collisions (WVCs) within 1-mile buffer (based on VDOT study revealing 8.5 times more WVCs are occurring than what DOT reports show)	Non-injury crash: 85 ($2,125,000) **Total crashes and cost estimate: 85 ($2,125,000)**

10
Reported WVCs within 1-mile buffer (2018-2022)

$250,000
Reported WVCs cost estimate

8,600
Annual average daily traffic (2021)

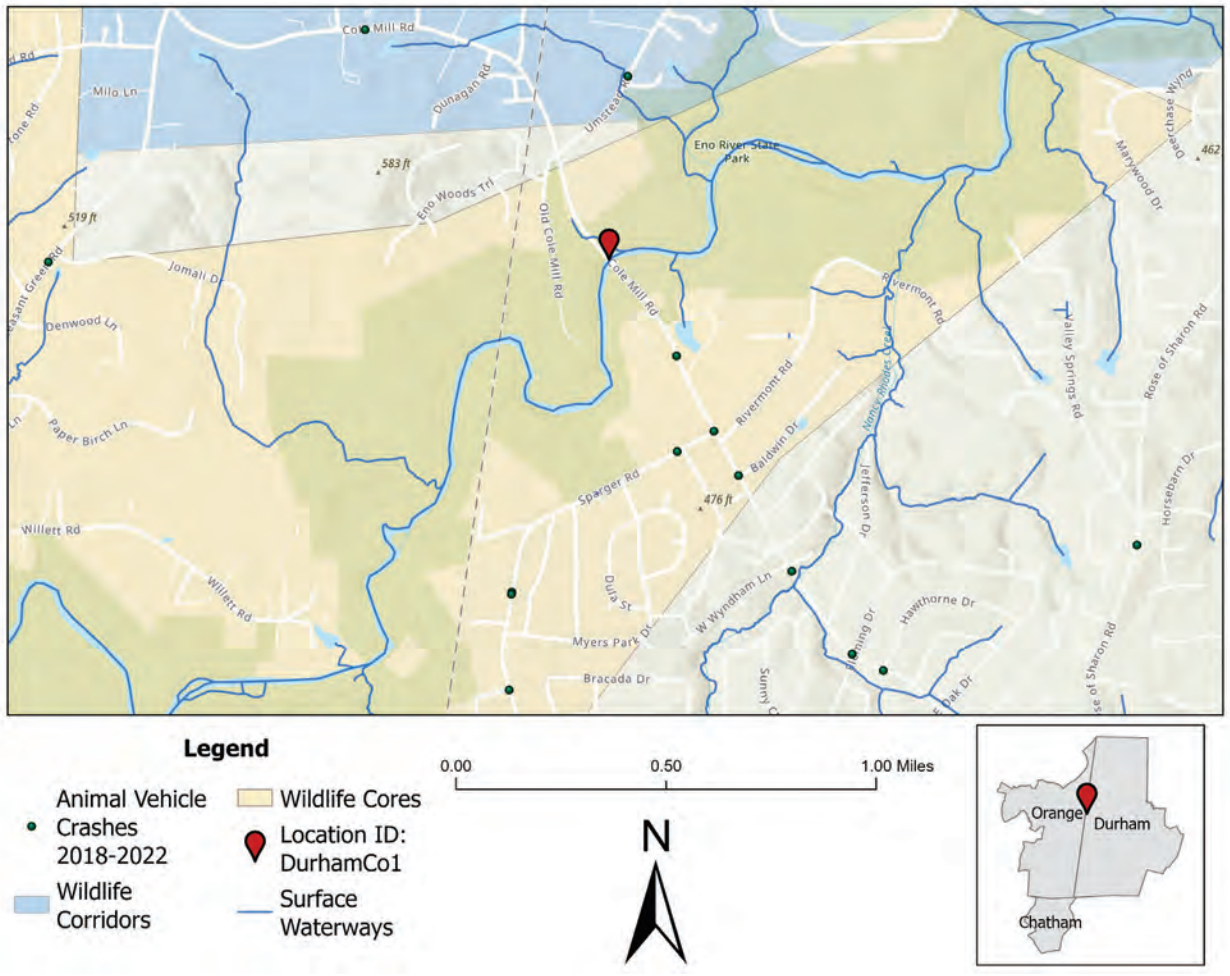
Adjacent managed natural land

Preferred Scenario

Replace the bridge with a longer span that provides sufficient room for dry wildlife and trail passage on both banks of the river. Vertical bents at the abutments are recommended to maximize low slope dry passages and provide additional high water flow capacity to minimize bank scour. Connect dry passages to habitat up and downstream on both sides of the river.

Alternate Scenario

Bench into the north bank slope to provide a minimum of 8 feet of dry passage for wildlife and trail foot traffic. Similarly, bench into the paved slope protection on the south bank. Connect dry passages to habitat up and downstream on both sides of the river. Repair the scour around the bent piers that are eroding into both banks and potentially threatening the integrity of the piers.



Durham County

Rivermont Road over Nancy Rhodes Creek

Summary and Problem Statement

Rivermont Road over Nancy Rhodes Creek has been identified as a priority wildlife crossing. This crossing resides within a wildlife core identified by Wildlands Network, and 11 WVCs have been reported within a one-mile buffer of this site. This site has no bicycle and pedestrian facilities. Since there are no active ordinances for this route, the roadway falls under statutory speed limits, which is 55 mph outside of city limits. However, the road's gravel surface, curves, and narrow bridge suggests that a maximum safe speed would be closer to 35 mph.

This site is adjacent to several managed and natural lands. The N.C. Department of Natural & Cultural Resources Division of Parks & Recreation maintains Eno River State Park along the north side of the site, and the Middle Eno River Bluffs and Slope natural heritage area. The Eno River Association maintains a conservation easement covering 8.84 acres on the southwest side of the site. The City of Durham maintains Valley Spring Park, which covers 124.58 acres on the southeast side of the site.

Barriers to wildlife travel exist within this core and under the bridge, which encourages wildlife travel on the roadway and results in conflicts with motorists. Barriers include scattered riprap, steep and actively eroding and undercut banks, and abandoned temporary silt fence and posts. The banks beneath the bridge appear to need immediate stabilization from creek bank erosion. The once uniformly steep, riprap slopes are now eroded, leaving hardpan and saprolite benches that are discontinuously present on both banks. Neither side provides continuous dry stream bank passage at any stream level.

The slopes from the creek bank to the abutments appear to have been once covered by riprap slope protection, but all that remains is some riprap within a few feet of each abutment; the rest has been eroded away and the underlying subgrades have been significantly scoured away. These slopes should be rebuilt to provide natural surface dry passage benches, while also providing critical stabilization of the abutment slopes. The bridge appears to be a recent replacement span and of adequate span length to provide dry passage on both sides if the slopes are reconstructed and stabilized adequately.

Rivermont Road ridge over Nancy Rhodes Creek looking Southwest. DCHC MPO.

Rivermont Road bridge over Nancy Rhodes Creek looking East. Pete Schubert.

Aerial photograph of Rivermont Road bridge over Nancy Rhodes Creek. Nearmap

Site Facts

Location ID	DurhamCo2
Date of Site Visit	April 17, 2024
Jurisdiction	Durham County
Coordinates	36°03'31.1"N 78°57'58.1"W
NCDOT Crossing/Structure Code	310458
Existing Structure Type	Bridge
Property Owner Type	Local, private, state
Existing Plan Alignment	CTP Pedestrian: Rivermont Rd
Managed and Natural Lands	NC DNCR Division of Parks and Recreation, Eno River Association, City of Durham
Average Annual Daily Traffic (AADT) (2019)	Unavailable
Average Annual Daily Traffic (AADT) (2021)	Unavailable
Projected Average Weekday Traffic (AWDT)	Unavailable
Speed Limit	55 mph (statutory speed limit outside of city limits)
Reported Wildlife-vehicle collisions (WVCs) within 1-mile Buffer (2018-2022) and Comprehensive Crash Cost Estimate	Non-injury crash: 10 ($250,000) Type C injury crash: 1 ($107,000) **Total crashes and cost estimate: 11 ($357,000)**
Likely Wildlife-vehicle collisions (WVCs) within 1-mile buffer (based on VDOT study revealing 8.5 times more WVCs are occurring than what DOT reports show)	Non-injury crash: 85 ($2,125,000) Type C injury crash: 8.5 ($909,500) **Total crashes and cost estimate: 93.5 ($3,034,500)**

11
Reported WVCs within 1-mile buffer (2018-2022)

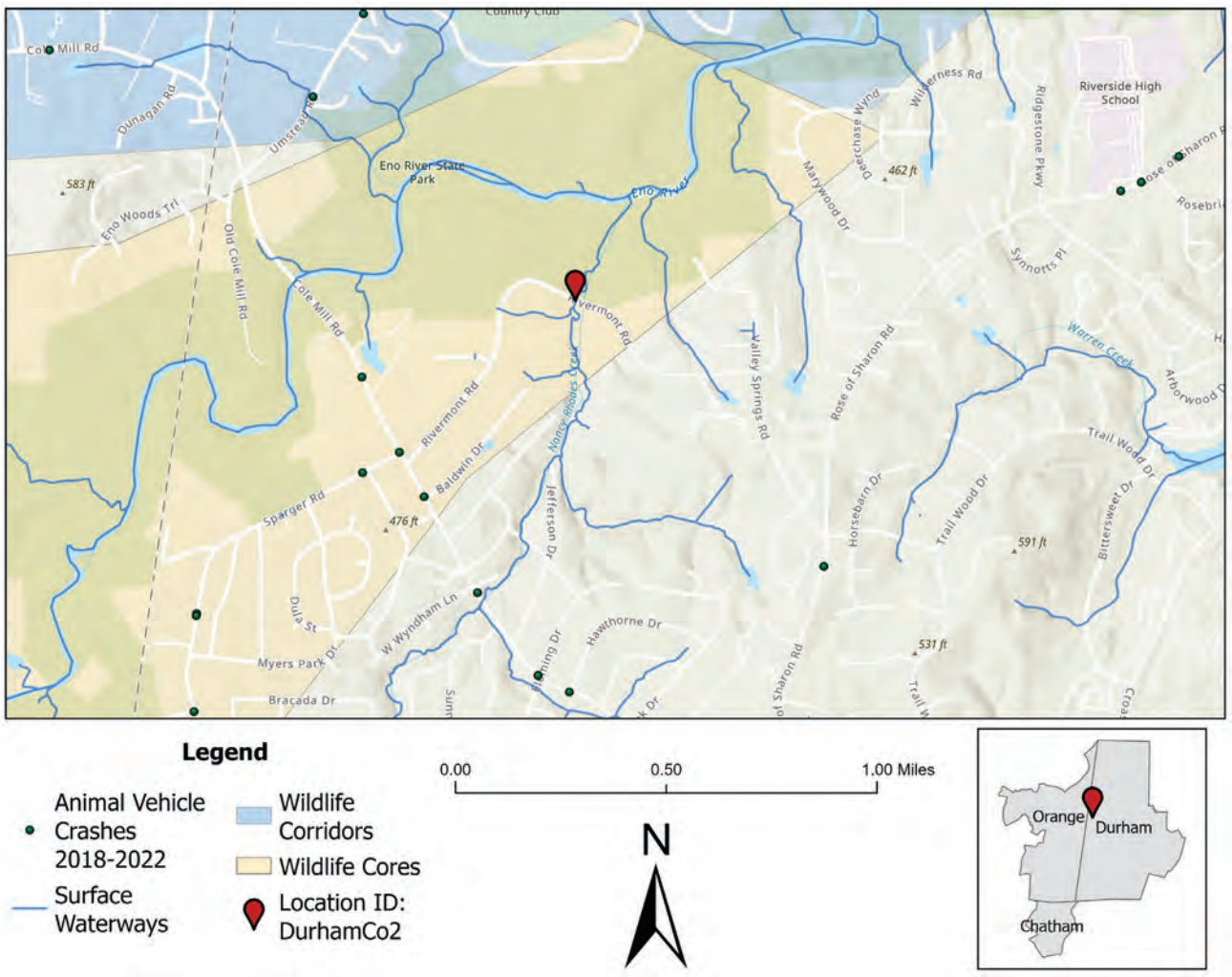
$357,000
Reported WVCs cost estimate

55
mph speed limit

Adjacent managed natural land

Preferred Scenario

Rebuild the eroded abutment slopes with retaining walls to provide a natural surface dry wildlife passage on both sides of the creek. Ensure passages connect into habitat up and downstream.



Durham County

US 501 (Roxboro Road) over Eno River

Summary and Problem Statement

US 501 (Roxboro Road) over the Eno River has been identified as a priority wildlife crossing. This crossing is located within one mile of both a wildlife core and corridor identified by Wildlands Network, making this site important for both. There have been nineteen (19) WVCs reported within a one-mile buffer of this site. This site has no bicycle and pedestrian facilities, has a posted speed limit of 45 mph, and garners 30,000 vehicles per day (2021 AADT).

This site is adjacent to several managed and natural lands. The City of Durham maintains West Point Park along the western side of the crossing. The NC DNCR Division of Parks and Recreation maintains the Mountains-to-Sea Trail, Middle Eno River Bluffs and Slope, and the Eno River Aquatic Habitat. The US Fish and Wildlife Service has identified the site as a critical habitat for the Atlantic Pigtoe, Neuse River Waterdog, Carolina Madtom, and Green Floater.

While barriers to wildlife travel under the bridge exist, which encourages wildlife travel on the roadway and results in conflicts with motorists, the wildlife passage appears to be highly viable along this section of the river and corridor approaching and under the bridge, and the natural surface stream banks are overall excellent. No major remediation is needed except for the northeast and southeast slopes needing deep erosion/incision and voids backfilled and stabilized to prevent recurrence, and to allow full wildlife passage.

Under US 501 (Roxboro Road) bridge over Eno River, view upstream on the south bank. Pete Schubert.

Under US 501 (Roxboro Road) bridge over Eno River, view downstream from the south bank to the north bank. Pete Schubert.

Aerial photograph of US 501 (Roxboro Road) bridge over Eno River. Nearmap.

Site Facts

Location ID	DurhamCo3
Date of Site Visit	June 13, 2024
Jurisdiction	Durham County
Coordinates	36°04'19.4"N 78°54'31.0"W
NCDOT Crossing/Structure Code	310035
Existing Structure Type	Bridge
Property Owner Type	Public
Existing Plan Alignment	2050 MTP Highway: (MTP ID 92) Roxboro Rd (501 N) CTP Highway: US 501 (Roxboro Rd) CTP Multiuse Path: RoxboroA2 CTP Pedestrian: Hwy 501
Managed and Natural Lands	City of Durham, NC DNCR Division of Parks and Recreation, US Fish and Wildlife Service
Average Annual Daily Traffic (AADT) (2019)	31,500
Average Annual Daily Traffic (AADT) (2021)	30,000
Projected Average Weekday Traffic (AWDT)	29,766
Speed Limit	45 mph
Reported Wildlife-vehicle collisions (WVCs) within 1-mile Buffer (2018-2022) and Comprehensive Crash Cost Estimate	Non-injury crash: 18 ($450,000) Type B injury crash: 1 ($187,000) **Total crashes and cost estimate: 19 ($637,000)**
Likely Wildlife-vehicle collisions (WVCs) within 1-mile buffer (based on VDOT study revealing 8.5 times more WVCs are occurring than what DOT reports show)	Non-injury crash: 153 ($3,825,000) Type B injury crash: 8.5 ($1,589,500) **Total crashes and cost estimate: 161.5 ($5,414,500)**

19
Reported WVCs within 1-mile buffer (2018-2022)

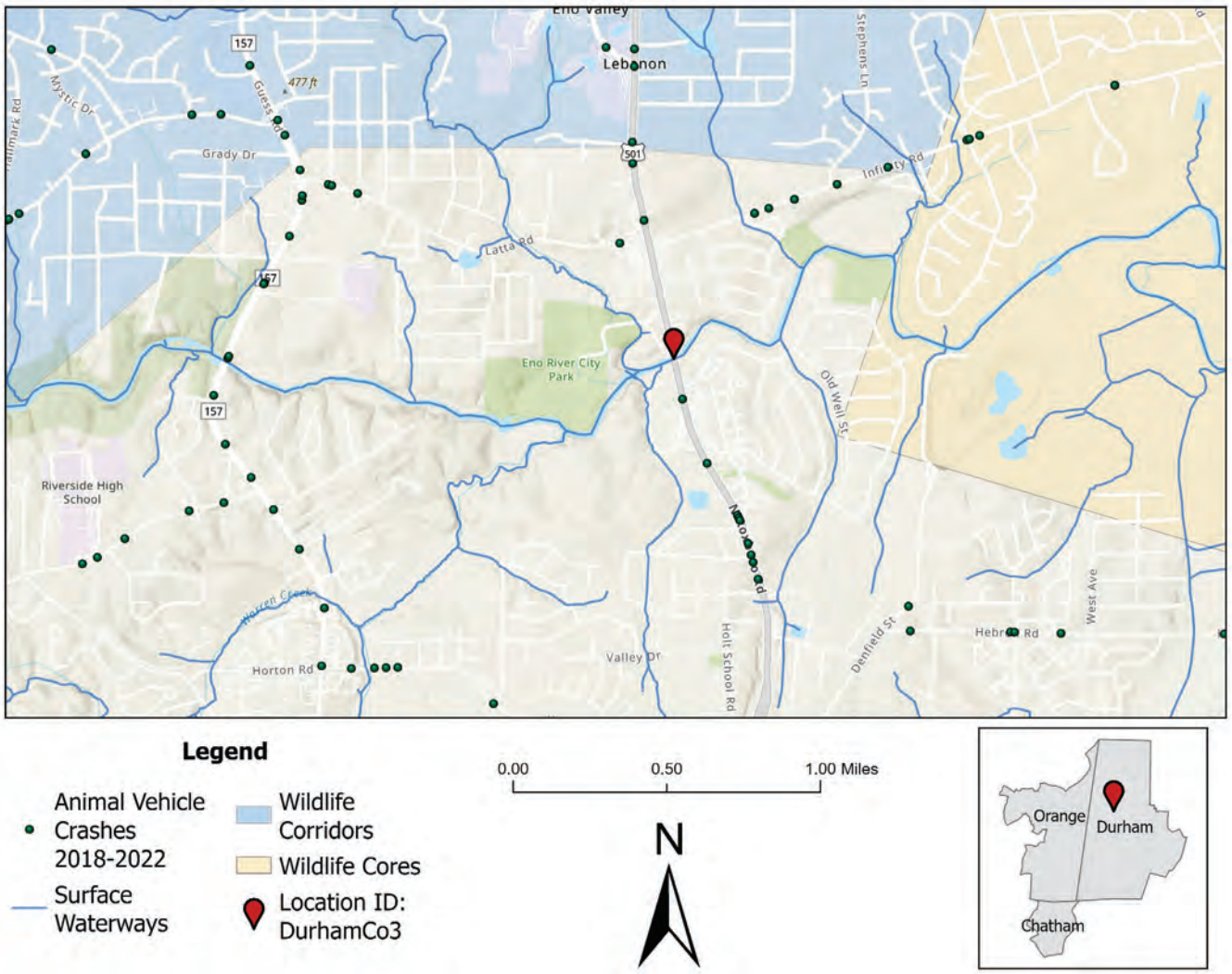
$637,000
Reported WVCs cost estimate

30,000
Annual average daily traffic (2021)

Adjacent managed natural land

Preferred Scenario

Evaluate and permanently repair deep erosion of banks due to stormwater flows coming from the roadway embankments and daylighting downstream of the bridge.



Durham County

Guess Road over Eno River

Summary and Problem Statement

Guess Road (NC 157) over the Eno River has been identified as a priority wildlife crossing. This crossing resides just outside of the boundaries of both a wildlife corridor and core identified by the Wildlands Network, making this site an important travel connection to both. The 5-lane single-span bridge is divided by a median, with two lanes moving southbound, and three lanes moving northbound. There have been 34 WVCs have been reported within a one-mile buffer of this site. This site has no bicycle and pedestrian facilities, has a posted speed limit of 45 mph, and garners 20,500 vehicles per day (2021 AADT).

This site is adjacent to natural managed lands. The City of Durham maintains West Point Park, which runs along the eastern side of crossing. The NC DNCR, Division of Parks and Recreation maintains Eno River State Park along the western side of the crossings and the Mountains-to-Sea Trail. The US Fish and Wildlife Service has identified the site as a critical habitat for the Atlantic Pigtoe, Neuse River Waterdog, and Carolina Madtom.

Barriers to wildlife travel under the bridge exist, which encourages wildlife travel on the roadway and results in conflicts with motorists. The substrate is a continuous rocky bottom throughout with large stones and some exposed bedrock. A low-profile concrete weir exists under the bridge perpendicular to the river water flow which may be a remnant from a former abutment. Large riprap covers the slope on both sides, beginning at the river's edge. Both riprap slopes have a shelf that could be remediated for wildlife passage. The south side has a 5-foot wide dry passage near the top of slope but it would be difficult for wildlife to negotiate. The north side has a 50-foot-wide dry passage for the Mountains-to-Sea Trail. All entryways to the bridge appear to be clear of obstructions including any dense vegetation. Wildlife passage is not possible on the south side due to the placement of exposed, oversize riprap. Riprap on existing shelves could be relocated or removed to expose a natural surface, or it could be left in place and the voids filled with fine aggregate and alluvial materials to create a natural surface.

East side of Guess Road bridge over Eno River. Pete Schubert.

West side of Guess Road bridge over Eno River. Pete Schubert.

Aerial photograph of Guess Road bridge over Eno River. Nearmap.

Site Facts

Location ID	DurhamCo4
Date of Site Visit	June 13, 2024
Jurisdiction	Durham County
Coordinates	36°04'18.7"N 78°56'04.8"W
NCDOT Crossing/Structure Code	310050
Existing Structure Type	Bridge
Property Owner Type	Public, private
Existing Plan Alignment	CTP Pedestrian: Guess Rd (Bicycle Lane) CTP Highway: NC 157 (Guess Rd)
Managed and Natural Lands	City of Durham, NC DNCR Division of Parks and Recreation, US Fish and Wildlife Service
Average Annual Daily Traffic (AADT) (2019)	22,500
Average Annual Daily Traffic (AADT) (2021)	20,500
Projected Average Weekday Traffic (AWDT)	31,230
Speed Limit	45 mph
Reported Wildlife-vehicle collisions (WVCs) within 1-mile Buffer (2018-2022) and Comprehensive Crash Cost Estimate	Non-injury crash: 33 ($825,000) Type B injury crash: 1 ($187,000) **Total crashes and cost estimate: 34 ($1,012,000)**
Likely Wildlife-vehicle collisions (WVCs) within 1-mile buffer (based on VDOT study revealing 8.5 times more WVCs are occurring than what DOT reports show)	Non-injury crash: 280.5 ($7,012,500) Type B injury crash: 8.5 ($1,589,500) **Total crashes and cost estimate: 289 ($8,602,000)**

34
Reported WVCs within 1-mile buffer (2018-2022)

$1,012,000
Reported WVCs cost estimate

20,500
Annual average daily traffic (2021)

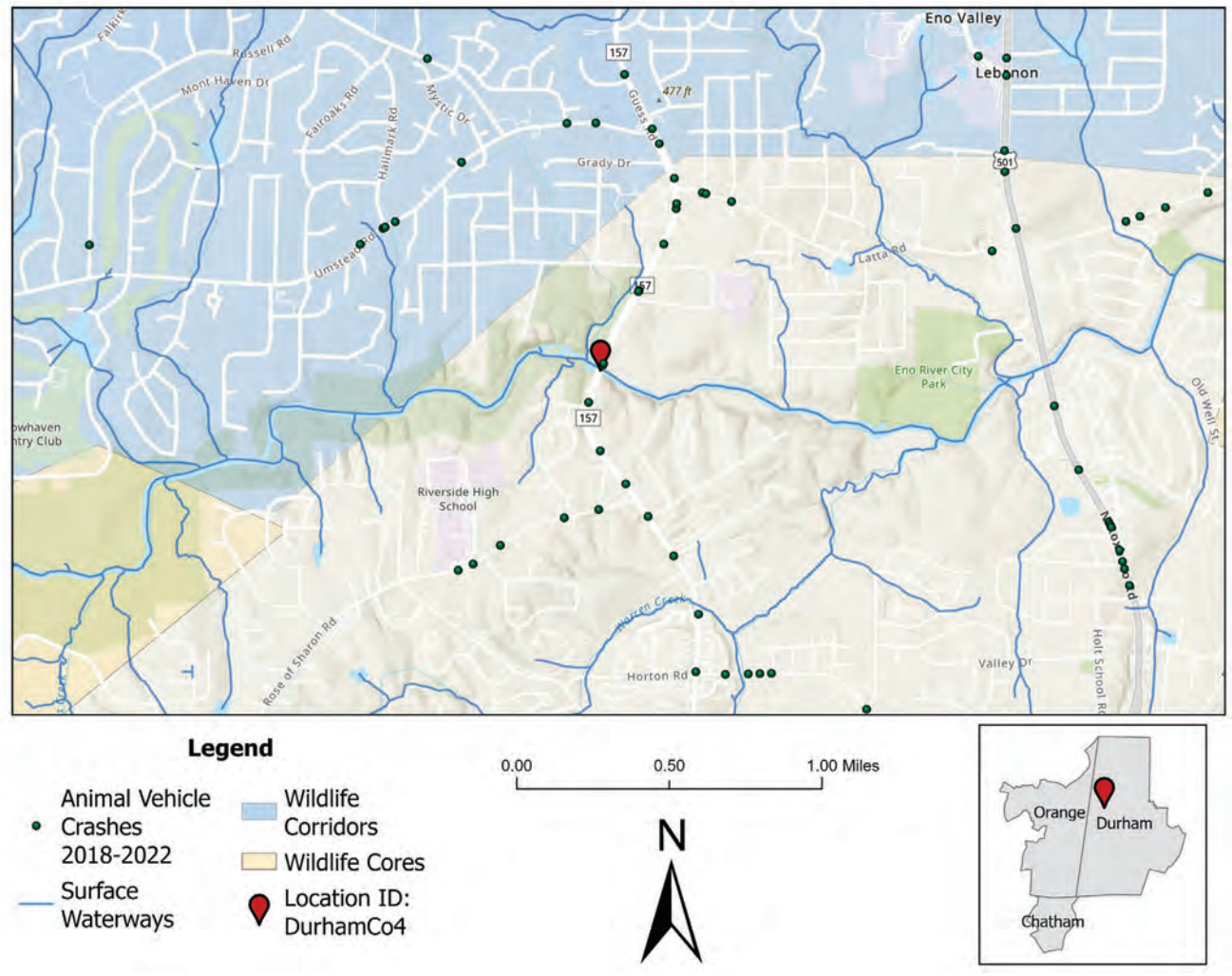
Adjacent managed natural land

Preferred Scenario

Remove some of the large riprap slope protection from existing shelves under the bridge on both sides (including entryways) to allow wildlife passage on natural surfaces.

Alternate Scenario

Use small stones to choke/fill the voids within the shelf portions of the existing riprap slope to allow for a 12-foot-wide passage on both slopes. Continue shelves for about 30 feet beyond the underside of bridge to allow for adequate approaches for wildlife.



Durham County

Old Oxford Road over Eno River

Summary and Problem Statement

Old Oxford Road over the Eno River has been identified as a priority wildlife crossing. This crossing resides within a wildlife core identified by the Wildlands Network, and five WVCs have been reported within a one-mile buffer of this site. The bridge is a 2-lane undivided with no bicycle and pedestrian facilities. This site has a posted speed limit of 45 mph, and garners 7,700 vehicles per day (2021 AADT).

This site is adjacent to several managed and natural lands. The US Army Corps of Engineers maintains Falls Lake managed area on both sides of the roadway and crossing. The NCWRC maintains Butner-Falls of Neuse Game Land on the eastern side of the crossing. The Catsburg Registered Heritage area (NHNA) covers 100 areas to the southwest side of the crossing, which is maintained by NC DNCR Natural Heritage Program, NC Department of Agriculture Plan Conservation Program, and the US Army Corps of Engineers. The US Fish and Wildlife Service has identified the site as a critical habitat for the Neuse River Waterdog, Carolina Madtom, and Green Floater. The NC DNCR Natural Heritage Program maintains the Penny's Bend/Eno River Bluffs Registered Heritage Area (NHNA) on the western side of crossing following the bank of the Eno River.

Barriers to wildlife travel within this core and under the bridge exist, which encourages wildlife travel on the roadway and results in conflicts with motorists. Above the river there are steep slopes with little to no riprap. The north slope contains many stranded debris at a high bench with about 12 feet of clearance. The bench is impassible due to the debris, and the highest portion has some riprap. There is a narrow semi-dry passage (4-5 feet wide) along the river edge with some gravel substrate. The south slope above the abutment wall is dry natural substrate with concrete on portions of the upper slope. There is approximately 8-10 feet of dry upper passage. At the bottom of the slope there is 5-6 feet of semi-dry passage with 7 feet of clearance.

Old Oxford Road bridge over Eno River looking South. Pete Schubert.

Old Oxford Road bridge over Eno River looking North. Pete Schubert.

Aerial photograph of Old Oxford Road bridge over Eno River. Nearmap.

Site Facts

Location ID	DurhamCo5
Date of Site Visit	June 13, 2024
Jurisdiction	Durham County
Coordinates	36°04'21.5"N 78°51'45.9"W
NCDOT Crossing/Structure Code	310024
Existing Structure Type	Bridge
Property Owner Type	Public
Existing Plan Alignment	CTP Highway: Old Oxford Rd CTP Bicycle: Roxboro to US 70 CTP Pedestrian: Old Oxford Hwy
Managed and Natural Lands	US Army Corps of Engineers, NCWRC, NC DNCR Natural Heritage Program, NC Department of Agriculture Plan Conservation program, US Fish and Wildlife Service
Average Annual Daily Traffic (AADT) (2019)	6,600
Average Annual Daily Traffic (AADT) (2021)	7,700
Projected Average Weekday Traffic (AWDT)	8,971
Speed Limit	45 mph
Reported Wildlife-vehicle collisions (WVCs) within 1-mile Buffer (2018-2022) and Comprehensive Crash Cost Estimate	Non-injury crash: 4 ($100,000) Type C injury crash: 1 ($107,000) **Total crashes and cost estimate: 5 ($207,000)**
Likely Wildlife-vehicle collisions (WVCs) within 1-mile buffer (based on VDOT study revealing 8.5 times more WVCs are occurring than what DOT reports show)	Non-injury crash: 34 ($850,000) Type C injury crash: 8.5 ($909,500) **Total crashes and cost estimate: 42.5 ($1,759,500)**

5
Reported WVCs within 1-mile buffer (2018-2022)

$207,000
Reported WVCs cost estimate

45
mph speed limit

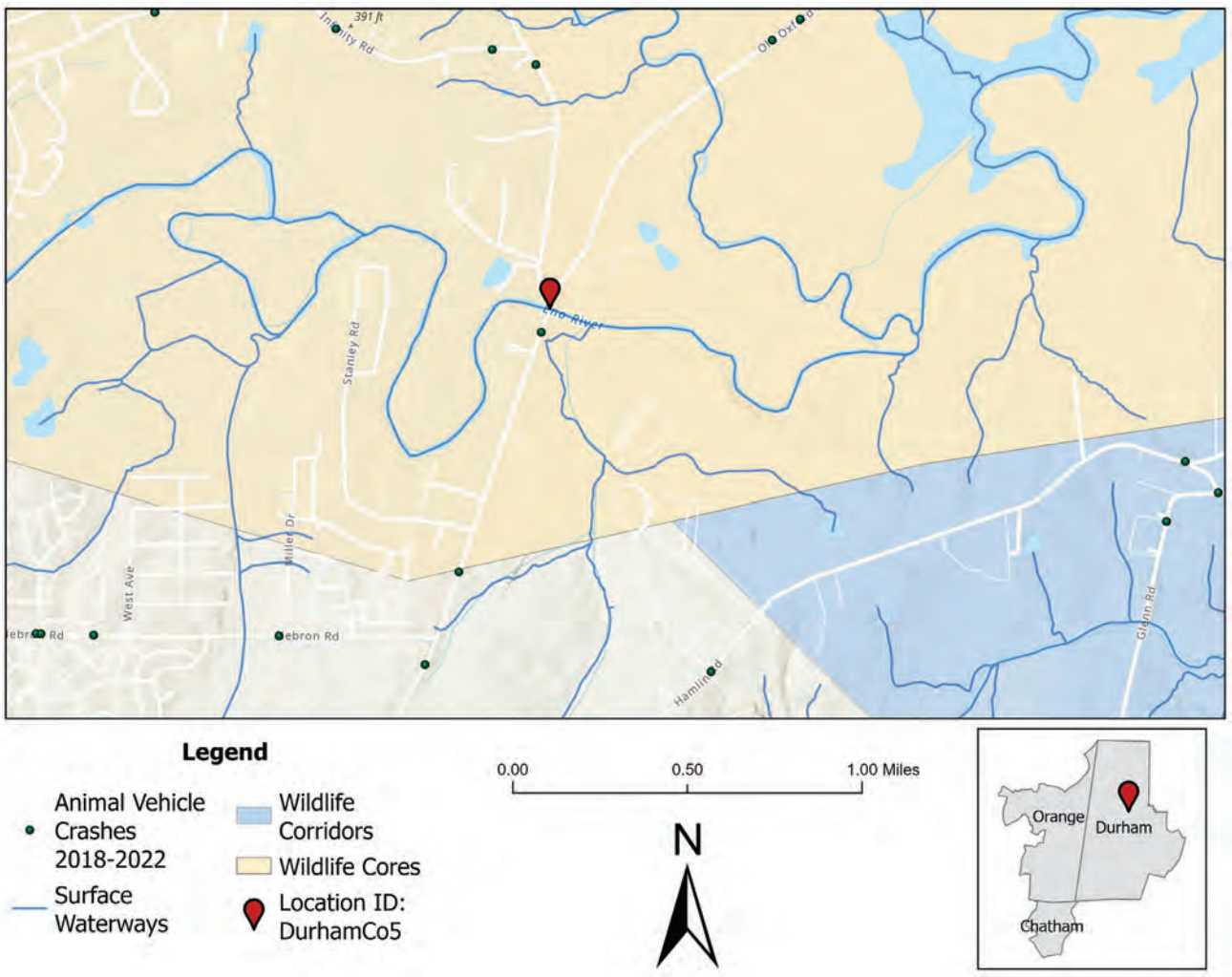
Adjacent managed natural land

Preferred Scenario

Replace the bridge and lengthen the span from the current hourglass-shaped causeway (and incised riverbank) that creates a choke point for wildlife (and fishers) and catches debris both at water's edge and up the slope.

Alternate Scenario

Remove considerable large debris from the upper northern side slope and lower southern slope to enable wildlife passage, which is currently impassible.



Durham County

NC 54 over New Hope Creek

Summary and Problem Statement

NC 54 at New Hope Creek has been identified as a priority wildlife crossing. This crossing resides within a wildlife corridor identified by the Wildlands Network, and twenty-one WVCs have been reported within a one-mile buffer of this site. This crossing recommendation encompasses two separate structures along NC 54 that are 0.25 miles apart: a culvert to the west, and a bridge to the east. This site has no bicycle and pedestrian facilities, has a posted speed limit of 45 mph, and garners 13,500 vehicles per day (2021 AADT).

This site is adjacent to several managed and natural lands. The U.S. Army Corps of Engineers manages land as part of the B. Everret Jordan Lake and Dam managed area. The U.S. Army Corps of Engineers, NC DNCR, and the Natural Heritage Program manages land as part of the Lower New Hope Creek Floodplain Forest and Slopes Registered Heritage Area- managed area covering 1,601.41 acres to the south of the crossing sites (registered heritage area). The U.S. Army Corps of Engineers, NC DNCR, and the Natural Heritage Program also manages land as part of the New Hope Creek Bottomland Forest Registered Heritage Area-managed area covering 739.85 acres to the North of the crossing sites (registered heritage area).

Barriers to wildlife travel along this corridor and under the bridge and through the culvert exist, which encourages wildlife travel on the roadway and results in conflicts with motorists. While the bridge span does have dry passage on both sides of the channel, it does not during flood stage. Though the overhead clearance is marginal at present, it may be possible to install stepped natural soil benches against each abutment slope to provide some high-water access. Additional dry culverts (with natural soil bottoms at adjacent floodplain level with at least one bay stepped up) should be considered on both the bridge structure, and the 4-bay box culvert.

Approximately 500 feet upstream of NC 54 in the New Hope Creek floodplain is the New Hope Waterfowl Impoundment, which consists of two low (5-foot rise) earthen causeway/embankments (roughly 1,950 feet west and 250 feet east), connected by a 490-foot flat topped concrete spillway and a 2-bay stoplog control structure across the creek channel. Immediately downstream and parallel to the spillway and outlet structure is a 490-foot by 130-foot open water stilling basin, which provides a significant barrier to wildlife passage along the creek up and downstream, forcing movement away from the banks to cross the sub-impoundment structures, and then to return to the narrowed banks approaching the NC 54 bridge and causeway. Additionally, when seasonally impounded (fall/early winter), terrestrial wildlife passage is forced to the far edges of the inundated floodplain. Though the grassed, low slope sub-impoundment embankments are not significant barriers, the NC 54 embankment and motor vehicle traffic is. Additional dry culverts should be added to NC 54 at the causeway ends to allow for dry passage of wildlife when the impoundments above and/or below NC 54 are flooded.

Aerial photograph of NC 54 culvert (west) and bridge (east) over New Hope Creek. Nearmap.

NC 54 culvert over New Hope Creek. Pete Schubert.

Site Facts

Location ID	DurhamCo6 (Bridge) DurhamCo7 (Culvert)
Date of Site Visit	April 19, 2024
Jurisdiction	City of Durham
Coordinates	Bridge: 35°55'00.4"N 78°58'13.6"W Culvert: 35°54'56.8"N 78°58'28.5"W
NCDOT Crossing/Structure Code	Bridge: 310041 Culvert: 310013
Existing Structure Type	Bridge, culvert
Property Owner Type	Public
Existing Plan Alignment	2050 MTP: U-5774G CTP Highway: NC 54 CTP Bicycle & Pedestrian: W Hwy 54 CTP Bicycle & Pedestrian: Durham-Chapel Hill Greenway
Managed and Natural Lands	US Army Corps of Engineers, NC DNCR, Natural Heritage Program
Average Annual Daily Traffic (AADT) (2019)	16,500
Average Annual Daily Traffic (AADT) (2021)	13,500
Projected Average Weekday Traffic (AWDT)	27,742
Speed Limit	45 mph
Reported Wildlife-vehicle collisions (WVCs) within 1-mile Buffer (2018-2022) and Comprehensive Crash Cost Estimate	Non-injury crash: 20 ($500,000) Total C injury crash: 1 ($107,000) **Total Crashes and cost estimate: 21 ($607,000)**
Likely Wildlife-vehicle collisions (WVCs) within 1-mile buffer (based on VDOT study revealing 8.5 times more WVCs are occurring than what DOT reports show)	Non-injury crash: 170 ($4,250,000) Total C injury crash: 8.5 ($909,500) **Total Crashes and cost estimate: 178.5 ($5,159,000)**

21
Reported WVCs within 1-mile buffer (2018-2022)

$607,000
Reported WVCs cost estimate

13,500
Annual average daily traffic (2021)

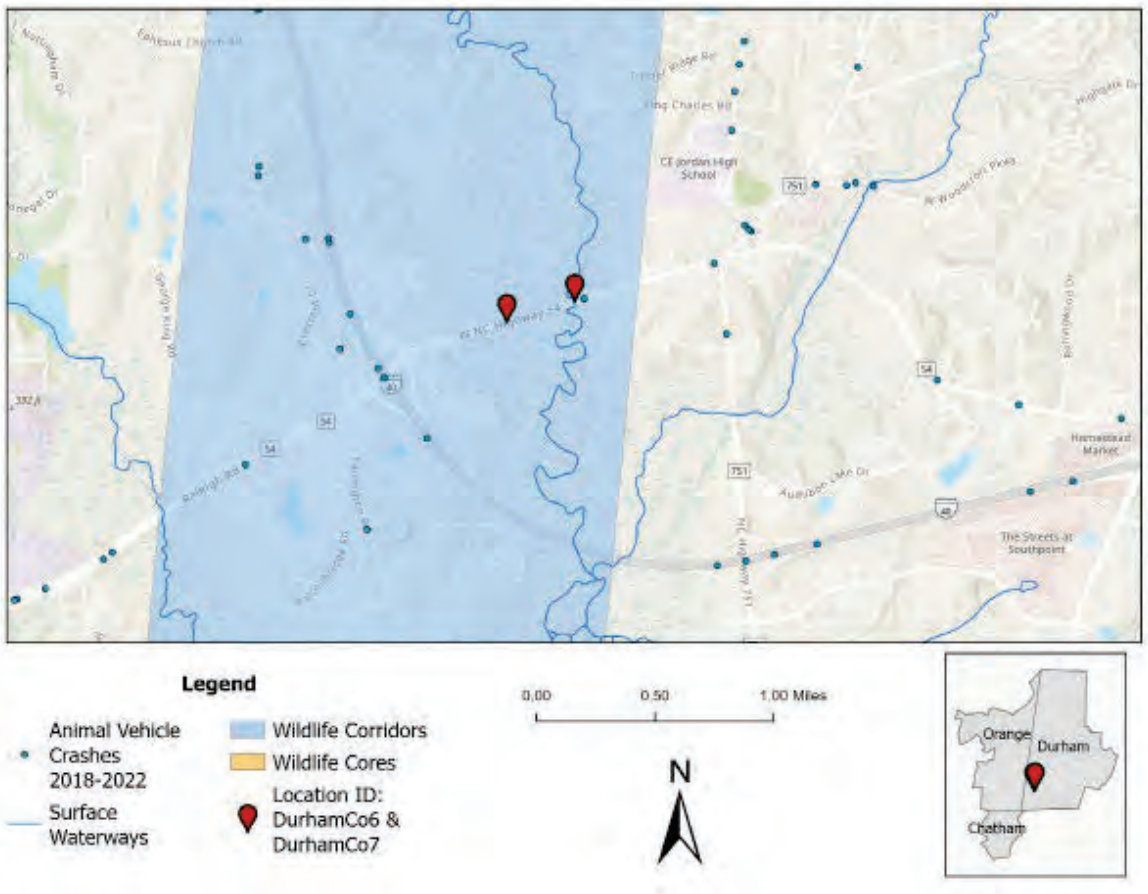
Adjacent managed natural land

Preferred Scenario

Replace the bridge with a longer and higher span to allow for the construction of dry wildlife passages above the floodplain on both sides of the creek, with at least 8 feet of vertical clearance beneath the new structure. Elsewhere along the raised and widened NC 54 causeway, construct at least two multi-bay box culverts away from the active or any abandoned channels, to provide dry passage for wildlife within the wide New Hope Creek floodplain, aligned due south (downstream) of the ends of the upstream wildlife sub-impoundment structure (spillway and control structure including stilling basin). One of the bays should be floored above the floodplain elevation to provide dry passage during flood events. Similarly, replace the existing 4-bay box culvert with a single span bridge of sufficient length and height to provide dry passage for wildlife on both sides of the high-water channel.

Alternate Scenario

Raise a section of the banks under the bridge against the abutment slopes on both sides of the creek to provide a high-water dry wildlife passage.



Durham County

I-40 Bridge over New Hope Creek

Summary and Problem Statement

The I-40 bridge over New Hope Creek has been identified as a priority wildlife crossing. This crossing resides within a wildlife corridor identified by the Wildlands Network, has been identified by Wildlands Network as a priority wildlife crossing site, and thirteen WVCs have been reported within a one-mile buffer of this site. This crossing recommendation encompasses two separate bridge structures along I-40, both with three lanes in each direction – making this a six-lane transportation facility. This site has no bicycle and pedestrian facilities, has a posted speed limit of 65 mph, and garners 124,000 vehicles per day (2019 AADT).

This site is adjacent to several managed and natural lands. The U.S. Army Corps of Engineers manages land as part of the B. Everret Jordan Lake and Dam managed area. The U.S. Army Corps of Engineers, NC DNCR, and the Natural Heritage Program manages land as part of the Lower New Hope Creek Floodplain Forest and Slopes Registered Heritage Area- managed area covering 1601.41 acres to the south of the crossing sites (registered heritage area).

Barriers to wildlife travel along this corridor and under the bridge exist, which encourages wildlife travel on the roadway and results in conflicts with motorists. The barriers include riprap placement, a sub impoundment structure (stoplog control structure and concrete spillway), standing water in the downstream stilling basis, fencing, tributary stream crossing, and noise. Riprap covers the area under the bridge on the west side of the stream, on the steep slopes up to and down from the access road, and the sub impoundment structure on both southeast and southwest sides of bridge. On the southwest side of the bridge, fencing extends from bridge to the width of the ROW (at top of steep riprap slope). On the southeast side of the bridge, fencing extends from bridge to the width of the ROW (perpendicular to end of concrete spillway structure) and then turns parallel to the interstate highway. The steep slopes of the sub impoundment spillway structure eliminate any sightlines wildlife may use.

On the northeast side of bridge, Third Fork Creek flows into New Hope Creek. The Third Fork Creek channel extends parallel to the road about twice the bridge's length and then turns north. The channel appears to be engineered, and there is riprap along portions of the banks. At the confluence with New Hope Creek, there is currently a sediment (sand/silt) bar across the tributary (likely shifting or impermanent). As a result of all the above, there are significant "pathway" barriers for wildlife to move between habitat on the north and south sides of the bridge. The noise generated by vehicular travel on the bridge is exceptionally loud and can be an audible wildlife deterrent.

Aerial photograph of I-40 bridge over New Hope Creek. Nearmap.

Under I 40 bridge facing east over New Hope Creek. Pete Schubert.

Site Facts

Location ID	DurhamCo8 DurhamCo9
Date of Site Visit	April 19, 2024
Jurisdiction	City of Durham
Coordinates	35°54'16.5"N 78°58'13.1"W
NCDOT Crossing/Structure Code	DurhamCo8: 310304 DurhamCo9: 310303
Existing Structure Type	Bridge (2 seperate structures)
Property Owner Type	Public
Existing Plan Alignment	2024-2033 STIP: I-5993 2050 MTP: I-6006 CTP Highway: I-40 CTP Bicycle & Pedestrian: I-40 Multiuse Path
Managed and Natural Lands	US Army Corps of Engineers, NC DNCR, Natural Heritage Program
Average Annual Daily Traffic (AADT) (2019)	124,000
Average Annual Daily Traffic (AADT) (2021)	Unavailable
Projected Average Weekday Traffic (AWDT)	Eastbound bridge: 81,571 Westbound bridge: 82,638
Speed Limit	65 mph
Reported Wildlife-vehicle collisions (WVCs) within 1-mile Buffer (2018-2022) and Comprehensive Crash Cost Estimate	Non-injury crash: 12 ($300,000) Type C injury crash: 1 ($107,000) **Total crashes and cost estimate: 13 ($407,000)**
Likely Wildlife-vehicle collisions (WVCs) within 1-mile buffer (based on VDOT study revealing 8.5 times more WVCs are occurring than what DOT reports show)	Non-injury crash: 102 ($2,550,000) Type C injury crash: 8.5 ($909,500) **Total crashes and cost estimate: 110.5 ($3,459,500)**

13
Reported WVCs within 1-mile buffer (2018-2022)

$407,000
Reported WVCs cost estimate

124,000
Annual average daily traffic (2019)

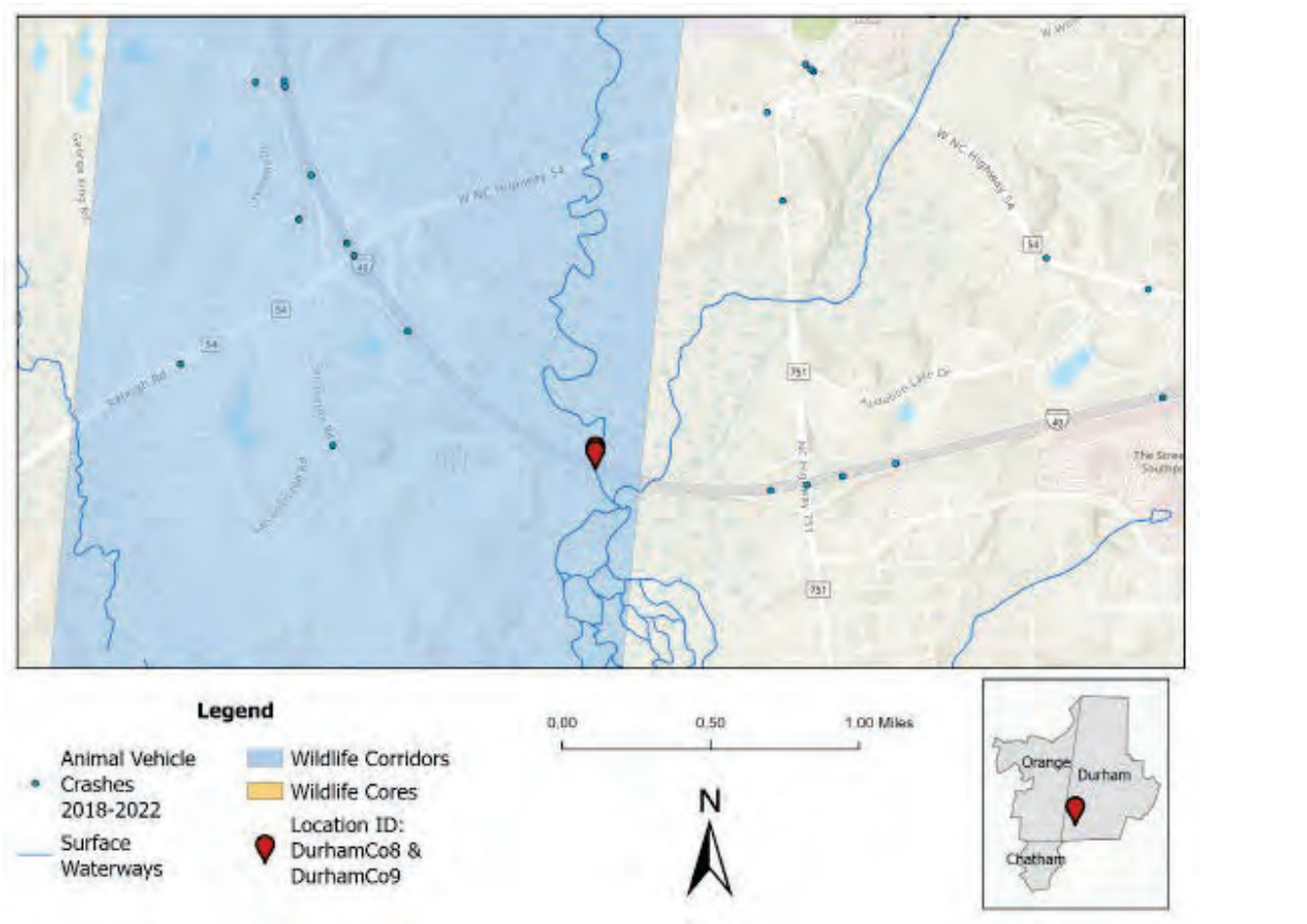
Adjacent managed natural land

Preferred Scenario

Fill the voids in the exposed riprap surfaces under the bridge spans with fine aggregate stone or alluvial fill to provide a continuous dry wildlife passage on the west side. Raise the elevation of the ground surface in the easternmost bay with appropriate material to provide a dry wildlife passage above the floodplain surface. Consult with NCWRC to explore the removal of the sub impoundment structures and significant barrier to wildlife access across the ROW with the New Hope Creek floodplain and stream under the I-40 spans.

Alternate Scenario

Fill the voids in the exposed riprap surfaces under the bridge spans with fine aggregate stone or alluvial fill to provide a continuous dry wildlife passage on the west side. Raise the elevation of the ground surface in the easternmost bay with appropriate material to provide a dry wildlife passage above the floodplain surface.



Durham County

Stagecoach Road over New Hope Creek

Summary and Problem Statement

Stagecoach Road over New Hope Creek has been identified as a priority wildlife crossing. This crossing resides within a wildlife corridor identified by the Wildlands Network, and seven WVCs have been reported within a one-mile buffer of this site. This site has no bicycle and pedestrian facilities, has a posted speed limit of 45 mph, and garners 8,300 vehicles per day (2021 AADT).

This site is adjacent to several managed and natural lands. The U.S. Army Corps of Engineers manages land as part of the B. Everret Jordan Lake and Dam managed area. The U.S. Army Corps of Engineers, NC DNCR, and the Natural Heritage Program manages land as part of the Lower New Hope Creek Floodplain Forest and Slopes Registered Heritage Area- managed area covering 1,601.41 acres on both sides of the crossing area (registered heritage area).

Barriers to wildlife travel along this corridor and under the bridge exist, which encourages wildlife travel on the roadway and results in conflicts with motorists. While the bridge span does have dry passage on both sides of the channel, the exposed riprap is an obstacle that could be alleviated by using small stone fill the voids and create a natural surface. Even with this surface improvement, there is no dry passage during flood stage. Though the overhead clearance of the bridge is marginal at present, it may be possible to install stepped natural soil benches against each abutment slope to provide some high-water access. Additional dry culverts (with natural soil bottoms at adjacent floodplain level with at least one bay stepped up) should be added if Stagecoach Road is widened in the future.

Approximately 270 feet upstream of Stagecoach Road in the New Hope Creek floodplain is the NCWRC's "Stagecoach Road Waterfowl Impoundment", which consists of two low (5-foot rise) earthen causeway/embankments (roughly 830 feet West and 500 feet East), connected by a 590-foot flat-topped concrete spillway and a 2-bay stoplog control structure across the creek channel. Immediately downstream and parallel to the spillway and outlet structure is a 620-foot by 150-foot open water stilling basin, which provides a significant barrier to wildlife passage along the creek up and downstream, forcing movement away from the banks to cross the sub impoundment structures, and then to return to the narrowed banks approaching the Stagecoach Road bridge and causeway. Additionally, when seasonally impounded (fall/early winter), terrestrial wildlife passage is forced to the far edges of the inundated floodplain. Though the grassed, low slope sub impoundment embankments are not significant barriers, the Stagecoach Road embankment and vehicle traffic is. Additional dry culverts should be added to Stagecoach Road at the causeway ends to allow for dry passage of wildlife when the impoundments above and/or below Stagecoach Road (including when Jordan lake rises) are flooded.

Aerial photograph of Stagecoach Road bridge over New Hope Creek. Nearmap.

South side of Stagecoach Road bridge facing North over New Hope Creek. Pete Schubert.

Site Facts

Location ID	DurhamCo10
Date of Site Visit	April 19, 2024
Jurisdiction	Durham County
Coordinates	35°53'05.7"N 78°57'56.3"W
NCDOT Crossing/Structure Code	310111
Existing Structure Type	Bridge
Property Owner Type	Public
Existing Plan Alignment	CTP Pedestrian: Stagecoach Rd
Managed and Natural Lands	US Army Corps of Engineers, NC DNCR Natural Heritage Program
Average Annual Daily Traffic (AADT) (2019)	9,700
Average Annual Daily Traffic (AADT) (2021)	8,300
Projected Average Weekday Traffic (AWDT)	18,958
Speed Limit	45
Reported Wildlife-vehicle collisions (WVCs) within 1-mile Buffer (2018-2022) and Comprehensive Crash Cost Estimate	Non-injury crash: 7 ($175,000) **Total crashes and cost estimate: 7 ($175,000)**
Likely Wildlife-vehicle collisions (WVCs) within 1-mile buffer (based on VDOT study revealing 8.5 times more WVCs are occurring than what DOT reports show)	Non-injury crash: 59.5 ($1,487,500) **Total crashes and cost estimate: 59.5 ($1,487,500)**

7
Reported WVCs within 1-mile buffer (2018-2022)

$175,000
Reported WVCs cost estimate

8,300
Annual average daily traffic (2021)

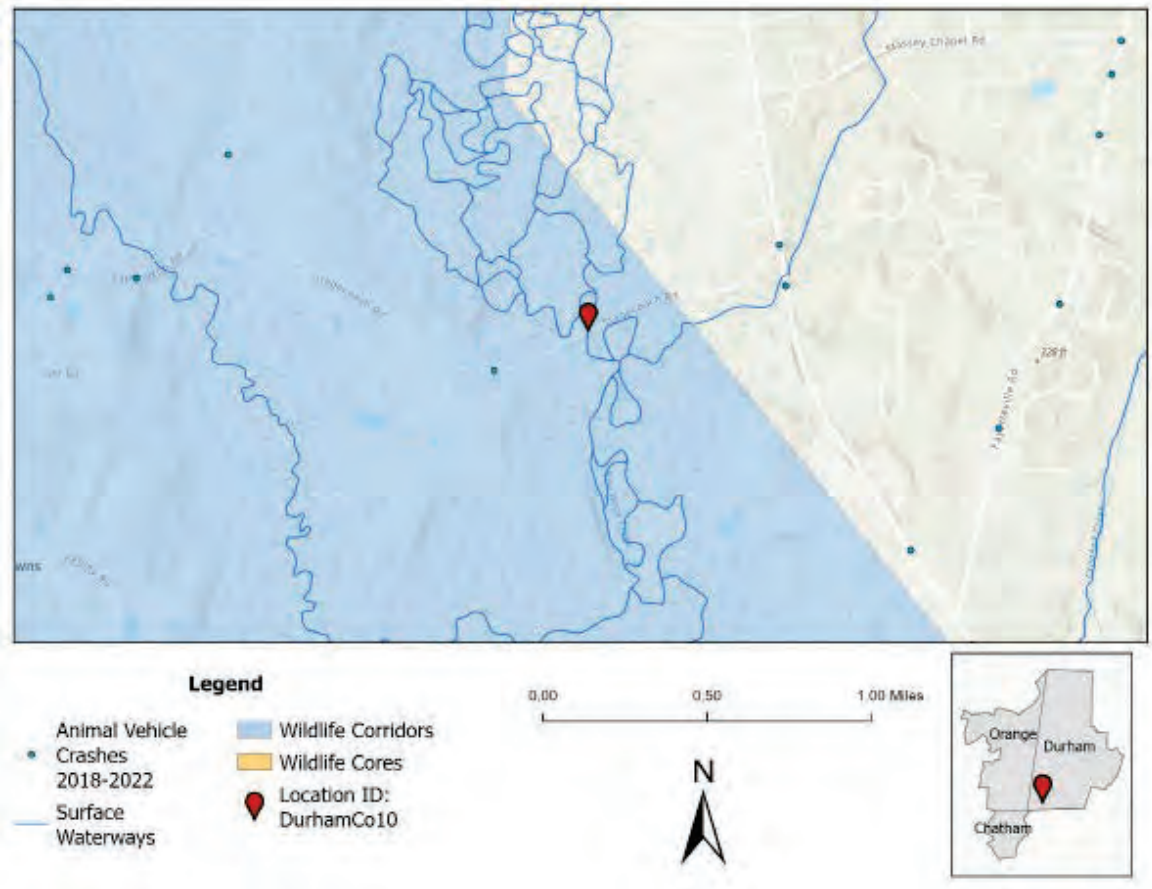
Adjacent managed natural land

Preferred Scenario

Raise the approaches of the bridge and causeway to a minimum of 8 feet vertical clearance for wildlife along dry passages on both sides of the creek. Install two supplementary minimum 2-bay box culverts at points along the causeway downstream of the ends of the upstream wildlife sub impoundment structure (spillway, outlet/control bays, and stilling basin), to allow for dry passage of wildlife within the New Hope Creek floodplain away from the creek banks. All culvert bays shall have natural surface bottoms and at least 8 feet of vertical clearance, with one bay floored above the floodplain to enhance dry passage during flooding events.

Alternate Scenario

Use fine aggregate to fill the voids among the exposed riprap under the existing bridge span to provide natural surface dry passage for wildlife. Build up the elevation of the dry passage nearer the abutments to provide dry passage during flooding events. Install additional, supplementary dry passage culverts to allow for dry passage of wildlife within the New Hope Creek floodplain away from



Durham County

Old Chapel Hill Road over New Hope Creek

Summary and Problem Statement

The bridge at Old Chapel Hill Road at New Hope Creek has been identified as a priority wildlife crossing. This crossing resides within a wildlife corridor identified by the Wildlands Network, and there have been fourteen reported wildlife-vehicle crashes within a one-mile buffer in this identified wildlife corridor. This site is adjacent to managed lands by the NC DNCR Natural Heritage Program, and U.S. Army Corps of Engineers, which is part of the New Hope Creek Bottomland Forest Registered Heritage Area covering 739.85 acres on both sides of the crossing. The crossing site on Old Chapel Hill Road (SR 2220) has bicycle and pedestrian facilities, has a posted speed limit of 40 mph, and garners 13,500 vehicles per day (2021 AADT). This wildlife crossing site is positioned along TIP project EB-4707B: "Old Chapel Hill (SR 2220) Old Durham Rd (SR 1838)", which added bicycle and pedestrian facilities and was completed on July 3, 2019. Wildlife crossing countermeasures were not incorporated as part of this completed project.

Barriers to wildlife travel along this corridor and under the bridge exist, which encourages wildlife travel on the roadway and results in conflicts with motorists. A significant obstacle to safe wildlife passage under the existing structure is the lack of bare ground between the riprap slope protection and the creek channel. While the lower portions of the riprap have trapped some interstitial sediment, there are many voids and a very uneven surface that would prevent smaller wildlife from crossing.

South side of Old Chapel Hill Road bridge over New Hope Creek looking north. DCHC MPO.

North side of Old Chapel Hill Road bridge over New Hope Creek looking south. DCHC MPO.

Aerial photograph of Old Chapel Hill Road bridge over New Hope Creek. Nearmap.

Site Facts

Location ID	DurhamCo11
Date of Site Visit	March 15, 2024
Jurisdiction	Durham County
Coordinates	35°56'34.3"N 78°58'32.6"W
NCDOT Crossing/Structure Code	310215
Existing Structure Type	Bridge
Property Owner Type	Public
Existing Plan Alignment	STIP # EB-4707B (completed July 3, 2019) CTP Highway: Old Chapel Hill Rd. CTP Pedestrian: Old Chapel Hill Rd CTP Multiuse Paths: Old Chapel Hill A1
Managed and Natural Lands	NC DNCR, Natural Heritage Program. New Hope Creek Bottomland Forest Registered Heritage Area
Average Annual Daily Traffic (AADT) (2019)	15,000
Average Annual Daily Traffic (AADT) (2021)	13,500
Projected Average Weekday Traffic (AWDT)	20,937
Speed Limit	40
Reported Wildlife-vehicle collisions (WVCs) within 1-mile Buffer (2018-2022) and Comprehensive Crash Cost Estimate	Non-injury crash: 13 ($325,000) Type C injury crash: 1 ($107,000) **Total crashes and cost estimate: 14 ($432,000)**
Likely Wildlife-vehicle collisions (WVCs) within 1-mile buffer (based on VDOT study revealing 8.5 times more WVCs are occurring than what DOT reports show)	Non-injury crash: 110.5 ($2,762,500) Type C injury crash: 8.5 ($909,500) **Total crashes and cost estimate: 119 ($3,672,000)**

14
Reported WVCs within 1-mile buffer (2018-2022)

$432,000
Reported WVCs cost estimate

13,500
Annual average daily traffic (2021)

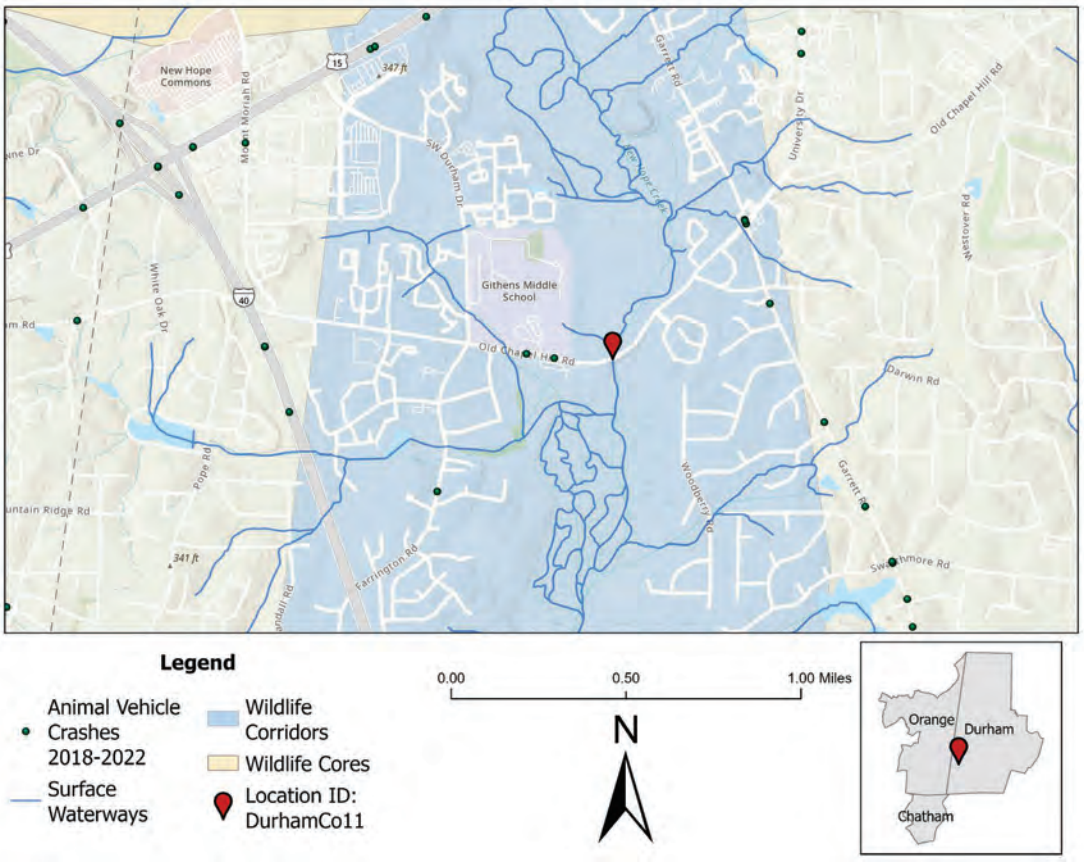
Adjacent managed natural land

Preferred Scenario

The preferred recommendation of this site includes lengthening the bridge span and removing approach embankment fills to leave room for continuous floodplain on both sides under the bridge; create benching into the riprap to provide a terrace parallel to the bank (on each side), which would then be choked and filled with gravel and rock fines; to suspend or otherwise support a shelf from the deck that wildlife could use; and then install quality fencing on both sides of the bridge to guide wildlife under the structure and off of the road. However, this crossing aligns with a TIP project (EB-4707B) completed in July 2019 – therefore, a new bridge (while preferred) may be unlikely.

Alternate Scenario

Remove considerable large debris from the upper northern side slope and lower southern slope to conduct a riprap remediation to reposition existing riprap to create a wildlife bench on both sides of the creek. Once the benches are built, install fencing of sufficient length on both sides of the bridge to guide wildlife under the structure and off the road.



Durham County

Farrington Road over Little Creek

Summary and Problem Statement

Farrington Road over Little Creek has been identified as a priority wildlife crossing. This crossing resides within a wildlife corridor identified by the Wildlands Network, and seven (7) WVCs have been reported within a one-mile buffer of this site. The single-span bridge is a 2-lane undivided with no bicycle and pedestrian facilities. This site has a posted speed limit of 45 mph and garners 13,000 vehicles per day (2021 AADT). The NCDOT is currently conducting environmental, planning, and design studies to support the future replacement of this bridge (Bridge Replacement: BP5-R117), which presents a timely opportunity to help inform this project. The current let date is October 2030.

This site is adjacent to natural managed lands. The US Army Corps of Engineers maintains the B. Everret Jordan Lake and Dam managed area. The NC DNCR Natural Heritage Program maintains Little Creek Bottomlands and Slopes Registered Heritage Area, which covers 1,088.6 acres on the south side of crossing and 160 ft north of the crossing in the Jordan Lake Managed area.

Barriers to wildlife travel along this corridor and under the bridge exist, which encourages wildlife travel on the roadway and results in conflicts with motorists. Barriers include standing water, riprap placement, and the upstream sub impoundment spillway, outlet structure, and earth embankments with steep riprapped slopes. There are areas of permanent flooding upstream and downstream of the crossing – the upstream flooding is due to the sub impoundment structure and was created to support waterfowl habitat for hunting. The cause of the downstream flooding is likely to be the result of backwater from Jordan reservoir, perhaps amplified by downstream beaver damming in the extensive floodplain. An earthen causeway extends from the ends of the spillway structure. Riprap slopes extend down the road causeway at the corners of the spillway structure and along the causeway slopes. There are also riprap slopes leading to the corners of the underpass opening, blocking the approach to the underpass. The riprap slopes wrap entirely around the causeway. All riprap slope protection so described and observed extends into standing water. Dense vegetation may block visibility of approach to the underpass area for wildlife. Wildlife has no path from floodplain to or through the underpass.

On the west side of the underpass, there exists a natural earth area above the riprap slope protection, approximately 12 feet wide and 7 feet high, that could function for wildlife passage, however, because it is entirely above the riprap and there is no path down the riprap to the floodplain habitat either upstream or downstream, it is not connected. Similarly, on the east side of the underpass, the potential dry area passage is about 12 to 15 feet wide and 7 to 8 feet high, but it is inaccessible to the up and downstream habitat by the continuous riprap slope protection on both the roadway embankment/ causeway and the sub impoundment spillway and embankment. There is a 4 to 6 foot bench in the surface of the riprap near both outer bents, which could be connected to adjacent habitat if the benching was continued to the limits of the riprap and the voids were filled with small stone to provide a natural surface.

Aerial photograph of Farrington Road bridge over Little Creek. Nearmap.

Site Facts

Location ID	DurhamCo12
Date of Site Visit	June 13, 2024
Jurisdiction	Durham County
Coordinates	35°53'14.0"N 78°59'03.3"W
NCDOT Crossing/Structure Code	310110
Existing Structure Type	Bridge
Property Owner Type	Public
Existing Plan Alignment	Bridge Replacement: BP5-R117 CTP Multiuse Path: Farrington Rd CTP Pedestrian: Farrington Rd CTP Highway: Farrington Rd
Managed and Natural Lands	US Army Corps of Engineers, NC DNCR Natural Heritage Program, UNC Chapel Hill
Average Annual Daily Traffic (AADT) (2019)	14,500
Average Annual Daily Traffic (AADT) (2021)	13,000
Projected Average Weekday Traffic (AWDT)	20,177
Speed Limit	45 mph
Reported Wildlife-vehicle collisions (WVCs) within 1-mile Buffer (2018-2022) and Comprehensive Crash Cost Estimate	Non-injury crash: 7 ($175,000) **Total crashes and cost estimate: 7 ($175,000)**
Likely Wildlife-vehicle collisions (WVCs) within 1-mile buffer (based on VDOT study revealing 8.5 times more WVCs are occurring than what DOT reports show)	Non-injury crash: 59.5 ($1,487,000) **Total crashes and cost estimate: 59.5 ($1,487,000)**

7
Reported WVCs within 1-mile buffer (2018-2022)

$175,000
Reported WVCs cost estimate

Environmental, planning, and design studies underway for future bridge replacement

Adjacent managed natural land

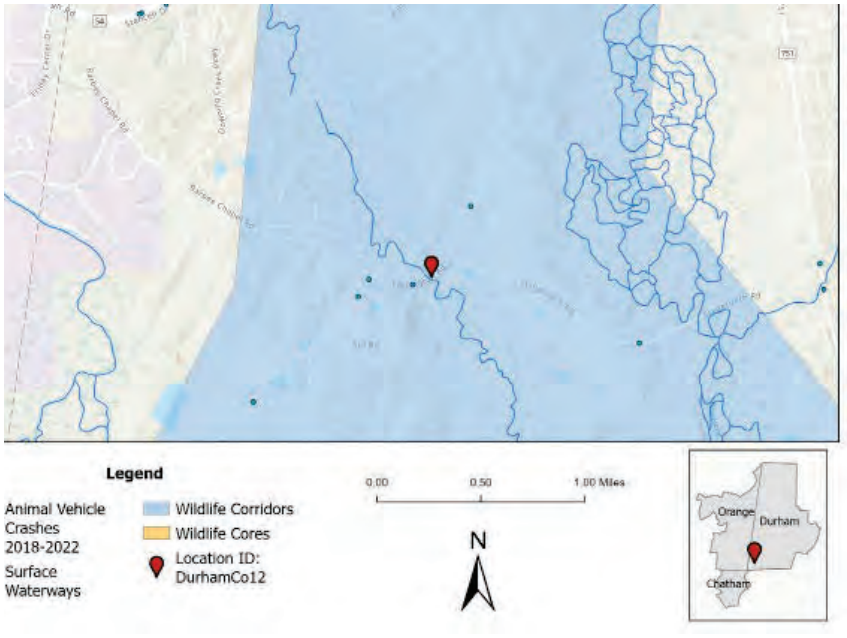
Preferred Scenario

Bench, choke (fill voids) with small stone, and flatten the slopes of riprap to tie the benches into adjacent habitat areas to provide natural surface wildlife pathways that cross under the bridge at the current top of the riprap slope protection. This must be done on both sides of the bridge and across the full length of the riprap until it can tie into undisturbed habitat up and down stream, including making natural surface connections across the grassed sub impoundment dikes.

Alternate Scenario

In addition to the preferred recommendation, or as an alternative wildlife pathway, install dry culverts that are at least 8 feet high and 12 feet wide under the road at the floodplain elevation, on both sides of the bridge area, so that wildlife can move from non-flooded habitat directly to and through an underpass into non-flooded habitat on the other side of the road. These underpasses would then allow wildlife to bypass the now impenetrable obstacles in place along the streambanks. Fencing to guide wildlife to these passages and away from the road and riprap would be necessary.

Consider changing (flattening) the artificially steep slopes of the road berm and earthen causeway to gentler slopes, which could be a (re-)design principle that might also improve/reduce structural needs for riprap slope protection and to prevent fill collapse. Consideration should also be given to the need for the upstream sub impoundment in light of back flooding from Jordan Reservoir. The elimination/deconstruction of the frequently flooded spillway stilling basin, outlet structure channel, and removal of the no longer needed concrete spillway and embankment riprap slope protection would simplify the scope of the preferred scenario for the bridge and road causeways. Though the sub impoundment provides for seasonal waterfowl management upstream, it is a continuous wildlife passage impediment for all terrestrial species in the bottomlands.



Section 3.3

ORANGE COUNTY RECOMMENDATIONS

The DCHC MPO is recommending thirteen (13) projects for Orange County as part of this plan. The list of projects can be found below in Table 3.3, and a map showing these sites are found in Figure 3.3: Map of complete list of wildlife crossing project recommendations in Orange County.

Project ID	Project Name	Jurisdiction
OrangeCo1	Pleasant Green Road over Eno River	Orange County
OrangeCo2	US 70 over Stony Creek	Orange County
OrangeCo3	I-85 over Stony Creek	Orange County
OrangeCo4	University Station Road over Stony Creek	Orange County
OrangeCo5	Old NC Highway 10 over Stony Creek	Orange County
OrangeCo6	Halls Mill Road over Eno River	Orange County
OrangeCo7	Jones Ferry Road over Neville Creek	Orange County
OrangeCo8	Neville Road over Phil's Creek	Orange County
OrangeCo9	NC 54 over Morgan Creek	Orange County
OrangeCo10	Damascus Church Road over Pritchard Mill Creek	Orange County
OrangeCo11	New Hope Church Road over New Hope Creek	Orange County
OrangeCo12	NC 86 over New Hope Creek	Orange County
OrangeCo13	I-40 Culvert over New Hope Creek	Orange County

Table 3.3: Complete list of wildlife crossing project recommendations in Orange County.

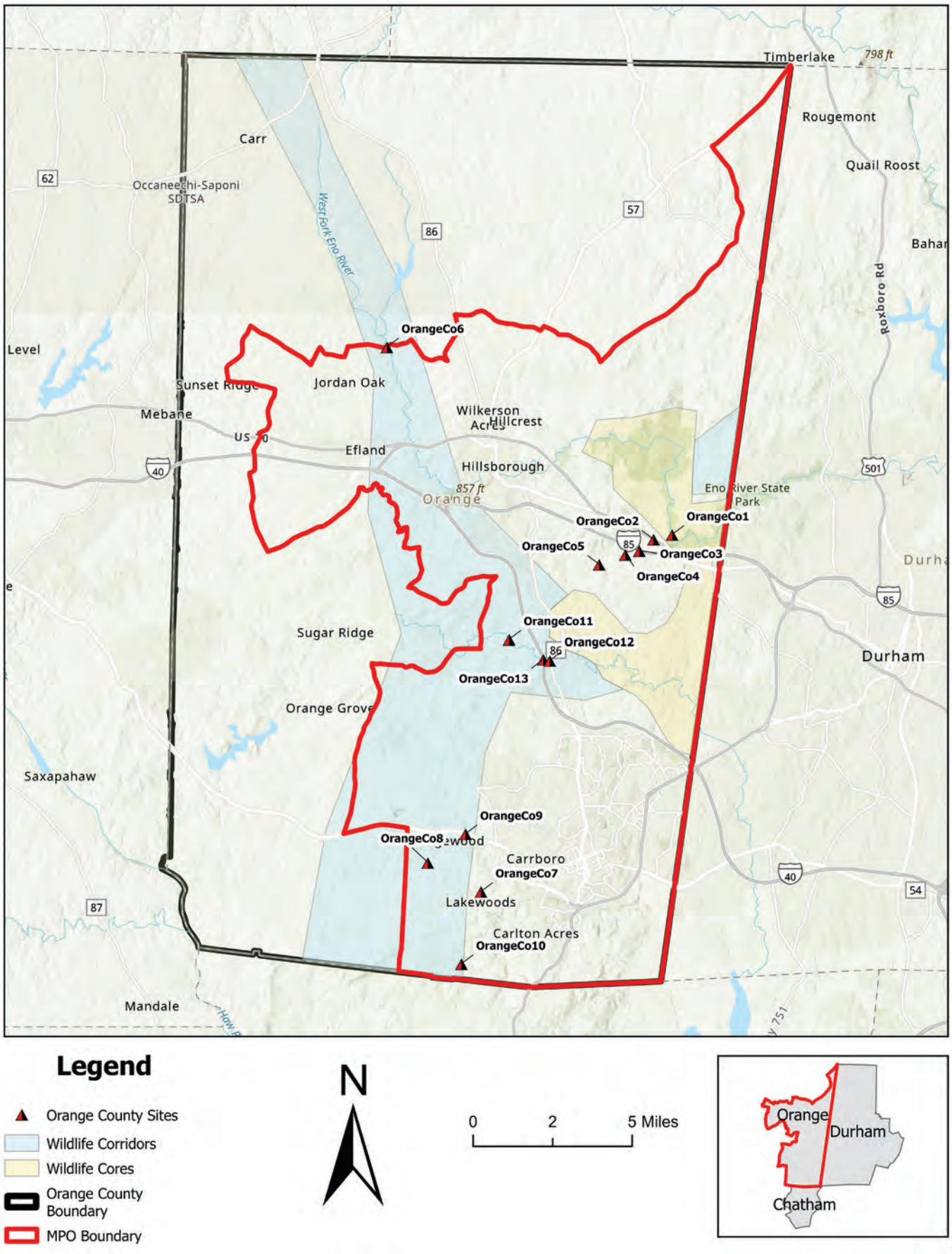


Figure 3.3: Map of complete list of wildlife crossing project recommendations in Orange County.

Orange County

Pleasant Green Road over Eno River

Summary and Problem Statement

Pleasant Green Road over the Eno River has been identified as a priority wildlife crossing. This crossing resides within a wildlife core identified by the Wildlands Network, and eleven WVCs have been reported within a one-mile buffer of this site. Additionally, the two-lane undivided bridge is expected to be replaced (Bridge Replacement: BP7-R007), with a current let date of September 5, 2030. This site has no bicycle and pedestrian facilities, has a speed limit of 45 mph, and garners 3,400 vehicles per day (2021 AADT).

This site is adjacent to several managed and natural lands. The NC Department of Natural & Cultural Resources Division of Parks & Recreation maintains the Eno River State Park along both sides of the road, the Mountains-to-Sea Trail (MST) is in the vicinity of the crossing site, and the Eno River Aquatic Habitat. The US Fish and Wildlife Service has also identified this site as a critical habitat for the Atlantic Pigtoe, Neuse River Waterdog, and Carolina Madtom.

Barriers to wildlife travel within this core and under the bridge exist, which encourages wildlife travel on the roadway and results in conflicts with motorists. Current site conditions show that while the bench on the west side is serving as both wildlife passage and the MST alignment, the east side of the bridge is not conducive to wildlife movement due to the steep concrete slope and moderately steep natural surface embankment with no functional bench. Note that the master plan for continuation of the MST to the north (upstream) has the MST crossing the Eno River on or adjacent to the Pleasant Green Road bridge. As such, the new bridge must include enough new bend on the river's east side to accommodate wildlife passage and trail passage needed once the MST is open on the east side. The east side is presently used by fisherfolk to access bank fishing, which is likely to continue.

Pleasant Green Road bridge over Eno River facing East. DCHC MPO.

Pleasant Green Road bridge over Eno River looking southwest. DCHC MPO.

Aerial photograph of Pleasant Green Road bridge over Eno River. Nearmap.

Site Facts

Location ID	OrangeCo1
Date of Site Visit	April 12, 2024
Jurisdiction	Orange County
Coordinates	36°02'47.9"N 79°00'38.6"W
NCDOT Crossing/Structure Code	670063
Existing Structure Type	Bridge
Property Owner Type	Public, private
Existing Plan Alignment	Bridge Replacement: BP7-R007 CTP Pedestrian: Pleasant Green Rd CTP Highway: Pleasant Green Rd
Managed and Natural Lands	NC DNCR Division of Parks and Recreation, US Fish and Wildlife Service
Average Annual Daily Traffic (AADT) (2019)	4,100
Average Annual Daily Traffic (AADT) (2021)	3,400
Projected Average Weekday Traffic (AWDT)	4,767
Speed Limit	45 mph
Reported Wildlife-vehicle collisions (WVCs) within 1-mile Buffer (2018-2022) and Comprehensive Crash Cost Estimate	Non-injury crash: 23 ($575,000) Type C injury crash: 2 ($214,000) **Total crashes and cost estimate: 25 ($789,000)**
Likely Wildlife-vehicle collisions (WVCs) within 1-mile buffer (based on VDOT study revealing 8.5 times more WVCs are occurring than what DOT reports show)	Non-injury crash: 195.5 ($4,887,500) Type C injury crash: 17 ($1,819,000) **Total crashes and cost estimate: 212.5 ($6,706,500)**

25
Reported WVCs within 1-mile buffer (2018-2022)

$789,000
Reported WVCs cost estimate

Bridge replacement in progress

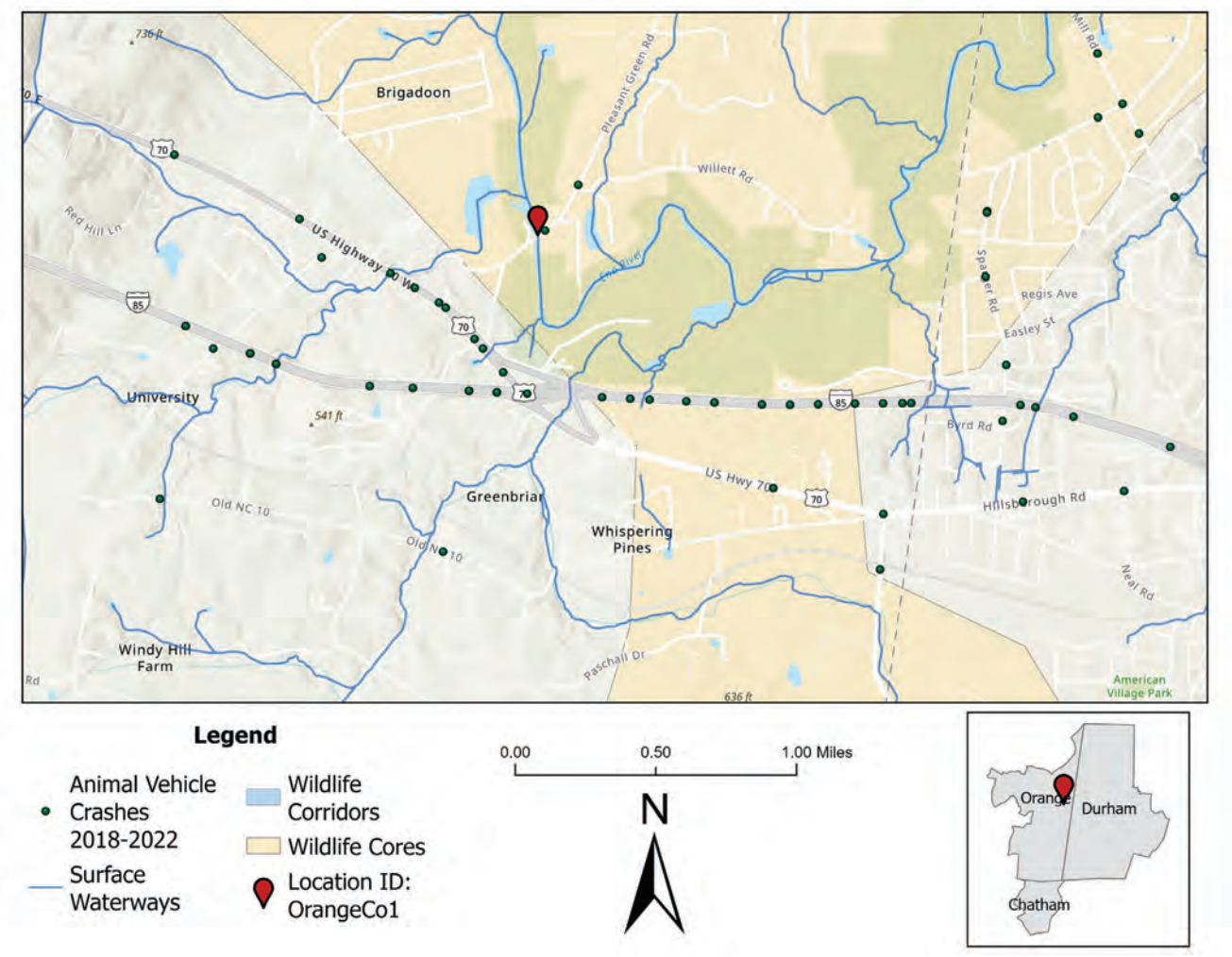
Adjacent managed natural land

Preferred Scenario

Provide a replacement bridge that maintains or extends the dry wildlife passage and MST footprint on natural benches on both sides of the river/ends of the bridge. Provide safe pedestrian crossing of the Eno River for the MST, either on the new bridge (preferably both sides) with connecting trails down to the benches below. Alternatively, pedestrian river crossing may be provided by a standalone pedestrian bridge upstream of the existing bridge if bridge sidewalks are not provided..

Alternate Scenario

Until the new bridge is constructed, install a natural surface wildlife passage bench under the east side of the bridge in the 2nd bay from the abutment, including tie-ins to habitat up and downstream.



Orange County

US 70 over Stony Creek

Summary and Problem Statement

US 70 over Stony Creek (a tributary of the Eno River) has been identified as a priority wildlife crossing. This crossing resides within a wildlife core identified by the Wildlands Network, and thirty WVCs have been reported within a one-mile buffer of this site. Providing wildlife crossing countermeasures at all crossings along Stony Creek will extend the network where wildlife can travel safely while reducing the amount of WVCs along this riparian corridor. This site has no bicycle and pedestrian facilities, has a speed limit of 45 mph, and garners 14,000 vehicles per day (2021 AADT).

The structure at this site is a bottomless, single-cell culvert. The Stony Creek bed generally consists of sound bedrock, with varying depths, which continues through the culvert, providing a solid natural creek bottom within the culvert. Barriers to wildlife travel through the culvert exist, which encourages wildlife travel on the roadway and results in conflicts with motorists. The barriers include standing water in the channel, lack of continuous dry bank on one side, narrow and ephemeral dry banks on side, diminishing height of culvert at banks (sloping culvert walls), and steep embankments. The roadway has standard guardrail along both sides, which is porous to terrestrial wildlife.

US 70 culvert over Stony Creek, facing south-west upstream. DCHC MPO.

US 70 culvert over Stony Creek, facing south-west upstream. Pete Schubert.

Aerial photograph of US 70 culvert over Stony Creek. Nearmap.

Site Facts

Location ID	OrangeCo2
Date of Site Visit	March 15, 2024
Jurisdiction	Orange County
Coordinates	36°02'41.0"N 79°01'12.4"W
NCDOT Crossing/Structure Code	670056
Existing Structure Type	Pipe (bottomless culvert)
Property Owner Type	Private
Existing Plan Alignment	CTP Highway: US 70A
Managed and Natural Lands	N/A
Average Annual Daily Traffic (AADT) (2019)	15,500
Average Annual Daily Traffic (AADT) (2021)	14,000
Projected Average Weekday Traffic (AWDT)	20,285
Speed Limit	45 mph
Reported Wildlife-vehicle collisions (WVCs) within 1-mile Buffer (2018-2022) and Comprehensive Crash Cost Estimate	Non-injury crash: 30 ($750,000) **Total crashes and cost estimate: 30 ($750,000)**
Likely Wildlife-vehicle collisions (WVCs) within 1-mile buffer (based on VDOT study revealing 8.5 times more WVCs are occurring than what DOT reports show)	Non-injury crash: 255 ($6,375,000) **Total crashes and cost estimate: 255 ($6,375,000)**

30
Reported WVCs within 1-mile buffer (2018-2022)

$750,000
Reported WVCs cost estimate

14,000
Annual average daily traffic (2021)

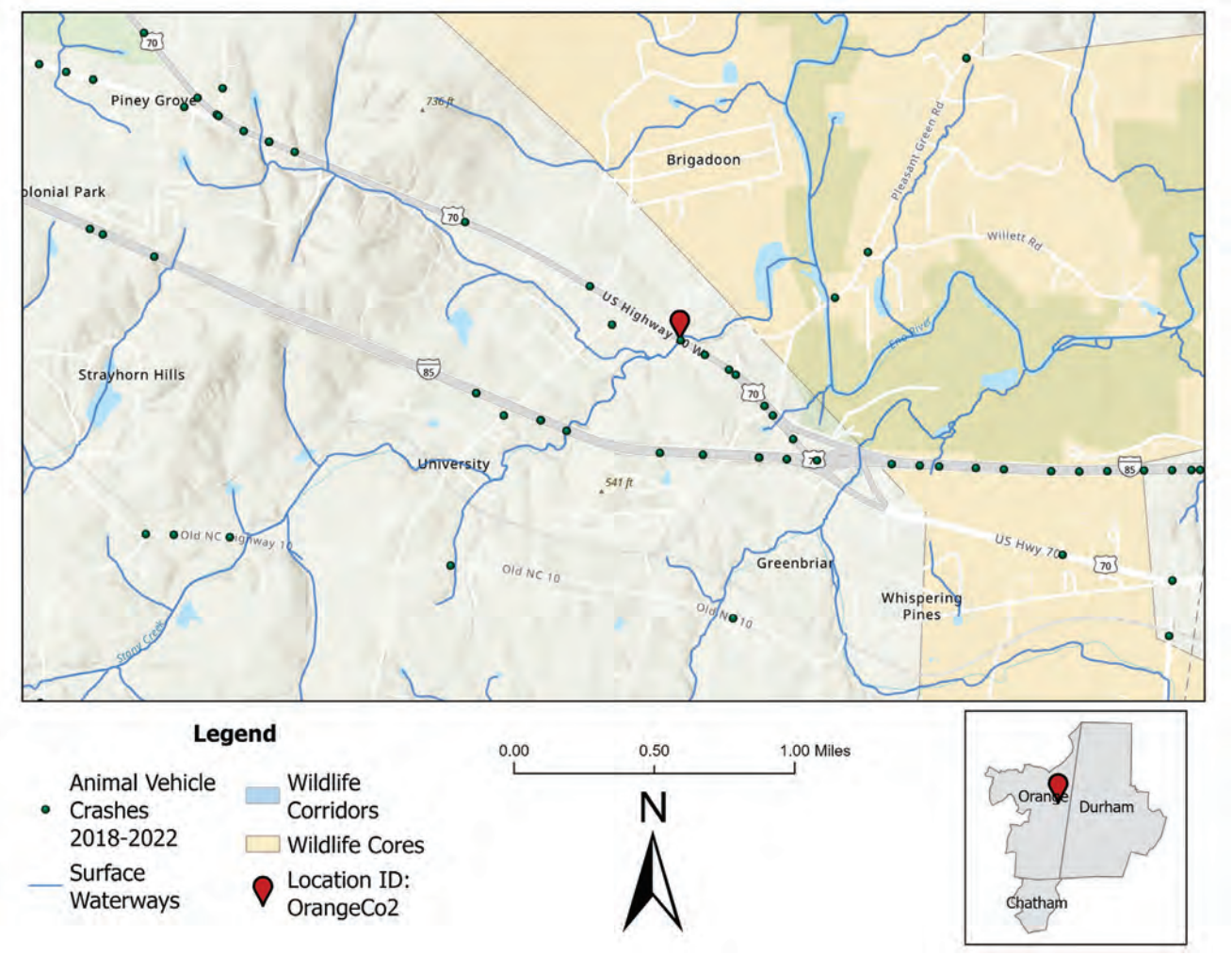
45
mph speed limit

Preferred Scenario

Provide a replacement bridge that maintains or extends the dry wildlife passage and MST footprint on natural benches on both sides of the river/ends of the bridge. Provide safe pedestrian crossing of the Eno River for the MST, either on the new bridge (preferably both sides) with connecting trails down to the benches below. Alternatively, pedestrian river crossing may be provided by a standalone pedestrian bridge upstream of the existing bridge if bridge sidewalks are not provided.

Alternate Scenario

Until the new bridge is constructed, install a natural surface wildlife passage bench under the east side of the bridge in the 2nd bay from the abutment, including tie-ins to habitat up and downstream.



Orange County

I-85 over Stony Creek

Summary and Problem Statement

The bottomless pipe culvert at I-85 over Stony Creek (a tributary of the Eno River) has been identified as a priority wildlife crossing. This site has garnered twenty-eight reported wildlife-vehicle crashes within a one-mile buffer in this identified wildlife corridor. While this specific crossing does not reside within a wildlife corridor or core identified by the Wildlands Network, the northeast portion of Stony Creek does reside within a wildlife core. Providing wildlife crossing countermeasures at all crossings along Stony Creek will extend the network where wildlife can travel safely while reducing the amount of WVCs along this riparian corridor. The roadway has two lanes going both north- and southbound divided by a 20-foot grass median, and steel guardrails (with gap underneath the rail between the posts) extend along top of I-85 road embankment mostly ahead of the culvert on both sides of the 65 MPH divided highway. This site has no bicycle and pedestrian facilities, has a posted speed limit of 65 mph, and garners 56,000 vehicles per day (2019 AADT).

Barriers to wildlife travel through the culvert exist, which encourages wildlife travel on the roadway and results in conflicts with motorists. This site does provide dry passage (approximately 25 feet) on the east side of the stream during low water conditions. However, there is no dry passage on the west side of stream, and the stream bank leading up to the culvert on the west side is extremely steep. As a result, wildlife will be forced around the steep stream bank (and the concrete wingwall extending from the culvert inlet) and up the road embankment to the roadway. However, the stream channel itself is narrow, shallow, and slow enough (at least during the low water conditions) that many wildlife species would be able to cross the stream to dry passage on the east side. During times of high and fast water flow, wildlife would be prevented from crossing the stream and could attempt to cross on the roadway.

I-85 culvert over Stony Creek, facing north, downstream. Pete Schubert.

I-85 culvert over Stony Creek, facing north, downstream. Pete Schubert.

Aerial photograph of I-85 culvert over Stony Creek. Nearmap.

Site Facts

Location ID	OrangeCo3
Date of Site Visit	April 26, 2024
Jurisdiction	Orange County
Coordinates	36°02'24.0"N 79°01'38.3"W
NCDOT Crossing/Structure Code	670097
Existing Structure Type	Pipe culvert
Property Owner Type	Private
Existing Plan Alignment	2024-2033 STIP: # I-0305 2050 MTP: I-85, MTP ID: 48 CTP Highway: I-85
Managed and Natural Lands	N/A
Average Annual Daily Traffic (AADT) (2019)	56,000
Average Annual Daily Traffic (AADT) (2021)	Unavailable
Projected Average Weekday Traffic (AWDT)	56,467
Speed Limit	65 mph
Reported Wildlife-vehicle collisions (WVCs) within 1-mile Buffer (2018-2022) and Comprehensive Crash Cost Estimate	Non-injury crash: 28 ($700,000) **Total crashes and cost estimate: 28 ($700,000)**
Likely Wildlife-vehicle collisions (WVCs) within 1-mile buffer (based on VDOT study revealing 8.5 times more WVCs are occurring than what DOT reports show)	Non-injury crash: 238 ($5,950,000) **Total crashes and cost estimate: 238 ($5,950,000)**

28
Reported WVCs within 1-mile buffer (2018-2022)

$700,000
Reported WVCs cost estimate

56,000
Annual average daily traffic (2019)

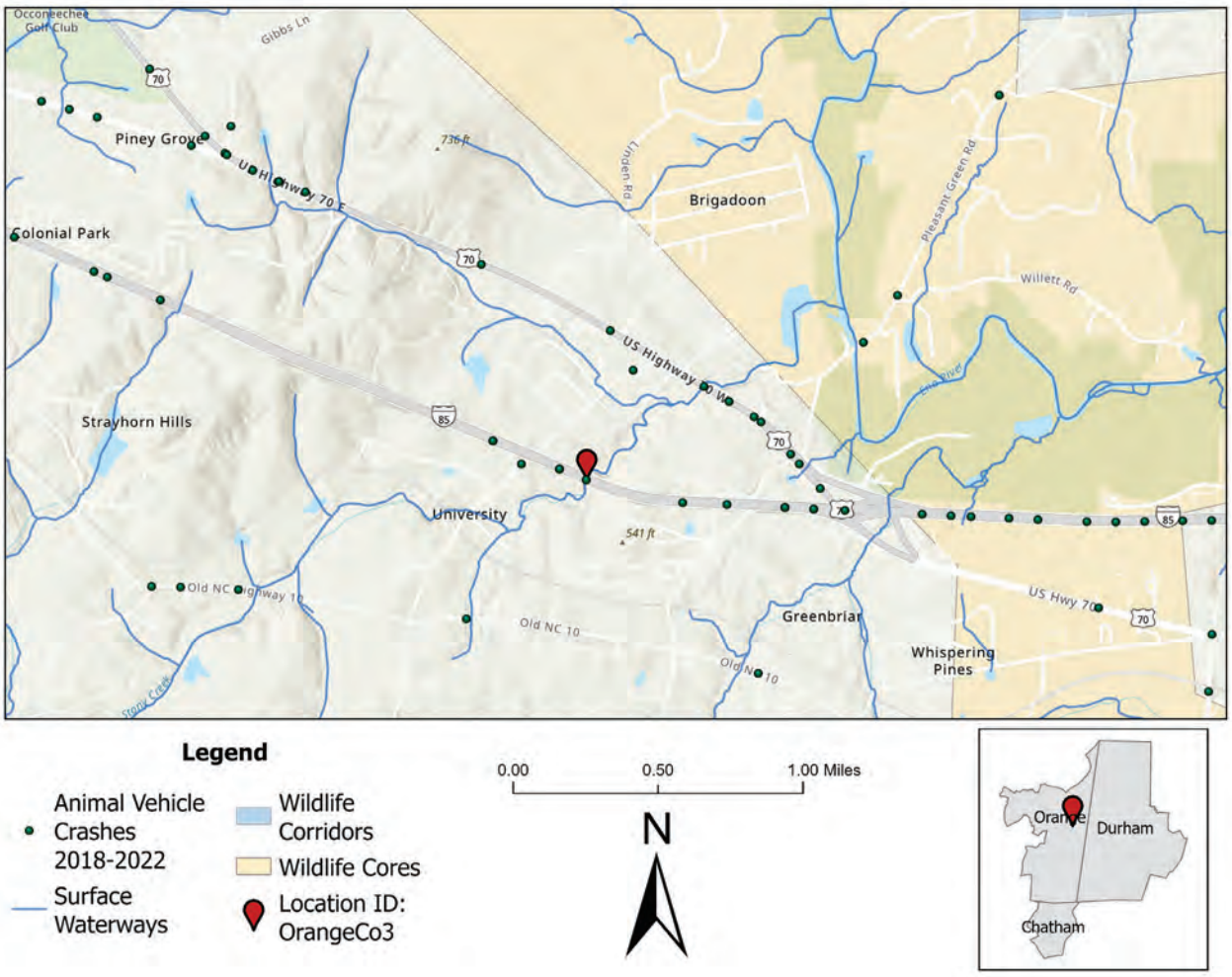
55 / 65
mph speed limit

Preferred Scenario

Replace the culvert with a bridge of sufficient span length to provide dry passage for wildlife on natural surfaces on atop both east and west stream banks, with such passage constructed continuous with habitat up and down stream. Provide two separate spans (eastbound and westbound) with a median gap to allow daylight to penetrate to the stream and banks below the bridge. Install fencing along the roadway ROW / toes of the embankment (both sides) of sufficient length to guide large wildlife through the culvert.

Alternate Scenario

If hydraulic and hydrologic analyses allow, construct a permanent dry passage within the culvert on the west side, tied into the stream banks up and downstream.



Orange County

University Station Road over Stony Creek

Summary and Problem Statement

University Station Road over Stony Creek (a tributary of the Eno River) has been identified as a priority wildlife crossing. While this specific crossing does not reside within a wildlife corridor or core identified by the Wildlands Network, the northeast portion of Stony Creek does reside within a wildlife core. Providing wildlife crossing countermeasures at all crossings along Stony Creek will extend the network where wildlife can travel safely while reducing the amount of WVCs along this riparian corridor. This site has no bicycle and pedestrian facilities, has a posted speed limit of 45 mph, and seventeen WVCs have been reported within a one-mile buffer.

Barriers to wildlife travel under the bridge exist, which encourages wildlife travel on the roadway and results in conflicts with motorists. Identified barriers include concrete walls and steep, exposed riprap slopes that cover the entire area under the bridge. There is also a steep riprap slope on the northeast side extending from the streambank/underpass area up to the road. Stream fills the channel between concrete walls with no dry passage. Remnants of wooden piers are embedded in what are likely concrete footings for former bridge piers, now abandoned in place and confining the channel under the current bridge. Because these old structures confine the channel, the adjacent riprapped slopes could be benched / terraced and choked with fines to provide stabilized natural surface dry passages under the bridge. These could easily be connected to dry banks up and down stream. Due to the close proximity of driveways and private parcels, wildlife fencing may not be appropriate.

East side of University Road bridge over Stony Creek, facing northwest. Pete Schubert.

Underneath University Road bridge over Stony Creek, facing northwest. Pete Schubert.

Aerial photograph of University Station Road. Nearmap.

Site Facts

Location ID	OrangeCo4
Date of Site Visit	April 26, 2024
Jurisdiction	Orange County
Coordinates	36°02'18.4"N 79°02'03.7"W
NCDOT Crossing/Structure Code	670104
Existing Structure Type	Bridge
Property Owner Type	Private
Existing Plan Alignment	CTP Pedestrian: University Station Rd
Managed and Natural Lands	N/A
Average Annual Daily Traffic (AADT) (2019)	Unavailable
Average Annual Daily Traffic (AADT) (2021)	Unavailable
Projected Average Weekday Traffic (AWDT)	928
Speed Limit	45 mph
Reported Wildlife-vehicle collisions (WVCs) within 1-mile Buffer (2018-2022) and Comprehensive Crash Cost Estimate	Non-injury crash: 17 ($425,000) **Total crashes and cost estimate: 17 ($425,000)**
Likely Wildlife-vehicle collisions (WVCs) within 1-mile buffer (based on VDOT study revealing 8.5 times more WVCs are occurring than what DOT reports show)	Non-injury crash: 144.5 ($3,612,500) **Total crashes and cost estimate: 144.5 ($3,612,500)**

17
Reported WVCs within 1-mile buffer (2018-2022)

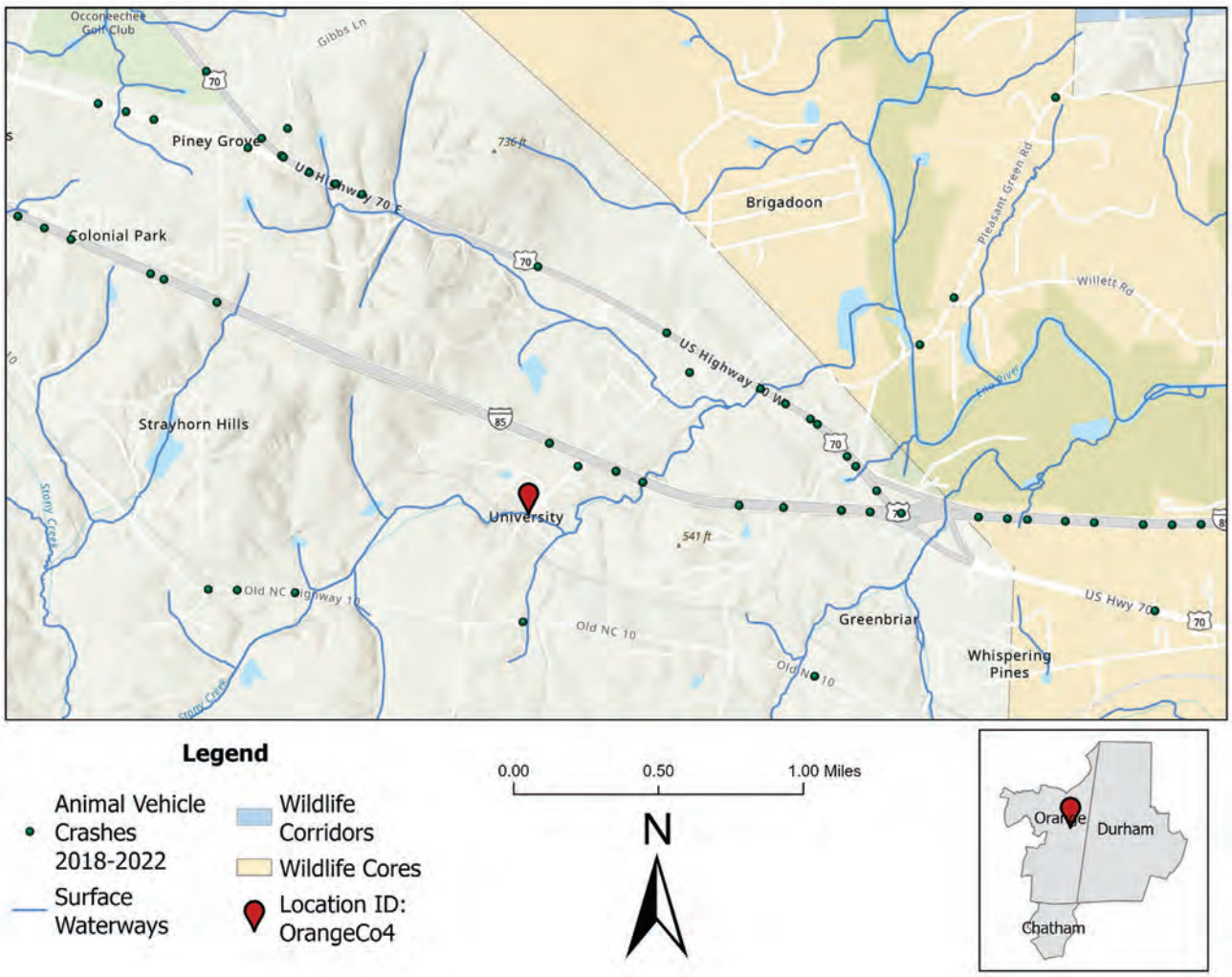
$425,000
Reported WVCs cost estimate

928
Projected annual daily traffic

45
mph speed limit

Preferred Scenario

Create a bench in the existing riprap slope protection on each side of the creek under the bridge, and use small stones to fill the voids to create a natural surface wildlife passage that is connected upstream and downstream to existing habitat areas.



Orange County

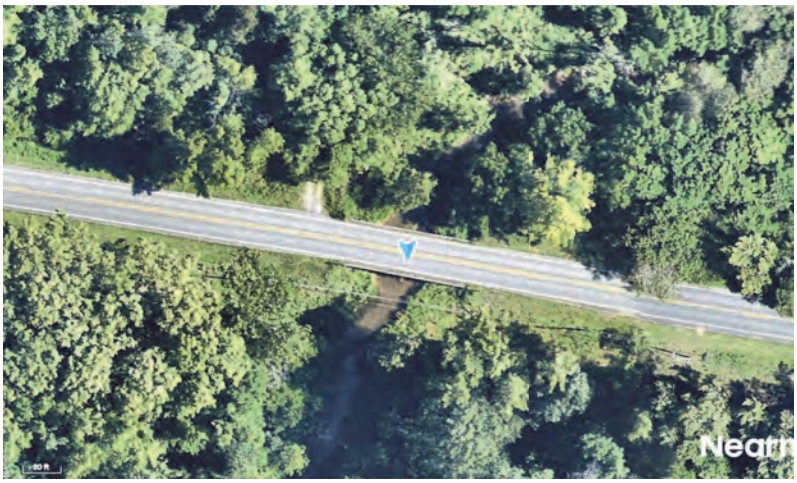
Old NC Highway 10 over Stony Creek

Summary and Problem Statement

Old NC Highway 10 over Stony Creek (a tributary of the Eno River) has been identified as a priority wildlife crossing. While this specific crossing does not reside within a wildlife corridor or core identified by the Wildlands Network, the northeast portion of Stony Creek does reside within a wildlife core. Providing wildlife crossing countermeasures at all crossings along Stony Creek will extend the network where wildlife can travel safely while reducing the amount of WVCs along this riparian corridor. This site has no bicycle and pedestrian facilities, has a posted speed limit of 45 mph, and seven WVCs have been reported within a one-mile buffer.

This site is adjacent to several managed and natural lands. The Eno River Association maintains a conservation area on both sides of the site. The NC Department of Natural and Cultural Resources Land and Water Fund maintains a conservation easement along the waterway and table. The Triangle Land Conservancy maintains a conservation area covering 606.75 acres of land on both sides of roadway, covers all other overlapping conservations. Orange County government maintains an easement covering 163 acres along the northern side of the roadway, which aligns with the plot as the Triangle Land Conservancy land north of roadway.

Barriers to wildlife travel under the bridge exist, which encourages wildlife travel on the roadway and results in conflicts with motorists. The barriers include riprap on abutment slopes under the bridge, on both sides; lack of natural surface dry passage benches on either side; and marginally sufficient vertical clearance under the bridge for high water passage for large mammals. There is no ROW fencing or guardrail along the roadway except as railing for the bridge itself. At a minimum, the riprap slope protections should be benched and choked with gravel or alluvial material to create dry passages on both sides. However, as these will need to be partway up the abutment slopes, they will have less than five feet of vertical clearance. Consideration should be given to replacing this bridge with a single span at least double the current span length, to both remove the bent from the channel and to provide width for dry wildlife passage on both sides. Ideally, the road profile should be raised at least two feet to provide adequate vertical clearance for larger mammals under the bridge. Fencing should also be considered along the roadway at the base of the causeway to funnel wildlife under the bridge after it has been improved and if AADT warrants.



Aerial photograph of Old NC Highway 10 bridge over Stony Creek. Nearmap.

Underneath Old NC Highway 10 bridge over Stony Creek, facing west. Pete Schubert.

Site Facts

Location ID	OrangeCo5
Date of Site Visit	April 18, 2024
Jurisdiction	Orange County
Coordinates	36°02'03.8"N 79°02'51.4"W
NCDOT Crossing/Structure Code	670102
Existing Structure Type	Bridge
Property Owner Type	Private, public
Existing Plan Alignment	CTP Pedestrian: Old NC 10 CTP Highway: Old NC 10
Managed and Natural Lands	Eno River Association, NC DNCR Land and Water Fund, Orange County, Triangle Land Conservancy
Average Annual Daily Traffic (AADT) (2019)	3,300
Average Annual Daily Traffic (AADT) (2021)	2,500
Projected Average Weekday Traffic (AWDT)	2,301
Speed Limit	45 mph
Reported Wildlife-vehicle collisions (WVCs) within 1-mile Buffer (2018-2022) and Comprehensive Crash Cost Estimate	Non-injury crash: 7 ($175,000) **Total crashes and cost estimate: 7 ($175,000)**
Likely Wildlife-vehicle collisions (WVCs) within 1-mile buffer (based on VDOT study revealing 8.5 times more WVCs are occurring than what DOT reports show)	Non-injury crash: 59.5 ($1,487,500) **Total crashes and cost estimate: 59.5 ($1,487,500)**

7
Reported WVCs within 1-mile buffer (2018-2022)

$175,000
Reported WVCs cost estimate

2,500
Annual average daily traffic (2021)

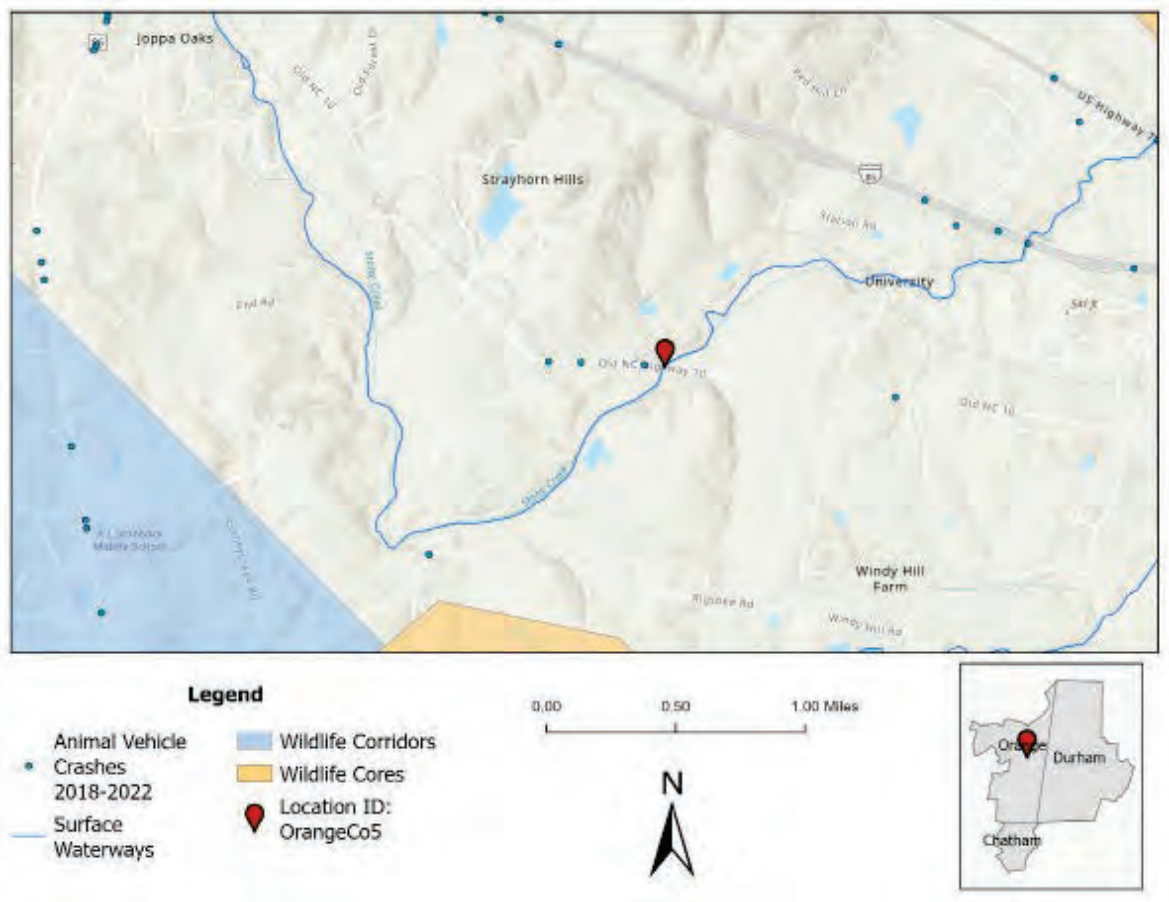
Adjacent managed natural land

Preferred Scenario

Raise the road and causeway profile and replace the existing narrow bridge with a single or multiple span of adequate length to provide for dry passage of wildlife on both sides of the creek and a minimum of eight feet vertical clearance. Install fencing of adequate length on both sides and approaches to channel wildlife movement under the improved bridge.

Alternate Scenario

Construct benches in the existing riprap slope protection for each abutment including choking the riprap with fine aggregate to provide a natural surface for wildlife passage. Benches shall be tied into habitat up and down stream.



Orange County

Halls Mill Road over Eno River

Summary and Problem Statement

The bridge at Halls Mill Road (SR 1336) over the Eno River has been identified as a priority wildlife crossing as it resides within a wildlife corridor identified by the Wildlands Network, and the bridge is currently scheduled to be replaced. The existing two-lane bridge (Br# 670011) is 125 feet long and 18 feet wide. Located in rural Elfland, Orange County, Halls Mill Road has no bicycle and pedestrian facilities, and has a posted speed limit of 55 mph. The closest 2021 AADT station data is located at Efland Cedar Grove Road approximately one-mile to the west of the site, is a major collector which counted 4,500 vehicles per day.

This site serves as an important corridor for wildlife, including rare and threatened species. The bridge crosses a section of the Eno River identified by the U.S. Fish and Wildlife Service as Critical Habitat for the Federally Threatened Neuse River Waterdog. The N.C. Natural Heritage Program has identified this section of the river as aquatic habitat of national significance – Eno River Aquatic Habitat. At this location, the Eno River contains a significant number of rare aquatic species, including the federally threatened and state endangered Atlantic pigtoe, and the federally threatened and state special concern Neuse River waterdog. Several other rare species have been identified downstream such as state endangered green floater and yellow lampmussel, state threatened eastern lampmussel and triangle floater, state species of concern Carolina darter, and state significantly rare Roanoke bass. In addition, the Orange County Future Land Use Map (Orange County 2030 Comprehensive Plan), the 2004 Inventory of Natural Areas and Wildlife Habitat for Orange County, NC (NC Natural Heritage Program), and A Landscape Plan for Wildlife Habitat Connectivity in the Eno River and New Hope Creek Watersheds, North Carolina (2019) identifies this segment of the Eno River, and more specifically under this bridge, as a highly important wildlife corridor.

The following are wildlife crossing improvements to this site based on review of the new bridge's plans:

- Replacement bridge span has an increase of approximately 20 feet. This bridge lengthening allows greater opportunity to create dry passage underneath and along the embankments for wildlife to travel.
- Details for the shoulder berm gutter shows a mountable curb inside of a standard steel guardrail set on posts. This can contribute to adequate passage for smaller wildlife.
- The bridge profile depicts an increase in clear span height from a 13-foot average (existing) to 21.5-foot average (new/replacement), providing a clear span at the toe of the Class II Riprap slope protection of 13 feet on west end and 14 feet on east end. This increase can help create dry wildlife passage at low flow/discharge.

Aerial photograph of Halls Mill Road bridge over Eno River. Nearmap.

Site Facts

Location ID	OrangeCo6
Date of Site Visit	May 16, 2024
Jurisdiction	Orange County
Coordinates	36°07'25.1"N 79°09'18.3"W
NCDOT Crossing/Structure Code	670011
Existing Structure Type	Bridge
Property Owner Type	Private
Existing Plan Alignment	WBS No. BP7.R009.1
Managed and Natural Lands	N/A
Average Annual Daily Traffic (AADT) (2019)	Unavailable
Average Annual Daily Traffic (AADT) (2021)	Unavailable
Projected Average Weekday Traffic (AWDT)	Unavailable
Speed Limit	55 mph
Reported Wildlife-vehicle collisions (WVCs) within 1-mile Buffer (2018-2022) and Comprehensive Crash Cost Estimate	Non-injury crash: 1 ($25,000) **Total crashes and cost estimate: 1 ($25,000)**
Likely Wildlife-vehicle collisions (WVCs) within 1-mile buffer (based on VDOT study revealing 8.5 times more WVCs are occurring than what DOT reports show)	Non-injury crash: 8.5 ($212,500) **Total crashes and cost estimate: 8.5 ($212,500)**

1
Reported WVCs within 1-mile buffer (2018-2022)

$25,000
Reported WVCs cost estimate

Bridge replacement in progress

55
mph speed limit

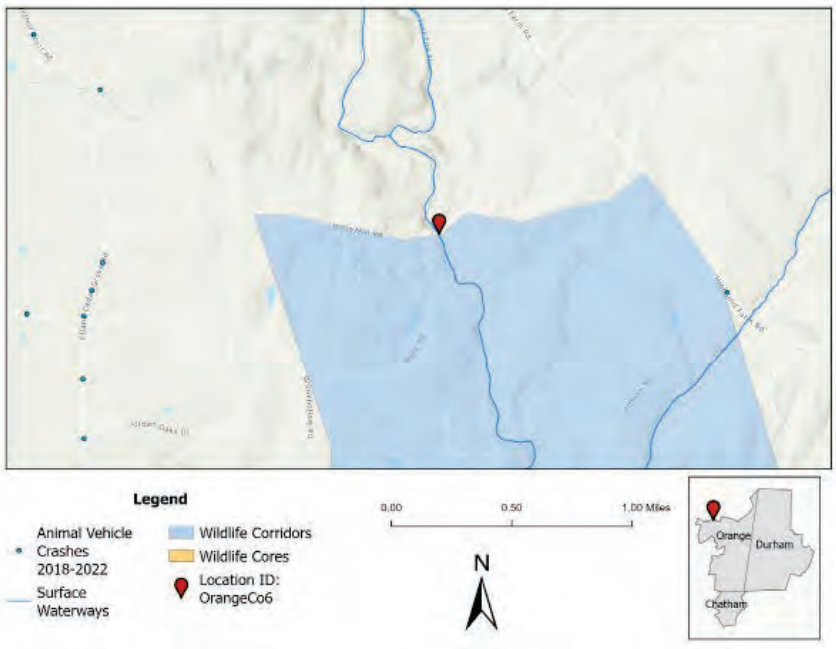
Preferred Scenario

As the planning and design for this project moves forward, the following elements are recommended to be considered to promote wildlife connectivity in the identified wildlife corridor and eliminate fatalities and serious injuries as a result of WVCs in the project's location:

- Avoid installing riprap slope protection under the span. Riprap should not be placed within the area of wildlife passage as it creates a barrier for wildlife movement. Instead, provide full height full wall end bents as are currently in place, which would eliminate the need for slope protection under the span.
- The replacement bridge should have a span at least as long as the current span; longer if there will be a slope up to the abutments instead of a vertical end bent. The replacement bridge should provide no less capacity for wildlife to cross as is presently afforded, consisting of a range of elevations of dry passage on both sides of the bridge, tied into the habitat up and down stream.
- Once the bridge replacement has been completed, perform annual vegetation management in accordance with the NCDOT Vegetation Management Manual and standard practices to eradicate invasive bamboo, selectively clear other dense woody vegetation, and allow wildlife full access to the dry passages under the span.

Alternate Scenario

If new riprap slope protection is incorporated, then natural surface (i.e., choked riprap) benches at least 6 feet below the new bridge deck are recommended. Until the bridge is replaced, perform annual vegetation management in accordance with the NCDOT Vegetation Management Manual and standard practices to eradicate invasive bamboo, selectively clear other dense woody vegetation, and allow wildlife full access to the dry passages under the span.



Orange County

Jones Ferry Road over Neville Creek

Summary and Problem Statement

Jones Ferry Road over Neville Creek has been identified as a priority wildlife crossing. This site has garnered thirteen reported wildlife-vehicle crashes within a one-mile buffer in this identified wildlife corridor, and is located just outside of a wildlife corridor identified by the Wildlands Network. The bridge is a two-lane undivided with a speed limit of 45 mph. This site has no bicycle and pedestrian facilities, and garners 8,300 vehicles per day (2021 AADT). This site is adjacent to the University of North Carolina's managed natural lands of University Lake and McCauley Mountain Slopes.

Barriers to wildlife travel along this corridor and under the bridge exist, which encourages wildlife travel on the roadway and results in conflicts with motorists. The barriers include standing water, riprap, and low visibility. Standing water is present just outside of the bridge underpass area and extends into habitat areas that are in the direct path for wildlife toward the dry underpass. The low visibility of the passage area under the bridge is caused by dense vegetation near openings and (possibly) the metal wings extending from the ends of bridge.

East side of Jones Ferry Road bridge over Neville Creek. Pete Schubert.

Underneath Jones Ferry Road bridge over Neville Creek, facing Northeast. Pete Schubert.

Aerial photograph of Jones Ferry Road bridge over Neville Creek. Nearmap.

Site Facts

Location ID	OrangeCo7
Date of Site Visit	May 31, 2024
Jurisdiction	Orange County
Coordinates	35°54'00.3"N 79°06'25.8"W
NCDOT Crossing/Structure Code	670092
Existing Structure Type	Bridge
Property Owner Type	Public
Existing Plan Alignment	CTP Pedestrian: Jones Ferry Rd. CTP Highway: Jones Ferry Rd.
Managed and Natural Lands	UNC Chapel Hill
Average Annual Daily Traffic (AADT) (2019)	9,800
Average Annual Daily Traffic (AADT) (2021)	8,300
Projected Average Weekday Traffic (AWDT)	5,692
Speed Limit	45 mph
Reported Wildlife-vehicle collisions (WVCs) within 1-mile Buffer (2018-2022) and Comprehensive Crash Cost Estimate	Non-injury crash: 13 ($325,000) **Total crashes and cost estimate: 13 ($325,000)**
Likely Wildlife-vehicle collisions (WVCs) within 1-mile buffer (based on VDOT study revealing 8.5 times more WVCs are occurring than what DOT reports show)	Non-injury crash: 110.5 ($2,762,500) **Total crashes and cost estimate: 110.5 ($2,762,500)**

13
Reported WVCs within 1-mile buffer (2018-2022)

$325,000
Reported WVCs cost estimate

8,300
Annual average daily traffic (2021)

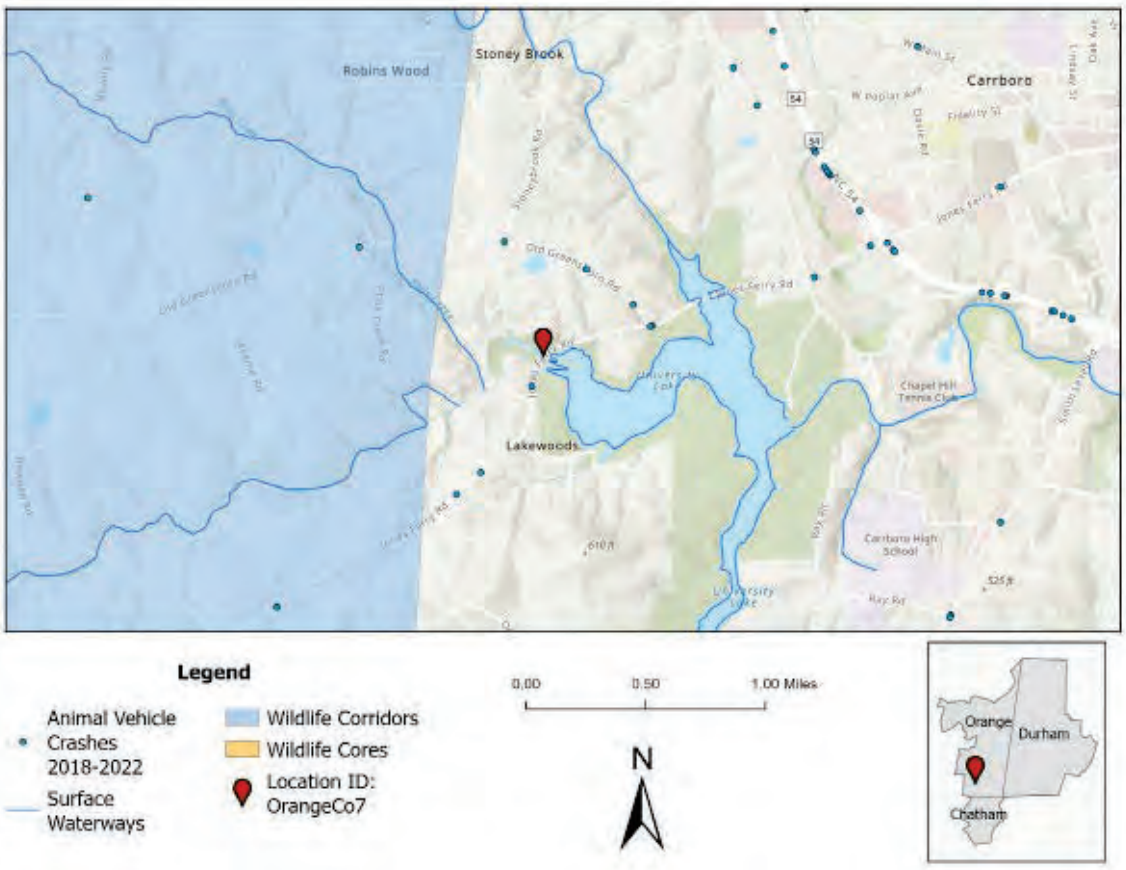
Adjacent managed natural land

Preferred Scenario

Replace the existing bridge and raise the road's approach to it to increase the height clearance for the dry passage areas. The bridge span should be long enough, and above flood level, to allow for dry passage on both sides of the creek. Fencing to guide wildlife into the underpass should then be installed.

Alternate Scenario

A temporary solution to consider is to excavate down in the earthen areas on each streambank and leave an earthen "table", to get an additional 2-3 feet of height (with about 4 feet of width). Perform vegetation management in accordance with the NCDOT Vegetation Management Manual and standard practices to ensure visibility of the existing dry opening for wildlife.



Orange County

Neville Road over Phil's Creek

Summary and Problem Statement

Neville Road over Phil's Creek has been identified as a priority wildlife crossing. This crossing resides within a wildlife corridor identified by the Wildlands Network, and six WVCs have been reported within a one-mile buffer of this site. This site has no bicycle and pedestrian facilities and has a posted speed limit of 55 mph. The Triangle Land Conservancy manages a short stretch of the creek on the east side of the road.

Barriers to wildlife travel along this corridor and under the bridge exist, which encourages wildlife travel on the roadway and results in conflicts with motorists. The bridge at this site was replaced within the past few years. While the footings for the previous bridge were left in place to minimize disturbance to the creek channel, they are constraining the flow and some wildlife access to the creek under the bridge. However, the outer footings stabilize the low-slope abutment embankment toes, providing considerable space for dry wildlife passage. But such passage is not possible due to the placement of exposed, oversize riprap. Given the low slope, the riprap could be removed, but the sheer size of the riprap and the low overhead clearance makes heavy equipment access difficult. If the riprap can be relocated or removed to expose a natural surface, it can be left in place with the voids filled with fine aggregate and alluvial materials to create a natural surface at all points with at least 4-feet of vertical clearance to the deck bottom above. Under the bridge, there is ephemeral dry passage through only the north channel, and only at low flow. At higher flows, both channels have standing water and there is no dry passage due to the riprap slope lining on both sides, except on the narrow (one-foot wide) flat footing tops.

Under Neville Road bridge over Phil's Creek, facing East. Pete Schubert.

Under Neville Road bridge over Phil's Creek, facing South. Pete Schubert.

Aerial photograph of Neville Road bridge over Phil's Creek. Nearmap.

Site Facts

Location ID	OrangeCo8
Date of Site Visit	May 31, 2024
Jurisdiction	Orange County
Coordinates	35°54'43.1"N 79°08'02.5"W
NCDOT Crossing/Structure Code	670232
Existing Structure Type	Bridge
Property Owner Type	Public, private
Existing Plan Alignment	CTP Multiuse Path: Phils Creek Trail
Managed and Natural Lands	Triangle Land Conservancy
Average Annual Daily Traffic (AADT) (2019)	Unavailable
Average Annual Daily Traffic (AADT) (2021)	Unavailable
Projected Average Weekday Traffic (AWDT)	920
Speed Limit	55 mph
Reported Wildlife-vehicle collisions (WVCs) within 1-mile Buffer (2018-2022) and Comprehensive Crash Cost Estimate	Non-injury crash: 5 ($125,000) Type C injury crash: 1 ($107,000) **Total crashes and cost estimate: 6 ($232,000)**
Likely Wildlife-vehicle collisions (WVCs) within 1-mile buffer (based on VDOT study revealing 8.5 times more WVCs are occurring than what DOT reports show)	Non-injury crash: 42.5 ($1,062,500) Type C injury crash: 8.5 ($909,500) **Total crashes and cost estimate: 51 ($1,972,000)**

6
Reported WVCs within 1-mile buffer (2018-2022)

$232,000
Reported WVCs cost estimate

55
mph speed limit

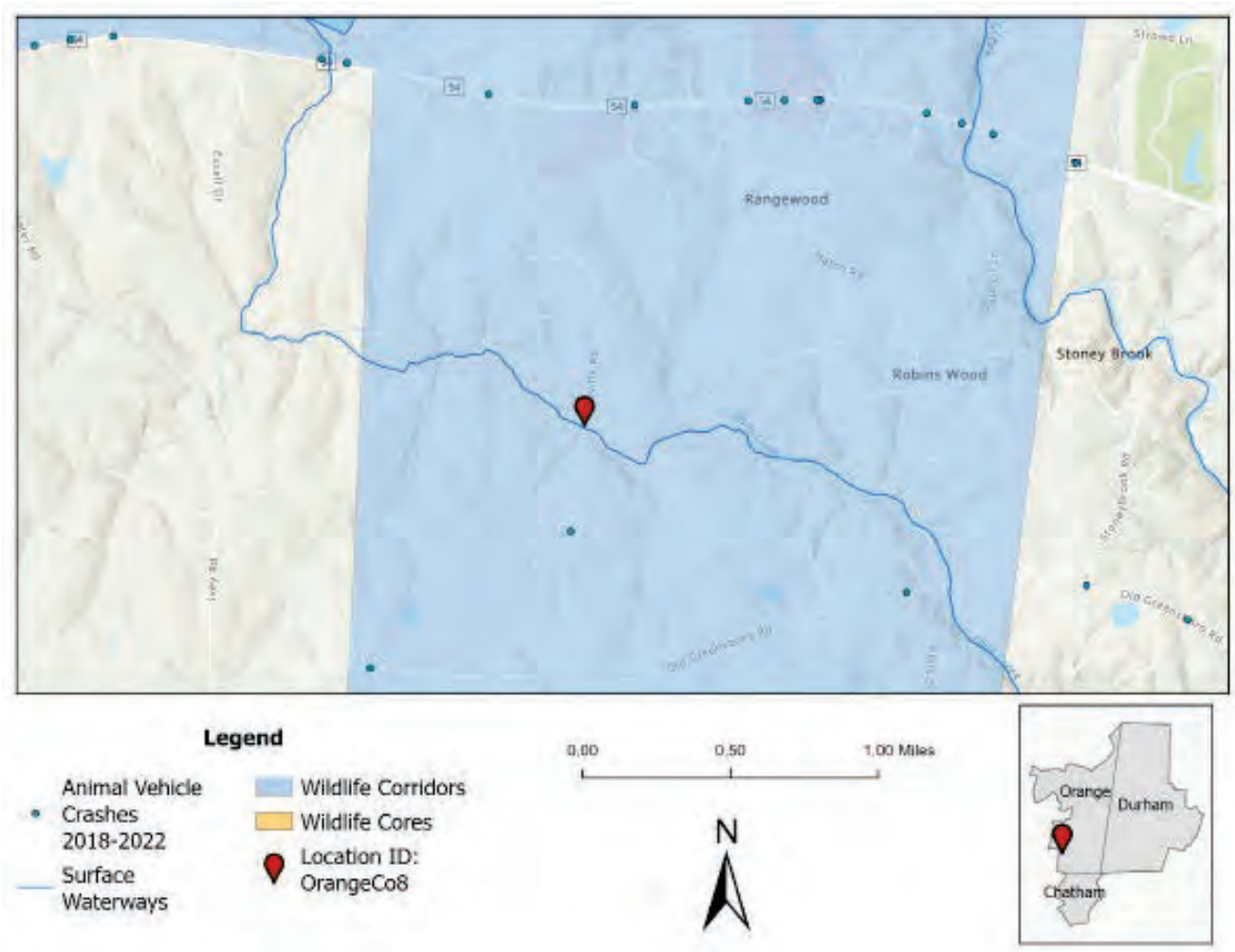
Adjacent managed natural land

Preferred Scenario

Remove the riprap slope protection under the bridge on both sides up to within 4 feet of the underside of the deck, leaving a low-slope natural surface dry passage for wildlife on both sides of the creek.

Alternate Scenario

Use small stones to choke/fill the voids in all riprap slope protection up to within 4 feet of the underside of the deck to create a low-slope natural surface dry passage for wildlife on both sides of the creek.



Orange County

NC 54 over Morgan Creek

Summary and Problem Statement

NC 54 over Morgan Creek has been identified as a priority wildlife crossing. This crossing resides within a wildlife corridor identified by the Wildlands Network, and fourteen WVCs have been reported within a one-mile buffer of this site. This site has no bicycle and pedestrian facilities and has a posted speed limit of 55 mph. The culvert at this site is set to be replaced (BR-0091), which presents an opportunity to enhance wildlife connectivity and create a safer roadway for wildlife and drivers alike. While this site is not currently adjacent to natural managed land, the Triangle Land Conservancy owns conservation land upstream to the north of the crossing site, and University Lake land is owned by the University of North Carolina along with an NC Land and Water Fund Conservation Agreement downstream to the south of the crossing site.

Barriers to wildlife travel along this corridor and through the culvert exist, which encourages wildlife travel on the roadway and results in conflicts with motorists. The two-bay box culvert has standing water in both cells, which provides no dry and safe passage for wildlife. Wildlife that encounters this flooded culvert may move up the slope and onto NC 54 to cross the roadway. Additionally, dense vegetation on the north side of the road (such as dense non-native wisteria extending from the road bank down to the stream on the northeast side) poses an additional barrier and obstacle for wildlife to travel through the natural habitat.

North side of NC 54 culvert, facing South.
Pete Schubert.

South side of NC 54 culvert, facing North.
Pete Schubert.

Aerial photograph of NC 54 culvert over Morgan Creek. Nearmap.

Site Facts

Location ID	OrangeCo9
Date of Site Visit	July 26, 2024
Jurisdiction	Orange County
Coordinates	35°55'25.6"N 79°06'54.0"W
NCDOT Crossing/Structure Code	670036
Existing Structure Type	Culvert
Property Owner Type	Private
Existing Plan Alignment	Bridge Replacement: BR-0091 2050 MTP Highway: NC 54 CTP Highway: NC 54 CTP Pedestrian: NC 54
Managed and Natural Lands	N/A
Average Annual Daily Traffic (AADT) (2019)	15,500
Average Annual Daily Traffic (AADT) (2021)	12,500
Projected Average Weekday Traffic (AWDT)	21,211
Speed Limit	55 mph
Reported Wildlife-vehicle collisions (WVCs) within 1-mile Buffer (2018-2022) and Comprehensive Crash Cost Estimate	Non-injury crash: 13 ($325,000) Type C injury crash: 1 ($107,000) **Total crashes and cost estimate: 14 ($432,000)**
Likely Wildlife-vehicle collisions (WVCs) within 1-mile buffer (based on VDOT study revealing 8.5 times more WVCs are occurring than what DOT reports show)	Non-injury crash: 110.5 ($2,762,500) Type C injury crash: 8.5 ($909,500) **Total crashes and cost estimate: 119 ($3,672,000)**

14
Reported WVCs within 1-mile buffer (2018-2022)

$432,000
Reported WVCs cost estimate

Bridge replacement in progress

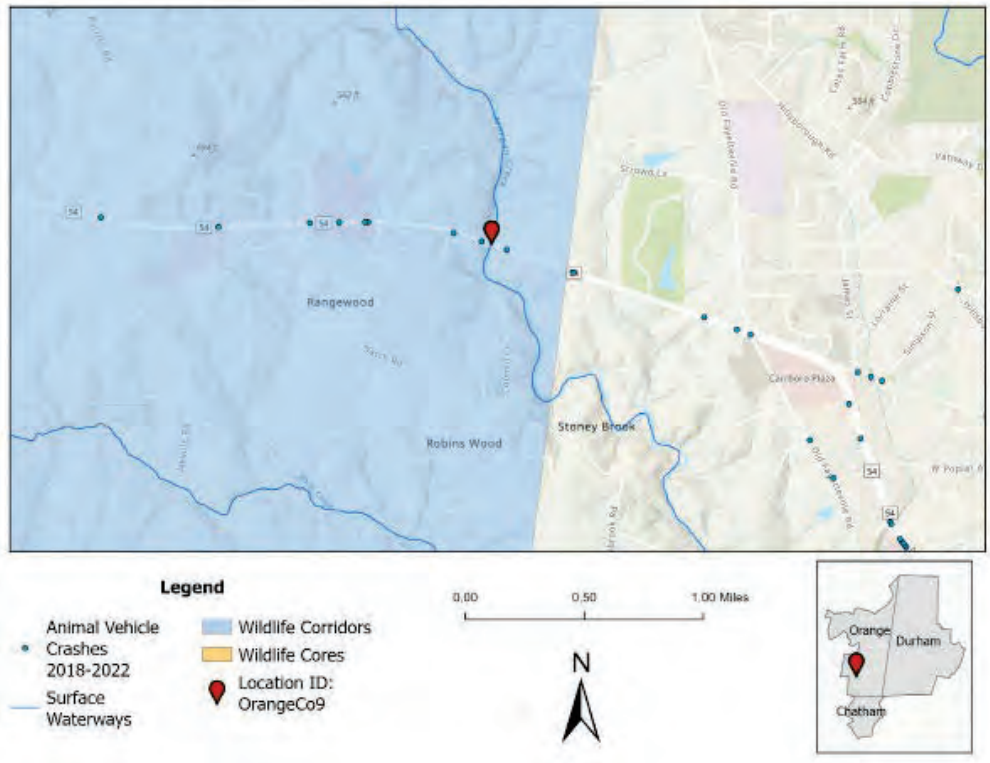
12,500
Annual average daily traffic (2021)

Preferred Scenario

Replace the flooded bottom box culvert with a single span bridge of adequate span length and height to provide dry passage for wildlife on both sides of the creek under the structure. Connect new dry passages to adjacent habitat up and downstream on both sides of the stream. Install fencing along the ROW approaching the bridge to guide wildlife into the dry crossings under the new bridge and deter crossing NC 54. Perform annual vegetation management in accordance with the NCDOT Vegetation Management Manual and standard practices.

Alternate Scenario

Install new higher bottom elevation culverts away from the existing culverts to provide dry passage for wildlife away from the creek entering the flooded culverts. Culverts shall be at a location to provide a minimum height of 8 feet and minimum width of 12 feet, and a bottom elevation that ties into adjacent habitats' elevations up and downstream. Install fencing along the ROW approaching the new dry culverts to guide wildlife into the crossings and deter crossing the busy NC 54. Perform annual vegetation management in accordance with the NCDOT Vegetation Management Manual and standard practices.



Orange County

Damascus Church Road over Pritchard Mill Creek

Summary and Problem Statement

Damascus Church Road over Pritchard Mill Creek has been identified as a priority wildlife crossing. This crossing resides within a wildlife corridor identified by the Wildlands Network, and one WVC has been reported within a one-mile buffer of this site. This site has no bicycle and pedestrian facilities and has a posted speed limit of 45 mph. The bridge at this site is set to be replaced (BP7-R013), which presents an opportunity to enhance wildlife connectivity and create a safer roadway for wildlife and drivers alike. While this site is not currently adjacent to natural managed land, the Triangle Land Conservancy owns conservation land upstream to the north of the crossing site, and University Lake land is owned by the University of North Carolina along with an NC Land and Water Fund Conservation Agreement downstream to the south of the crossing site.

Barriers to wildlife travel along this corridor under the bridge exist, which encourages wildlife travel on the roadway and results in conflicts with motorists. The creek channel has migrated to the south vertical abutment and scoured/exposed the concrete abutment wall footing, leaving no dry passage, and no dry connection to upstream or downstream habitat on that side. Scattered rocks and debris (wooden boards) do not seem to represent significant barriers.

West side of Damascus Church Road bridge over Pritchard Mill Creek, facing east. DCHC MPO.

East side of Damascus Church Road bridge over Pritchard Mill Creek, facing west. DCHC MPO.

Aerial photograph of Damascus Church Road bridge over Pritchard Mill Creek. Nearmap.

Site Facts

Location ID	OrangeCo10
Date of Site Visit	July 26, 2024
Jurisdiction	Orange County
Coordinates	35°52'13.4"N 79°07'01.2"W
NCDOT Crossing/Structure Code	670090
Existing Structure Type	Bridge
Property Owner Type	Private
Existing Plan Alignment	Bridge Replacement: BP7-R013
Managed and Natural Lands	N/A
Average Annual Daily Traffic (AADT) (2019)	Unavailable
Average Annual Daily Traffic (AADT) (2021)	Unavailable
Projected Average Weekday Traffic (AWDT)	1,636
Speed Limit	45 mph
Reported Wildlife-vehicle collisions (WVCs) within 1-mile Buffer (2018-2022) and Comprehensive Crash Cost Estimate	Non-injury crash: 1 ($25,000) **Total crashes and cost estimate: 1 ($25,000)**
Likely Wildlife-vehicle collisions (WVCs) within 1-mile buffer (based on VDOT study revealing 8.5 times more WVCs are occurring than what DOT reports show)	Non-injury crash: 8.5 ($212,500) **Total crashes and cost estimate: 8.5 ($212,500)**

1
Reported WVCs within 1-mile buffer (2018-2022)

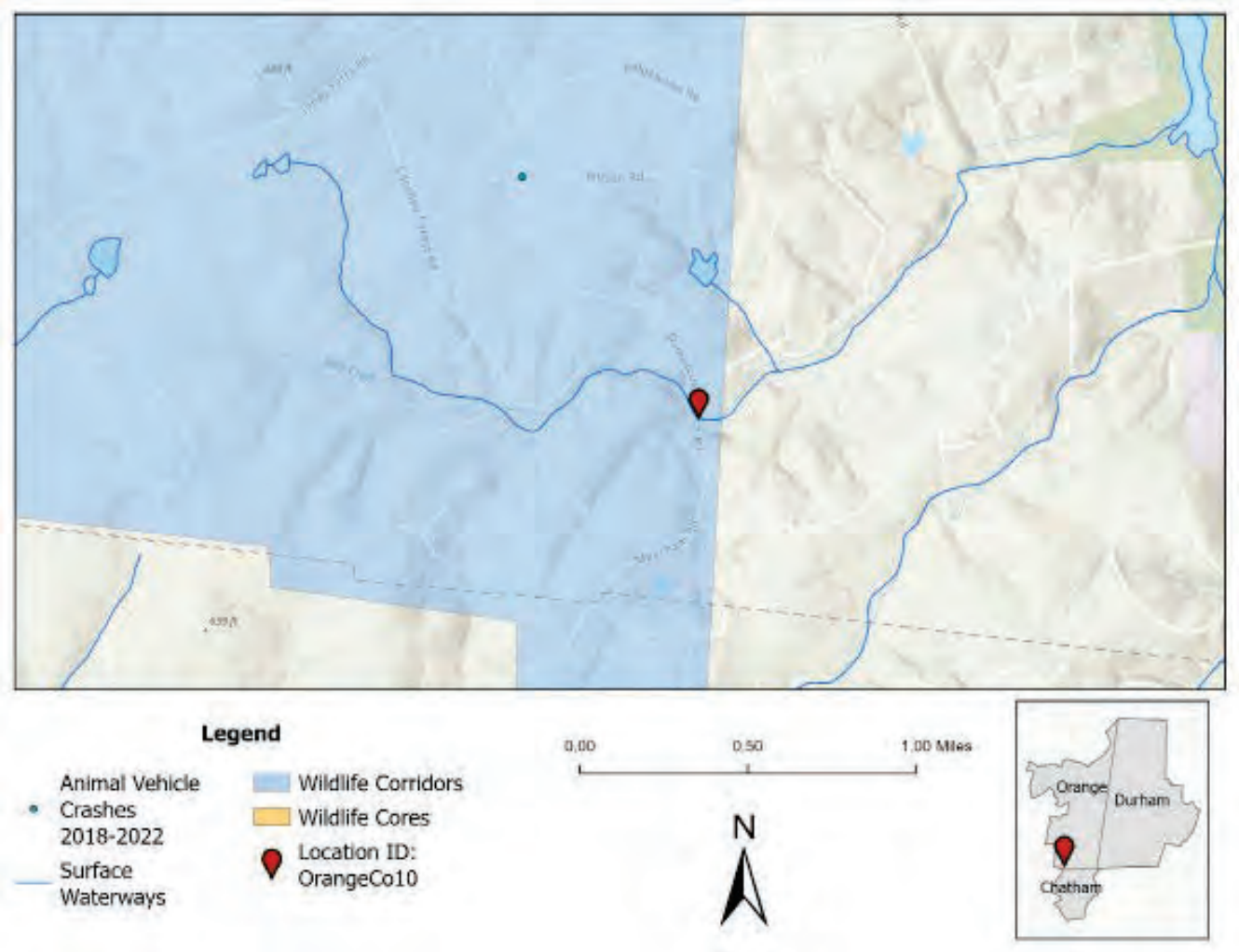
$25,000
Reported WVCs cost estimate

Bridge replacement in progress

45
mph speed limit

Preferred Scenario

As part of this bridge replacement, ensure the replacement bridge is high and long enough to allow for dry passage on both sides of the creek, especially during times of high flood. It is recommended that the span be lengthened, especially to the south where there is currently no dry passage, and the creek channel is against the footing of the abutment wall. Connect new natural surface dry passages to up and downstream habitat on both sides of the creek.



Orange County

New Hope Church Road over New Hope Creek

Summary and Problem Statement

New Hope Church Road over New Hope Creek has been identified as a priority wildlife crossing. This crossing resides within a wildlife corridor identified by the Wildlands Network, and fourteen WVCs have been reported within a one-mile buffer of this site. This site has no bicycle and pedestrian facilities and has a posted speed limit of 45 mph. The 13.2-acre parcel to the north of the bridge is the former Girl Scout Camp Pipsissewa that is actively managed as natural habitat land by private owners, which elevates this site as a good candidate for permanent protection. Additionally, smaller upstream and downstream parcels contain an average of at least 100 feet of wide floodplain, which are also good candidates for permanent habitat protection.

Barriers to wildlife travel along this corridor and under the bridge exist, which encourages wildlife travel on the roadway and results in conflicts with motorists. The east bank slope is completely covered with gently sloping riprap from the abutment 2 feet below the deck to the bottom of the bank, interfering with dry passage on this side only. However, the west bank has a level dry passage, but will not function at high water due to riprap covering the balance of the slope up to the 2 feet abutment under the deck. The bridge span is of adequate distance and has gentle dry slopes underneath to accommodate wildlife passage if the riprap placed above the top of the bank is choked with small stone to provide a natural surface to within 2 feet vertically of the underside of the bridge deck.

View of west bank, under New Hope Church Road bridge over New Hope Creek. Pete Schubert.

East bank, under New Hope Church Road bridge over New Hope Creek. Pete Schubert.

Aerial photograph of New Hope Church Road bridge over New Hope Creek. Nearmap.

Site Facts

Location ID	OrangeCo11
Date of Site Visit	May 22, 2024
Jurisdiction	Orange County
Coordinates	36°00'12.8"N 79°05'35.1"W
NCDOT Crossing/Structure Code	670099
Existing Structure Type	Bridge
Property Owner Type	Private
Existing Plan Alignment	CTP Highway: New Hope Church Rd. CTP Pedestrian: New Hope Church Rd
Managed and Natural Lands	N/A
Average Annual Daily Traffic (AADT) (2019)	3,900
Average Annual Daily Traffic (AADT) (2021)	3,200
Projected Average Weekday Traffic (AWDT)	4,966
Speed Limit	45 mph
Reported Wildlife-vehicle collisions (WVCs) within 1-mile Buffer (2018-2022) and Comprehensive Crash Cost Estimate	Non-injury crash: 13 ($325,000) Type B injury crash: 1 ($187,000) **Total crashes and cost estimate: 14 ($512,000)**
Likely Wildlife-vehicle collisions (WVCs) within 1-mile buffer (based on VDOT study revealing 8.5 times more WVCs are occurring than what DOT reports show)	Non-injury crash: 110.5 ($2,762,500) Type B injury crash: 8.5 ($1,589,500) **Total crashes and cost estimate: 119 ($4,352,000)**

14
Reported WVCs within 1-mile buffer (2018-2022)

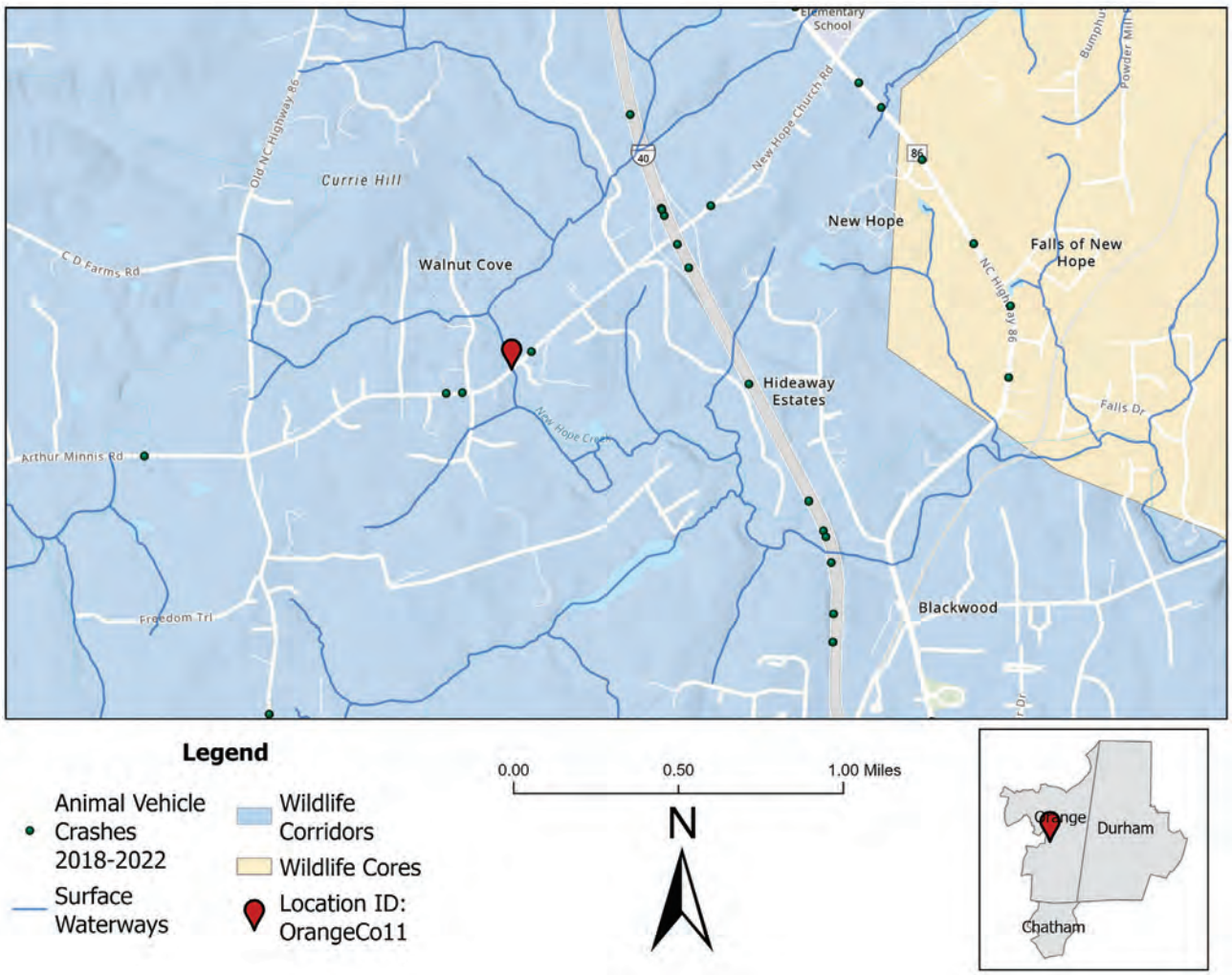
$512,000
Reported WVCs cost estimate

45
mph speed limit

Adjacent managed natural land

Preferred Scenario

Create a natural, dry surface for wildlife passage by using small stones to choke/fill the voids within the portions of the existing riprap slope that is below 2 feet from the underside of the deck to the top of the creek bank.



Orange County

NC 86 over New Hope Creek

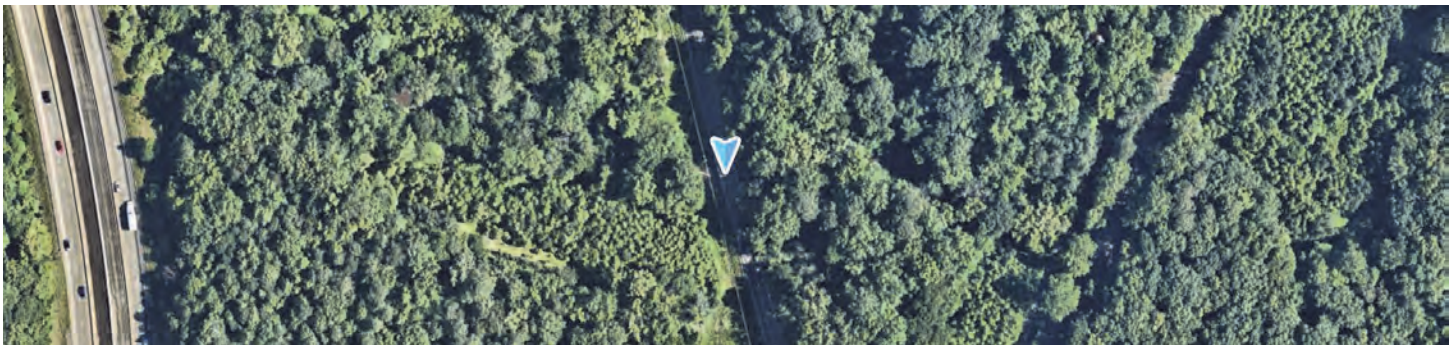
Summary and Problem Statement

NC 86 over New Hope Creek has been identified as a priority wildlife crossing. This crossing resides within a wildlife corridor identified by the Wildlands Network, and thirteen WVCs have been reported within a one-mile buffer of this site. This site has no bicycle and pedestrian facilities and has a posted speed limit of 45 mph. The bridge at this site is set to be replaced (Bridge Replacement: BR-0092), which presents an opportunity to enhance wildlife connectivity and create a safer roadway for wildlife and drivers alike. Upstream and downstream along New Hope Creek and Mountain Creek are conservation lands owned by Duke Forest and Triangle Land Conservancy.

Barriers to wildlife travel along this corridor under the bridge exist, which encourages wildlife travel on the roadway and results in conflicts with motorists. Barriers include riprap on the entire south abutment slope, and old construction debris in the lower portion of the north slope and bank. The existing bridge span is of insufficient length to fully accommodate dry passage on both banks at high creek levels, as evidenced by stranded woody debris and flotsam. The existing bridge is low and narrow and appears to have been structurally repaired and augmented many times over the years, and a replacement bridge provides the opportunity to improve dry wildlife passage along both creek banks. Lengthening the bridge span as part of the replacement is the most critical, combined with replacing the multiple bents with a single span across the entire crossing.

West side of NC 86 bridge over New Hope Creek, facing east. DCHC MPO.

East side of NC 86 bridge over New Hope Creek, facing west. DCHC MPO.



Aerial photograph of NC 86 bridge over New Hope Creek. Nearmap.

Site Facts

Location ID	OrangeCo12
Date of Site Visit	July 26, 2024
Jurisdiction	Orange County
Coordinates	35°59'42.1"N 79°04'21.1"W
NCDOT Crossing/Structure Code	670037
Existing Structure Type	Bridge
Property Owner Type	Private
Existing Plan Alignment	Bridge Replacement: BR-0092 CTP Highway: NC 86 CTP Pedestrian: NC 86 CTP Multiuse Paths: New Hope Creek Trail
Managed and Natural Lands	Duke Forest, Triangle Land Conservancy
Average Annual Daily Traffic (AADT) (2019)	5,900
Average Annual Daily Traffic (AADT) (2021)	5,200
Projected Average Weekday Traffic (AWDT)	1,949
Speed Limit	45 mph
Reported Wildlife-vehicle collisions (WVCs) within 1-mile Buffer (2018-2022) and Comprehensive Crash Cost Estimate	Non-injury crash: 12 ($300,000) Type C injury crash: 1 ($107,000) **Total crashes and cost estimate: 13 ($407,000)**
Likely Wildlife-vehicle collisions (WVCs) within 1-mile buffer (based on VDOT study revealing 8.5 times more WVCs are occurring than what DOT reports show)	Non-injury crash: 102 ($2,550,000) Type C injury crash: 8.5 ($909,500) **Total crashes and cost estimate: 110.5 ($3,459,500)**

13
Reported WVCs within 1-mile buffer (2018-2022)

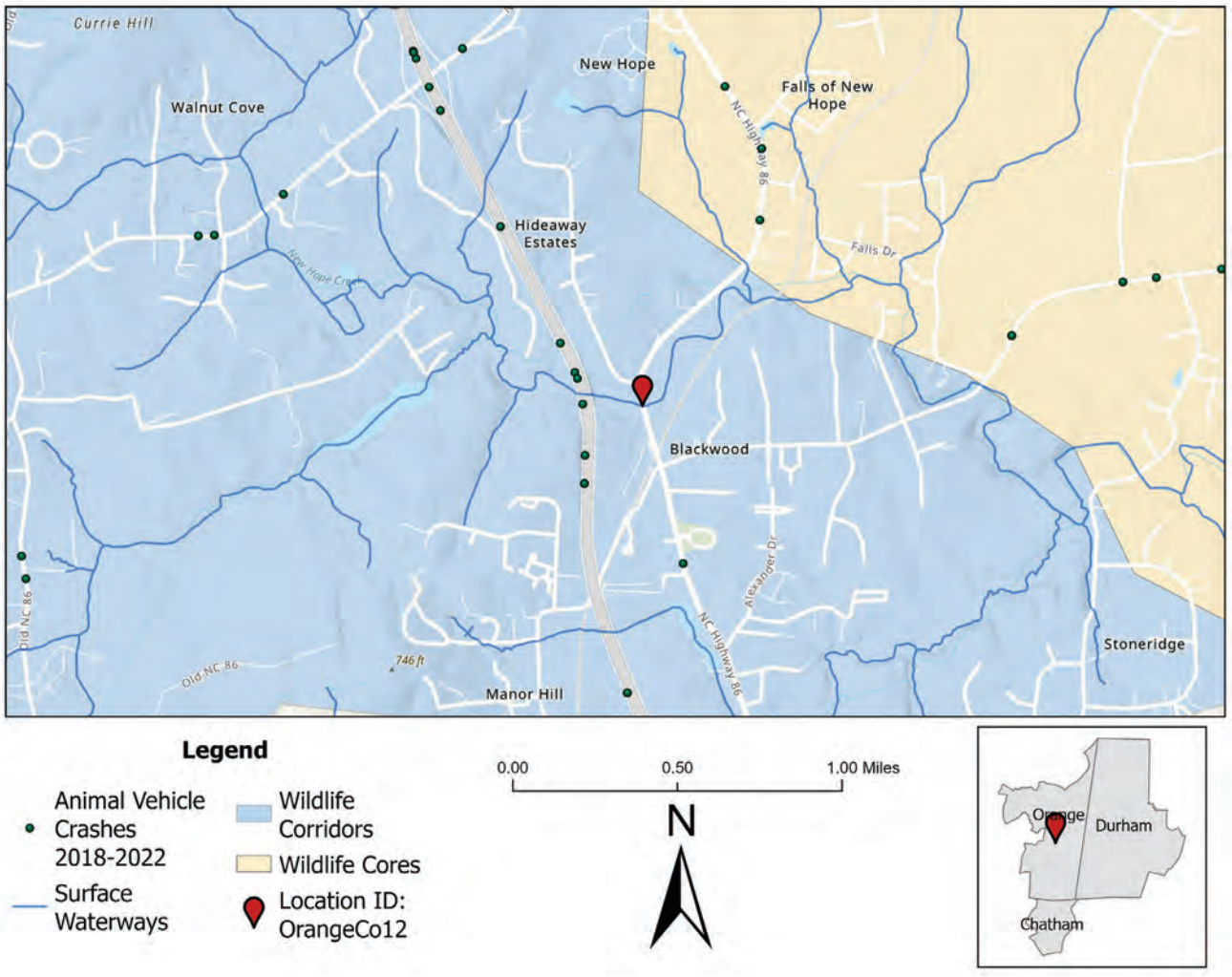
$407,000
Reported WVCs cost estimate

Bridge replacement in progress

Adjacent managed natural land

Preferred Scenario

As part of the bridge replacement project, raise the NC 86 causeway profile through the entire New Hope Creek floodplain and install a replacement bridge with a span high and long enough to create a passage bench for wildlife on both sides of the creek, which must remain dry during times of high flood. Avoid placing riprap slope protection on abutment slopes, and provide dry connection to adjacent habitat up and downstream on both banks.



Orange County

I-40 Culvert over New Hope Creek

Summary and Problem Statement

The I-40 culvert over New Hope Creek has been identified as a priority wildlife crossing. This crossing resides within a wildlife corridor identified by the Wildlands Network, and fourteen WVCs have been reported within a one-mile buffer of this site. This site has no bicycle and pedestrian facilities, has a posted speed limit of 65 mph, and garners 74,000 vehicles per day (2019 AADT). Upstream and downstream along New Hope Creek and Mountain Creek are conservation lands owned by Duke Forest and Triangle Land Conservancy.

Barriers to wildlife travel along this corridor through the culvert exist. No dry passage for wildlife exists at this site due to continued standing water in the culvert. Combined with ROW fencing that was installed on both sides of the creek, this stie creates an ecological dead end for wildlife. However, white-tailed deer have navigated through the existing ROW fence and onto the roadway as indicated by the reported WVCs.

East side of I-40 culvert over New Hope Creek, facing west. DCHC MPO.

Aerial photograph of I-40 culvert over New Hope Creek. Nearmap.

Site Facts

Location ID	OrangeCo13
Date of Site Visit	July 26, 2024
Jurisdiction	Orange County
Coordinates	35°59'43.9"N 79°04'33.0"W
NCDOT Crossing/Structure Code	670263
Existing Structure Type	Culvert
Property Owner Type	Private
Existing Plan Alignment	2050 MTP Highway: I-40 CTP Highway: I-40 CTP Multiuse Paths: New Hope Creek Trail
Managed and Natural Lands	Duke Forest, Triangle Land Conservancy
Average Annual Daily Traffic (AADT) (2019)	74,000
Average Annual Daily Traffic (AADT) (2021)	Unavailable
Projected Average Weekday Traffic (AWDT)	58,239
Speed Limit	65 mph
Reported Wildlife-vehicle collisions (WVCs) within 1-mile Buffer (2018-2022) and Comprehensive Crash Cost Estimate	Non-injury crash: 13 ($325,000) Type C injury crash: 1 ($107,000) **Total crashes and cost estimate: 14 ($432,000)**
Likely Wildlife-vehicle collisions (WVCs) within 1-mile buffer (based on VDOT study revealing 8.5 times more WVCs are occurring than what DOT reports show)	Non-injury crash: 110.5 ($2,762,500) Type C injury crash: 8.5 ($909,500) **Total crashes and cost estimate: 119 ($3,672,000)**

14
Reported WVCs within 1-mile buffer (2018-2022)

$432,000
Reported WVCs cost estimate

65
mph speed limit

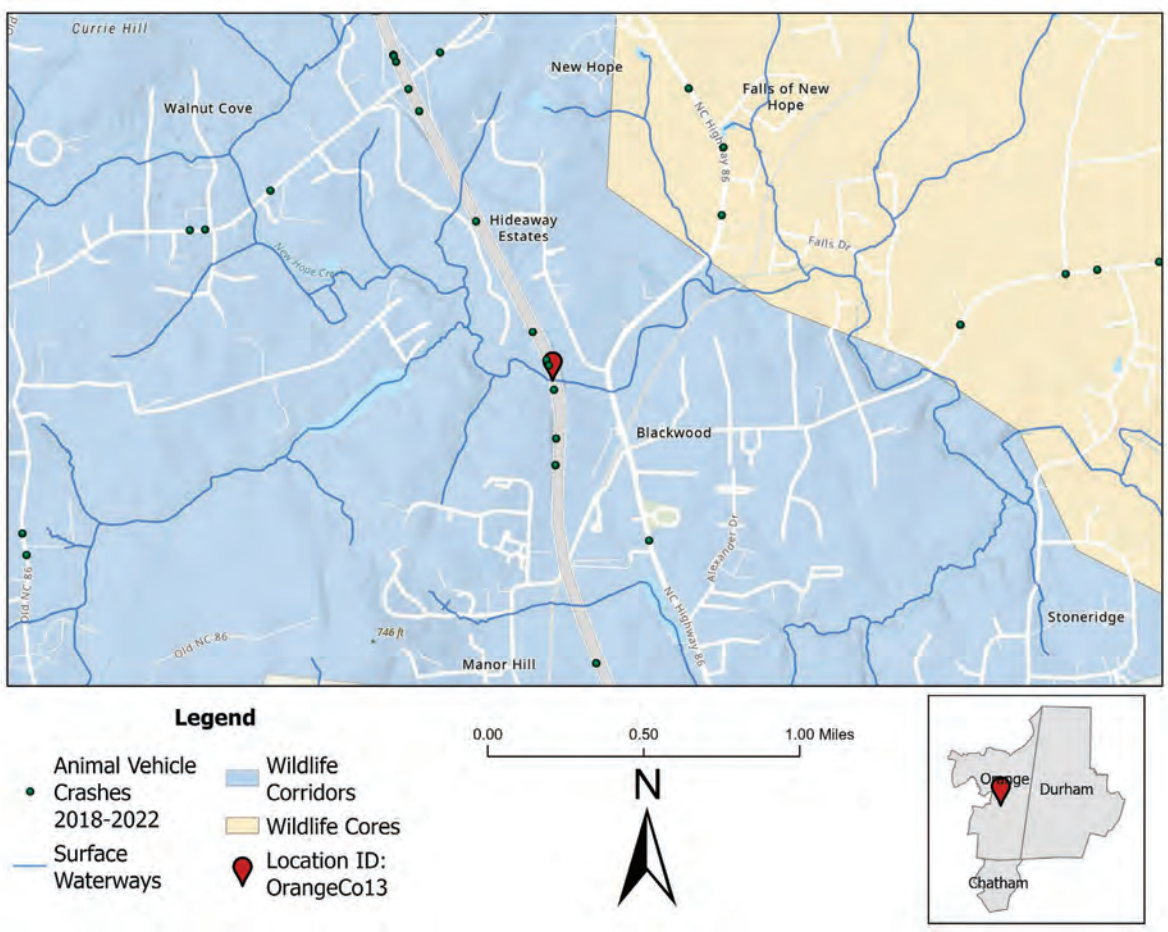
Adjacent managed natural land

Preferred Scenario

Replace the existing 4-cell culvert with a multicell culvert which includes additional outer raised bottom elevation culverts to accommodate dry passage for both creek banks. Construct these new dry passage culverts with natural surface floors. Connect these new dry passages to adjacent habitat up and downstream.

Alternate Scenario

Construct separate, new dry culverts through the I-40 embankment out from the existing flooded culvert to accommodate dry passage for both creek banks. These two new culverts should be at least 8 feet high and 12 feet wide, with a natural surface floor and be straight with no offset or skew. Replace existing ROW fencing with taller fencing to guide wildlife into the dry passes from the adjacent habitat areas and deter wildlife climbing the embankment to attempt to cross I-40.



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Section 3.4

WILDLIFE CROSSING CORRIDOR RECOMMENDATIONS

Many of the wildlife crossing projects that DCHC MPO has identified and is recommending as part of this plan align with corridors of wildlife travel. Identifying and implementing wildlife crossing projects within corridors can help create both a connected network for wildlife travel by ensuring there are no gaps, and enhance roadway safety for drivers due to wildlife being guided along the natural corridor, and off the road. Additionally, presenting a slate of wildlife crossing projects within a corridor could be a priority for funding agencies who seek to enhance and make a connected safety network.

DCHC MPO has identified two corridors as part of this plan:

- The Eno River Corridor
- The New Hope Creek Corridor

US 15-501 bridge over New Hope Creek in Durham County. DCHC MPO.

Eno River Corridor

The DCHC MPO has identified eleven (11) project recommendations and sites as part of the Eno River Corridor within this plan. The projects span both Durham and Orange counties. A complete list of projects along this corridor is described in Table 3.4.1, and a map showing these projects is shown in Figure 3.4.1.

Project ID	Project / Crossing Name	County
DurhamCo1	Cole Mill Road over Eno River	Durham
DurhamCo2	Rivermont Road over Nancy Rhodes Creek	Durham
DurhamCo3	US 501 (Roxboro Road) over Eno River	Durham
DurhamCo4	Guess Road over Eno River	Durham
DurhamCo5	Old Oxford Road over Eno River	Durham
OrangeCo1	Pleasant Green Road over Eno River	Orange
OrangeCo2	US 70 over Stony Creek	Orange
OrangeCo3	I-85 over Stony Creek	Orange
OrangeCo4	University Station Road over Stony Creek	Orange
OrangeCo5	Old NC Highway 10 over Stony Creek	Orange
OrangeCo6	Halls Mill Road over Eno River	Orange

Table 3.4.1: Complete list of wildlife crossing project recommendations in the Eno River Corridor.

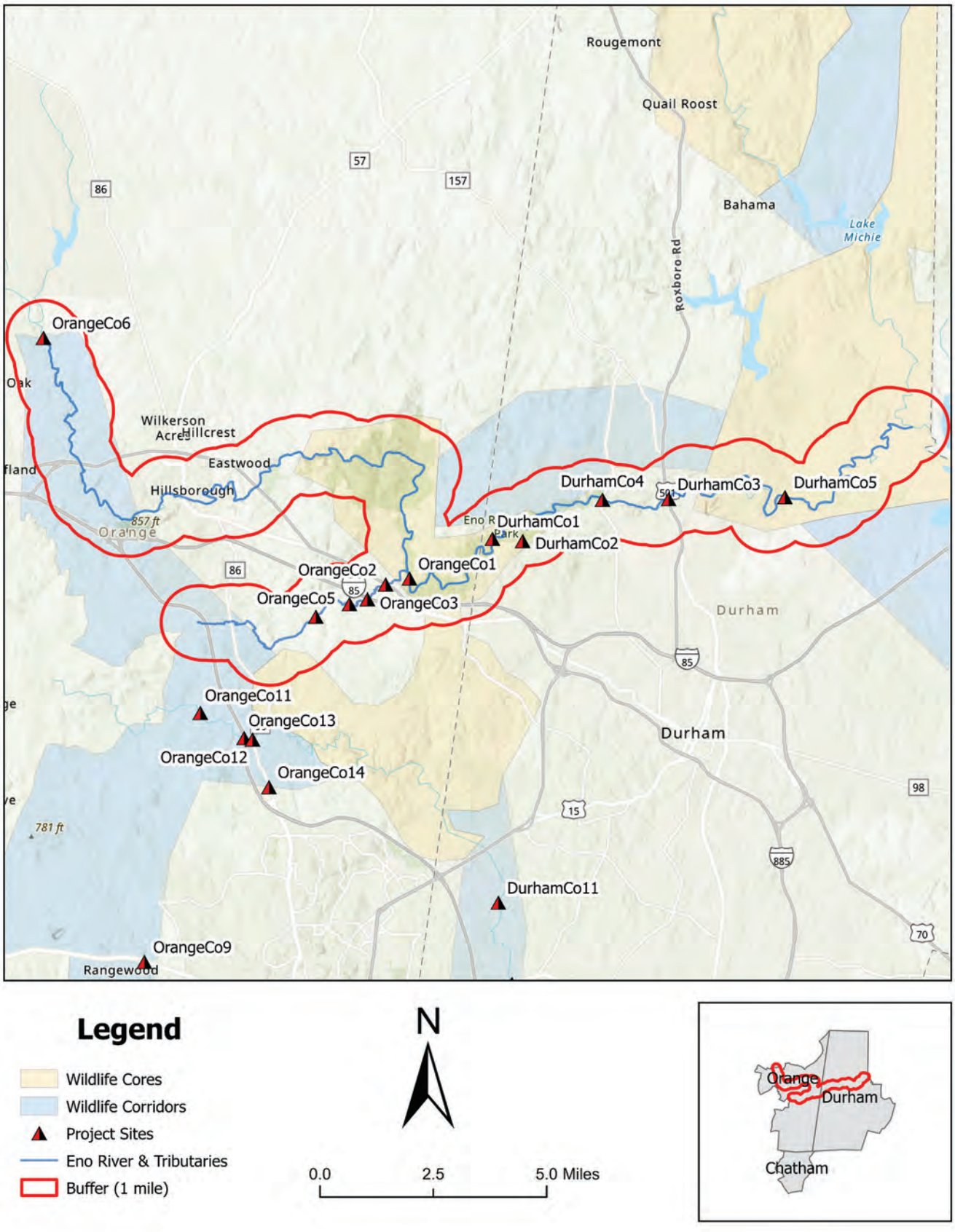

Figure 3.4.1: Map of complete list of wildlife crossing project recommendations in the Eno River Corridor.

New Hope Creek Corridor

The DCHC MPO has identified eight (8) project recommendations and sites as part of the New Hope Creek Corridor within this plan. The projects span both Durham and Orange counties. A complete list of projects along this corridor is described in Table 3.4.2, and a map showing these projects is shown in Figure 3.4.2. Projects that have two Project IDs indicate two separate structures at this site.

Project ID	Project / Crossing Name	County
DurhamCo6 DurhamCo7	NC 54 over New Hope Creek	Durham
DurhamCo8 DurhamCo9	I-40 Bridge over New Hope Creek	Durham
DurhamCo10	Stagecoach Road over New Hope Creek	Durham
DurhamCo11	Old Chapel Hill Road over New Hope Creek	Durham
DurhamCo12	Farrington Road over Little Creek	Durham
OrangeCo11	New Hope Church Road over New Hope Creek	Orange
OrangeCo12	NC 86 over New Hope Creek	Orange
OrangeCo13	I-40 Culvert over New Hope Creek	Orange

Table 3.4.2: Complete list of wildlife crossing project recommendations in the New Hope Creek Corridor.

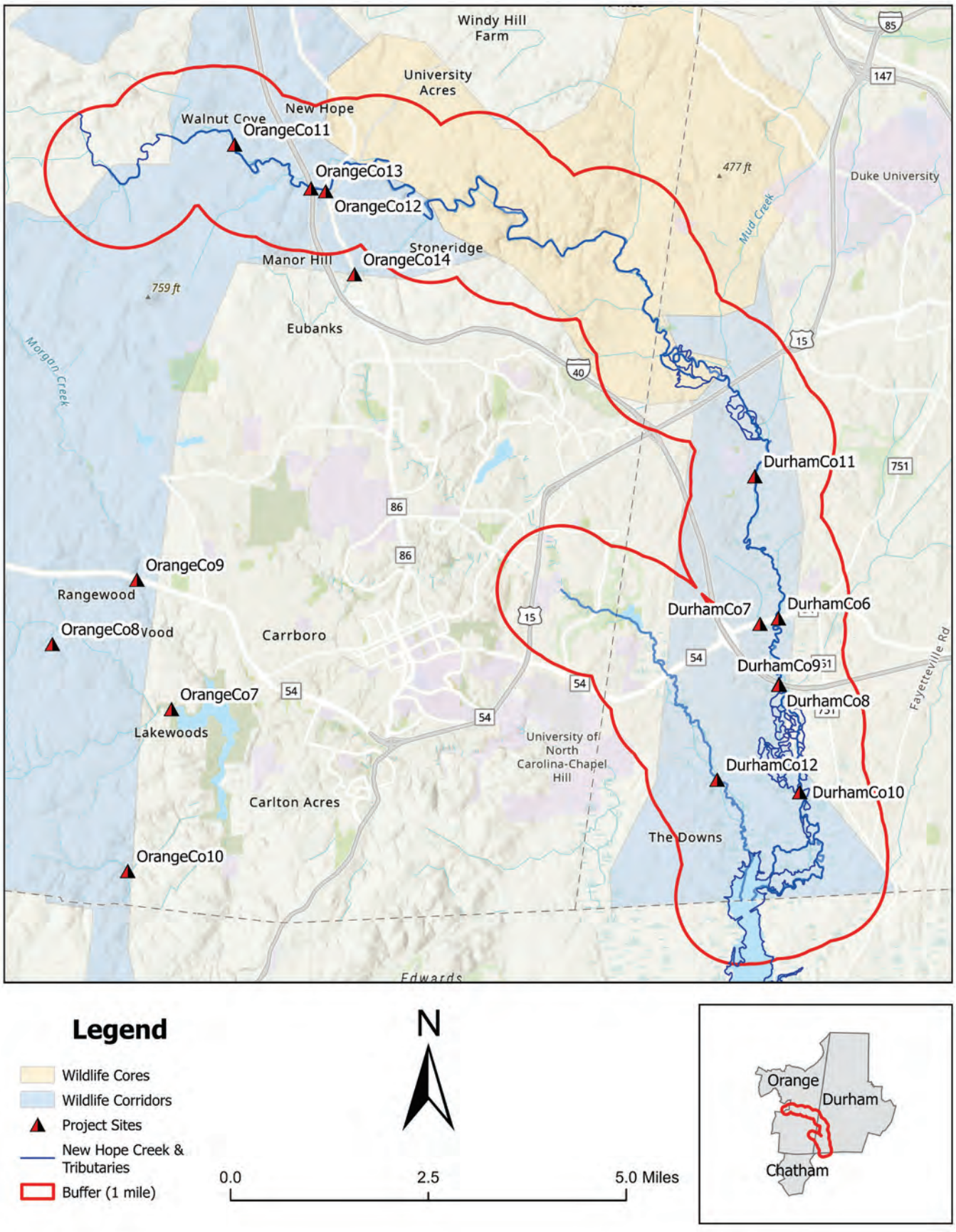

Figure 3.4.2: Map of complete list of wildlife crossing project recommendations in the New Hope Creek Corridor.

Section 3.5

ADDITIONAL WILDLIFE CROSSING CONSIDERATIONS

To help enhance roadway safety for both people and wildlife, wildlife crossing sites and structures in the DCHC MPO planning area should continue to be identified, analyzed, and assessed. While not exhaustive, the following is a list of wildlife crossing sites for future consideration that have been identified as part of this planning process.

#	Project / Crossing Name	County
1	I-0305 Project Corridor	Durham, Orange
2	I-40 at Sevenmile Creek	Orange
3	NC-54 at Willow Creek	Orange
4	NCRR over Stony Creek	Orange
5	Jones Ferry Road over University Lake	Orange
6	Lawrence Road over Eno River	Orange
7	Eno Mountain Road over Eno River	Orange
8	New Hope Church Road over Stony Creek	Orange
9	NC 86 over Stony Creek	Orange
10	I-40 over Stony Creek	Orange

#	Project / Crossing Name	County
11	St. Mary's Road over Buckwater Creek	Orange
12	South Church Street over Eno River	Orange
13	Mount Sinai Road over New Hope Creek	Orange
14	Mount Sinai Road over Piney Mountain Creek	Orange
15	Old NC 86 over New Hope Creek	Orange
16	Erwin Road over New Hope Creek	Orange
17	Turkey Farm Road over New Hope Creek	Orange
18	US 15/501 over Morgan Creek	Orange
19	I-85 / I-40 over Rocky Run	Orange
20	Old Greensboro Road over Phils Creek	Orange
21	Smith Level Road over Morgan Creek	Orange
22	I-40 over Old Field Creek	Orange
23	I-85 over Rhodes Creek	Durham
24	Old Oxford Highway over Flat River	Durham
25	Old Oxford Road over Little River	Durham
26	Old NC 75 over Knap of Reeds Creek	Durham
27	S Lowell Road over Mountain Creek	Durham
28	US 501S over Little River	Durham
29	US 501 N over Little River	Durham
30	US 501 over Mountain Creek	Durham

#	Project / Crossing Name	County
31	N Roxboro Road over Mountain Creek	Durham
32	S Lowell Road over South Fork Little River	Durham
33	S Lowell Road over North Fork Little River	Durham
34	NC 751 over Third Fork Creek	Durham
35	Barbee Chapel Road over Little Creek tributary	Durham
36	Red Mill Road over Eno River	Durham
37	Red Mill Road over Ellerbee Creek	Durham
38	US 15/US 501 over Mud Creek/New Hope Creek	Durham
39	Farrington Point Road over Cub Creek	Chatham
40	US 15-501 over Haw River	Chatham
41	Old Farrington Road over Morgan Creek	Chatham
42	US 64 over Haw River	Chatham
43	US 15-501 over Cub Creek	Chatham

Table 3.5: Complete list of additional wildlife crossing projects for future consideration in the DCHC MPO planning area.