U.S. Department of Transportation
Federal Highway Administration

STIP Project No. U-2719

I-440 Improvement Project

From south of Walnut Street in Cary to east of Wade Avenue in Raleigh

ENVIRONMENTAL ASSESSMENT

June 2017

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June 2017

I-440 Improvement Project

From south of Walnut Street in Cary to east of Wade Avenue in Raleigh

Federal Aid Project No. IMSNHS-0440(10)
WBS No. 35869.1.2
STIP Project No. U-2719

Administrative Action

ENVIRONMENTAL ASSESSMENT

UNITED STATES DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION &
NC DEPARTMENT OF TRANSPORTATION

Submitted Pursuant to the National Environmental Policy Act 42 USC 4332(2)(c) and 49 USC 303

6/22/17 Beverly G. Robinson
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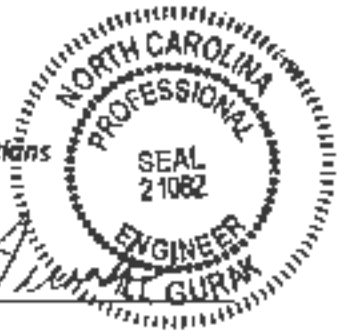
Document Prepared By Atkins



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Note to the Reader

What's in this document?

The North Carolina Department of Transportation (NCDOT) prepared this environmental document in accordance with the requirements set forth in the National Environmental Policy Act (NEPA) of 1969, as amended. NCDOT and Federal Highway Administration (FHWA) are joint lead agencies for the proposed project.

This Environmental Assessment (EA) summarizes the potential environmental impacts and benefits of the proposed widening improvements for I-440/US 1-64 from south of Walnut Street to east of Wade Avenue in Wake County, North Carolina. This EA explains why the project is being proposed, the alternatives considered for the project, potential impacts and benefits, and proposed avoidance, minimization, and/or mitigation measures that would lessen impacts.

Supporting documentation for this EA includes many technical studies and analyses, which are listed at the end of each chapter. This EA uses plain language as much as possible, and includes definitions of technical terms where needed. Where there is a question of meaning, the reader should defer to the applicable technical studies.

NEPA encourages documents that "concentrate on the issues that are truly significant to the action in question, rather than amassing needless detail." (Title 40 of the Code of Federal Regulations, Part 1500.1). Therefore, this document is streamlined to address issues and resources present in the project area and relevant to the project decision making process. The following resources are not addressed in this document because they are not present in the project area: farmland, archaeological resources, mines and mineral resources, wild and scenic rivers, and coastal resources.

Tell us what you think

NCDOT would like to hear your comments about the project and this EA. NCDOT will hold a public hearing after publication of the document at a date and location to be advertised. Comments are welcome any time before and during the hearing, and through the comment period following the hearing.

Copies of this EA are available for review at the following locations and internet site. Supporting documents are available upon request, and the website also includes links to many of these.

Physical addresses where hard copies of the EA can be reviewed:

- **NCDOT Division 5 Office**
  2612 N. Duke Street
  Durham, NC 27704
- **NCDOT Div. 5 District 1 Office**
  4900 District Drive
  Raleigh, NC 27607
- **Athens Drive Community Library**
  1420 Athens Drive
  Raleigh, NC 27606
- **Method Community Park**
  514 Method Road
  Raleigh, NC 27607
- **Thomas Crowder Woodlands Center**
  5611 Jaguar Park Drive
  Raleigh, NC 27606

Website address where a pdf of the EA can be reviewed and downloaded: **https://www.ncdot.gov/projects/i-440improvements/**

If you have any comments about the proposed project, please send your comments to:

John F. Sullivan, III, PE

Federal Highway Administration
310 New Bern Avenue, Suite #410
Raleigh, NC 27601-1418

Or

Beverly Robinson, CPM

NCDOT, Project Development Group Supervisor
1548 Mail Service Center
Raleigh, NC 27699-1548

Or

via email to **brobinson@ncdot.gov**.

What happens next?

After comments are received from the public and reviewing agencies, NCDOT and FHWA will consider the input received, as well as the technical studies and evaluation summarized in this EA, to identify the Selected Alternative. The decision, and responses to comments received, will be published in a final environmental document called a Finding of No Significant Impact (FONSI); unless additional environmental studies are determined to be required in an Environmental Impact Statement (EIS).

Upon completion of the FONSI, NCDOT will be authorized to continue into the final design, right of way acquisition, and construction phases of the project.

At this time, it is NCDOT's intention to advertise this project for construction as a design-build project. In the design-build process, construction contractors team up with design engineers to bid on the project. These teams review the preliminary design of the Selected Alternative and try to improve upon the design, lessen impacts, shorten construction times, and reduce costs. The teams' submissions are reviewed by NCDOT and the best value team is awarded the contract. The selected design-build team completes the final design, obtains required permits, and constructs the project.

PC
CHAPTER

Project Commitments

I-440 Improvements
From south of Walnut Street to east of Wade Avenue
Wake County, North Carolina
STIP Project No. U-2719
Project WBS No. 35869.1.2
Federal Aid Project No. IMSNHS-0440(10)

This chapter identifies the special commitments to avoid, minimize, or mitigate project impacts.

This "Green Sheet" identifies the special commitments to avoid, minimize, or mitigate project impacts. The commitments are organized by the responsible NCDOT unit.

NCDOT Project Development Section and NCDOT Human Environment Section

- To maintain the "No Adverse Effect' determination for the historic Oak Grove Cemetery if the Ligon Street Build Bridge to North Alternative is selected, during final design NCDOT will conduct outreach with the Method Neighborhood and the City of Raleigh regarding potential aesthetic treatments for the new bridge.
- The Ligon Street Build Bridge to South Alternative would have an "Adverse Effect" on the historic Oak Grove Cemetery. If it is the selected alternative, additional coordination and consultation under Section 106 of the Historic Preservation Act between NCDOT, FHWA, NC Historic Preservation Office, and property owners must occur to explore ways to avoid and minimize impacts and include measures to mitigate adverse effects. Measures needed to resolve adverse effects would be documented in a Memorandum of Agreement.
- To maintain the "No Adverse Effect" determination for the Berry O'Kelly School Historic District, during final design NCDOT will conduct outreach with the Method Neighborhood and the Raleigh Parks and Recreation Department to discuss potential aesthetic treatments and/or a potential public art project for the community side of the wall adjacent to the historic site/Method Community Park.

NCDOT Hydraulics Unit

- Through final design and construction, NCDOT will continue coordination with the City of Raleigh regarding their planned project to relocate the White Oak Lake dam and to modify the lake.
- During final hydraulic design, NCDOT will coordinate with the City of Raleigh Stormwater Services for information on any ongoing stormwater studies being conducted by the City in the project area.
- NCDOT Hydraulics Unit will coordinate with FEMA/NC Floodplain Mapping Program and local authorities to ensure compliance with applicable floodplain management ordinances. Since this project involves construction on or adjacent to FEMA regulated streams at Walnut Creek and House Creek, the construction contractor shall submit sealed as-built construction plans to NCDOT Hydraulics Unit upon completion of project construction, certifying that

the drainage structures and roadway embankment that are located within the 100-year floodplain were built as shown in the construction plans, both horizontally and vertically.

NCDOT Roadway Design Unit and NCDOT Division 5

- NCDOT will coordinate with Raleigh and Cary regarding cost-sharing for sidewalks, multi-use paths, noise walls, median planters, and landscaping. Municipal Agreements will be prepared, as applicable, prior to project construction.
- In order to not adversely impact the Museum Park's activities, features, and attributes and to achieve a de minimis concurrence from the NC Museum of Art (NCMA), FHWA and NCDOT agreed to discuss additional mitigation measures, including potentially contributing to stream restoration projects NCMA is currently developing for stream segments on their property. A Memorandum of Understanding (MOU) will be developed between the parties to define FHWA and NCDOT participation. The MOU will be further discussed in the final environmental document.
- NCDOT will coordinate construction of the I-440 improvement project (U-2719) with construction of the Blue Ridge Road grade separation over the CSX/NCRR railroad tracks near the State Fairgrounds (Project U-4437).
- NCDOT will coordinate with Meredith College and the City of Raleigh on the final design of the relocated Reedy Creek Greenway to be constructed as part of Project U-2719. The design for the relocated greenway will include maintaining the culvert under Wade Avenue that connects Meredith College properties.
- During construction, NCDOT will coordinate with the NC State Fairgrounds (including NC Department of Agriculture and Consumer Services), Carter-Finley Stadium, NC State University, Wolfpack Club, PNC Arena, Gale Force Sports (Division of Carolina Hurricanes), NC State Highway Patrol, and City of Raleigh Police Department regarding traffic flow during construction for major events at these venues west of I-440 that generate major traffic on I-440.
- During construction, NCDOT will coordinate with the Wake County Public School System, transit agencies, and emergency response providers. NCDOT will coordinate with these service providers regarding detour routes and associated route changes that may be necessary during construction.
- During final design, NCDOT will coordinate with NC State University (NCSU) regarding lighting design along I-440 adjacent and near to NCSU greenhouses located between Western Boulevard and Hillsborough Street.

NCDOT Roadway Design Unit and Structure Design Unit

- During final design, NCDOT Roadway Design Unit and Structures Design Unit will coordinate with the NCDOT Rail Division and NCRR to ensure future planned tracks in the NCRR corridor are accounted for.

NCDOT Right of Way Unit and NCDOT Division 5

- NCDOT will coordinate with NC State University and the University Club during final design to explore potential minimization measures and options to address displacement of University Club facilities and the NC State Athletics golf practice facility.

NCDOT Natural Environment Analysis Unit

- NCDOT will conduct re-surveys of the project study area for Michaux's sumac in 2017, prior to the publication of the final environmental document.

1 CHAPTER

Purpose and Need for Project

This chapter describes the reasons why improvements are needed to I-440 in the project area and also describes the purpose of the project.

What's In This Chapter...

WANT MORE DETAILS?

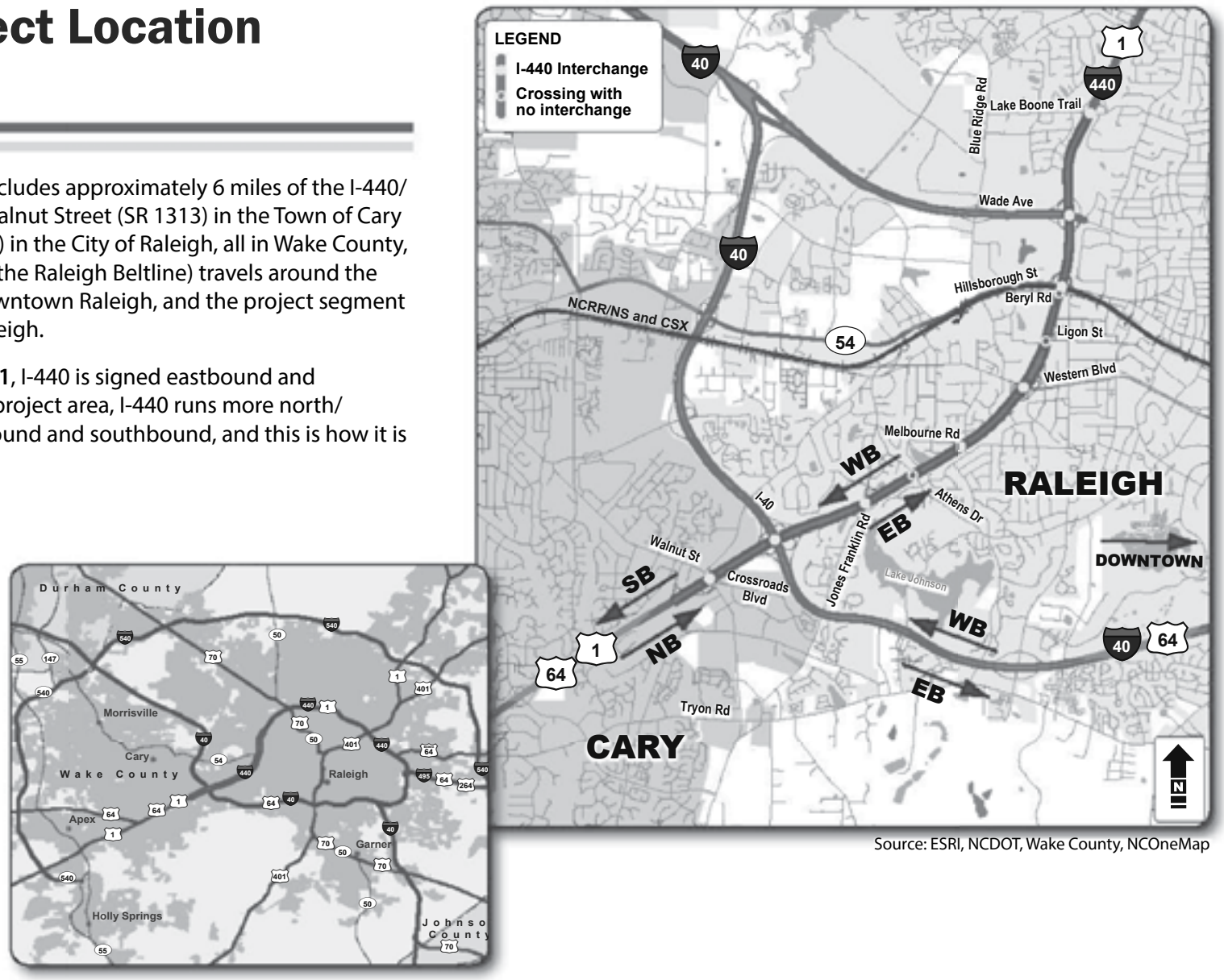
See the list of technical reports at the end of this chapter.

1.1 SECTION Project Location

The proposed project corridor includes approximately 6 miles of the I-440/ US 1-64 freeway from south of Walnut Street (SR 1313) in the Town of Cary to east of Wade Avenue (SR 1728) in the City of Raleigh, all in Wake County, North Carolina. I-440 (known as the Raleigh Beltline) travels around the west, north, and east sides of downtown Raleigh, and the project segment of I-440 is west of downtown Raleigh.

Note that as shown on **Exhibit 1.1**, I-440 is signed eastbound and westbound, even though in the project area, I-440 runs more north/ south. US 1-64 is signed northbound and southbound, and this is how it is oriented in the project area.

Exhibit 1.1: Project Location Map



Source: ESRI, NCDOT, Wake County, NCOneMap

1.2 SECTION Project Purpose and Proposed Action

The purpose of the project is to improve traffic flow, make the roadway operate more efficiently, and enhance mobility on this segment of I-440. The project will address the need to increase capacity, improve the layout of the roadway and interchanges, and fix poor conditions along this segment of I-440.

To fulfill the project's purpose, NCDOT proposes to widen I-440/US 1-64 in the project area from four lanes to six lanes and to eliminate bottlenecks at both ends of the project. The project also will reconstruct interchanges, replace structures, and repair pavement conditions.

The project is included as Project U-2719 in NCDOT's adopted *2016-2025 State Transportation Improvement Program (STIP)* and draft *2017-2027 STIP*. The project would be constructed as a design-build project beginning in 2018. Being a design-build project means the construction contractor will be responsible for the final design plans, right of way acquisition, and construction.

Want to know more about the State Transportation Improvement Program?

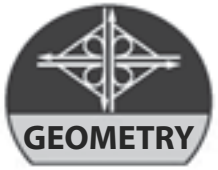
https://connect.ncdot.gov/projects/planning/Pages/State-Transportation-Improvement-Program.aspx

1.3 SECTION Need for Improvements to I-440

Existing and projected future conditions along the I-440 corridor demonstrate a need for improvements in the study area. A video tour of the project corridor that illustrates existing conditions and problems can be viewed at: https://www.ncdot.gov/projects/i-440improvements/.

There are three problem areas described below, relating to:

Capacity
The ability to handle the traffic demand



Geometry
The layout of the roadway and interchanges

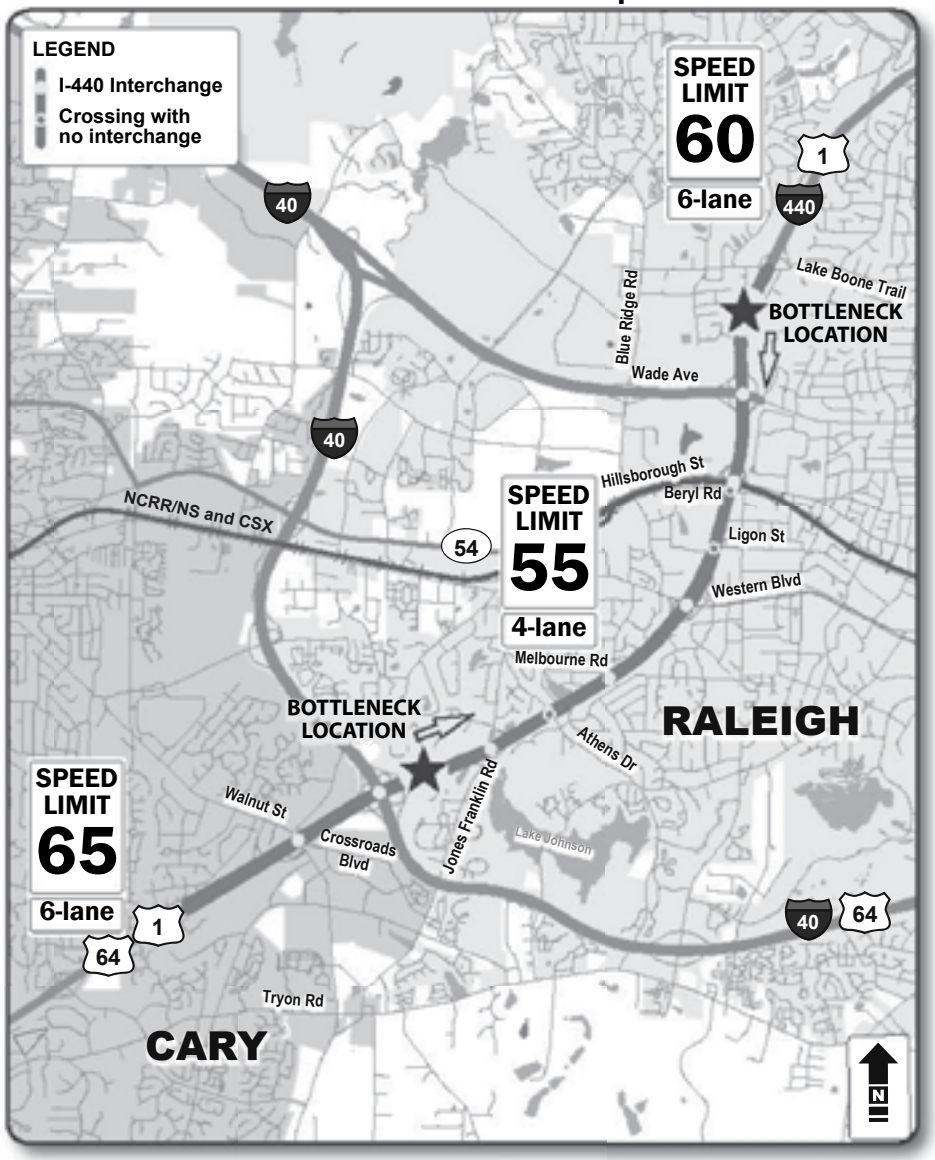
Condition
The state of the pavement and structures

Capacity Problems

- **Bottlenecks** - Bottlenecks are areas along a highway where backups and congestion regularly occur. Along I-440 in the project area, bottlenecks occur where the westbound and eastbound through lanes are reduced from three lanes to two lanes. In the westbound direction, this occurs near the Wade Avenue interchange and in the eastbound direction this occurs near the Jones Franklin Road interchange. The locations are shown in **Exhibit 1.2**.
- **Slower speed limit** - Currently, the speed limit is 55 mph on I-440 in the project area. It is 65 mph to the west and 60 mph to the east.
- **Congestion** - Travelers on I-440/US 1-64 in the project area regularly experience congestion, which is projected to worsen through 2035. Traffic volumes on I-440/US 1-64 in the project study area are projected to increase by 19 to 26 percent between 2012 and 2035. Existing and future estimated average travel speeds are well below the posted speed limit during peak hours.

Peak hour congestion at the eastbound I-440 bottleneck at Jones Franklin Road

Exhibit 1.2: I-440 Bottlenecks and Speed Limits



Source: ESRI, NCDOT, Wake County, NCOneMap

Geometry Problems

Congestion experienced along I-440/US 1-64 in the project study area is a function of geometric problems as well as capacity problems.

I-440 and its interchanges in the study area have elements that do not meet current-day design standards. These include poor sight lines, narrow shoulders and medians and short distances for acceleration/deceleration along interchange ramps.

Example: Narrow median and shoulder on westbound I-440

Example: No deceleration lane and inadequate shoulder at Western Boulevard exit

Condition Problems

I-440 in the project study area was constructed in the early 1960's and is the oldest section of the Raleigh Beltline. Due to the age of the facility, the pavement, structures, and interchanges are in need of rehabilitation or replacement.

Of the fifteen bridges along or over I-440 in the project area, six are functionally obsolete (meaning they do not meet current minimum federal roadway and bridge design standards) and three are structurally deficient (meaning they need maintenance and repair and eventual rehabilitation or replacement).

Rough pavement on I-440 near Western Boulevard

Athens Drive bridge - rated structurally deficient

Melbourne Road bridge - rated structurally deficient

1.4 SECTION Project Surroundings

1.4.1 Regional Roadway Network

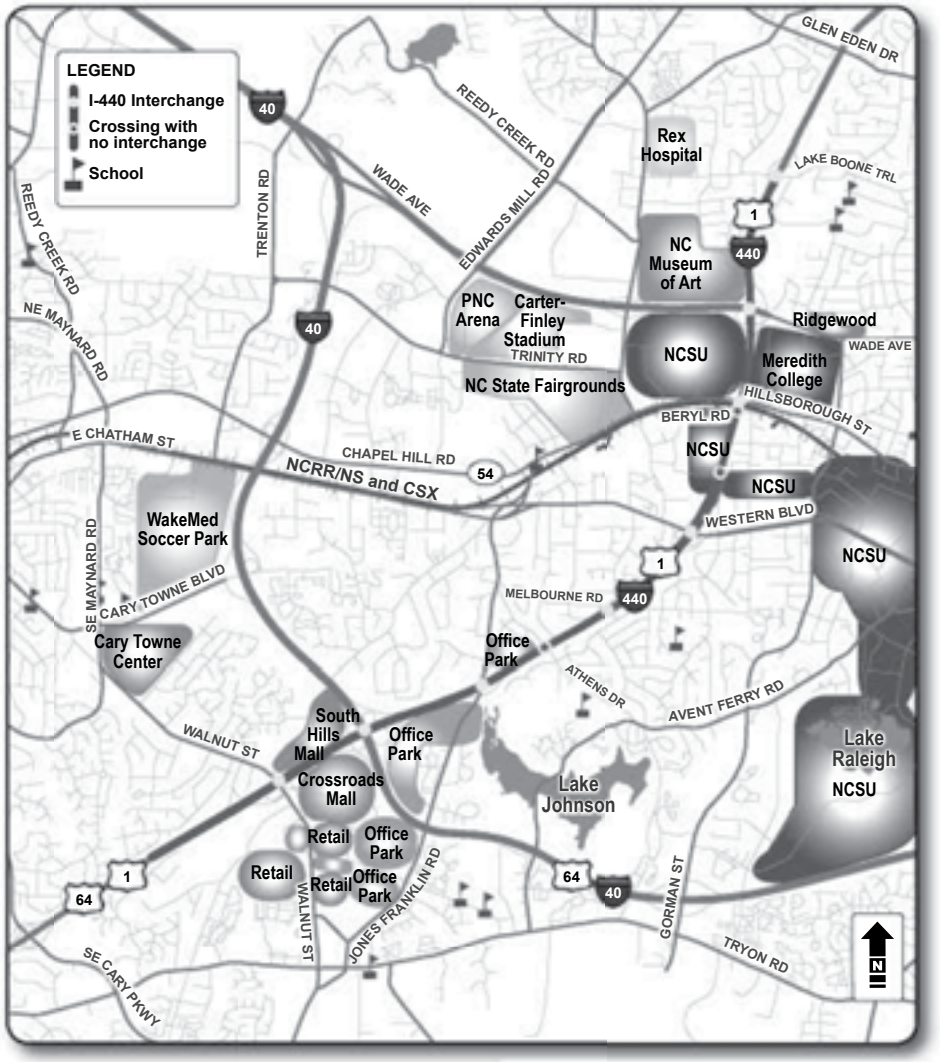
I-440 has statewide and regional importance and is a critical link in the roadway network of the Triangle region. In the project area, major roads include I-40, US 1, US 64, US 264, and several other US routes (**Exhibit 1.1**). As shown in **Exhibit 1.1**, the facility forms a partial loop around the north, east, and west of downtown Raleigh, with I-40 forming the southern part of the loop.

I-440 connects with I-40 near the western end of the project, and also at the eastern end of the project via Wade Avenue.

1.4.2 Land Uses in the Project Area

The project is located in an established mixed-use urban area approximately 3 miles west of downtown Raleigh. There are several residential neighborhoods, parks, and commercial areas along the corridor. I-440 provides a route to several major destinations (**Exhibit 1.3**) located in and around the project study area, including the North Carolina State Fairgrounds, Carter-Finley Stadium, PNC Arena, the North Carolina Museum of Art, Rex Hospital, North Carolina State University (NCSU), Meredith College, and Crossroads Mall.

Exhibit 1.3: Major Destinations in the Project Area



Source: ESRI, NCDOT, Wake County, NCOneMap

1.5 SECTION Existing I-440

In general, I-440 within the project study area is a four-lane median divided freeway facility. Between some interchanges there is an extra lane (called an auxiliary lane) to provide more space to enter and exit the freeway, but this is not a lane that continues through.

Typical I-440 in the project area

Westbound bottleneck at Wade Avenue

Bottlenecks occur on I-440 in the project area where I-440 reduces from three lanes to two lanes: westbound near the Wade Avenue interchange and eastbound near the Jones Franklin Road interchange. (**Exhibit 1-2**).

Near I-40 the freeway splits into through lanes and a separate southbound collector-distributor (C-D) road that provides access to/from I-40. The C-D road runs parallel to I-440/US 1-64 and keeps the lane-changing actions occurring at the I 40/I-440 ramps separated from the high-speed I-440/US 1-64 through traffic.

Collector-Distributor road to I-40 ramps

I-440/US 1-64 has the following interchanges in the project study area, listed from west to east:

- Walnut Street
- Crossroads Boulevard (partial interchange)
- Hillsborough Street (NC 54)
- Western Boulevard
- Melbourne Road (partial interchange)
- Jones Franklin Road
- I-40
- Wade Avenue
- Lake Boone Trail

There are three additional roadway crossings of I-440 that do not have interchanges:

- Beryl Road crosses under the I-440 bridge that also spans the railroad tracks and Hillsborough Street
- Ligon Street crosses through a one-lane tunnel under I-440
- Athens Drive is on a bridge over I-440

Ligon Street one-lane tunnel under I-440

I-440 bridge over Beryl Road, railroad, and Hillsborough Street

1.6 SECTION Other Transportation Modes in Corridor

The project study area includes bus routes, railroad tracks, sidewalks, greenways, and bicycle routes. **Exhibit 1.4** shows the railroad tracks, greenways, and bicycle routes. These modes, and bus routes, will be considered in the design of project alternatives.

Bus Routes. Transit service in the project area is provided by Capital Area Transit (CAT), Cary Transit (C-Tran), Triangle Transit (TT), and NCSU Wolfline. Every road that crosses I-440/US 1-64 in the project area, except for I-40 and Ligon Street, carries at least one bus route.

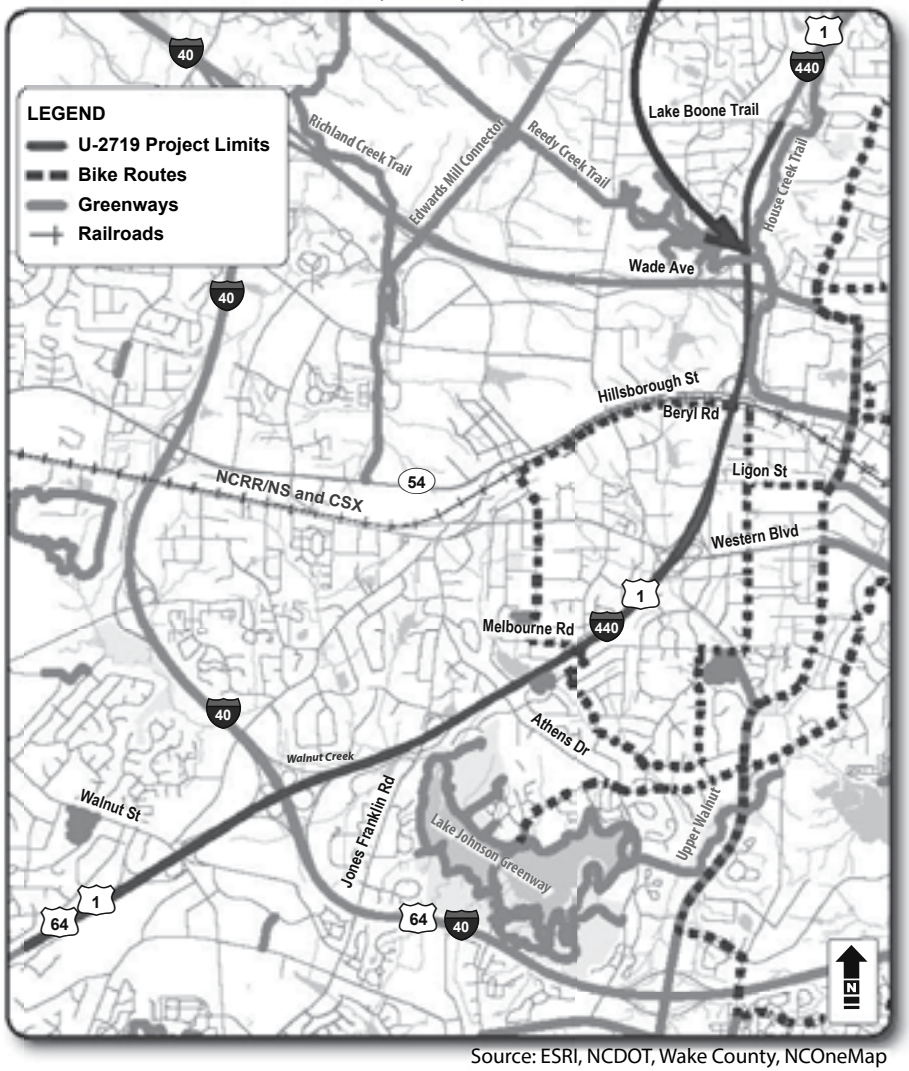
Railroad Tracks. Between Hillsborough Street and Beryl Road, two main tracks and a siding track cross under I-440. The tracks and property are owned by NC Railroad (NCRR) and used for freight transport and passenger trains. One track is operated/maintained by Norfolk Southern. CSX owns/operates the other track on the NCRR property. Three Amtrak passenger rail routes also use this corridor: the Piedmont, the Carolinian, and the Silver Star. In this area, NCRR has plans for two additional tracks in their corridor, as described in their *Future Track Infrastructure Planning Study*.

Sidewalks, Greenways and Bicycle Routes. Pedestrians and bicycles are prohibited on I-440/US 1-64, but there are pedestrian and bicycle facilities within the project study area crossing over or adjacent to I-440/US 1-64. Existing sidewalks cross I-440 on both sides of Melbourne Road and the north side of Western Boulevard. Signed bicycle routes cross I-440 on Beryl Road and Melbourne Road.

Greenways in the project area include Reedy Creek Trail, House Creek Trail, and Lake Johnson Greenway. The Reedy Creek Trail crosses I-440 on a signature pedestrian bridge. A future greenway is planned by Raleigh to extend from the Lake Johnson Greenway across I-440 on Jones Franklin Road then along Walnut Creek.

Reedy Creek Trail pedestrian bridge over I-440 north of Wade Avenue

Exhibit 1.4: Greenways, Bicycle Routes and Railroads



Source: ESRI, NCDOT, Wake County, NCOneMap

1.7 SECTION Existing and Future Traffic Conditions

This section presents traffic volumes along the corridor, evaluates existing and future congestion, and describes existing crash data.

1.7.1 Traffic Volumes

Traffic operations along a roadway are based on a roadway's design and the numbers and types of vehicles traveling the corridor. Estimates of existing and future average daily traffic volumes along a roadway are prepared by NCDOT using a variety of data such as existing traffic counts and a regional transportation computer model.

Average daily traffic volumes for 2012 and 2035 are shown in the schematic in **Table 1.1**. Year 2012 volumes on I-440 ranged from 79,200 to 134,200 vehicles per day (vpd). The highest traffic volumes occurred along the segment just south of the I-40 interchange. By 2035, with no changes to the project corridor, traffic volumes are projected to increase 19 to 26 percent, ranging from 96,400 to 169,600 vpd.

Table 1.1: 2012 and 2035 Traffic Volumes

I-440	2012 Average # Vehicles per Day	2035 Average # Vehicles per Day	Percent Change (2012-2035)
Lake Boone Trail (SR 1676)	109,200	138,000	26%
Wade Avenue (SR 1728)	94,800	117,600	24%
Hillsborough Street (NC 54)	88,200	105,100	19%
Western Boulevard (SR 2012)	85,000	105,500	24%
Melbourne Road (SR 1445) (partial interchange)	81,200	98,700	22%
Jones Franklin Road (SR 5039)	79,200	96,400	22%
I-40	134,200	169,600	26%
Crossroads Boulevard (partial interchange)	118,500	149,200	26%
Walnut Street (SR 1313)	118,000	145,600	23%
Cary Parkway			

Source: *Traffic Forecast for U-2719*, NCDOT, January 10, 2013

1.7.2 Traffic Congestion

Traffic operations during morning and evening rush hours were modeled for 2012 and 2035 to evaluate congestion along I-440 if no improvements are made (called the no-build condition).

In Chapter 2, the same models are used with the alternative designs so that the results can be compared between alternatives and compared to making no improvements along the road.

Traffic operations were assessed two ways – by modeling the level of service of individual corridor segments and by use of a model to simulate travel speeds along the entire corridor. All models show that I-440 has congestion problems, now and even more in the future.

Table 1.2 shows the results of the individual corridor segment models. For the individual segments, congestion levels are reported as Levels of Service (LOS). In Raleigh, it's the City's policy to try to maintain an overall LOS E or better on all roadways and intersections within the city.

What is Level of Service?

Level of Service (LOS) is a rating system that uses a letter grade from A (free flow conditions) to F (stop and go). LOS E defines the maximum capacity of the roadway.

As shown in the table, much of I-440 is at capacity or congested (LOS E and F) during peak hours, and congestion is projected to get worse through 2035. The peak (or rush) hours are the 2-hour periods on weekday mornings and evenings when traffic flow is the heaviest.

Currently, traffic flow is heaviest in the eastbound direction (Cary to Raleigh) in the mornings, switching to the westbound direction (Raleigh to Cary) in the evenings, with many segments operating at LOS E and F during these times. In the future, both directions of travel are projected to operate at mostly LOS F during the morning and evening rush hours. This can be seen in **Table 1.2** by the increased numbers of red boxes.

Table 1.2: Existing and Future Congestion Levels During Rush Hours without the Project

2012					2035			
AM		PM		I-440	AM		PM	
EB	WB	EB	WB		EB	WB	EB	WB
D	F	D	F	Lake Boone Trail (SR 1676)	F	F	E	F
F	E	E	E	Wade Avenue (SR 1728)	F	F	F	F
F	E	E	F	Hillsborough Street (NC 54)	F	F	F	F
F	C	E	E	Western Boulevard (SR 2012)	F	E	F	F
F	D	D	F	Melbourne Road (SR 1445) (partial interchange)	F	F	F	F
F	C	C	D	Jones Franklin Road (SR 5039)	F	D	F	E
E	C	D	D	I-40	F	C	F	D
D	C	C	D	Walnut Street (SR 1313)	F	D	D	F
				Cary Parkway				

Source: *Traffic Operations Technical Memorandum for I-440 Improvements Project STIP Number U-2719*, Atkins, June 2014

Note: The letters C through F are Levels of Service (LOS) for each direction of roadway segment in the morning and evening rush hours.