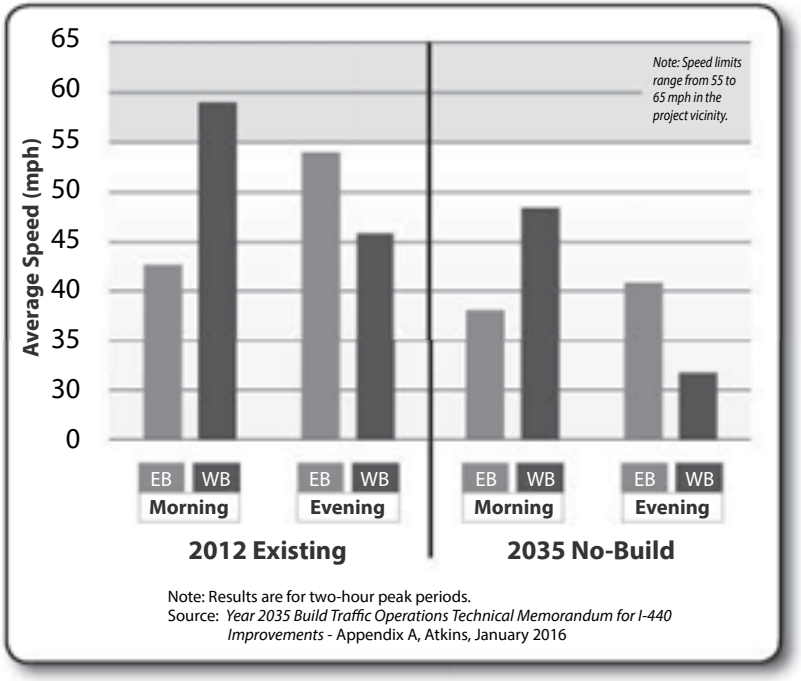
Average travel speeds through the corridor during the morning and evening rush hours were estimated using a computer model that simulates travel along the entire corridor. The modeled corridor extends from south of Walnut Street to north of Wade Avenue and includes the delays at both bottlenecks. **Exhibit 1.5** shows existing and future modeled average travel speeds during two hour peak periods in the morning and evening.

In the eastbound direction, where the posted speed limits are 55 to 65 miles per hour (mph), existing average travel speeds are 43 mph in the morning and 54 mph in the afternoon. This direction is the main commuting directing in the morning. These speeds are expected to slow further, to between 38 and 41 mph, by 2035.

In the westbound direction, the average morning speed is 59 mph and the afternoon speed is 46 mph. This is the main commuting direction for afternoon traffic. By 2035, the speeds are again expected to be much lower.

Exhibit 1.5: Average Speed on I-440 through the Project Corridor During Two-Hour Peak Periods



Note: Results are for two-hour peak periods.
Source: *Year 2035 Build Traffic Operations Technical Memorandum for I-440 Improvements* - Appendix A, Atkins, January 2016

1.7.3 Crash Data

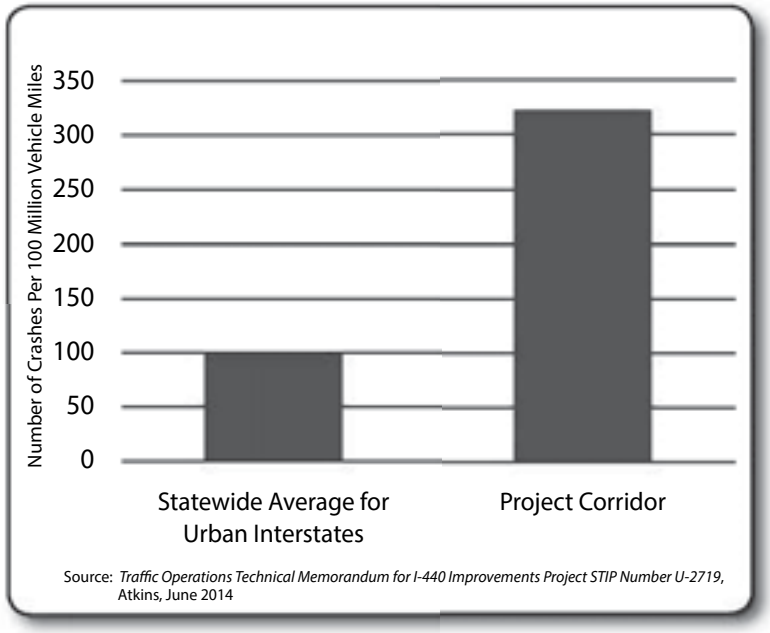
In addition to high traffic volumes creating congestion, incidents such as vehicle breakdowns or crashes occurring on I-440/US 1-64 can also cause back-ups.

NCDOT Traffic Survey Unit collects data on crashes. For the three year period August 2009 through July 2012, there were 1,166 reported crashes along the I-440/US 1-64 project corridor. This is an average of about one every day.

Crash rates (crashes per hundred million vehicle miles traveled) along the project corridor are approximately three times higher than the statewide average rate for urban interstates, as shown in **Exhibit 1.6**.

The three most common types of crashes are rear end, ran off road, and sideswipe, which together make up nearly 82 percent of the total crashes. Rear end crashes comprise more than half of the total crashes along the project corridor, and are typically caused by traffic slowing down due to congestion.

Exhibit 1.6: Crash Rate (per 100 million vehicle miles)



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

1.8 SECTION Transportation Plans and Land Use Plans

Transportation Plans. There are several transportation plans that include the project or reference the importance of the project area, as listed below. These plans help guide the timing of improvements and elements to be included in the design of the project.

- *State Transportation Improvement Program* (March 2017)
- *Capital Area MPO Comprehensive Transportation Plan* (October 2010)
- *Capital Area MPO 2040 Long Range Transportation Plan* (April 2013) and as amended
- *Capital Area MPO Metropolitan Transportation Improvement Program 2012-2018* (September 2011)
- *City of Raleigh BikeRaleigh Plan* (2016)
- *Triangle Transit, Durham-Wake County Corridor Alternatives Analysis* (June 2011)

Land Use Plans. The following land use plans relate to the project or project study area. The proposed project is consistent with these plans.

- *City of Raleigh and Town of Cary Existing Zoning*
- *City of Raleigh 2030 Comprehensive Plan* (October 2009 and as amended)
- *Town of Cary Comprehensive Plan* (November 1996 and amended through August 2009)
- *North Carolina State University Physical Master Plan* (2007) and *Centennial Biomedical Campus Development and Design Guidelines* (July 2010)

Many of these plans can be found on the internet at the agencies' websites.

FOR MORE DETAILS ON THE INFORMATION IN THIS CHAPTER:

The following document is available on the project website at: https://www.ncdot.gov/projects/i-440improvements/.

- ***I-440 Improvements (STIP U-2719) Purpose and Need Statement***
  (September 2014, Atkins)
  Chapter 1 is a summary of this report.

The following documents are available upon request by contacting Beverly Robinson at NCDOT at brobinson@ncdot.gov.

- ***Traffic Forecast for U-2719 Memorandum***
  (January 2013, NCDOT TPB)
  This report provides the forecasts of annual average daily traffic volumes for project roadways for 2012 and 2035 under the no-build condition and 2035 for the build project condition. Traffic mixes (percents of cars and trucks) and other traffic volume information also is provided.
- ***I-440 Widening Project Existing Conditions and Deficiencies Report***
  (July 2013, Atkins)
  This report provides details on conditions of bridges and pavement, geometric conditions (alignments, sight distances, ramp design, etc.), and design operations (route continuity, lane balance, ramp sequences, crashes, congestion).
- ***I-440 Improvement Project (STIP U-2719) Year 2012 Existing & 2035 No-Build Traffic Operations Technical Memorandum***
  (June 2014, Atkins)
  This report documents the modeling of existing and future traffic operations along the corridor if no improvements are made. The report includes a crash analysis and corridor-level analyses of vehicle miles traveled and average corridor speeds. Analysis results are also provided for freeway segments and intersections.
- ***I-440 Improvement Project (STIP U-2719) Community Impact Assessment***
  (Draft - April 2017, Atkins)
  This report describes the community features and resources along the corridor, including land uses, plans, neighborhoods, parks, etc. and the impacts to residences, businesses, and community resources.

2 CHAPTER Alternatives

This chapter describes the range of alternatives considered for the project and those identified as the Detailed Study Alternatives. For the Detailed Study Alternatives, traffic information and preliminary designs are presented.

What's In This Chapter...

2.1 The Process Used to Identify the Detailed Study Alternatives
- **2.1.1 Process Overview and First Screening**
- **2.1.2 Second and Third Screenings of Alternatives**

2.2 The Detailed Study Alternatives
- **2.2.1 Summary - Putting the Pieces Together**
- **2.2.2 Public and Agency Input on the Alternatives**

2.3 Traffic Information
- **2.3.1 Traffic Volume Forecasts**
- **2.3.2 Traffic Operations Along the Corridor**

2.4 Preliminary Designs of the Detailed Study Alternatives
- **2.4.1 Background on Design Stages**
- **2.4.2 Design Criteria and Other Considerations**
- **2.4.3 The Preliminary Designs**
- **2.4.4 Cost Estimates**

WANT MORE DETAILS?

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

2.1 SECTION The Process Used to Identify the Detailed Study Alternatives

2.1.1 Process Overview and First Screening

Process Overview

The flowchart in **Exhibit 2.1** summarizes the multi-step screening process used to identify the alternatives studied in detail in this EA. Each step in the process eliminated alternatives and allowed the project team to develop more details for the remaining alternatives.

The first screening evaluated the ability of general approaches to meet the project purpose based on a set of screening criteria. The project purpose is to improve traffic flow, make the roadway operate more efficiently, and enhance mobility on I-440 in the project area. For this project, only the Improve Existing Corridor approach made it through the first screening, along with the No-Build Alternative (required to always be an option).

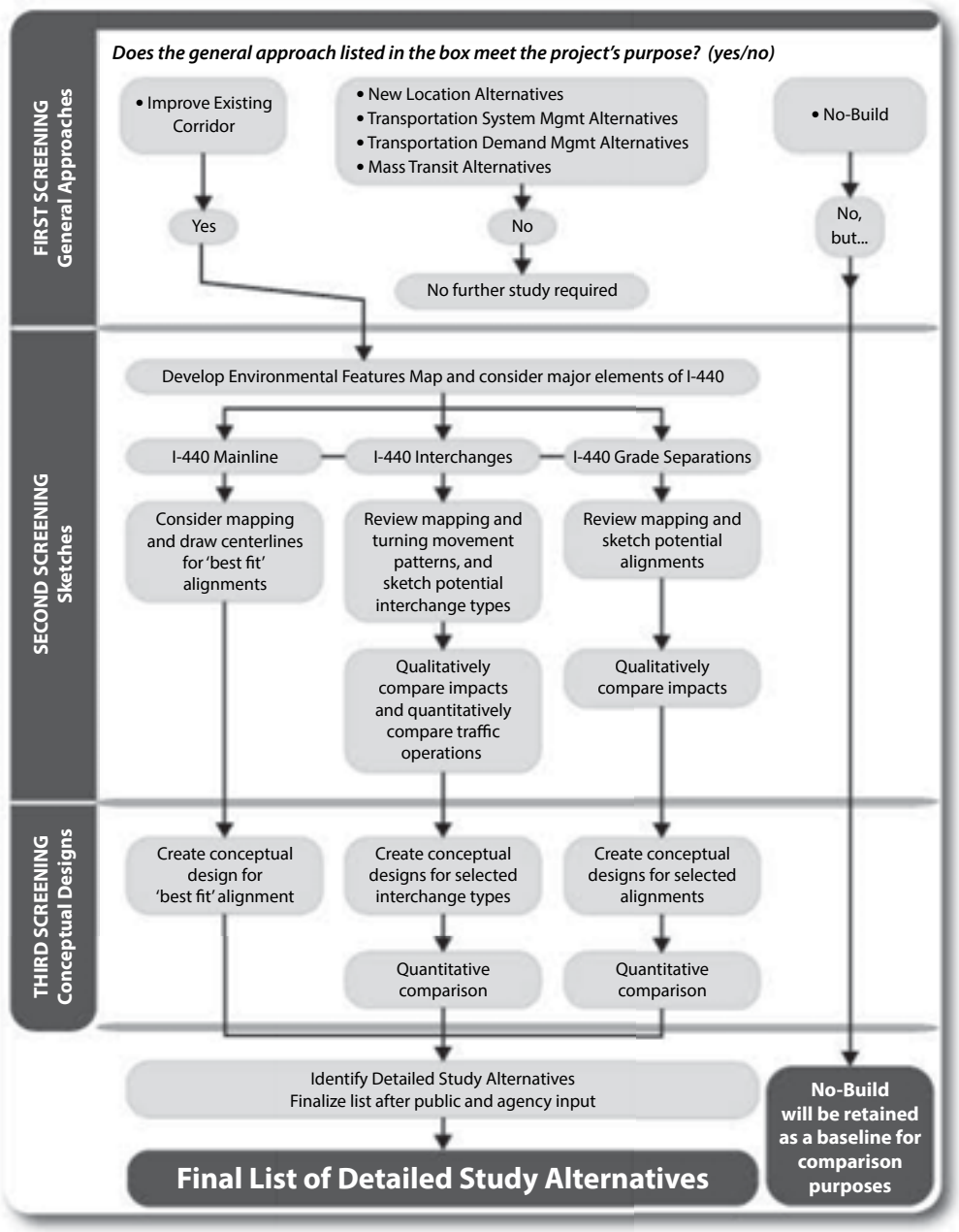
The second screening compared sketch designs for improving the I-440 mainline and crossings, and eliminated those that were unreasonable, impractical, and/or had higher impacts or less improvement to traffic flow.

The third screening developed more details in conceptual designs and compared the designs on how well they would operate and their potential impacts.

The conceptual designs and analysis results were presented for public and agency input, and the Detailed Study Alternatives were finalized after considering this input (**Section 2.2**).

Preliminary designs were then prepared for the Detailed Study Alternatives (**Section 2.4**). Preliminary designs include additional design details such as turn lanes at intersections, preliminary construction footprints, and right of way limits that are not included in the conceptual designs.

Exhibit 2.1: Process Used to Identify the Detailed Study Alternatives



First Screening Analysis

The alternatives development process started by considering a wide range of potential approaches for meeting the stated project purpose and need (see **Chapter 1**). This is the first screening step in **Exhibit 2.1**.

The **Improve Existing Corridor Alternative** would include widening the I-440 mainline as well as rehabilitating/reconstructing interchanges and grade separations (crossings of I-440 that are not interchanges).

The **New Location Highway Alternative** would involve building a new highway somewhere near the vicinity of I-440 or upgrading nearby roadways to freeways.

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

Transportation Demand Management (TDM) Alternatives include a combination of measures that change traveler behavior to reduce demand for additional highway capacity. TDM measures could include carpools/vanpools, electronic traveler information systems, or converting existing lanes to high-occupancy vehicle (HOV) lanes.

Mass Transit Alternatives can include expansion of existing bus and/or passenger rail transit. Four transit agencies operate in the project area: GoRaleigh (formerly Capital Area Transit System [CATS]), GoTriangle (formerly Triangle Transit), C-Tran (Town of Cary transit system), and NC State University Wolfline. Existing and planned transit routes currently cross over I-440 and do not use it as part of their systems.

The **No-Build Alternative** would make no improvements to I-440 as defined under Project U-2719. Other projects in the area included in the STIP or programmed by others were assumed to be implemented.

First Screening Criteria

To determine whether an approach would meet the project purpose, the following screening criteria were used:

- Can the alternative improve average travel speeds through the I-440 corridor during peak periods and increase the carrying capacity of the roadway? (**Section 1.3** - Capacity Problems)
- Does the alternative have the ability to improve the roadway and interchanges to better conform to current design standards? (**Section 1.3** - Geometry Problems)
- Can the alternative address pavement and structures that are in need of rehabilitation? (**Section 1.3** - Condition Problems)

First Screening Results

The Improve Existing Corridor approach could meet all three criteria and was carried forward to the second screening. The No-Build Alternative is always retained for detailed study to provide a comparison to the build alternatives.

The New Location Alternative was eliminated because it would not address geometric and condition problems along the I-440 corridor and it would have extremely high impacts to the surrounding densely developed area.

The TSM Alternatives, TDM Alternatives, and Mass Transit Alternatives were eliminated because they would neither improve geometry problems nor improve condition problems along the I-440 corridor.

Alternatives Making It Through First Screening

The **Improve Existing Corridor** approach would meet all screening criteria and fulfill the project's purpose. It would address capacity, geometry, and condition problems along I-440.

The **No-Build Alternative** also is retained to provide a comparison.

2.1.2 Second and Third Screenings of Alternatives

As shown in **Exhibit 2.1**, for the second and third screening of alternatives for improving the existing I-440 corridor, the project corridor was divided into its major elements. These are the mainline of I-440, the interchanges, and the grade separations crossing I-440. The elements were considered separately because the various alternatives for each element are not dependent on each other and can be mixed and matched.

The second screening evaluated several sketch-level designs for each corridor element. Sketch level designs are basic engineering line drawings of the mainline, interchange forms, and grade separations. The sketches for each element were compared to eliminate those that were unreasonable, impractical, and/or had higher impacts or less improvement to traffic flow. Existing resources and features considered in the impact analysis are shown on the map in **Appendix A**.

For those sketch designs carried forward to the third screening, conceptual designs were developed. These designs include more detail than sketches to provide a better comparison of potential impacts.

The following sections marked with the symbol below summarize the results of the second and third screening analyses. The sections start with the I-440 mainline. This is followed by the results for each interchange and grade separation area along the project corridor from west to east. All the preliminary alternatives considered at each interchange and grade separation location are shown on small maps, with accompanying text explaining why each preliminary alternative was either eliminated or retained for further study as a Detailed Study Alternative.

The I-440 Mainline

An additional through lane in each direction of I-440 is proposed. There would be a total of three through lanes in each direction with a grass or hard median in the center, depending on available space. This would match the three lanes in each direction that exist along the remainder of I-440 and would eliminate the bottlenecks located at either end of the project area.

The mainline can be widened entirely to one side or the other, or by widening symmetrically around the existing road centerline. Different options were applied up and down the corridor, considering existing resources and features, and a "best fit" option was developed.

Since there is one "best fit" option for widening the mainline that will be combined with the interchange alternatives, there was no need to complete a third screening.

Constraints considered in developing the "best fit" option for the mainline included:

- The Walnut Creek floodway and floodplain near the Jones Franklin Road interchange
- The power easement on the eastbound side of I-440
- Lake Johnson Park, Kaplan Park, Method Community Park, and Museum of Art Park
- White Oak Lake and dam south of Melbourne Road interchange
- Oak Grove Cemetery (also a historic site)
- Reedy Creek Greenway pedestrian bridge
- Surrounding neighborhoods, businesses, and land uses

SCREENING

The I-40 Interchange Area

LEGEND

- New or Improved Road/Ramp
- New Bridge
- Road/Ramp Removed
- Buildings
- Property Lines
- Streets
- Rail
- Major Power Towers
- Conservation/ Open Space
- Greenways
- Lakes
- Floodway
- 100 Year Floodplain

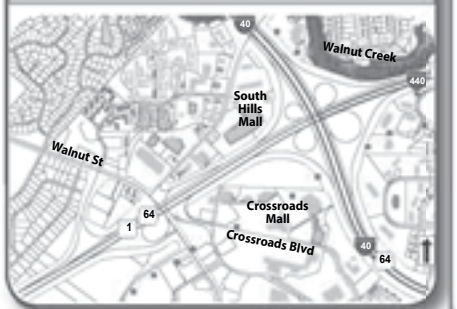
I-440 Project Area

- Wade Ave
- Hillsborough St
- Ligon St
- Western Blvd
- Melbourne Rd
- Athens Dr
- Jones Franklin Rd
- I-40
- Walnut St

Interchange

Grade Separation

EXISTING INTERCHANGE



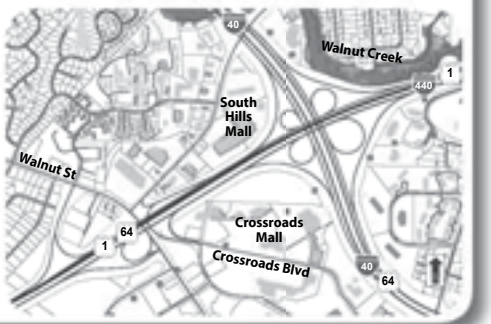
Source: ESRI, NCDOT, Wake County, NCOneMap

WIDEN I-440 ONLY

Retained for Detailed Study

This alternative retained for detailed study because it would have little to no impact on surrounding land uses and Walnut Creek, and it would provide some traffic flow improvement. It was the least expensive of the options studied.

It would provide the most flexibility for future projects programmed for I-40 in this area. These projects include STIP Project I-5703 to reconstruct the I-40/I-440 interchange, and STIP Project I-5704 to add lanes to I-40. Both projects are currently scheduled to begin construction in 2022.

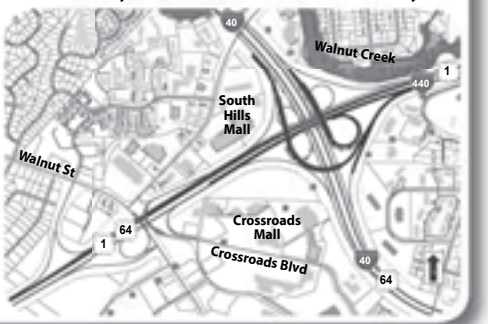


SOUTHWEST QUADRANT FLYOVER

Eliminated from Further Study

This alternative was initially recommended to be retained for detailed study. It had the most potential benefit to traffic flow, and was originally estimated to fit mostly within existing right of way.

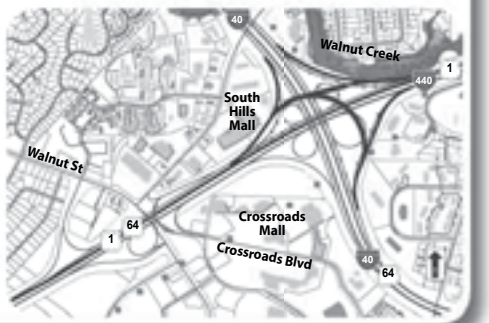
This alternative was eliminated during preliminary design. Projects on I-40 in this area (I-5701 and I-5703) are now programmed by NCDOT to begin construction in 2022. If the Southwest Quadrant Flyover was constructed, it would be in place before 2022 and may have to be torn out to make way for the I-40 projects. In addition, the footprint of this alternative got bigger in preliminary design, and impacts to Centerview office park increased.



NORTHEAST QUADRANT FLYOVER

Eliminated from Further Study

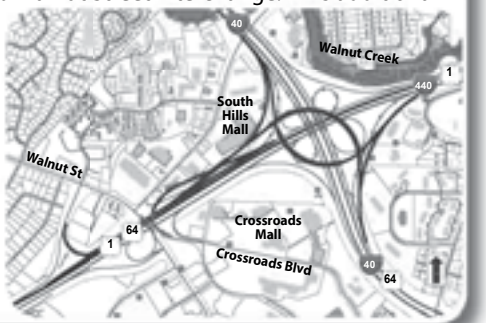
This alternative was eliminated because it would impact the sensitive Walnut Creek floodway and floodplain and the South Hills Mall. Land adjacent to Walnut Creek in this area frequently floods, and additional encroachment on the floodplain/floodway would worsen this condition.



FLYOVERS IN NE & SW QUADRANTS

Eliminated from Further Study

This alternative was eliminated because it would have the most impacts to surrounding development, including the South Hills Mall. It is also the most expensive. Although it improved traffic flow compared to a no-build condition, it was the lowest performing compared to the other alternatives. This concept would eliminate direct access from I-40 to Crossroads Boulevard, rerouting this traffic to the already congested Walnut Street interchange. This additional rerouted traffic reduces traffic flow in the area, canceling any other traffic flow improvement achieved by this concept.



SCREENING

The Jones Franklin Road Interchange

LEGEND

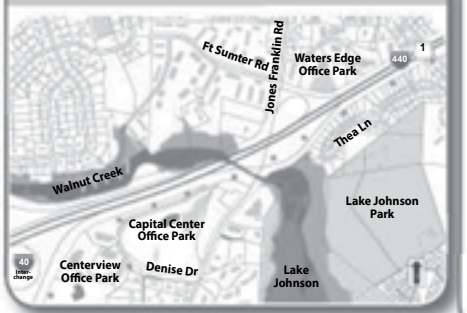
- New or Improved Road/Ramp
- New Bridge
- Road/Ramp Removed
- Buildings
- Property Lines
- Streets
- Rail
- Major Power Towers
- Conservation/ Open Space
- Greenways
- Lakes
- Floodway
- 100 Year Floodplain

I-440 Project Area

- Wade Ave
- Hillsborough St
- Ligon St
- Western Blvd
- Melbourne Rd
- Athens Dr
- Jones Franklin Rd
- I-40
- Walnut St

- Interchange
- Grade Separation

EXISTING INTERCHANGE

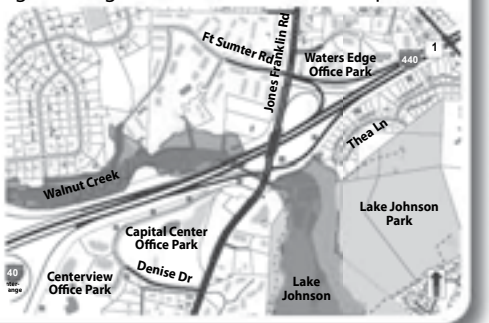


Source: ESRI, NCDOT, Wake County, NCOneMap

UPGRADE EXISTING PARTIAL CLOVER

Retained for Detailed Study

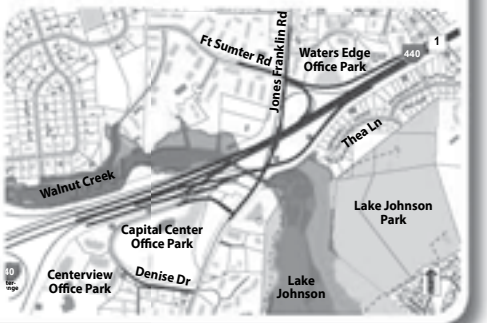
This alternative was developed during preliminary design to replace the Braided Partial Clover Alternative. It would provide the most flexibility for the separate projects now programmed for I-40 in this area because it would not require changes to I-40 or the I-40 interchange ramps. This alternative would retain the weaving area along eastbound I-440 but would extend an extra lane under the Jones Franklin Road bridge to increase merging/weaving distances, which would improve traffic flow in this direction. Impacts in the southeast quadrant of the interchange to the office parks and electric power towers would be less compared to the Braided Partial Clover.



BRAIDED PARTIAL CLOVER

Eliminated from Further Study

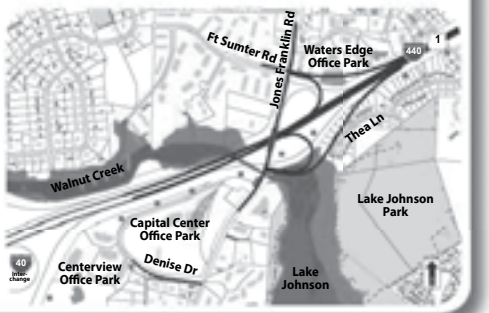
This alternative was originally retained because it would have the most improvements to traffic flow and would minimize impacts to Lake Johnson Park and homes on Thea Lane compared to the half clover options. The existing weaving area on I-440 eastbound between the I-40 on-ramp and the Jones Franklin Road off-ramp would be eliminated. However, the proposed ramp system in the eastbound direction would constrain options for newly programmed improvements to I-40. This alternative would impact the Capital Center/Centerview office parks and one or more major electric power towers (high cost to relocate).



HALF CLOVER

Eliminated from Further Study

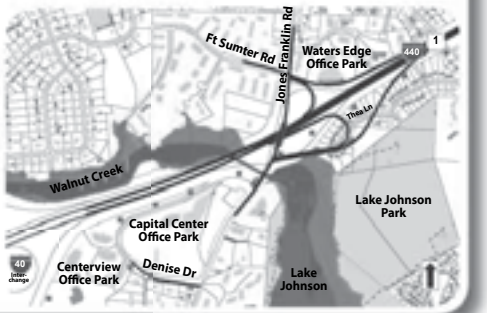
This alternative lengthens the weaving area in the eastbound direction between the I-40 on-ramp and the Jones Franklin Road off-ramp, which improves traffic flow, but not as much as the Braided Partial Clover, which eliminates the weaving area altogether. This alternative was eliminated because it would impact homes on Thea Lane that the partial clover options avoid, and it would have the most impacts to Lake Johnson Park and a wetland, floodplain, and floodway area at the north end of the lake.



ELONGATED HALF CLOVER

Eliminated from Further Study

This alternative was developed to reduce the impacts of the Half Clover while retaining the same concept. This alternative was eliminated from detailed study because it would still have impacts to Lake Johnson Park and a wetland at the northern end of the lake, would have potential impacts to major electric power towers, and have the most impact to homes on Thea Lane. This alternative, like all the others, would have impacts to Waters Edge Office Park and pond.



SCREENING

The Athens Drive Bridge

LEGEND

- New or Improved Road/Ramp
- New Bridge
- Road/Ramp Removed
- Buildings
- Property Lines
- Streets
- Rail
- Major Power Towers
- Conservation/ Open Space
- Greenways
- Lakes
- Floodway
- 100 Year Floodplain

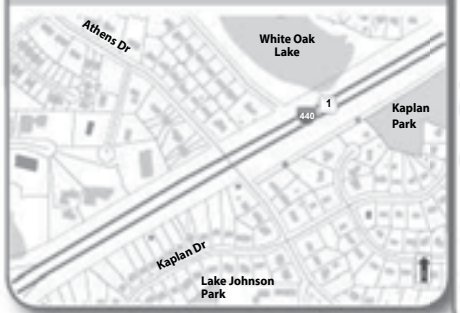
I-440 Project Area

- Wade Ave
- Hillsborough St
- Ligon St
- Western Blvd
- Melbourne Rd
- **Athens Dr**
- Jones Franklin Rd
- I-40
- Walnut St

Interchange

Grade Separation

EXISTING GRADE SEPARATION



REPLACE BRIDGE IN PLACE

Retained for Detailed Study

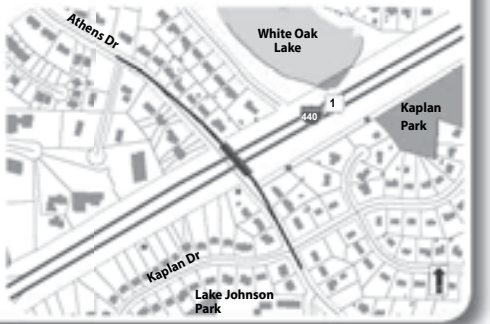
This alternative was retained for detailed study. It would have the least impacts to surrounding land uses and resources of the three preliminary alternatives. However, during construction, the existing bridge would be closed and a temporary off-site detour used for up to one year (see map below). This alternative would be the least expensive.

TEMPORARY CONSTRUCTION DETOUR FOR REPLACE BRIDGE IN PLACE

REPLACE BRIDGE TO NORTH

Retained for Detailed Study

This alternative was retained for detailed study to provide an option that would not need to close the existing bridge during construction (as required under Replace Bridge in Place). However, replacing the bridge to the north would require new right of way, which likely would impact homes on the north side of Athens Drive.



REPLACE BRIDGE TO SOUTH

Eliminated from Further Study

This alternative was eliminated from detailed study because it would have the most impacts. This alternative would require new right of way, which likely would impact homes on the south side of Athens Drive. It also would impact the electric power tower east of I-440 and south of Athens Drive, which would have a high cost to relocate.

Source: ESRI, NCDOT, Wake County, NCOneMap

SCREENING

The Melbourne Road Half Interchange

LEGEND

- New or Improved Road/Ramp
- New Bridge
- Road/Ramp Removed
- Buildings
- Property Lines
- Streets
- Rail
- Major Power Towers
- Conservation/ Open Space
- Greenways
- Lakes
- Floodway
- 100 Year Floodplain

I-440 Project Area

- Wade Ave
- Hillsborough St
- Ligon St
- Western Blvd
- Melbourne Rd
- Athens Dr
- Jones Franklin Rd
- I-40
- Walnut St

Interchange

Grade Separation

EXISTING INTERCHANGE

Source: ESRI, NCDOT, Wake County, NCOneMap

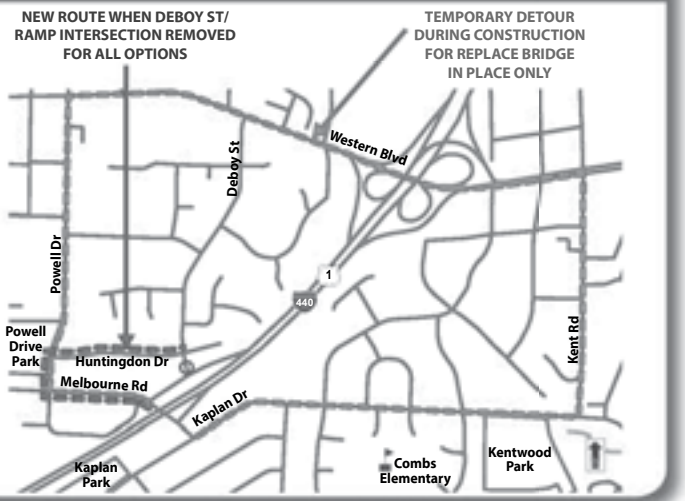
REPLACE BRIDGE IN PLACE

Retained for Detailed Study

This alternative was retained for detailed study. It would have the least impacts to surrounding land uses and resources of the three preliminary alternatives. However, during construction, the existing bridge would be closed and a temporary off-site detour used for up to one year (see map below). This alternative would be the least expensive.

All alternatives retain the half interchange configuration and would close the existing Deboy Street connection to the off ramp. Traffic could use Huntington Drive instead.

TEMPORARY CONSTRUCTION DETOURS FOR REPLACE BRIDGE IN PLACE



REPLACE BRIDGE TO NORTH

Retained for Detailed Study

This alternative was retained for detailed study to provide an option that would not need to close the existing bridge during construction (as required under Replace Bridge in Place). However, replacing the bridge to the north would require new right of way, which likely would impact homes on the north side of Melbourne Road.

All alternatives retain the half interchange configuration and would close the existing Deboy Street connection to the off ramp. Traffic could use Huntington Drive instead.

REPLACE BRIDGE TO SOUTH

Eliminated from Further Study

This alternative was eliminated from detailed study because it would have the most impacts. This alternative would require more new right of way than Replace Bridge to North and would likely impact homes on the south side of Melbourne Road. It also would impact the electric power tower east of I-440 and south of Melbourne Road, which would have a high cost to relocate.

All alternatives retain the half interchange configuration and would close the existing Deboy Street connection to the off ramp. Traffic could use Huntington Drive instead.

SCREENING

The Western Boulevard Interchange

LEGEND

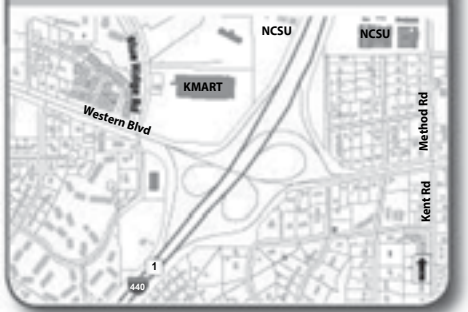
- New or Improved Road/Ramp
- New Bridge
- Road/Ramp Removed
- Buildings
- Property Lines
- Streets
- Rail
- Major Power Towers
- Conservation/ Open Space
- Greenways
- Lakes
- Floodway
- 100 Year Floodplain

I-440 Project Area

- Wade Ave
- Hillsborough St
- Ligon St
- Western Blvd
- Melbourne Rd
- Athens Dr
- Jones Franklin Rd
- I-40
- Walnut St

- Interchange
- Grade Separation

EXISTING INTERCHANGE



Source: ESRI, NCDOT, Wake County, NCOneMap

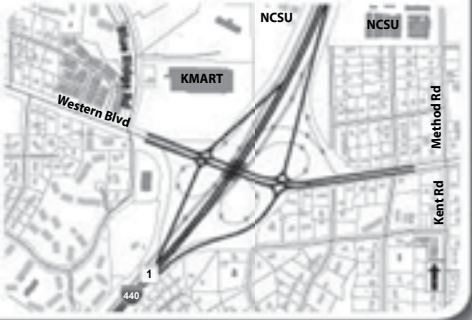
DOUBLE CROSSOVER DIAMOND

Retained for Detailed Study

This alternative was retained for detailed study because it would have the best traffic operations of the alternatives considered and it would accommodate bicyclists and pedestrians along Western Boulevard. Little new right of way is anticipated to be needed, so impacts to surrounding properties are expected to be minimal.

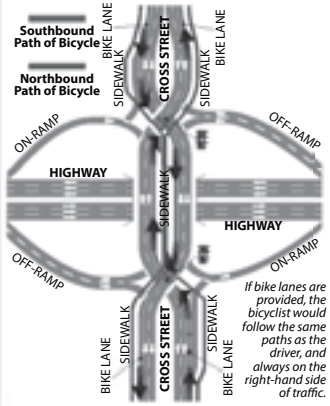
Western Boulevard is a primary route to NC State University and there is a multi-use path currently passing through the interchange, so accommodating bicyclists and pedestrians is important.

This interchange type is also known as a diverging diamond. It is not a common type of interchange, but there are a few in North Carolina.

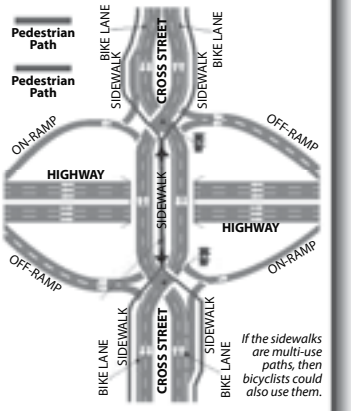


NAVIGATING A DOUBLE CROSSOVER DIAMOND INTERCHANGE

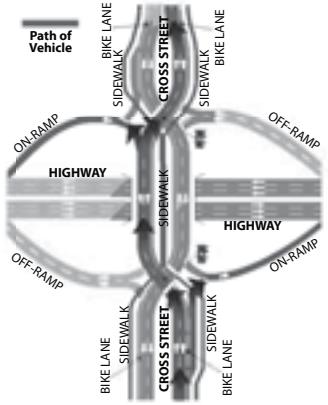
On a Bicycle



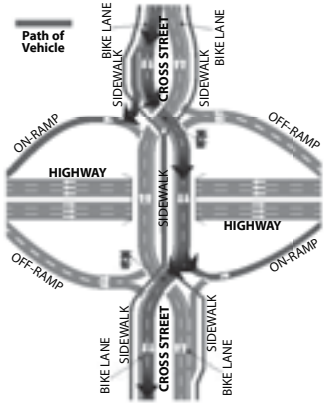
As a Pedestrian



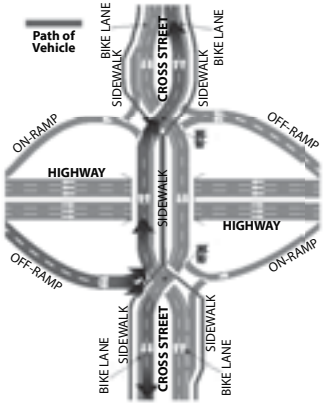
Northbound Cross Street Traffic



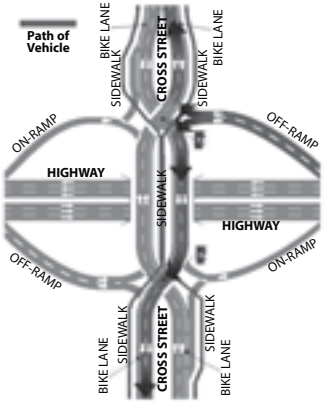
Southbound Cross Street Traffic



Eastbound Highway Traffic



Westbound Highway Traffic



Note: There are double crossover diamond interchanges at I-77/Catawba Avenue in Cornelius and I-85/NC 73 in Concord.

SCREENING

The Western Boulevard Interchange (continued)

LEGEND

- New or Improved Road/Ramp
- New Bridge
- Road/Ramp Removed
- Buildings
- Property Lines
- Streets
- Rail
- Major Power Towers
- Conservation/ Open Space
- Greenways
- Lakes
- Floodway
- 100 Year Floodplain

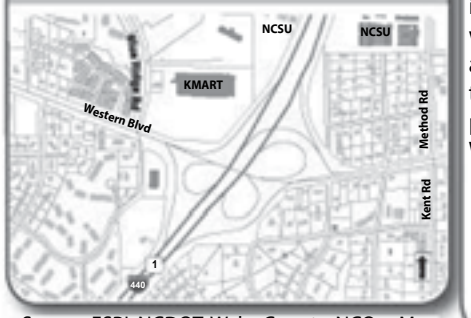
I-440 Project Area

- Wade Ave
- Hillsborough St
- Ligon St
- Western Blvd
- Melbourne Rd
- Athens Dr
- Jones Franklin Rd
- I-40
- Walnut St

Interchange

Grade Separation

EXISTING INTERCHANGE



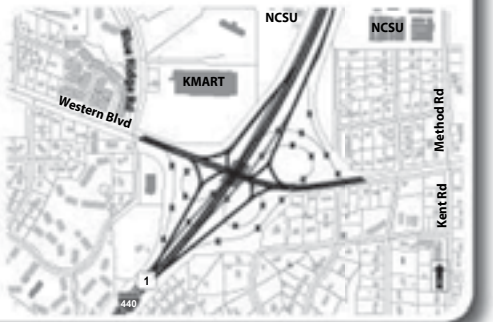
Source: ESRI, NCDOT, Wake County, NCOneMap

SINGLE POINT URBAN INTERCHANGE (SPUI)

Eliminated from Further Study

This alternative was eliminated from detailed study because traffic modeling showed that the westbound I-440 off ramp would require triple left turn lanes for adequate traffic operations and to prevent backups on I-440. However, there would not be enough lanes on Western Boulevard to receive triple left turn lanes.

This interchange type also is not common in North Carolina. There is an interchange of this type at I-540/Six Forks Road in Raleigh (with double left turn lanes).

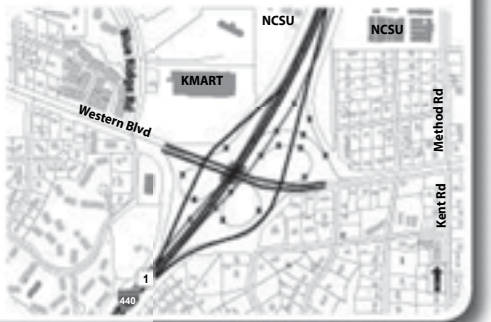


TRADITIONAL DIAMOND

Eliminated from Further Study

This alternative was eliminated from detailed study because traffic modeling showed that both the westbound and eastbound I-440 off ramps would require triple left turn lanes for adequate traffic operations and to prevent backups on I-440. However, there would not be enough lanes on Western Boulevard to receive triple left turn lanes.

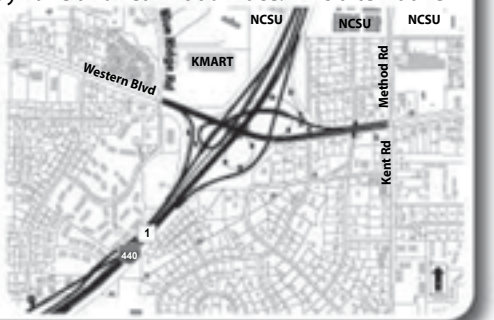
This interchange type is common, and a nearby one of this type is at I-40/Gorman Street in Raleigh.



MODERNIZE EXISTING INTERCHANGE FORM

Eliminated from Further Study

This alternative was eliminated from detailed study because it would have the most impacts and be substantially more expensive than the other alternatives. In addition, vehicles getting on westbound I-440 from Western Boulevard would not be able to get off at Melbourne Road due to not enough distance between the ramps. The new right of way needed for this alternative would likely impact homes on Wendy Lane and Teakwood Place. This alternative would be the least accommodating to bicyclists and pedestrians on Western Boulevard.

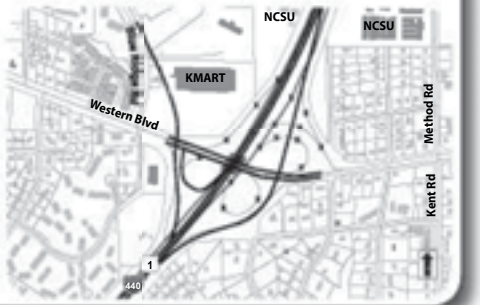


PARTIAL CLOVER

Eliminated from Further Study

This alternative was eliminated from detailed study because traffic modeling showed that the westbound I-440 off ramp would require triple left turn lanes for adequate traffic operations and to prevent backups on I-440. However, there would not be enough lanes on Western Boulevard to receive triple left turn lanes. This alternative also would require right of way from the K-mart in the northwest quadrant to realign Blue Ridge Road.

This alternative was added to the study as a result of comments received at Public Meeting #2 (held 11/12/14).



SCREENING

The Ligon Street Crossing

LEGEND

New or Improved Road/Ramp
New Bridge
Road/Ramp Removed
Buildings
Property Lines
Streets
Rail
Major Power Towers
Conservation/ Open Space
Greenways
Lakes
Floodway
100 Year Floodplain

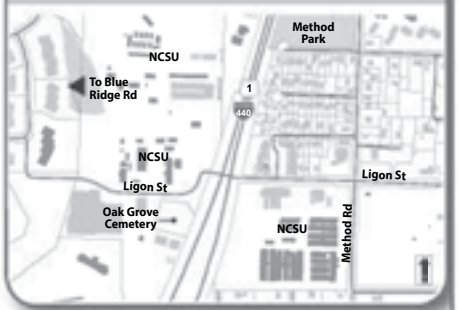
I-440 Project Area

- Wade Ave
- Hillsborough St
- Ligon St
- Western Blvd
- Melbourne Rd
- Athens Dr
- Jones Franklin Rd
- I-40
- Walnut St

Interchange

Grade Separation

EXISTING GRADE SEPARATION

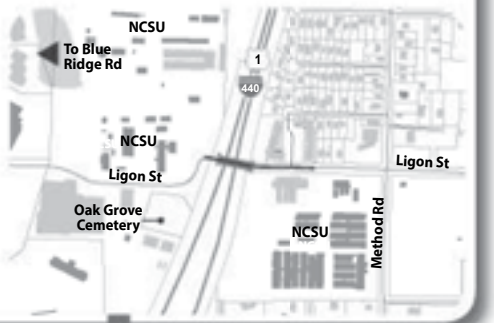


EXTEND TRAFFIC CULVERT UNDER I-440

Retained for Detailed Study

This alternative would extend the existing one-lane traffic culvert to be long enough to carry the widened I-440 above. The existing culvert was included in the original I-440 construction to retain connections between the historic Oak Grove Cemetery and the Method Neighborhood. Extending the culvert would allow it to continue serving its original purpose.

Replacing the one-lane culvert with a two-lane culvert or bridging I-440 over Ligon Street also was considered. However, it would not be feasible to construct while maintaining traffic flow on I-440 during construction.



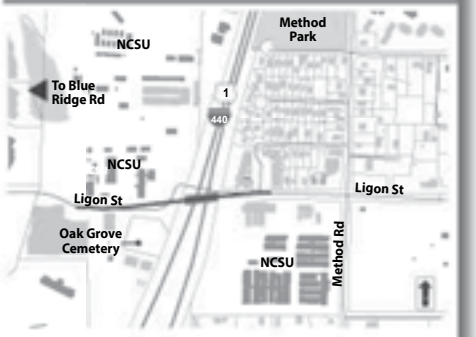
TEMPORARY CONSTRUCTION DETOUR FOR ALL OPTIONS

These two concepts would construct a two-lane bridge for Ligon St over I-440 to replace the culvert. NC State University and City of Raleigh are interested in upgrading the Ligon St crossing to a two-lane bridge to provide improved bus, pedestrian, and bicycle access along this road and because they have plans to extend Ligon St to Blue Ridge Rd in the future. Currently, buses cannot use the traffic culvert due to size.

The initial bridge concept showed the alignment south of the culvert. A second concept was developed during preliminary design on an alignment north of the culvert. Both are Detailed Study Alternatives. Each would have different impacts and costs, but both would avoid encroaching on the historic Oak Grove Cemetery and the Oak Grove Baptist Church (corner of Ligon St and Method Rd).

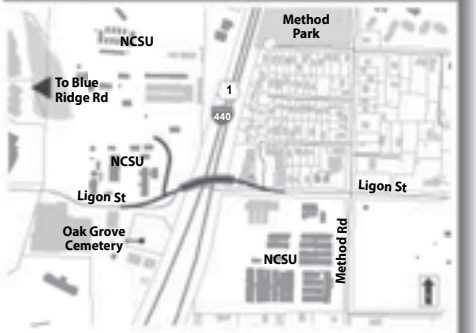
TWO-LANE BRIDGE TO SOUTH

Retained for Detailed Study



TWO-LANE BRIDGE TO NORTH

Retained for Detailed Study



Source: ESRI, NCDOT, Wake County, NCOneMap