FEASIBILITY STUDY

NC 132 (College Road) Widening
From SR 1272 (New Centre Drive) to SR 1327 (Gordon Road)
City of Wilmington, New Hanover County, North Carolina

Division 3

FS-0203C

Prepared for the
Program Development Branch
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Rasay Abadilla, P.E. — 11/16/09
Feasibility Studies Engineer — Date

Derrick W. Lewis, P.E — 11/16/09
Feasibility Studies Unit Head — Date

Documentation Prepared by URS Corporation-North Carolina

Christopher M. Werner, P.E. — 11/16/09
Project Engineer — Date

Kim S. Leight, AICP — 11/16/09
Project Planner — Date

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I. General Description

This Feasibility Study describes the improvements of NC 132 (College Road) from SR 1272 (New Centre Drive) to the SR 2048 (Gordon Road) interchange, in New Hanover County, north of the City of Wilmington, a distance of approximately 2.5 miles. The project location is shown on Figure 1.

This study is the initial step in the planning and design process for this project and is not the product of exhaustive environmental or design investigations. The purpose of this study is to describe the proposed project, including costs, and to identify potential problems that may require consideration in the future planning and design phase.

II. Background

Purpose and Need

I-40 is a major east-west interstate facility with full control of access which spans the United States and has an eastern terminus in Wilmington, North Carolina. I-40 terminates as an interstate facility at the Gordon Road interchange, where it merges with NC 132, which is known as College Road. College Road, south of Gordon Road, has become the primary north-south thoroughfare through New Hanover County, providing a route to and from major commercial and tourist destinations. This includes truck traffic destined for the Port of Wilmington and tourist traffic destined for locations such as Wrightsville Beach, Carolina Beach, Kure Beach and the North Carolina Aquarium, to name a few.

As part of this study, the following will be evaluated based on the ability to improve north-south mobility along the College Road corridor between the Gordon Road interchange and New Centre Drive:

- Improving College Road to a six-lane facility, from New Centre Drive to Martin Luther King Jr. Parkway (MLK) and to an eight-lane facility from MLK to Gordon Road;
- improving the US 17 Business (Market Street) interchange with College Road;
- improving the MLK at-grade intersection with College Road;
- managing access along College Road from New Centre Drive to the Gordon Road interchange; and
- improving the Gordon Road interchange.

Existing Conditions

Within the project study area, existing College Road is a four-lane roadway (two travel lanes in each direction) with a 30-foot depressed median and includes a variable right-of-way width. The project study area is shown on Figure 2. From New Centre Drive to the Market Street interchange, College Road has a posted speed limit of 45 miles per hour (mph), which transitions to a posted speed limit of 55 mph at the Market Street interchange. This speed limit is maintained along College Road as it exits the study area to the North. Currently, College Road does not provide accommodations for pedestrian or bicycle traffic.

College Road is classified as "major thoroughfare" according to the Greater Wilmington Urban Area Thoroughfare Plan, an "urban principal arterial" according to the Wilmington Urban Area 2030 Long Range Transportation Plan (LRTP) and a "freeway" according to the North Carolina Department of Transportation (NCDOT) Strategic Highway Corridor description for Corridor 6.

According to the NCDOT Bridge Location Maps for New Hanover County, the following structures exist along or adjacent to the College Road corridor within the study area:

- Structure # 3 (northbound College Road over Market Street)
- Structure # 8 (southbound College Road over Market Street)
- Structure # C117 (MLK culvert-west of College Road)
- Structure # 57 (flyover over I-40 to College Road northbound)
- Structure # 58 (I-40 eastbound over Gordon Road)
- Structure # 59 (I-40 westbound over Gordon Road)
- Structure # C60 (Gordon Road on-ramp culvert – to I-40 westbound)
- Structure # C61 (Gordon Road culvert – east of I-40)
- Structure # C62 (I-40 culvert – within Gordon Road interchange)
- Structure # C63 (Gordon Road on-ramp culvert – to College Road southbound)

Existing Land Use

Land uses along College Road, from New Centre Drive to MLK, consist of commercial and industrial services including shopping centers, auto dealerships, banks, hotels, and the Corning industrial plant. North of MLK, land uses along College Road consist of predominantly residential (single family and multi family) with several gas stations, churches and two religious academies. The few open areas along the corridor are associated with natural resource features such as wetlands identified in the Division of Coastal Management GIS data and NCDOT Wetland Mitigation Sites.

The City of Wilmington adopted the *College Road Corridor Plan* in November 2004, which evaluated College Road from Lansdowne Road to MLK. The purposes of the Plan included making "College Road less congested" and helping to implement the City's Strategic Plan by "strengthening the economic and fiscal impact of commercial development along the corridor". The Plan included rezoning strategies to achieve the above goals, which recommended "site-by-site redevelopment and public investment in sidewalks, medians, turn lanes, alleys and landscaping to see meaningful improvements to congestion and attractiveness".

Adjacent Projects

Other proposed NCDOT State Transportation Improvement Program (STIP) projects occurring within the vicinity of this project include the following:

- U-4902 US 17 Business – From Colonial Avenue to SR 1402. Access management improvements.
- U-3831 SR 2048 (Gordon Road), NC 132 interchange ramp to west of US 17. Widen to multiple lanes.
- U-4718 US 76 and NC 132. Intersection improvements.
- U-3338 Kerr Avenue Widening – scheduled for right of way acquisition to begin in fiscal year 2010 and construction to begin in fiscal year 2012.
- U-4920 Randall Parkway, Independence Boulevard/Covil Avenue to South College Road.
- U-4751 New route – From SR 1409 (Military Cutoff Road) to the proposed Wilmington Bypass. Multi-lanes on new location.
- U-4436 SR 1318 and Wilmington Bypass. Construct an interchange.
- U-4434 Independence Boulevard Extension – Extension of Independence Boulevard to MLK. Multi-lanes on new location.

Hurricane Evacuation

According to the *Southeastern Coastal Area North Carolina I-40 Lane Reversal Hurricane Evacuation Plan*, College Road is included as a part of the evacuation route. Lane reversals would begin at the College Road intersection with MLK and continue north, exiting the study area.

III. Crash Analysis Summary

A crash analysis of the existing College Road corridor and major secondary roadways crossing College Road was conducted utilizing crash data provided by the NCDOT for a three-year period from July 1, 2004 to June 30, 2007. The Total Crash Rates included in the data for the roadways analyzed, were compared to the Statewide Average Rates for similar routes to determine if the segment exceeded the statewide average. However, a more appropriate method is the Critical Crash Rate method, which is a statistically derived number that can be used to identify locations where crash occurrence is higher than expected for a given facility type. The Critical Crash Rate is beneficial as it accounts for exposure (traffic volumes) and varying segment lengths. If a segment has an Actual Crash Rate higher than the Critical Crash Rate, the location may have a potential highway safety deficiency and should receive additional analysis. The table below shows a comparison of the Total Crash Rates versus the Statewide Average (for similar routes) and the calculated Critical Crash Rate for each roadway segment.

Crash Analysis Years 2004-2007			
Segment	Total Crashes per 100 Million Vehicle Miles	Statewide Rate[1]	Critical Rate[2]
College Road from New Centre Drive to SR 2201(Murrayville Road)	503.5	341.5	370.62
New Centre Drive from Market Street to Racine Drive	1051.1	404.22	482.88
Market Street from New Centre Drive to SR 2127 (North Crestwood Drive)	605.51	318.41	355.91
MLK from SR 1175 (Kerr Avenue) to Racine Drive	318.36	404.22	454.86
Gordon Road from Kerr Avenue to SR 1328 (White Road)	539.27	404.22	461.82

1. 2005-2007 Statewide Crash Rates for similar routes
2. Based on the statewide crash rate (95% level of confidence).

IV. Description of Alternatives Analyzed

2008 No-Build Conditions

The 2008 No-Build Conditions along existing College Road corridor from New Centre Drive to Gordon Road consists of a mixture of at-grade intersections and urban interchanges. Signalized intersections are located at New Centre Drive, Oriole Drive, the Market Street interchange ramp terminals, Hunters Trail, MLK, Kings Drive and at the Gordon Road/I-40 eastbound loop/ramp terminal. Unsignalized intersections are located at Spring View Drive, Freedom Baptist Church Entrance/Service Road, SR 2002 (Shelley Drive), SR 2061 (Kenningston Drive), SR 2003 (Kings Grant Road) and the Gordon Road/I-40 westbound ramp terminal.

2035 No-Build Conditions

The 2035 No-Build Conditions include the 2008 No-Build Conditions and assumes the local transportation system would evolve as currently planned, but without implementation of the proposed project. With the exception of routine maintenance, no change would take place along the existing corridor within the study area.

2035 Build Conditions

For the purpose of implementing improvements as funding becomes available, the Build Conditions were split into three sections: Section A, Section B and Section C. These sections are shown on Figure 2. Section A includes improvements along College Road from New Centre Drive through the Market Street interchange grade separation. Section B includes improvements along College Road from north of the Market Street interchange grade separation to south of the Gordon Road interchange ramps and includes alternatives for the MLK intersection with College Road. Section C includes improvements to the

Gordon Road interchange ramp terminal intersections, with no revisions to College Road or I-40. Section A and Section C are common for all Section B Alternatives.

Section A

Section A, shown on Figure 2, is approximately 0.70 miles long and includes improvements along College Road, from New Centre Drive through the Market Street interchange. Improvements consists of converting the depressed median to a 23 foot raised median, widening the existing roadway from a four lane to a six lane facility, implementing access management efforts from New Centre Drive to south of the Market Street interchange ramps, modifying loop and ramp alignments to/from the Market Street interchange, revising the Marker Street ramp terminal configurations and widening the northbound College Road bridge over Market Street.

Given the proposed widening on northbound and southbound College Road, both loops associated with the Market Street interchange need to be realigned to tie into the new lanes. As a result of the proposed roadway widening and loop realignment, the loop radii need to be adjusted to accommodate a 25 mph design speed. Realignment of the loop in the SW quadrant requires the adjacent ramp to be realigned as well. Since this loop and ramp are being modified, the proposed improvements include the addition of an exclusive eastbound right-turn lane onto the on-ramp to southbound College Road. The number of lanes on the loop remains the same; however it is proposed the lane marking reflect an exclusive northbound left-turn lane, a shared through/left-turn lane and an exclusive right-turn lane. It was also determined that the southbound College Road bridge over Market Street should be removed and replaced, given the existing bridge has a poor sufficiency rating (48.6). The Oriole Drive approach to College Road will also need to be slightly modified resulting with dual eastbound left-turn lanes and a shared through/right-turn lane. Currently, the existing right-of-way south of the interchange is variable and is approximately 200 feet wide. Improvements for Section A would require the purchase of additional right-of-way along the frontage of College Road as well as along the existing Market Street ramps. Section A is common for all Section B Alternatives, which is discussed below.

Section B

Section B, shown on Figure 2, is approximately 1.77 miles long and includes proposed improvements along College Road from north of the Market Street grade separated interchange to south of the Gordon Road interchange ramps. This section also includes alternatives for the MLK intersection with College Road. Currently, the existing right-of-way along College Road is variable and is approximately 200 feet wide. Along MLK the existing right-of-way is also variable, with a minimum of 200 feet provided.

Upgrade Existing MLK and College Road at-grade intersection Alternative

The upgrade existing MLK and College Road at-grade intersection Alternative consists of improving the existing lane configuration. Currently, both MLK and College Road have three through lanes in each direction. The northbound and southbound College Road approach includes dual left-turn lanes and one exclusive right-turn lane. The eastbound MLK approach includes dual left-turn lanes and one exclusive right-turn lane. The westbound MLK approach includes one exclusive left-turn lane and right-turn lane.

The proposed at-grade intersection improvements include adding turn lanes where warranted by the peak hour volumes. Additional lanes beyond this are not considered reasonable given the high traffic volumes entering the intersection.

Alternative 1

Alternative 1, shown on Figures 3 and 3A, consists of converting the College Road depressed median to a 23 foot raised median, improving the existing roadway from a four lane to a six lane facility and incorporates a Tight Urban Diamond Urban interchange configuration with flyovers at MLK. The flyovers would be utilized to accommodate the MLK eastbound to northbound movement and the College Road southbound to eastbound movement, resulting with tight ramps in the southwest and southeast quadrants. This configuration would also result with MLK and College Road being grade-separated.

The proposed improvements at MLK and College Road would require the signalized intersection of College Road at Hunters Trail/Corning industrial plant be removed to maintain the integrity of the

proposed interchange. This intersection is currently the primary access to the Corning industrial plant and therefore would require new access to be provided. Alternative 1 shows a proposed service road located directly across from the College Road northbound ramp terminal on Market Street to provide access to the Corning industrial plant.

North of the proposed interchange at MLK and College Road, access would be restricted to improve operations along College Road and to maintain the integrity of the flyovers. Access currently provided at Spring View Drive, Freedom Baptist Church Entrance/Service Road, Shelley Drive, and Kings Drive would be closed. Movements at Kenningston Drive and Kings Grant Road would be restricted to right-in right-out, with the incorporation of a grade separation over College Road in the Kings Drive area. This grade separation would allow access to neighborhoods on both sides of College Road utilizing the existing neighborhood streets.

Proposed improvements for Alternative 1 would require the purchase of additional right-of-way along College Road, MLK and in all four quadrants of the College Road/MLK intersection to accommodate the proposed interchange. The purchase of additional right-of-way along Kings Drive is also anticipated to accommodate the proposed grade-separation.

Alternative 2

Alternative 2, shown on Figures 4 and 4A, consists of converting the College Road depressed median to a 23 foot raised median, improving the existing roadway from a four lane to a six lane facility (with auxiliary lanes north of MLK) and incorporates a Three-Level Stacked interchange configuration utilizing flyovers in three of the four quadrants at MLK and College Road, with MLK and College Road remaining as an at-grade intersection. Additionally, right-turn ramps would be provided for the College Road southbound right-turn and the MLK westbound right-turn movement.

Similar to Alternative 1, the signalized intersection at Hunters Trail and the Corning industrial plant would be removed to maintain the integrity of the proposed interchange; however, given there is no ramp in the southwest quadrant of the MLK and College Road intersection, right-in right-out access to Hunters Trail would be provided.

North of the proposed interchange at MLK and College Road, conditions similar to that described in Alternative 1 would exist. Access would be restricted to improve operations north to the Gordon Road interchange. In order to maintain the integrity of the flyovers and the College Road corridor, access currently provided at Spring View Drive, Freedom Baptist Church Entrance/Service Road, Shelley Drive, and Kings Drive would be closed. Movements at Kenningston Drive and Kings Grant Road would be restricted to right-in right-out, with the incorporation of a grade separation over College Road in the Kings Drive area. This grade separation would allow access to neighborhoods on both sides of College Road utilizing the existing neighborhood streets.

Improvements for Alternative 2 would require the purchase of additional right-of-way along College Road, MLK and in all four quadrants of the College Road/MLK intersection to accommodate the proposed interchange. The purchase of additional right-of-way along Kings Drive is also anticipated to accommodate the proposed grade-separation.

Alternative 3

Alternative 3, shown on Figures 5 and 5A consists of converting the College Road depressed median to a 23 foot raised median, improving the existing roadway from a four lane to a six lane facility (with auxiliary lanes in some areas north of MLK) and incorporates a Three-Level Box interchange configuration which would grade separate the MLK and College Road through movements. The proposed interchange configuration will eliminate stop-delay on these corridors which is associated with signalized intersections. The Three-Level Box interchange configuration also utilizes dual lane one-way service roads (in some areas this may be reduced to one lane) parallel to MLK and College Road, which would intersect one another creating a box of signalized intersections on the intermediate level. The box of signalized intersections creates a circulating network which accommodates all MLK and College Road turning movements, in addition to U-turn movements.

With the use of the parallel service roads, right-in right-out access can be maintained to Hunters Trail and the Corning industrial plant via the MLK southbound service road and the MLK northbound service road, respectively.

Right-in right-out access to points north of the proposed interchange at MLK and College Road is also provided using the parallel service roads on the west side of College Road via an extension of Corbington Court and on the east side of College Road at Shelley Drive. Similar to Alternatives 1 and 2, access along College Road would be restricted to improve operations north to the Gordon Road interchange. In order to maintain the integrity of the flyovers and the College Road corridor, access currently provided at Spring View Drive, Freedom Baptist Church Entrance/Service Road, Shelley Drive, and Kings Drive would be closed. Movements at Kenningston Drive and Kings Grant Road would be restricted to right-in right-out, with the incorporation of a grade separation over College Road in the Kings Drive area. This grade separation would allow access to neighborhoods on both sides of College Road utilizing the existing neighborhood streets.

Improvements for Alternative 3 would require the purchase of additional right-of-way along College Road, MLK and in all four quadrants of the College Road/MLK intersection to accommodate the proposed interchange. The purchase of additional right-of-way along Kings Drive is also anticipated to accommodate the proposed grade-separation.

Alternative 4

Alternative 4, shown on Figures 6 and 6A, consists of converting the College Road depressed median to a 23 foot raised median, improving the existing roadway from a four lane to a six lane facility and incorporates an Echelon intersection configuration which would modify the current four approach at-grade intersection at MLK. The proposed intersection configuration would elevate the eastbound MLK and southbound College Road approaches, thus creating two grade separated signalized intersections. Slip ramps would be provided for four turn movements to transition from the elevated intersection to the at-grade elevation, which include the eastbound MLK left-turn, the westbound MLK left-turn, the southbound College Road right-turn and the northbound College Road right-turn.

With regard to the intersection of MLK and College Road, Alternative 4 does not eliminate stop-delay, but merely separates the eight phase signal into two grade separated two-phase signals. Traffic operations will be discussed in more detail in the following sections.

With the use of the signal control to create gaps in traffic at the MLK and College Road intersection, and the fact that College Road will have more arterial like characteristics; the proposed configuration maintains right-in right-out access to Hunters Trail and the Corning industrial plant. One concern with this design is that pavement markings or delineators may be required to prevent the westbound MLK left-turn slip ramp traffic from trying to turn into Hunters Trail.

Right-in right-out access to points north of the proposed intersection at MLK and College Road is provided on the west side of College Road via an extension of Corbington Road. Right-in right-out access is also proposed on the east side of College Road at the Freedom Baptist Church Entrance/Service Road and at both gas stations either directly or via Shelley Drive. Similar to Alternatives 1, 2 and 3, access along College Road would be restricted to improve operations north to the Gordon Road interchange, eliminating access currently provided at Spring View Drive and at Kings Drive. Movements at Kenningston Drive and Kings Grant Road would be restricted to right-in right-out, with the incorporation of a grade separation over College Road in the Kings Drive area. This grade separation would allow access to neighborhoods on both sides of College Road utilizing the existing neighborhood streets.

Improvements for Alternative 4 would require the purchase of additional right-of-way along College Road, MLK and in all four quadrants of the College Road/MLK intersection to accommodate the proposed interchange. The purchase of additional right-of-way along Kings Drive is also anticipated to accommodate the proposed grade-separation.

Alternative 5 (Interim)

Alternative 5 represents an interim design configuration which consists of converting the College Road depressed median to a 23 foot raised median and would improve College Road from a four-lane to a six lane facility from the Market Street interchange ramps, north to MLK. In order to improve the operations of the College Road corridor, access for this segment would also be restricted to right-in right-out, thus eliminating the signalized intersection at Hunters Trail and the Corning industrial plant. North of MLK, College Road would be improved from a four-lane to a six-lane facility, with an additional auxiliary lane in both directions to accommodate acceleration and deceleration of traffic exiting and entering College Road via right-in right-out access points. These access points are located on the west side of College Road at Spring View Drive and on the east side of College Road at the service road to Irwin Drive, Freedom Baptist Church Entrance/Service Road at both gas stations and Shelley Drive. Movements at Kenningston Drive and Kings Grant Road would be restricted to right-in right-out, with the incorporation of a grade separation over College Road in the Kings Drive area, similar to Alternatives 1, 2, 3 and 4.

Improvements for Alternative 5 would require the purchase of additional right-of-way along College Road and along Kings Drive in order to accommodate the proposed grade-separation.

Section C

Section C, shown on Figure 2, includes proposed improvements to the Gordon Road interchange ramp terminal intersections, with no revisions to College Road or I-40. The existing Gordon Road interchange includes College Road in the northeast quadrant across from the I-40 eastbound loop/ramp terminal in the southwest quadrant. A northbound off ramp is included in the southeast quadrant, with a flyover (where I-40 westbound and College Road separate) and an I-40 westbound on-ramp in the northeast quadrant.

Proposed improvements to the Gordon Road/I-40 eastbound loop/ramp intersection with College Road include providing additional storage for the Gordon Road eastbound left-turn lane and the I-40 eastbound loop/ramp northbound left-turn and right-turn lanes. The lane configuration for the College Road approach would be modified to provide an additional southbound left-turn lane. Gordon Road, between ramp terminals would not require any additional lanes; however, the pavement markings would be change to reflect two eastbound through lanes at the I-40 westbound ramp terminal which is consistent with the Gordon Road widening project STIP U-3831 proposes to widen Gordon Road to multiple lanes from the ramp terminal to west of US 17. Proposed changes to the northbound approach would provide an additional northbound right-turn lane and increase the existing storage length for this lane. The westbound Gordon Road approach would be modified to include an exclusive free-flow westbound right-turn lane, which would require the receiving on-ramp to be widened to two lanes that would transition to one lane prior to merging with I-40 westbound. Currently, Gordon Road includes approximately 60 feet of existing right-of-way. Improvements for Section C would require the purchase of additional right-of-way along the frontage of Gordon Road on both the east and west sides of the interchange with I-40. Section C is common for all Section B Alternatives.

V. Traffic Operations

Traffic volumes for the 2008 No-Build Conditions and the 2035 No-Build Conditions were obtained from forecasts provided by the NCDOT Transportation Planning Branch. The Average Annual Daily Traffic (AADT) volumes provided in the forecast were converted to peak hour volumes utilizing the NCDOT Congestion Management Section's Intersection Analysis Utility (IAU) spreadsheet. The peak hour volumes were then analyzed utilizing the techniques contained in the 2000 Edition of the Highway Capacity Manual (HCM) and its associated Highway Capacity Software (HCS Plus, version 5.2). Standard practices recommended in the NCDOT Congestion Management Section's "TIP Project Analysis Guidelines" were also utilized. The analysis of unsignalized and signalized intersections was completed utilizing Synchro Version 7 analysis software, which is based on the HCM methodologies for signalized intersections. The analysis includes the evaluation of Level of Service (LOS) for the 2008 No-Build Conditions, the 2035 No-Build Conditions, as well as for each of the build alternatives for the design year. Results of the analyses are summarized in the following sections.

2008 No-Build Conditions

The 2008 No-Build Conditions AADT along College Road between New Centre Drive and the Gordon Road interchange ranges from 46,000 and 62,000. The truck traffic along College Road makes up approximately eight percent of the vehicles. Traffic capacity analyses along the College Road corridor, show that all five signalized intersections are currently operating worse than LOS D. Signalized intersections associated with the ramp terminal intersections at the College Road interchanges at Market Street and Gordon Road also resulted with LOS worse than D. A summary of the traffic operations along College Road for the 2008 No-Build Conditions is included in the Section XI.

2035 No-Build Conditions

The 2035 No-Build Conditions AADT along College Road between New Centre Drive and the Gordon Road interchange ranges from 36,000 and 76,900. The truck traffic along College Road makes up approximately eight percent of the vehicles. Traffic capacity analyses along the College Road corridor show that four of the five signalized intersections will continue to operate worse than LOS D. Signalized intersections associated with the ramp terminal intersections of the College Road interchanges at Market Street and Gordon Road would also continue to operate worse than LOS D. A summary of the traffic operations along College Road for the 2035 No-Build Conditions is included in the Section XI.

2035 Build Conditions

Given the build alternatives involve improvements to an existing facility, the 2035 No-Build Conditions AADT were assumed to be adequate for analysis of all 2035 Build Conditions alternatives. Results of the 2035 Build Conditions alternatives analyses are below.

Section A

Section A is common for all Section B Alternatives, and includes improvements from New Centre Drive through the Market Street interchange, which involves providing an additional northbound and southbound lane on College Road and improvements to the ramp terminal intersections with Market Street. Traffic capacity analyses for Section A showed that all signalized intersections would operate at LOS D or better, with the exception of New Centre Drive and College Road. Additional improvements to this intersection were investigated by analyzing all reasonable lane additions given the projected peak hour volumes. It was determined the modifications required to improve operations at this intersection were beyond the scope of this study and therefore should be studied further under a separate project. A summary of the traffic operations analyzed for Section A 2035 Build Conditions is included in the Section XI.

Section B

Section B includes improvements along College Road from north of the Market Street interchange grade separation to south of the Gordon Road interchange ramps and includes alternatives for the MLK intersection with College Road.

Upgrade Existing MLK and College Road at-grade intersection Alternative

The upgrade existing MLK and College Road at-grade intersection Alternative consists of improving the existing lane configuration by incorporating additional lanes where warranted by the peak hour volumes. The traffic capacity analyses showed that the at-grade intersection would continue to operate at LOS F. Given the delay associated with this alternative, it was determined the Upgrade Existing MLK and College Road at-grade intersection Alternative would no longer be considered. A summary of the traffic operations is included in Section XI.

Alternative 1

Alternative 1 incorporates a Tight Urban Diamond interchange configuration with flyovers at College Road and MLK. The traffic capacity analysis showed that the signalized ramp terminals, multilane segments and ramp junctions would operate at LOS C or better. A summary of the traffic operations is included in Section XI.

Alternative 2

Alternative 2 incorporates a Three-Level Stacked interchange configuration with flyovers utilized in three of the four quadrants at College Road and MLK. The traffic capacity analysis showed that the signalized intersection, multilane segments and ramp junctions would operate at LOS C or better. A summary of the traffic operations is included in Section XI.

Alternative 3

Alternative 3 incorporates a Three-Level Box interchange configuration which would grade separate the MLK and College Road through movements. The traffic capacity analysis showed that the signalized intersections, multilane segments, ramp junctions and weaving segments would operate at LOS C or better. A summary of the traffic operations is included in Section XI.

Alternative 4

Alternative 4 incorporates an Echelon intersection configuration which would modify the current four approach at-grade intersection at College Road and MLK, resulting with an elevated intersection for the eastbound MLK and southbound College Road approach and an at-grade intersection for the westbound MLK and northbound College Road approach. The traffic capacity analysis showed that the signalized intersections and multilane segments would operate at LOS C or better. A summary of the traffic operations is included in Section XI.

Alternative 5 (Interim)

Alternative 5 is an interim design alternative which would improve College Road from a four-lane to a six lane facility from the Market Street interchange loops to MLK. From MLK to the Gordon Road southern ramps, College Road would be improved from a four-lane to a six-lane facility, with an additional auxiliary lane in both directions to accommodate acceleration and deceleration of traffic exiting and entering College Road. With the conversion to a raised median, all full movement intersections, other than at MLK, would be revised to right-in right-out access with the incorporation of a grade separation over College Road in the Kings Drive area. This grade separation would allow access to neighborhoods on both sides of College Road utilizing the existing neighborhood streets. The traffic capacity analysis showed that the multilane segments would operate at LOS C or better; however, the signalized intersection at MLK and College Road would continue to operate at LOS F in the year 2035. Therefore the lifespan of this alternative would need to be further investigated. A summary of the traffic operations is included in Section XI.

Section C

Section C is common for all Section B Alternatives, and includes improvements to the Gordon Road interchange ramp terminal intersections, with no revisions to College Road or I-40. The traffic capacity analysis showed that the signalized intersections, ramp junctions and basic freeway segments would operate at LOS D or better. A summary of the traffic operations is included in Section XI.

VI. Build Alternative Impacts and Cost Estimates

A summary of impacts and costs associated with each alternative by section is shown in the table below.

Summary of Project Impacts and Cost Estimates					
	Alternative				
	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5 (Interim)
Section A					
Residential Relocations	0	0	0	0	N/A
Business Relocations	1	1	1	1	N/A
Sign Impacts	1	1	1	1	N/A
Wetland Mitigation Sites (acres)	0	0	0	0	N/A
Construction Cost	$11,100,000	$11,100,000	$11,100,000	$11,100,000	N/A
Right of Way Relocation Cost	$15,000,000	$15,000,000	$15,000,000	$15,000,000	N/A
Utility Cost	$140,000	$140,000	$140,000	$140,000	N/A
Total Section Cost	$26,240,000	$26,240,000	$26,240,000	$26,240,000	N/A
Section B					
Residential Relocations	74	44	47	24	0[2] / 1[3] / 18[4]
Business Relocations	5	4	7[1]	3[1]	1[2] / 0[3] / 0[4]
Churches	1	1	1	0	0[2] / 0[3] / 0[4]
Wetland Mitigation Sites (acres)	8.9	9.7	7.7	3.5	0.2
Construction Cost	$51,000,000	$42,400,000	$54,000,000[1]	$29,000,000[1]	$9,350,000[2] / $9,250,000[3] / $2,500,000[4]
Right of Way Relocation Cost	$64,200,000	$45,800,000	$57,100,000[1]	$19,700,000[1]	$3,700,000[2] / $6,200,000[3] / $4,700,000[4]
Utility Cost	$300,000	$350,000	$350,000[1]	$260,000[1]	$250,000[2] / $410,000[3] / $160,000[4]
Total Section Cost	$115,500,000	$88,550,000	$111,450,000	$48,960,000	$36,520,000
Section C					
Residential Relocations	6	6	6	6	N/A
Business Relocations	0	0	0	0	N/A
Churches	1	1	1	1	N/A
Wetland Mitigation Sites (acres)	0	0	0	0	N/A
Construction Cost	$3,800,000	$3,800,000	$3,800,000	$3,800,000	N/A
Right of Way Relocation Cost	$4,500,000	$4,500,000	$4,500,000	$4,500,000	N/A
Utility Cost	$100,000	$100,000	$100,000	$100,000	N/A
Total Section Cost	$8,400,000	$8,400,000	$8,400,000	$8,400,000	N/A
Total Project Construction Cost	**$65,900,000**	**$57,300,000**	**$68,900,000**	**$43,900,000**	**$21,100,000**
Total Project Right of Way Cost	**$83,700,000**	**$65,300,000**	**$76,600,000**	**$39,200,000**	**$14,600,000**
Total Project Utility Cost	**$540,000**	**$590,000**	**$590,000**	**$500,000**	**$820,000**
Intelligent Transportation System Devices	**$490,000**	**$490,000**	**$490,000**	**$490,000**	**$490,000**
Total Project Cost	**$150,630,000**	**$123,680,000**	**$146,580,000**	**$84,090,000**	**$37,010,000**

[1]Does not include a service road that could be added separately which would provide access to the Corning Plant from Market Street. This service road would have 2 additional business impacts, an additional $1,500,000 in construction costs, $7,200,000 in right of way costs and $50,000 in utility costs, for a total cost of $8,750,000.
[2]Includes improvements from north of Market Street to MLK.
[3]Includes improvements from MLK to Gordon Road Interchange.
[4]Includes the proposed Kings Drive Grade separation.

VII. Community Issues

Existing Land Use
The existing land use throughout the study area is composed predominantly of residential (single family and multi family) and scattered support services, as well as commercial and industrial sites. There are no state, county, or municipal parks located directly in the study area.

Schools and Facilities
Wilmington Christian Academy was founded in 1969 as a ministry to Grace Baptist Church. The Academy has grown to be the largest private school in southeastern North Carolina and serves students in kindergarten through grade 12 with a current enrollment of approximately 700 students. The campus encompasses 85 acres located east of and adjacent to NC 132. The main entrance for the school facility is directly off of NC 132.

Sonshine Academy is a small private school affiliated with the Church of God located west of and adjacent to the NC 132 on Fallen Tree Road. The school has a small enrollment (less than 20) and serves secondary grades. The main entrance is directly off of Fallen Tree Road.

Historic Resources
Records and maps at the State Historic Preservation Office (SHPO) were reviewed for historic architectural resources that had been identified in previous surveys or that were listed in or had been determined eligible for listing in the National Register of Historic Places. No historic architectural resources have been recorded or mapped in any previous efforts within the study area.

Archaeological Resources
An archaeological site files check resulted with several study sites within the proposed project study area. One previously recorded archaeological site, 31NH276, is clearly located within the NC 132 widening project area; two other sites, 31NH277 and 31NH415, are recorded in very close proximity. None of these three sites' eligibility for listing on the NRHP has been assessed. Based on the presence of several other previously recorded sites near the project, it is likely that additional sites exist within the APE. Due to dense urban development throughout most of the project area, it is likely that much of the project APE will not require archaeological field studies; however, about 2,000 to 2,500 feet of the APE north of Kings Grant Road will likely need a Phase I Archaeological Survey to relocate site 31NH276 as well as any other archaeological sites within that section of the project. These issues will need to be further investigated and addressed in later planning and design stages.

VIII. Natural Environment Issues

A detailed environmental study was not conducted for this feasibility study. Geographic Information System (GIS) level research and a preliminary site review were completed. Figure 7 shows the location of documented natural resources within and near the project study area.

Water Quality Resources
The project is located in the Cape Fear River Basin (Sub basin ID #03-06-23). The main water course running through the project study area is Smith Creek (ID #18-74-63). Smith Creek drains to the Cape Fear River with the overall watershed for Smith Creek draining land within the City limits and the unincorporated County. The land within the watershed is a mix of industrial, residential, and commercial.

Section 303(d) of the Clean Water Act (CWA), requires states to develop a list of waters meeting water quality standards or which have impaired uses. The North Carolina Department of Environment and Natural Resources; Division of Water Quality (NCDENR; DWQ) monitors water quality in North Carolina and has a water quality monitoring station (SC GR) located on the waterway adjacent to NC 132. Smith Creek classified as C *(Classified for aquatic life propagation and maintenance of biological integrity (including fishing, and fish), wildlife, secondary recreation, agriculture and any other usage except for primary recreation or as a source of water supply for drinking, culinary, or food processing*

purposes. All freshwaters shall be classified to protect these uses at a minimum); and Sw (Swamp). Smith Creek is on the State's 303(d) list due to "impaired biological integrity".

Jurisdictional Features

New Hanover County is one of the 20 counties in North Carolina covered by the Coastal Area Management Act of 1972 (CAMA). CAMA requires permits in designated Areas of Environmental Concern (AECs) or areas of natural importance. An AEC is an area of natural importance: It may be easily destroyed by erosion or flooding; or it may have environmental, social, economic or aesthetic values that make it valuable to our state. There are four categories of AEC's:

- The Estuarine and Ocean System;
- The Ocean Hazard System;
- Public Water Supplies;
- Natural and Cultural Resource Areas.

Coastal wetlands fall under the Estuarine and Ocean Systems and are located throughout the project study area.

Sections 401 and 404 of the Clean Water Act require regulation of discharges of fill material into "Waters of the United States." The US Environmental Protection Agency (EPA) is the principal administrative agency of the CWA; however, the USACE has responsibility for implementation, permitting, and enforcement of the provisions of the CWA related to dredging and filling. The USACE regulatory program is defined in 33 CFR 320-330. NCDWQ is the principal administrative agency of the Section 401 Surface Water and Wetland Standards, which are defined in NC Administration Code 15A NCAC 02B .0100 and .0200.

Water bodies, including lakes, rivers, and streams, are subject to jurisdictional consideration under the Section 404 Program. Wetlands are also identified as waters of the United States. Wetlands, defined in 33 CFR 328.3, are those areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Any action that proposes to place fill into these areas falls under USACE jurisdiction.

Protected Species

The Natural Heritage Program (NHP) lists several occurrences of protected species located in a NCDOT mitigation site approximately one half mile northwest of the proposed project study. These species are listed below.

Scientific Name	Common Name	Federal Status	State Status	Location
Picoides borealis	Red-cockaded Woodpecker	E	E	Corbett Tract
Lysimachia asperufolia	Rough-leaved loosestrife	E	E	Corbett Tract

Source: NCNHP, database updated on 01/09/09.

None of the listed protected species are likely to be impacted by the proposed improvements; however, field surveys and Section 7 consultation are advised during project planning.

Existing NCDOT Mitigation Sites

The project study area for the NC 132 (College Road) Widening includes two NCDOT Mitigation sites. Both of these sites have successfully completed monitoring.

1. The U-92D wetland mitigation site is located in the southeast quadrant of the intersection at NC 132 and Kerr Avenue. It is a 4.5 acre site and provided riverine wetland restoration credit.
2. The Spring Branch wetland mitigation site is located in the northwest quadrant of the same intersection. The site is 11 acres and provided riverine restoration, enhancement, and preservation.

In addition, there are larger mitigation sites in the immediate area. The Kerr Avenue wetland mitigation site is located due west of the project study area on Kerr Avenue. The Corbett Tract was used for endangered species conservation and is located northeast of the proposed NC 132 Widening. Coordination with NCDOT will be required to lessen any potential impacts to these valuable mitigation sites.

North Carolina Division of Coastal Management

The Coastal Resources Commission (CRC) administers the CAMA and is tasked with protecting "Areas of Environmental Concern" which are the foundation of the CRC's permitting program for coastal development. Coastal wetlands fall under the "Estuarine and Ocean Systems" and are located throughout the project study area. CAMA requires a permit for development projects such as the proposed NC 132 Widening project. There are three types of permits; major, general and minor based on size and possible impacts. The proposed project will likely require a CAMA major permit. Applications for major permits are reviewed by 10 state and four federal agencies (including the US Army corps of Engineers) before a permitting decision is made.

United States Army Corps of Engineers

Section 404 Permit: any action that proposes to place fill into "Waters of the United States" falls under the jurisdiction of the United States Army Corps of Engineers (USACE) under Section 404 of the CWA (33 U.S.C 1344). The CWA provides for public notice and review of pending Section 404 permit applications. Encroachments into areas determined as subject under the CWA must be reviewed and approved by the USACE through the Section 404 program.

A CAMA major permit supersedes the Section 404 permitting process. However, the USACE does have cooperating agency status during the final permitting decisions

North Carolina Department of Environment and Natural Resources, Division of Water Quality

Section 401 Water Quality Certification: any activity which may result in discharge to navigable waters and requires a federal permit must obtain a certification through the NCDWQ that such discharge would be in compliance with applicable state water quality standards. Usually this permit is required in association with the Section 404 permitting process and is required prior to Section 404 authorization.

The City of Wilmington is subject to the requirements of the National Pollutant Discharge Elimination System (NPDES) stormwater permitting program for roadway construction and material storage facilities. The permit requirements include implementing a comprehensive stormwater management program, monitoring the program, and annual reports of the program's effectiveness and direction.

A CAMA major permit supersedes the Section 401 permitting process. However, the NCDWQ does have cooperating agency status during the final permitting decisions.

North Carolina Department of Environment and Natural Resources, Division of Land Resources

Erosion and Sedimentation Control Plan: in accordance with the North Carolina Sedimentation Pollution Control Act of 1973, projects disturbing more than one acre of land must submit an Erosion and Sedimentation Control Plan to the NCDENR Division of Land Resources (NCDLR). The plan must include erosion control measures and be approved by the DLR prior to construction.

United States Coast Guard

A permit must be obtained for any impacts to navigable waterways.

North Carolina Department of Environment and Natural Resources, Division of Forest Resources
Open Burning Permit: a permit is required to start a fire in woodlands or within 500 feet of woodlands under the protection of the Division of Forest Resources. Thirty day permits can be issued for highway construction.

IX. Recommendations

As noted in Section IV *Description of Alternatives Analyzed*, the Build Conditions were split into three sections for the purpose of implementing improvements as funding becomes available: Section A, Section B and Section C.

Section A
Section A includes improvements along College Road from New Centre Drive through the Market Street interchange grade separation and is common for all Section B Alternatives. It is anticipated that Section A would require (0) residences and (1) business to be relocated and would have 0.0 acres of NCDOT wetland mitigation site impacts. The total cost of Section A is $26,240,000, which includes $15,000,000 in right-of-way costs, $11,100,000 in construction costs, and $140,000 in utility costs. It is recommended improvements to Section A should be implemented in conjunction with Section B and Section C recommendations in order to improve mobility along the College Road Corridor north of New Centre Drive.

Section B
Section B includes improvements along College Road from north of the Market Street interchange grade separation to south of the Gordon Road interchange ramps and includes alternatives for the MLK intersection with College Road.

Upgrade Existing MLK and College Road at-grade intersection Alternative
The upgrade existing MLK and College Road at-grade intersection Alternative includes providing additional lanes where warranted by the peak hour volumes; however, these improvements continue to result with failing traffic operations. Therefore, the upgrade existing MLK and College Road at-grade intersection Alternative is not recommended as the preferred alternative.

Alternative 1
Alternative 1 incorporates a Tight Diamond Urban interchange configuration with flyovers at College Road and MLK and would have acceptable traffic operations. It was determined early on in the study that if Alternative 1 or 2 were recommended as the preferred alternative, the costs for a flyover should be estimated separately, so incremental improvements could be made until the full build out of the alternative would be needed. The construction cost estimate for an individual flyover is approximately $10,500,000 with right-of-way and utility costs varying depending upon which quadrant the flyovers are implemented. It is anticipated that the ultimate build out of Alternative 1 would require the relocation of (74) residences and (5) businesses, impact (1) church and would have 8.9 acres of NCDOT wetland mitigation site impacts. The total cost of this alternative is $115,500,000, which includes $64,200,000 in right-of-way costs, $51,000,000 in construction costs, and $300,000 in utility costs. Based on the number of relocations, wetland impacts, cost and overall project footprint, Alternative 1 is not recommended as the preferred alternative.

Alternative 2
Alternative 2 incorporates a Three-Level Stacked interchange configuration with flyovers utilized in three of the four quadrants at College Road and MLK and would have acceptable traffic operations. It is anticipated that Alternative 2 would require the relocation of (44) residences and (4) businesses, impact (1) church and would have 9.7 acres of NCDOT wetland mitigation site impacts. The total cost of this alternative is $88,550,000, which includes $45,800,000 in right-of-way costs, $42,400,000 in construction costs, and $350,000 in utility costs. Compared to Alternative 1, this alternative would have a smaller overall footprint; however, based on the number of relocations, wetland impacts, and cost, Alternative 2 is not recommended as the preferred alternative.

Alternative 3

Alternative 3 incorporates a Three-Level Box interchange configuration which grade separates the through movements and utilizes dual lane service roads parallel to MLK and College Road to accommodate the turning movements resulting with acceptable traffic operations. It is anticipated that Alternative 3 would require the relocation of (47) residences and (7) businesses, impact (1) church and would have 7.7 acres of NCDOT wetland mitigation site impacts. The total cost of this alternative is $111,450,000, which includes $57,100,000 in right-of-way costs, $54,000,000 in construction costs, and $350,000 in utility costs. Compared to Alternative 1 and 2, this alternative would have a smaller overall footprint; however, based on the number of relocations, wetland impacts, and cost, Alternative 3 is not recommended as the preferred alternative.

Alternative 4

Alternative 4 incorporates an Echelon intersection configuration, which consists of two grade separated intersections resulting with acceptable traffic operations. It is anticipated that Alternative 4 would require the relocation of (24) residences and (3) businesses and would have 3.5 acres of NCDOT wetland mitigation site impacts. The total cost of this alternative is $48,960,000, which includes $19,700,000 in right-of-way costs, $29,000,000 in construction costs, and $260,000 in utility costs. Compared to Alternatives 1, 2, and 3, Alternative 4 would have a substantially smaller overall footprint, require the least amount of relocatees, would impact the least amount of wetlands, and result with the lowest total cost. Based on the above comparison, Alternative 4 is therefore recommended as the preferred alternative. It is also recommended that improvements to Section B be implemented in conjunction with recommendations for Section A and Section C in order to improve mobility along the College Road Corridor north of New Centre Drive.

Alternative 5 (Interim)

Alternative 5 represents an interim design configuration which widens College Road from Market Street to south of the Gordon Road interchange and would restrict access to right-in right-out movements only, thus eliminating all signalized intersections for this segment of College Road, except at MLK. Left-turn movements from areas along the east and west side of the College Road corridor would be required to utilize existing roads to access College Road via Market Street or via a proposed grade separation over College Road in the Kings Drive area. It is anticipated that Alternative 5 would require the relocation of (19) residences and (1) business and would have 0.2 acres of NCDOT wetland mitigation site impacts. The total cost of this alternative is $36,520,000, which includes $14,600,000 in right-of-way costs, $21,100,000 in construction costs, and $820,000 in utility costs. Should only partial funding be available for this project, Alternative 5 would be recommended as an interim solution until the ultimate recommendations could be fully constructed.

Section C

Section C includes improvements to the Gordon Road interchange ramp terminal intersections. It is anticipated that Section C would require the relocation of (6) residences and (0) businesses, impact (1) church and would have 0.0 acres of NCDOT wetland mitigation site impacts. The total cost of Section C is $8,400,000, which includes $4,500,000 in right-of-way costs, $3,800,000 in construction costs, and $100,000 in utility costs. It is recommended improvements to Section C be implemented in conjunction with recommendations for Section A and Section B in order to improve mobility along the College Road Corridor north of New Centre Drive.

X. Additional Considerations

Regardless of which alternative is selected, an additional $490,000 would be required in order to provide Intelligent Transportation System (ITS) devices along College Road. ITS devices to be provided would include closed circuit television and a dynamic message sign.

Given the restriction of access along the College Road corridor in Section B, it was determined early on in the study, that more direct access to and from the Corning industrial plant may be required. With this in

mind, a service road with direct access to College Road via the Market Street interchange was developed and estimated separately. This service road would intersect Market Street directly across from the College Road northbound loop/ramp terminal. Section B Alternatives 1 and 2 currently include this service road; however, should Section B Alternatives 3 or 4 be implemented, the additional impacts and cost would need to be included into the overall project impacts and cost, which would require (0) residences and (2) businesses to be relocated with a total cost of $8,750,000, which includes $7,200,000 in right-of-way costs, $1,500,000 in construction costs, and $50,000 in utility costs.

XI. Tables

No Build Conditions Traffic Capacity Analysis Summary				
Signalized Intersections	**2008 AM Peak Hour LOS**	**2008 PM Peak Hour LOS**	**2035 AM Peak Hour LOS**	**2035 PM Peak Hour LOS**
New Centre Dr and College Rd	F	F	F	F
Oriole Dr/Shopping Center Access and College Rd	D	E	D	D
Market St and College Rd southbound ramp/Gingerwood Dr.	D	D	E	E
Market St and College Rd northbound ramp	E	F	C	C
Ringo Dr and College Rd	F	F	F	F
MLK and College Rd	F	F	F	F
Kings Dr and College Rd	F	E	F	F
Gordon Rd and NC 132/I-40 eastbound ramp	F	E	E	D
Gordon Rd and NC 132/I-40 westbound ramp	Unsig	Unsig	F	F
Unsignalized Intersections	**2008 AM Peak Hour LOS**	**2008 PM Peak Hour LOS**	**2035 AM Peak Hour LOS**	**2035 PM Peak Hour LOS**
SR 1378 (Spring View Dr)/Service Road and College Rd	-	-	-	-
Eastbound Right	D	D	F	F
Westbound Right	B	C	F	F
Northbound Left	F	E	F	F
Northbound Through	-	-	-	-
Northbound Right	-	-	-	-
Southbound Through/Right	-	-	-	-
Freedom Baptist Church/Service Road and College Rd				
Westbound Right	D	E	F	F
Southbound Left	N/A	N/A	N/A	N/A
SR 2002 (Shelley Dr) and College Rd				
Westbound Right	E	F	F	F
SR 2061 (Kenningston Dr) and College Rd				
Eastbound Left/Right	F	F	F	F
Northbound Left	F	D	F	F
Southbound Left(U-turn)	C	F	F	F
SR 2003 (Kings Grant Rd)/Daycare Ent. and College Rd				
Eastbound Right	C	C	E	D
Westbound Right	C	E	E	F
Northbound Left	E	D	F	F
Southbound Left	F	F	F	F
SR 2048 (Gordon Rd.) NC 132/I-40 westbound ramp				
Eastbound Left	E	C	Assumed	Assumed
Northbound Left	F	F	Signalized	Signalized
Northbound Right	F	F		
Basic Freeway Segments	**2008 AM Peak Hour LOS**	**2008 PM Peak Hour LOS**	**2035 PM Peak Hour LOS**	**2035 PM Peak Hour LOS**
NC 132/I-40 eastbound north of Gordon Rd	B	B	D	C
NC 132/I-40 eastbound between Gordon Rd ramps	B	A	C	C
NC 132/I-40 eastbound south of Gordon Rd	B	B	C	C
NC 132/I-40 westbound south of Gordon Rd	B	B	C	C
NC 132/I-40 westbound between Gordon Rd and US 117 ramp	A	B	B	B
NC 132/I-40 westbound between US 117 ramp and Gordon Rd ramp	A	B	B	C
NC 132/I-40 westbound north of Gordon Road	B	B	D	D

Freeway Ramp Junction	2008 AM Peak Hour LOS	2008 PM Peak Hour LOS	2035 PM Peak Hour LOS	2035 PM Peak Hour LOS
NC 132/I-40 eastbound to Gordon Rd	B	B	D	C
NC 132/I-40 eastbound from Gordon Rd	C	B	D	C
NC 132/I-40 westbound to Gordon Rd	B	C	C	C
NC 132/I-40 westbound to NC 117	B	B	B	C
NC 132/I-40 westbound from Gordon Rd	B	B	C	D
NC 132 southbound to Market St	C	B	B	B
NC 132 southbound from Market St	C	C	C	B
NC 132 northbound to Market St	C	D	C	C
NC 132 northbound from Market St	C	C	B	C

Section A 2035 Build Conditions Traffic Capacity Analysis Summary		
Signalized Intersections	**AM Peak Hour LOS**	**PM Peak Hour LOS**
New Centre Dr and College Rd	F	F
Oriole Dr/Shopping Center Access and College Rd	D	C
Market St and College Rd southbound ramp/Gingerwood Dr.	D	D
Market S) and College Rd northbound ramp	C	C
With Alternative 1-Tight Diamond Urban Interchange		
Freeway Ramp Junction	**AM Peak Hour LOS**	**PM Peak Hour LOS**
College Rd southbound loop	B	B
College Rd southbound ramp	B	B
College Rd northbound loop	B	B
College Rd northbound ramp	B	C
With Alternative 2-Three-Level Stacked Interchange		
Freeway Ramp Junction	**AM Peak Hour LOS**	**PM Peak Hour LOS**
College Rd southbound loop	B	B
College Rd southbound ramp	B	B
College Rd northbound loop	B	B
College Rd northbound ramp	B	C
With Alternative 3-Three-Level Box Interchange		
Freeway Ramp Junction	**AM Peak Hour LOS**	**PM Peak Hour LOS**
College Rd southbound loop: see weaving segments	N/A	N/A
College Rd southbound ramp	B	B
College Rd northbound loop: see weaving segments	N/A	N/A
College Rd northbound ramp	B	C
Weaving Segments	**AM Peak Hour LOS**	**PM Peak Hour LOS**
College Rd between MLK and southbound loop to Market St	B	B
College Rd between northbound loop from Market St and MLK	B	B
With Alternative 4- Echelon Intersection		
Freeway Ramp Junction	**AM Peak Hour LOS**	**PM Peak Hour LOS**
College Rd southbound loop	B	B
College Rd southbound ramp	B	B
College Rd northbound loop	B	B
College Rd northbound ramp	B	C

Section B 2035 Build Conditions Traffic Capacity Analysis Summary		
Upgrade Existing MLK and College Road at-grade intersection Alternative		
Signalized Intersections	**AM Peak Hour LOS**	**PM Peak Hour LOS**
MLK and College Rd	E	F
Alternative 1-Tight Diamond Urban Interchange		
Signalized Intersections	**AM Peak Hour LOS**	**PM Peak Hour LOS**
MLK and College Rd southbound ramp	A	A
MLK and College Rd northbound ramp	B	B
Multilane Segments	**AM Peak Hour LOS**	**PM Peak Hour LOS**
College Rd between MLK and Gordon Rd Dir 1=southbound	C	C
College Rd between MLK and Gordon Rd Dir 2=northbound	C	C
Freeway Ramp Junction	**AM Peak Hour LOS**	**PM Peak Hour LOS**
MLK eastbound from College Rd southbound	B	B
MLK eastbound to College Rd northbound	B	B
MLK westbound from College Rd southbound	B	B
MLK westbound to College Rd	C	B
College Rd northbound from MLK	C	B
College Rd northbound to MLK	B	B
College Rd southbound Flyover to MLK	B	B
College Rd southbound from MLK	B	B
College Rd northbound to MLK	B	B
Alternative 2-Three-Level Stacked Interchange		
Signalized Intersections	**AM Peak Hour LOS**	**PM Peak Hour LOS**
MLK and College Rd	C	C
Multilane Segments	**AM Peak Hour LOS**	**PM Peak Hour LOS**
College Rd between MLK and Gordon Rd Dir 1=southbound	C	C
College Rd between MLK and Gordon Rd Dir 2=northbound	C	C
Freeway Ramp Junction	**AM Peak Hour LOS**	**PM Peak Hour LOS**
MLK eastbound from College Rd southbound	C	B
MLK eastbound to College Rd northbound	B	B
MLK westbound from College Rd southbound	B	B
MLK westbound to College Rd	C	B
College Rd northbound from MLK eastbound	C	C
College Rd southbound to MLK eastbound	C	C
College Rd northbound from MLK westbound	C	B
College Rd southbound to MLK westbound	B	B

Alternative 3-Three-Level Box Interchange		
Signalized Intersections	**AM Peak Hour LOS**	**PM Peak Hour LOS**
Northbound College Rd Service Rd and eastbound MLK Service Rd	B	B
Northbound College Rd Service Rd and westbound MLK Service Rd	A	B
Southbound College Rd Service Rd and westbound MLK Service Rd	C	B
Southbound College Rd Service Rd and eastbound MLK Service Rd	B	C
Multilane Segments	**AM Peak Hour LOS**	**PM Peak Hour LOS**
College Rd between MLK and Gordon Rd Dir 1= southbound	C	C
College Rd between MLK and Gordon Rd Dir 2= northbound	C	C
Freeway Ramp Junction	**AM Peak Hour LOS**	**PM Peak Hour LOS**
Eastbound MLK Service Rd off-ramp	B	B
Eastbound MLK Service Rd on-ramp	B	C
Westbound MLK Service Rd off-ramp	C	B
Westbound MLK Service Rd on-ramp	B	B
Northbound College Rd Service Rd off-ramp: see weaving segments	N/A	N/A
Northbound College Rd Service Rd on-ramp	B	B
Southbound College Rd Service Rd off-ramp	B	A
Southbound College Rd Service Rd on-ramp: see weaving segments	N/A	N/A
Weaving Segments	**AM Peak Hour LOS**	**PM Peak Hour LOS**
College Rd between MLK and southbound loop to Market St	B	B
College Rd between northbound loop from Market St and MLK	B	B
Alternative 4- Echelon Intersection		
Signalized Intersections	**AM Peak Hour LOS**	**PM Peak Hour LOS**
Northbound College Rd and westbound MLK (At-grade)	C	C
Southbound College Rd and eastbound MLK (elevated)	C	C
Multilane Segments	**AM Peak Hour LOS**	**PM Peak Hour LOS**
College Rd between MLK and Gordon Rd Dir 1= southbound	C	C
College Rd between MLK and Gordon Rd Dir 2= northbound	C	C
Alternative 5-Interim		
Signalized Intersections	**AM Peak Hour LOS**	**PM Peak Hour LOS**
MLK and College Rd	F	F
Multilane Segments	**AM Peak Hour LOS**	**PM Peak Hour LOS**
College Rd between MLK and Gordon Rd Dir 1= southbound	C	C
College Rd between MLK and Gordon Rd Dir 2= northbound	C	C

Section C 2035 Build Conditions Traffic Capacity Analysis Summary		
Signalized Intersections	**AM Peak Hour LOS**	**PM Peak Hour LOS**
Gordon Rd and NC 132/I-40 eastbound ramp	D	D
Gordon Rd and NC 132/I-40 westbound ramp	D	C
Basic Freeway Segments	**AM Peak Hour LOS**	**PM Peak Hour LOS**
NC 132/I-40 eastbound north of Gordon Rd	D	C
NC 132/I-40 eastbound between Gordon Rd ramps	C	C
NC 132/I-40 eastbound south of Gordon Rd	C	C
NC 132/I-40 westbound south of Gordon Rd	C	C
NC 132/I-40 westbound between Gordon Rd and US 117 ramp	B	B
NC 132/I-40 westbound between US 117 ramp and Gordon Rd ramp	B	C
NC 132/I-40 westbound north of Gordon Road	D	D
Freeway Ramp Junction	**AM Peak Hour LOS**	**PM Peak Hour LOS**
NC 132/I-40 eastbound to Gordon Rd	D	C
NC 132/I-40 eastbound from Gordon Rd	C	C
NC 132/I-40 westbound to Gordon Rd	C	C
NC 132/I-40 westbound to NC 117	C	C
NC 132/I-40 westbound from Gordon Rd	B	B

XII. Reference Material

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FIGURES

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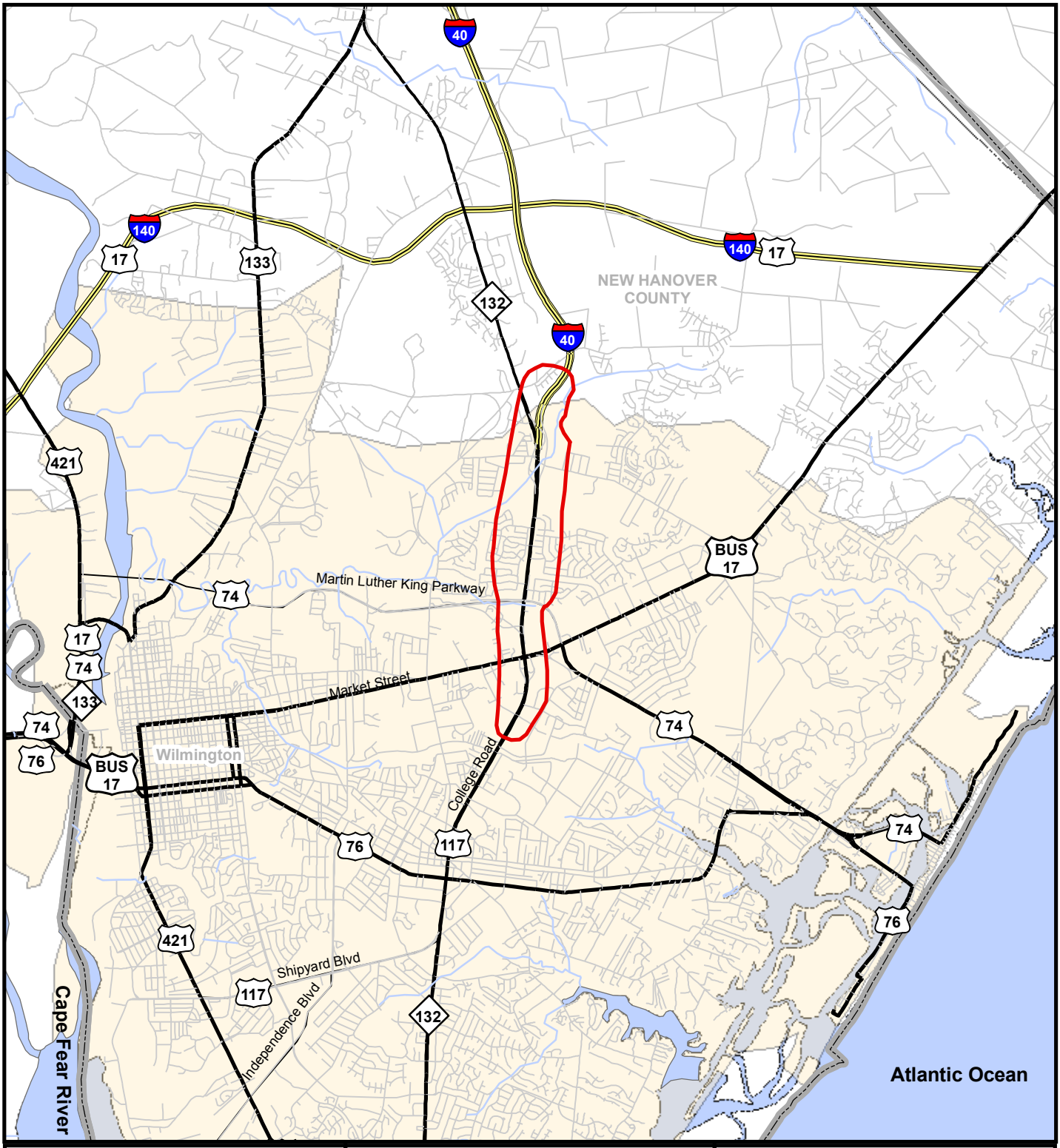
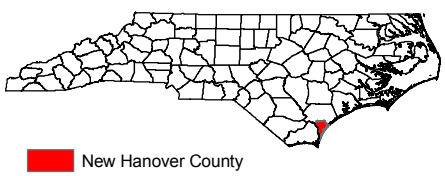


North Carolina Department of Transportation
Division of Highways
Feasibility Study

Legend

- Project Study Area
- Interstate
- US Highway
- NC Highway
- Local Road
- County Boundary
- Wilmington
- Stream
- Open Water



New Hanover County

N
W
E
S

0 1 2 3

Miles

College Road Widening
New Hanover County

STIP Project No. FS-0203C
Date: August 2009

Figure 1

Vicinity Map

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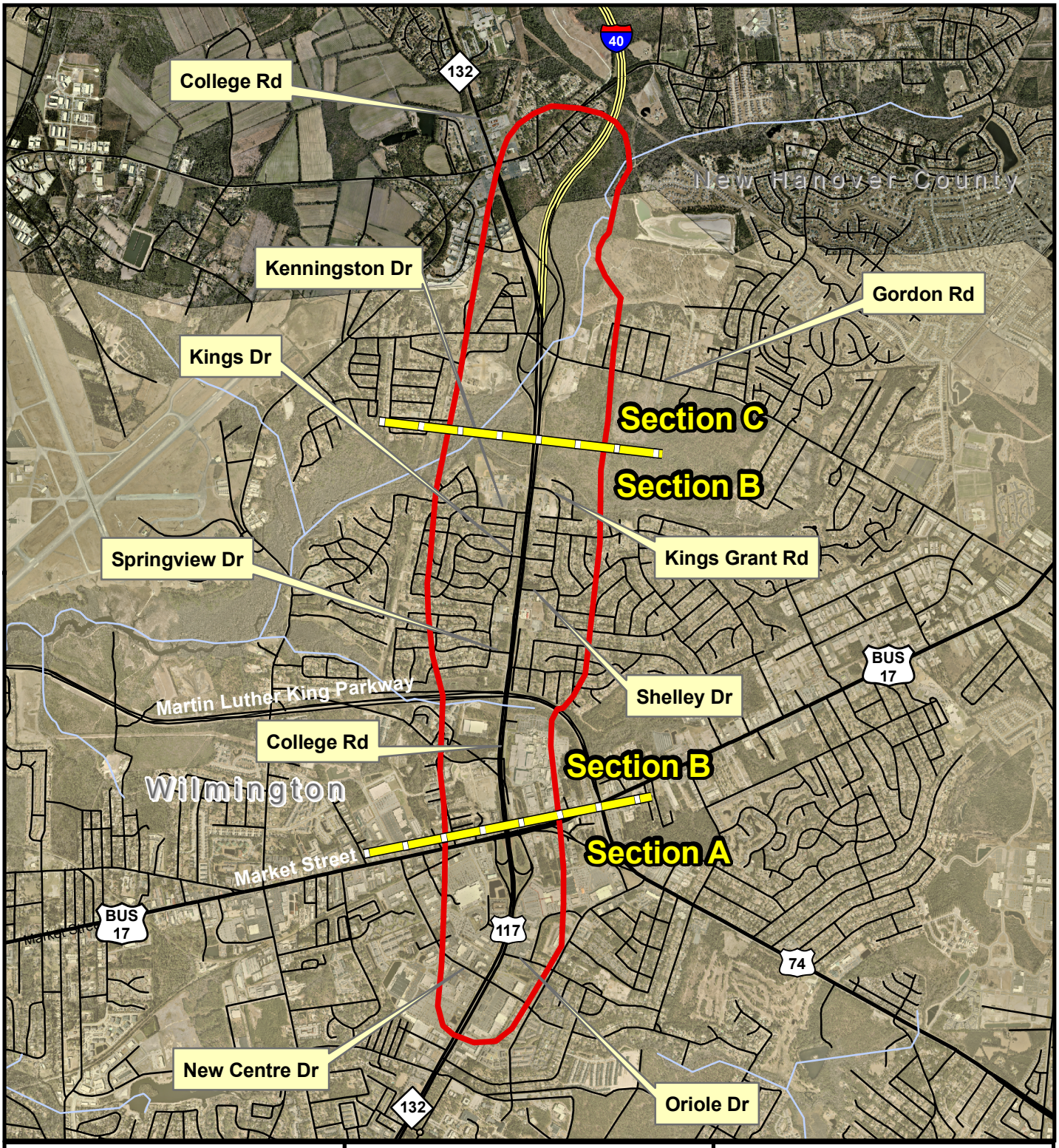
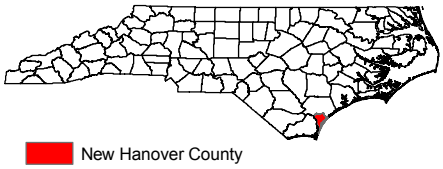


North Carolina Department of Transportation
Division of Highways
Feasibility Study

Legend

- Interstate
- US Highway
- NC Highway
- Local Road
- County Boundary
- Wilmington
- Stream
- Study Area



New Hanover County

N
W E
S

0 0.5 1
Miles

College Road Widening
New Hanover County

STIP Project No. FS-0203C
Date: August 2009

Figure 2

Project Study Area

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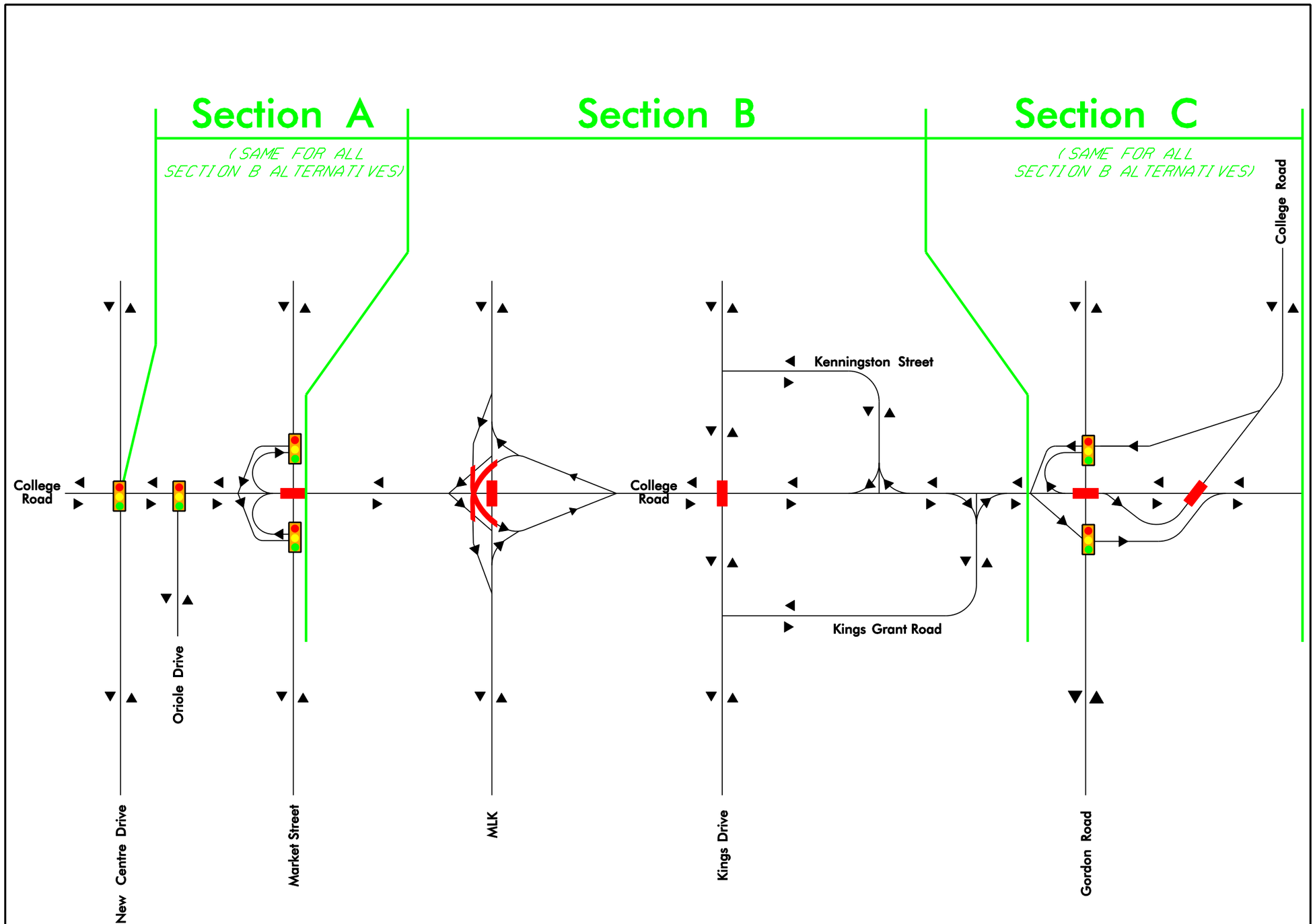

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

College Road Widening
New Hanover County

TIP Project No. FS-0203C

Legend

- Direction of traffic flow
- Bridge
- Traffic Signal

Date: August 2009

Figure 3

Section B Alternative 1

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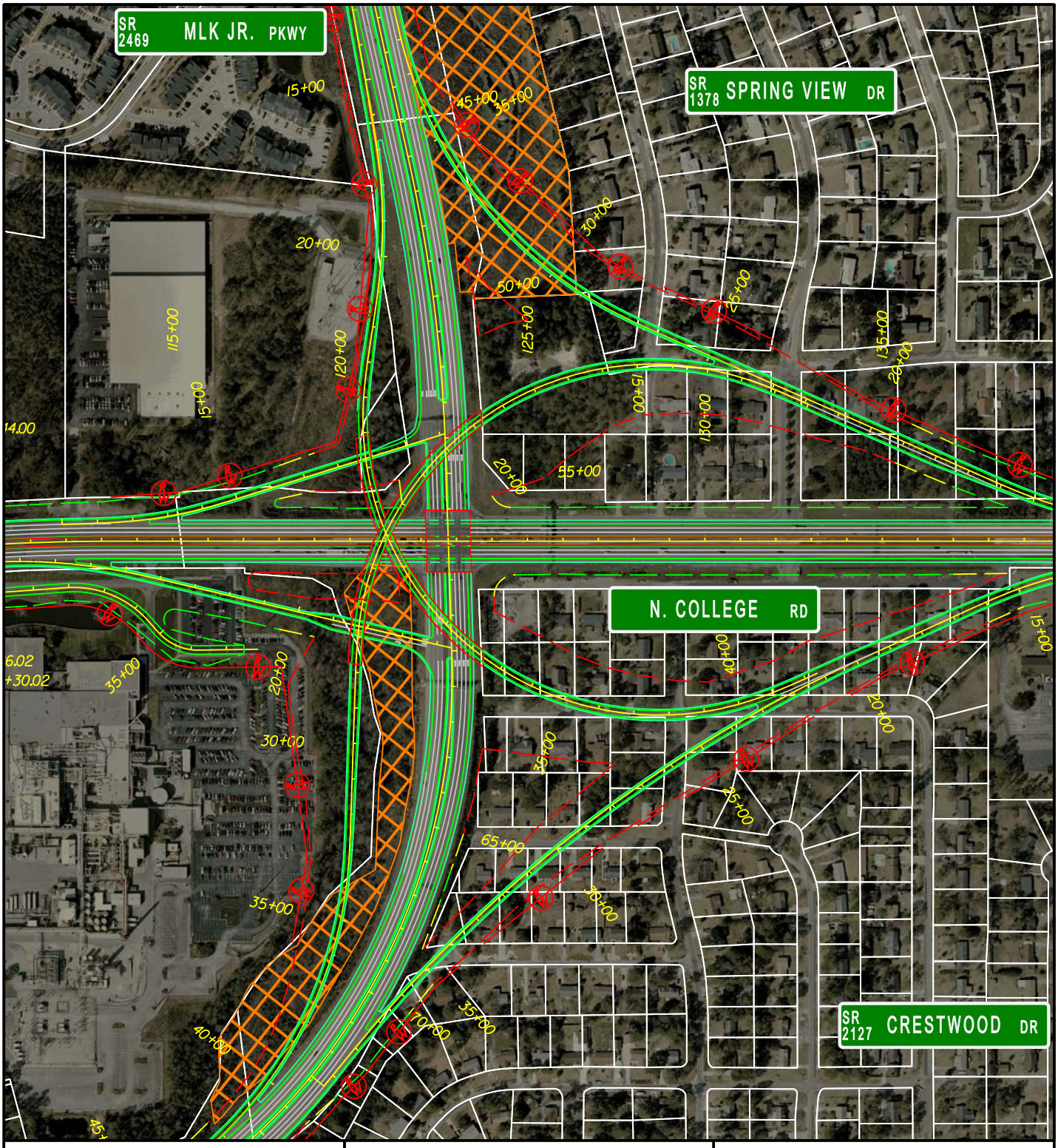

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

Legend

NCDOT Mitigation Sites

Date: August 2009

0 200 400 800

Feet

College Road Widening
New Hanover County

STIP Project No. FS-0203C

Figure 3A

College Road & MLK JR. Parkway Alternative 1

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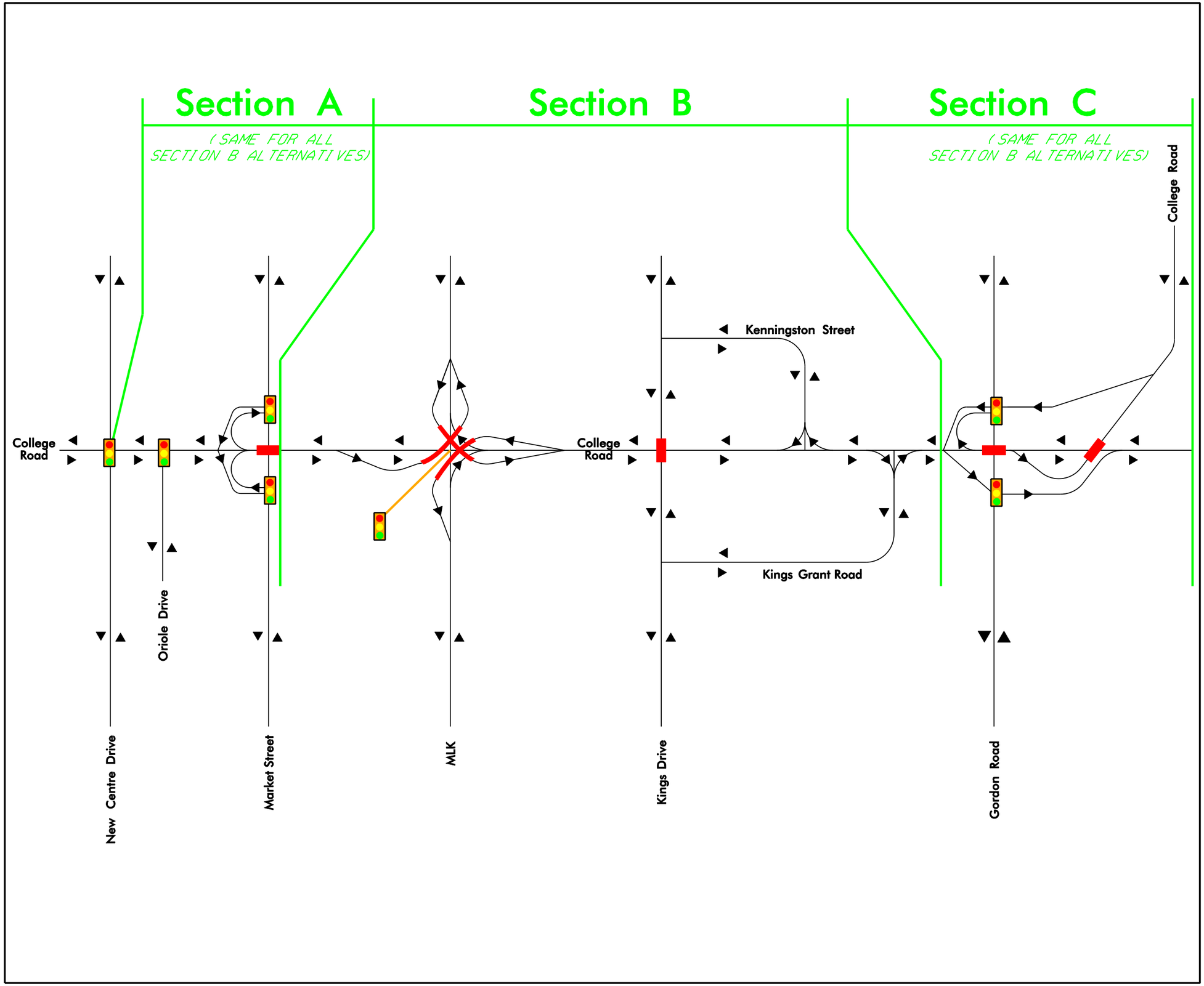

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

College Road Widening
New Hanover County

TIP Project No. FS-0203C

Legend

- Direction of traffic flow
- Bridge
- Traffic Signal

Date: August 2009

Figure 4

Section B Alternative 2

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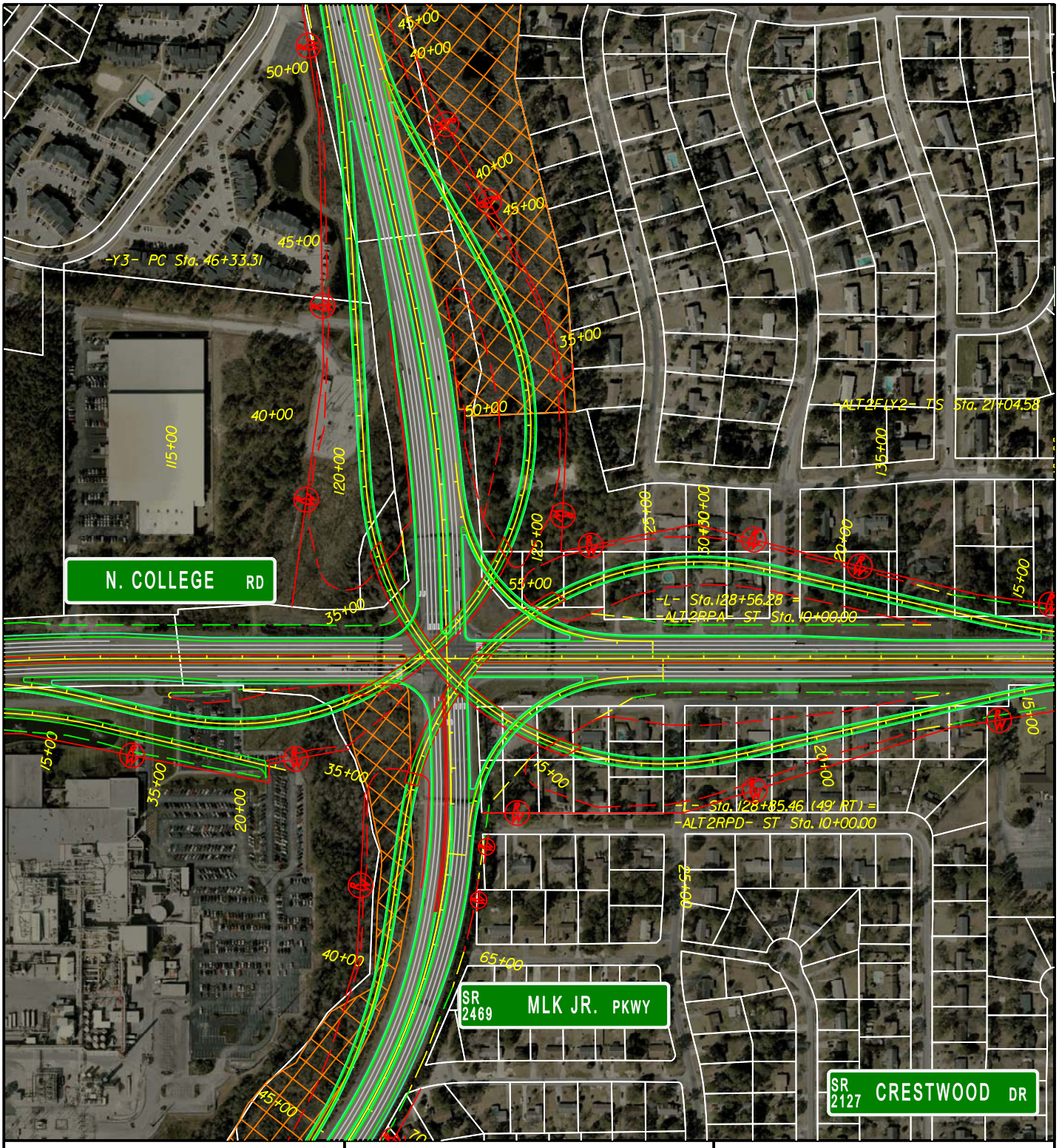

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

Legend

NCDOT Mitigation Sites

Date: August 2009

0 200 400 800

Feet

College Road Widening
New Hanover County

STIP Project No. FS-0203C

Figure 4A

College Road & MLK JR. Parkway Alternative 2

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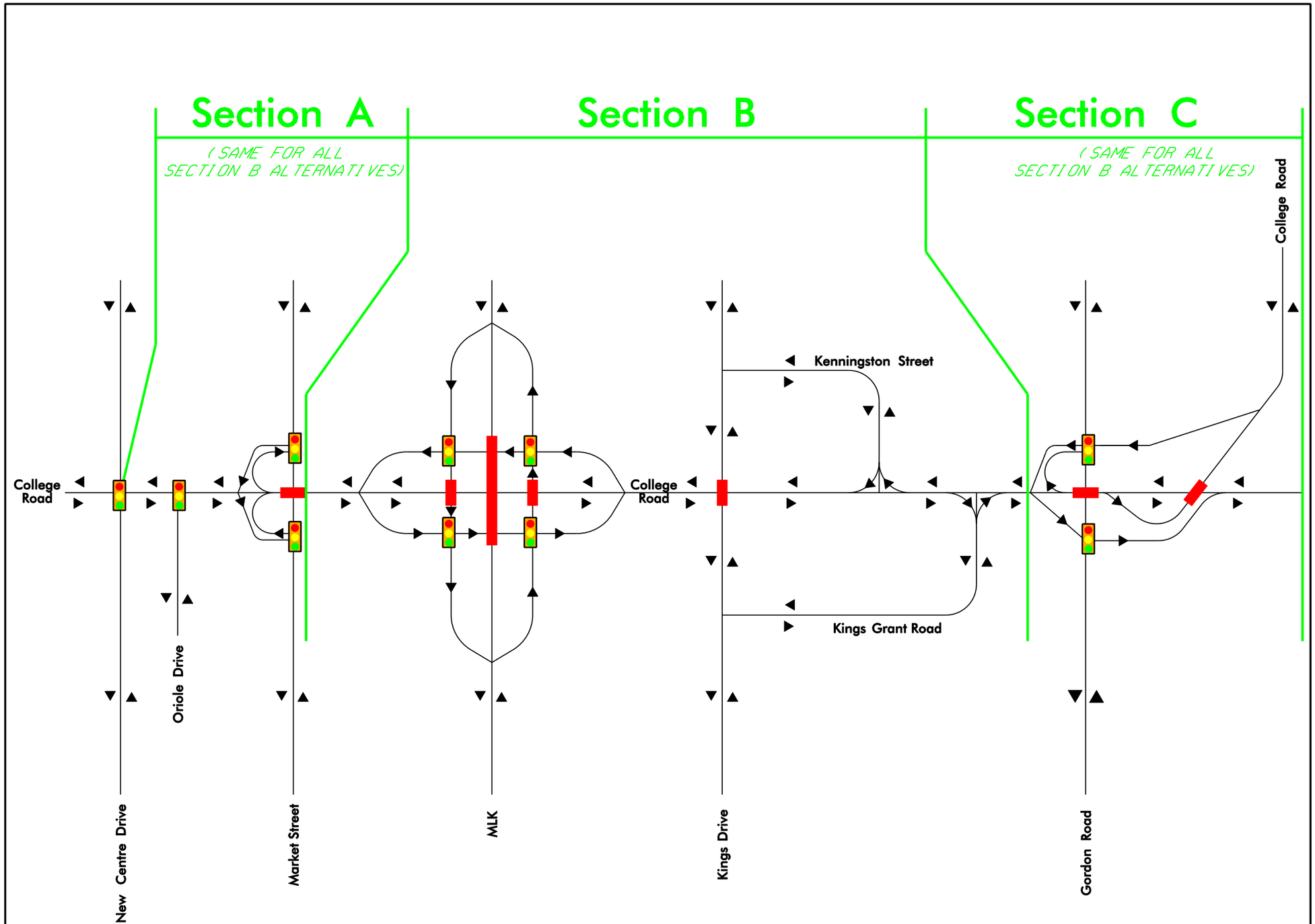

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

College Road Widening
New Hanover County

TIP Project No. FS-0203C

Legend

- Direction of traffic flow
- Bridge
- Traffic Signal

Date: August 2009

Figure 5

Section B Alternative 3

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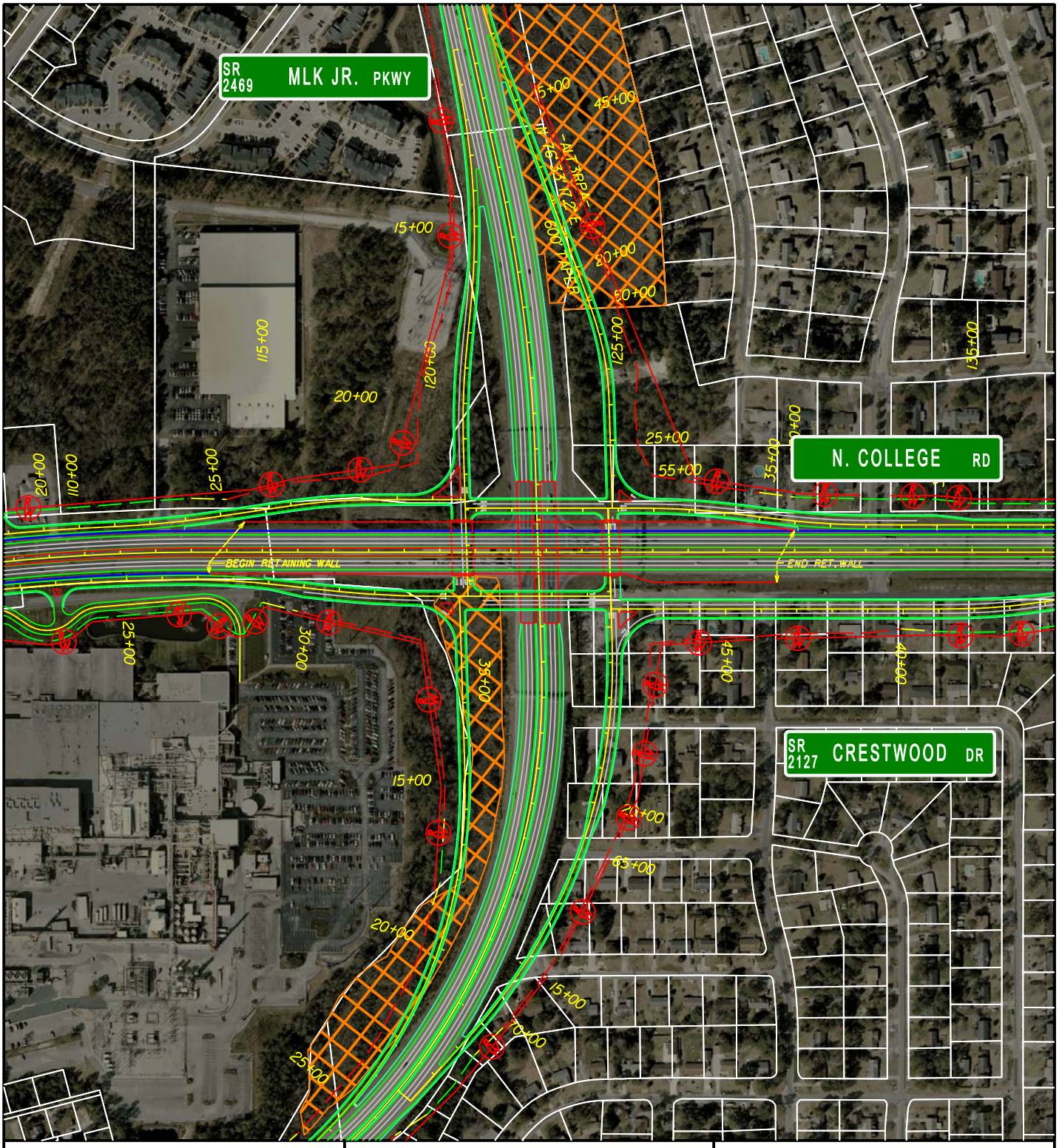

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

Legend

NCDOT Mitigation Sites

Date: August 2009

0 200 400 800

Feet

College Road Widening
New Hanover County

STIP Project No. FS-0203C

Figure 5A

College Road & MLK JR. Parkway Alternative 3

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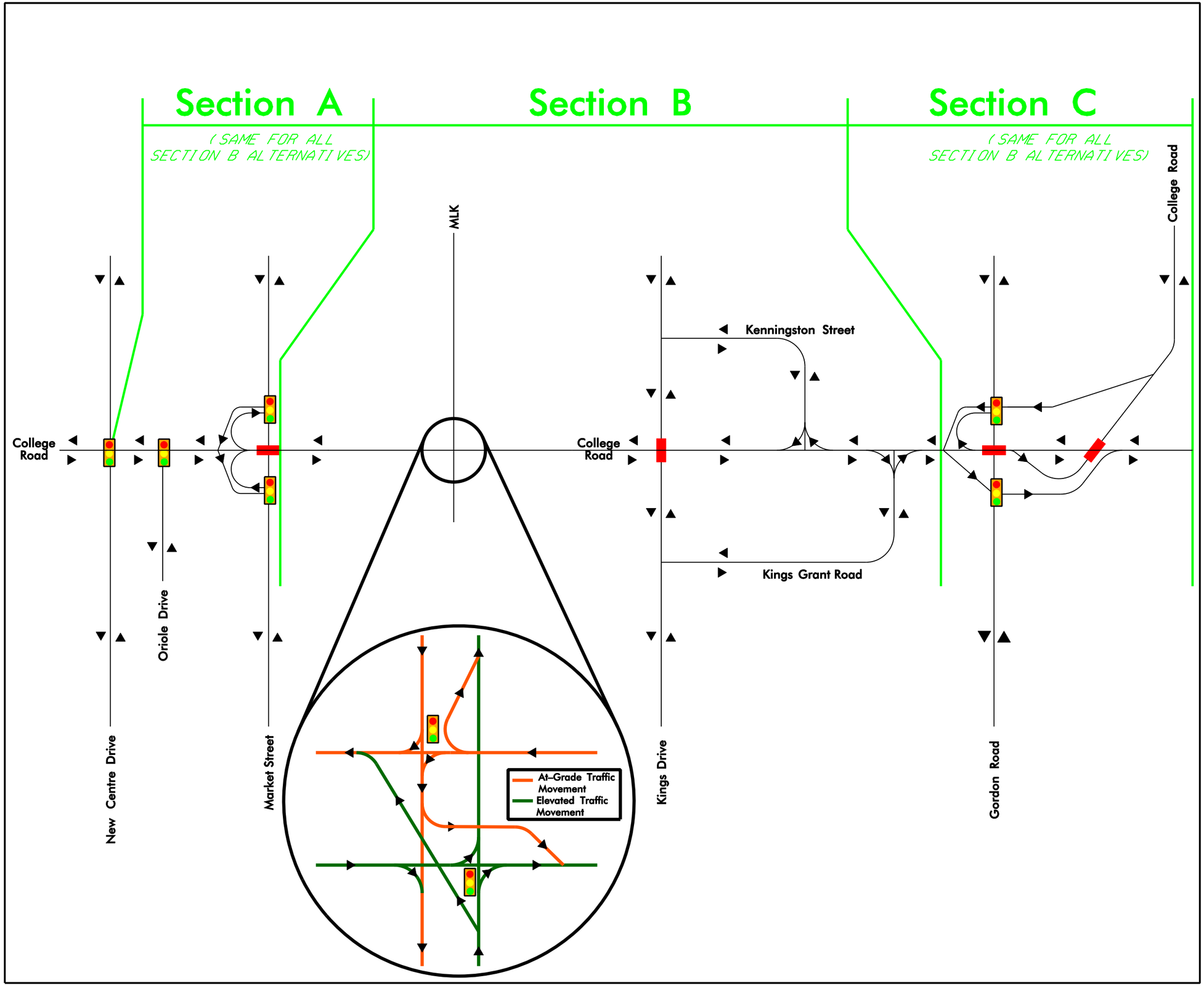

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

College Road Widening
New Hanover County

TIP Project No. FS-0203C

Legend

- Direction of traffic flow
- Bridge
- Traffic Signal

Date: August 2009

Figure 6

Section B Alternative 4

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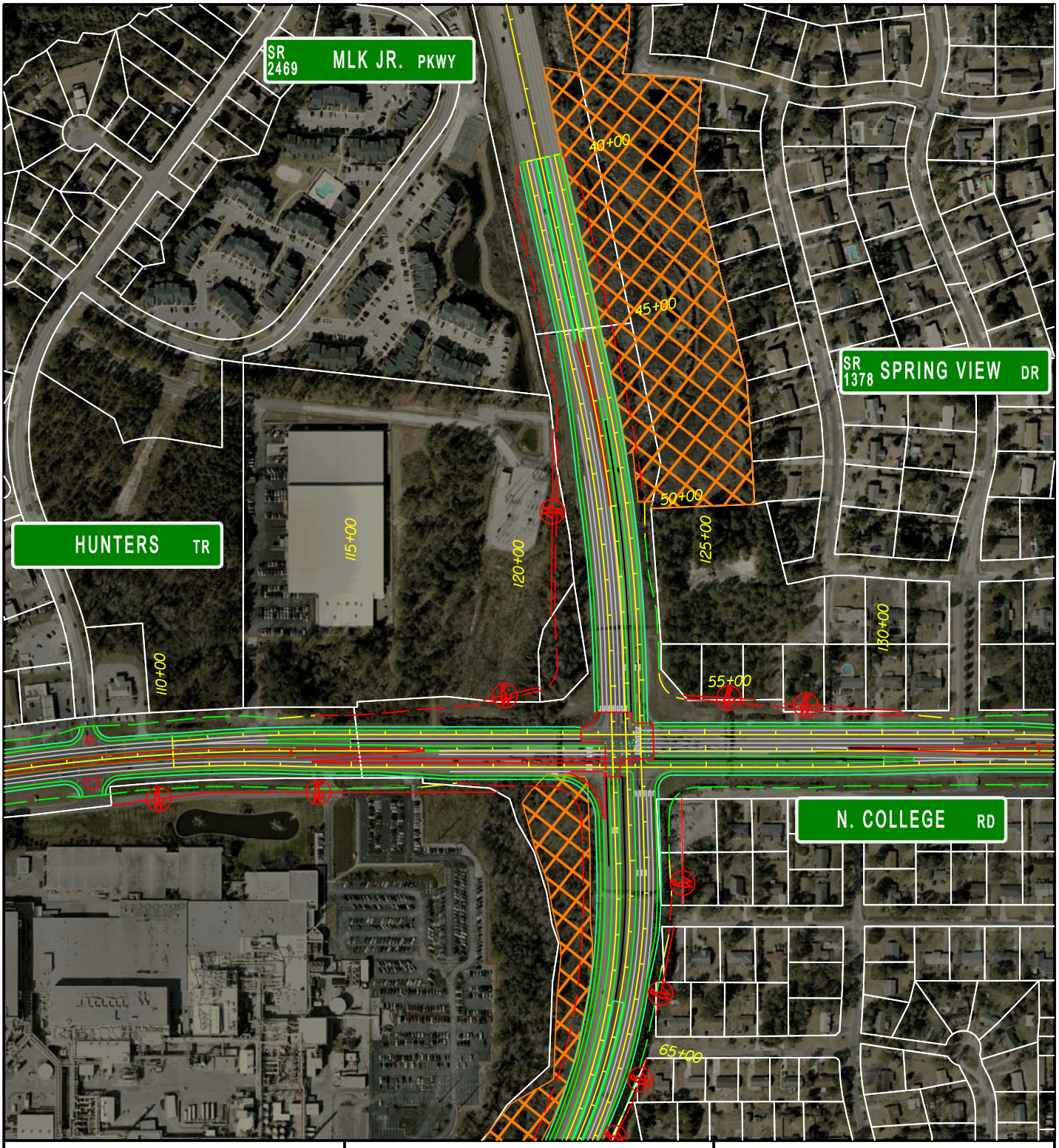

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

Legend

NCDOT Mitigation Sites

Date: August 2009

N W E S

0 200 400 800

Feet

College Road Widening
New Hanover County

STIP Project No. FS-0203C

Figure 6A

College Road & MLK JR. Parkway Alternative 4

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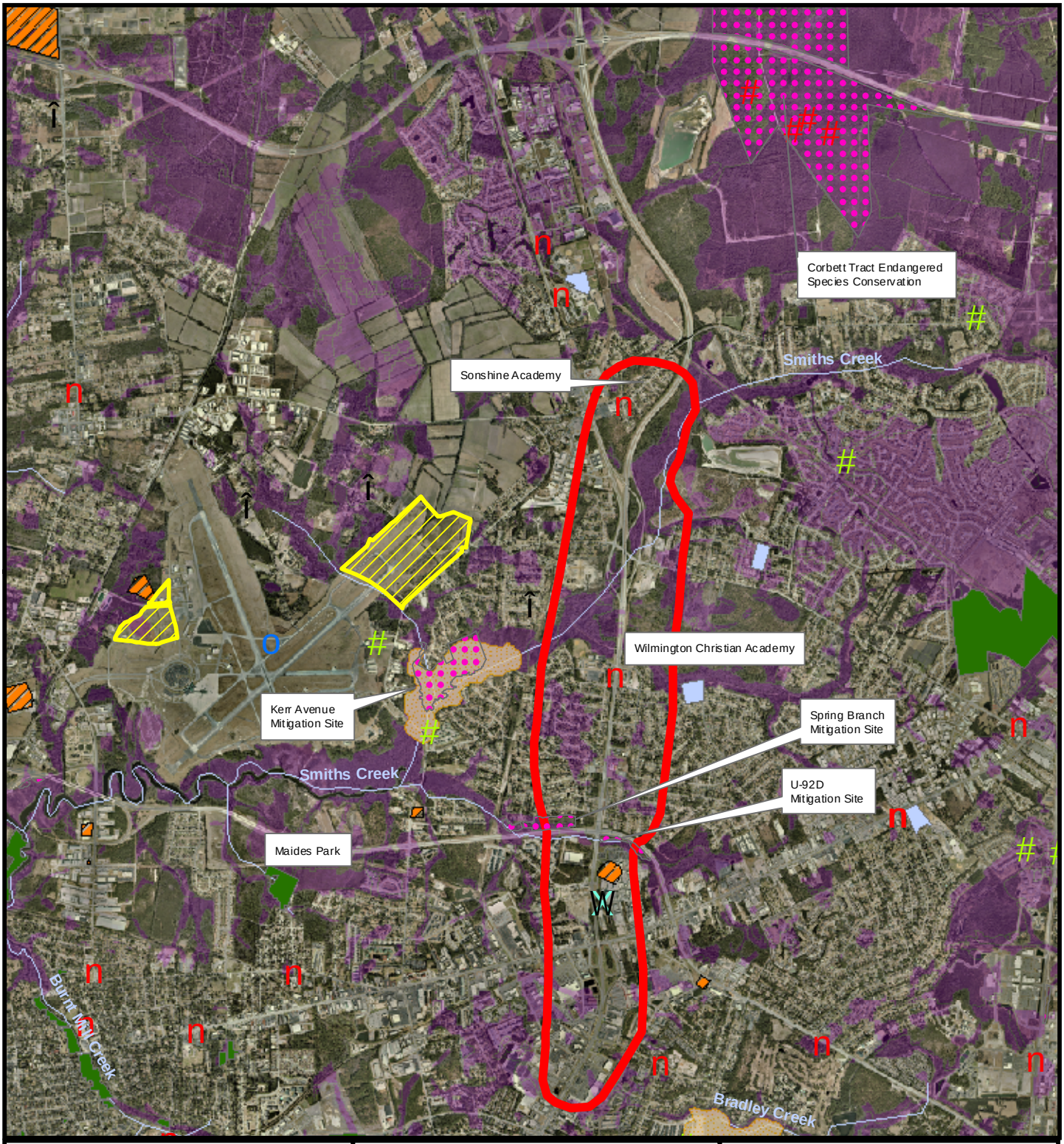

North Carolina Department of Transportation

College Road Widening
New Hanover County

STIP Project No. FS-0203C

Legend

- W NPDES Discharge
- n School
- Church
- Cemetery
- O Airport
- Military Land

Protected Species

- # Endangered
- # Federal Species of Concern
- # Threatened due to Similarity of Appearance
- NCDOT Mitigation Sites
- Study Limits
- Significant Natural Heritage Area
- Hazardous Substance Disposal Site
- Parks
- Streams
- Open Water
- DCM Wetlands

Date: August 2009

0 0.5 1 Miles

Figure 7

Environmental Features