

NC 84
NC 16 to SR 1008 (Waxhaw-Indian Trail Road) in Wesley Chapel
Construct Four Lane Roadway, Part on New Location
Union County

Federal-Aid Project No. STP-1316(10)

WBS No. 39019.1.1

STIP No. U-3467

Administrative Action

Environmental Assessment



Submitted By

US Department of Transportation
Federal Highway Administration
and

North Carolina Department of Transportation



U.S. Department
of Transportation
**Federal Highway
Administration**

Submitted Pursuant to 42 USC 4332(2)(c)

May 27, 2015

Date of Approval

for

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5-28-15

Date of Approval

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Federal Highway Administration

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PROJECT COMMITMENTS

NC 84

NC 16 to SR 1008 (Waxhaw-Indian Trail Road) in Wesley Chapel
Construct Four Lane Roadway, Part on New Location
Union County

Federal Aid Project No. STP-1316(10)

WBS Element No. 39019.1.1

STIP Project No. U-3467

Project Development & Environmental Analysis Unit - Human Environment Section

NCDOT will coordinate with the NC Historic Preservation Office regarding archaeological investigations when a preferred alternative is selected.

Geotechnical Unit

Preliminary site assessments will be conducted for all potentially contaminated sites within the proposed right-of-way prior to right-of-way acquisition.

Hydraulics Unit

The Hydraulics Unit will coordinate with the NC Floodplain Mapping Program (FMP) to determine the status of the project with regard to applicability of NCDOT's Memorandum of Agreement with FMP (dated April 22, 2013, modified February 5, 2015), or approval of a Conditional Letter of Map Revision (CLOMR) and subsequent final Letter of Map Revision (LOMR).

Division 10

This project involves construction activities on or adjacent to FEMA-regulated streams. Therefore, NCDOT Division 10 shall submit sealed as-built construction plans to the Hydraulics Unit upon completion of project construction, certifying the drainage structure(s) and roadway embankment located within the 100-year floodplain were built as shown in the construction plans, both horizontally and vertically.

The Howard House property located on NC 16 between SR 1316 (Rea Road) and SR 1318 (Lochaven Road) is eligible for the National Register of Historic Places. Construction fencing shall be erected at the back of the ditch line adjacent to Howard House during construction. No work shall take place in, and no utilities shall encroach into, the historic boundary.

The Jacob Allen Deal Farm property located on NC 84 (Weddington Road) between SR 3675 (Lake Forest Drive) and SR 1341 (Twelve Mile Creek Road) is eligible for the National Register of Historic Places. A 25-foot buffer shall be maintained from the historic boundary, delineated by

construction fencing erected at the back of the ditch line. The fencing shall extend 500 feet from each access drive, or to the property boundary, whichever is closer.

Roadway Design Unit and Structures Design Unit

Bicycle safe railing will be provided on the proposed bridge over West Fork Twelvemile Creek.

Division of Bicycle and Pedestrian Transportation and Roadway Design Unit

In accordance with NCDOT Pedestrian Policy, the inclusion of sidewalks as part of the proposed project will be dependent upon a cost-sharing agreement with the Town of Weddington and the Village of Wesley Chapel. Bicycle and pedestrian accommodations will be further coordinated with the Town of Weddington and the Village of Wesley Chapel prior to final project design.

INTRODUCTION

What is the purpose of an Environmental Assessment?

This Environmental Assessment (EA) is an important milestone in the project planning process. The objective of this EA is to provide the public and decision-makers with appropriate and relevant information to make an informed decision on which transportation improvement alternative to selection for implementation. This process is intended to provide all interested parties with the opportunity to contribute to the decision-making process.

This EA has been prepared to comply with the National Environmental Policy Act (NEPA), which requires that a detailed analysis be prepared if any federal agency is undertaking a major federal action that may significantly affect the environment.

The North Carolina Department of Transportation (NCDOT), in cooperation with the Federal Highway Administration (FHWA), is evaluating proposed transportation improvements in the Weddington and Wesley Chapel areas in Union County.

What does this EA include?

The table of contents presents the overall organization of this EA and can direct you to the appropriate page numbers in various chapters and sections in the document. Key findings are presented in the summary section. A full discussion of the proposed project and findings are presented in the following chapters:

- **Chapter 1 – Description of Proposed Action** provides a general overview of the project and a broad summary of the actions that took place prior to this Environmental Assessment. This chapter also discusses the current project schedule and cost estimates.
- **Chapter 2 – Purpose of and Need for Project** explains why improvements to the transportation system in the project area are proposed and why they should be implemented. This chapter also describes the existing conditions in the project study area.
- **Chapter 3 – Alternatives** describes the characteristics of the alternatives being considered for implementation, the “detailed study alternatives.” This chapter also summarizes other alternatives considered and the reasons why they were not selected for detailed study. The No Build Alternative is also described.
- **Chapter 4 – Proposed Improvements** provides an overview of the proposed project’s principal features as well as other features that are necessary to support the proposed improvements.
- **Chapter 5 – Environmental Effects of Proposed Action** provides an overview of the natural and human environmental features within the project study area. The project’s potential effects on resources and people are also discussed.
- **Chapter 6 – Comments and Coordination** describes the public involvement and federal, state, and local agency coordination that has taken place for the proposed project. Planned future public involvement activities and agency coordination are also discussed.
- **Chapter 7 – List of References and Technical Reports.**

Also included with this EA are appendices that provide documentation of agency correspondence and coordination, as well as the relocation reports for the proposed project.

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SUMMARY

NC 84

NC 16 to SR 1008 (Waxhaw-Indian Trail Road) in Wesley Chapel Construct Four Lane Roadway, Part on New Location Union County

Federal Aid Project No. STP-1316(10)

WBS No. 39019.1.1

STIP Project No. U-3467

1. Type of Action

What type of federal action is this?

This is a Federal Highway Administration (FHWA) Administrative Action, Environmental Assessment.

2. Description of the Proposed Action

What do we propose to build and where?

The North Carolina Department of Transportation (NCDOT) proposes to extend Rea Road (SR 1316) from NC 16 (Providence Road) east to Twelve Mile Creek Road (SR 1341)/NC 84 (Weddington Road) on new location (relocate NC 84), and widen existing NC 84 to Waxhaw-Indian Trail Road (SR 1008) in Wesley Chapel. The proposed project is approximately 4.3 miles long. The project study area is shown on Figure S-1.

NCDOT's current Draft 2016-2025 STIP identifies funds for U-3467 right-of-way acquisition in Fiscal Year (FY) 2017, and construction in FY 2019.

3. Summary of Purpose and Need

What purpose will the project serve?

The purpose of the proposed Rea Road Extension project is to improve the mobility and connectivity of Weddington Road (NC 84) in the project study area.

Why do we need the project?

- Traffic volumes in 2035 are expected to exceed capacity on NC 84 in the project area.
- Vehicles traveling west on existing NC 84 to Rea Road must follow a circuitous, or “dog-leg”, route. Currently, westbound traffic on NC 84 must turn left onto NC 16, travel approximately 0.75 mile, and then turn right onto Rea Road.

The proposed project is included in the Western Union County Local Area Regional Transportation Plan as NC 84 Relocation (Rea Road Extension). The Plan ranks U-3467 as the No. 1 High Priority Recommended Thoroughfare Plan project.

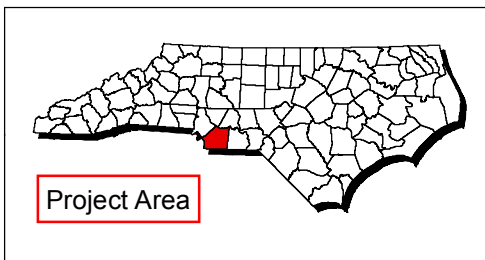
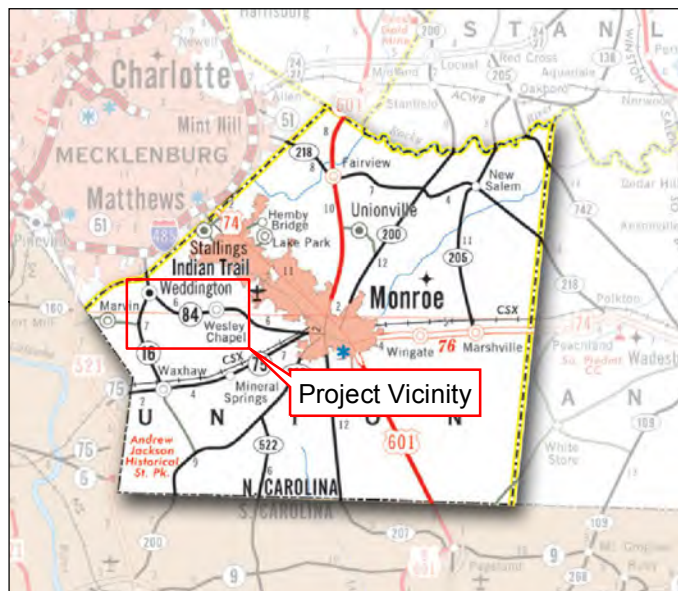


Figure S-1

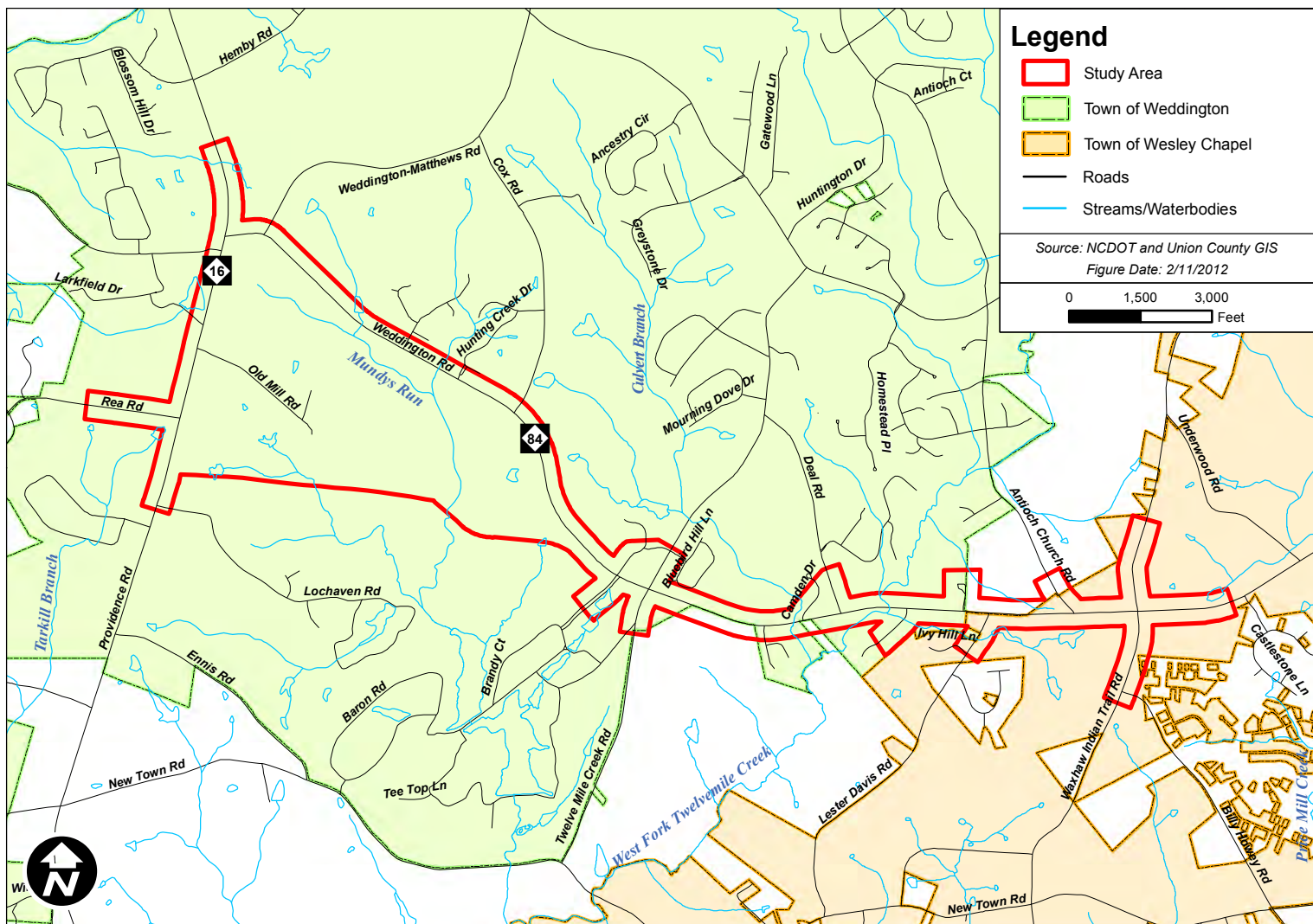
Project Vicinity

SR 1316 (Rea Road) Extension, NC 16 to SR 1008
 (Waxhaw-Indian Trail Road)
 NCDOT STIP Project No. U-3467

Union County, North Carolina



North Carolina
 Department of Transportation



4. Alternatives Considered

What alternatives are studied in this environmental assessment?

A range of preliminary alternatives were considered for the proposed project, including the No Build Alternative, the Improve Existing Alternative, and alternatives that considered alternate modes of transportation.

Two Build alternatives were developed for the proposed project (Alternatives A and C). Both alternatives extend Rea Road on new location from its current terminus at NC 16 to existing NC 84 approximately 0.35 mile west of Twelve Mile Creek Road, and widen existing NC 84 to Waxhaw-Indian Trail Road. Options for Alternatives A and C were developed to minimize potential impacts to wetlands (Alternatives A2 and C2). In consultation with FHWA, NCDOT selected Alternatives A2 and C2 for detailed study because they meet the project's Purpose and Need and minimize potential impacts to wetlands.

5. Permits Required

What permits may be necessary to construct the proposed project?

The proposed action will require permits pursuant to Section 401 and 404 of the Clean Water Act of 1977, as amended. A Section 401 Water Quality Certification from the Water Quality Section of the North Carolina Division of Water Resources will be needed for fill activity in adjacent wetlands and surface waters. A Section 404 permit issued by the US Army Corps of Engineers will be required to discharge and place fill materials into wetlands.

6. Summary of Environmental Effects

What effects does the proposed project have on the environment?

The proposed project was evaluated for impacts to the human and natural environment. Potential impacts associated with the detailed study alternatives are summarized in Table S-1.

Table S-1. Summary of Environmental Effects

Impact Category		Build Alternatives	
		A2	C2
Natural Resources Impacts¹			
Federally-Listed Species Present in Study Area		No	No
100-Year Floodplain and Floodway Impacts (acres)		7.2	7.3
Delineated Wetland Impacts (no. crossings/acres)		3/0.10	4/0.12
Delineated Stream Impacts (no. crossings/ linear feet)		8/1,397	11/2,933
Delineated Other Surface Water Impacts (acres)		0.25	0.00
Forest Impacts (acres)		39.9	43.2
Human Environment Impacts			
Relocations	Residential	5	5
	Business	1	1
	Non-Profit	1	1
	Total	7	7
Low Income/Minority Populations Present		No	No
Schools ²		1	1
Recreational Areas/Parks ³		1	1
Churches ⁴		2	2
Cemeteries		0	0
Historic Sites		2/No Adverse Effect ⁵	2/No Adverse Effect ⁵
Section 4(f) Impacts		1 (<i>de minimis</i>)	1 (<i>de minimis</i>)
Traffic Noise Impacts (receptors)		8	7
Physical Environment Impacts			
Prime, Statewide, and Unique Farmland Soils (acres)		62.4	63.7
Underground Storage Tanks/HazMat Sites		3	3
Preliminary Cost Estimate			
Total Cost		\$48,481,000	\$49,323,000

¹ Impacts are calculated based on slope stake limits plus 25 feet.

² Current access to Weddington High School will be changed as a result of the proposed project.

³ Right-of-way impacts, including impacts to recreational fields, will occur at Weddington Optimist Park.

⁴ Parking spaces will be impacted at Southbrook Community Church and Siler Presbyterian Church as a result of the proposed project.

⁵ No Adverse Effect with conditions identified in Section 5.2.1.

7. Other Highway and Non-Highway Actions

Are any other projects being considered in this area?

NCDOT's *Draft 2016-2025 State Transportation Improvement Program* (STIP) includes four projects in the vicinity of U-3467:

- B-5243 – Replace Bridge No. 258 on Indian Trail Road (SR 1008) over South Fork Crooked Creek. The Draft 2016-2025 STIP includes funding for construction in FY 2016.
- B-5791 – Replace Bridge No. 224 on SR 1301 (Marvin Road) over Twelvemile Creek. The Draft 2016-2025 STIP includes funding for right-of-way acquisition in FY 2020 and construction in FY 2021.
- U-5769 – Widen NC 16 (Providence Road South) to multi-lanes from SR 1316 (Rea Road Extension) to SR 1321 (Cuthbertson Road). The Draft 2016-2025 STIP includes funding for right-of-way acquisition in FY 2022 and construction in FY 2024.
- U-4714 – Widen John Street – Old Monroe Road (SR 1009) to multi-lanes from Trade Street (SR 3448 – SR 3474) in Mecklenburg County to Wesley Chapel – Stouts Road (SR 1377) in Union County. The Draft 2016-2025 STIP includes funding for a portion of right-of-way acquisition beginning in FY 2021 and construction beginning in FY 2023.

Roadway improvements in the project area were completed in September 2013 under NCDOT project U-5325. The project constructed a roundabout at the NC 84/ Weddington-Matthews Road (SR 1344) intersection and relocated the NC 16/Weddington Church Road (SR 1317) intersection (completed October 2012).

8. Coordination

How has the public been or will be involved with this project? What agencies were consulted regarding the project?

Early coordination meetings were held with representatives from Union County, the Town of Weddington, and the Village of Wesley Chapel in July 2012 to discuss the proposed project.

NEPA/Section 404 Merger screening was conducted on September 17, 2012 with FHWA, US Army Corps of Engineers (USACE), and NC Department of Environment and Natural Resources - Division of Water Resources (NCDENR-DWR). It was agreed the project would follow a modified process, with a joint Merger Team meeting for Concurrence Points 2A (Bridging Decisions and Alignment Review) and 4A (Avoidance and Minimization) after the public hearing.

A project scoping letter announcing the start of U-3467 project development and environmental and engineering studies was mailed out to federal, state, and local agencies in November, 2012. An External Scoping meeting was held on November 14, 2012. Representatives from NCDOT, FHWA, USACE, US Fish and Wildlife Service, US Environmental Protection Agency, NCDENR-DWR, and NC Wildlife Resources Commission participated in the meeting.

A newsletter providing information on the proposed project and public informational meeting was mailed to citizens in June 2013. A postcard to citizens in December 2013 announced the launch of the project website.

A local officials meeting and a public meeting were held for the proposed project on June 25, 2013 at Weddington Middle School. The purpose of the meetings was to present the project to the community and receive input during the alternatives development process. Approximately 60 citizens and six local officials attended the meetings.

NCDOT representatives met with the Weddington Town Council and staff to provide an update on the project at a Special Town Council Meeting on August 19, 2013.

NCDOT will conduct a public hearing for the proposed project to review the detailed study alternatives preliminary design plans and potential environmental impacts with the public, and receive their comments. Formal notices will be included in local newspapers a minimum of 30 days prior to the public hearing. Additional notices for the public hearing will also be sent to persons on the project mailing list.

9. Contact Information

Who can I contact for additional information about this document?

Additional information regarding the proposed project and Environmental Assessment can be obtained by contacting the following individuals:

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1.0 DESCRIPTION OF PROPOSED ACTION

This chapter provides a general overview of the project and a broad summary of the actions that took place prior to the Environmental Assessment.

What do we propose to build and where? What actions led up to the Environmental Assessment? How much will the project cost if constructed?

1.1 General Description

The North Carolina Department of Transportation (NCDOT) proposes to extend Rea Road (SR 1316) from NC 16 (Providence Road) east to Twelve Mile Creek Road (SR 1341)/NC 84 (Weddington Road) on new location (relocate NC 84), and widen existing NC 84 to Waxhaw-Indian Trail Road (SR 1008) in Wesley Chapel. The project is approximately 4.3 miles long. The project study area is shown on Figure 1 in Appendix A.

The current Draft NCDOT 2016-2025 STIP provides funding for this project. The current Draft STIP includes \$8,700,000 for right-of-way acquisition in Fiscal Year (FY) 2017 and \$31,900,000 for construction in FY 2019.

1.1.1 Historical Resume and Project Status

Rea Road Extension was included in the April 1992 *Thoroughfare Plan for Union County, North Carolina* as a Proposed Major Urban Thoroughfare between NC 16 and NC 84.

In 1994, the boundary of the Mecklenburg-Union Metropolitan Planning Organization [MUMPO, now Charlotte Regional Transportation Planning Organization (CRTPO)] was expanded to include western Union County. The MUMPO Thoroughfare Plan Map included the Relocation of NC 84 (Rea Road Extension) as a proposed facility.

MUMPO approved its 2015 Long Range Transportation Plan (LRTP) in 1995. The NC 84 Relocation Project (Rea Road Extension) was ranked number 66 out of the 107 ranked projects in the LRTP.

The Feasibility Study prepared for the proposed Rea Road Extension in 1996 recommended Rea Road Extension be constructed between NC 16 and NC 84 as a four-lane divided, curb and gutter facility on a 100-foot-wide right-of-way to match the recommended cross-section of the then-proposed Rea Road (STIP Project U-2506) west of NC 16.

A Location and Environmental Screening Report (Presnell Associates, Inc., April 1999) was prepared for the proposed NC 84 Relocation between NC 16 and Twelve Mile Creek Road. The study did not evaluate widening existing NC 84. The proposed typical section was identified as a four-lane divided, curb and gutter facility on a 100-foot wide right-of-way to be consistent with the then-proposed Rea Road to the west of NC 16.

The proposed project is included in current transportation planning documents (see Section 2.2.2). The CRTPO *2040 Metropolitan Transportation Plan* includes U-3467 in the Horizon Year 2025/2030 Fiscally Constrained Roadway Projects lists as a four-lane roadway with a median, wide outside lanes and sidewalks from NC 16 to Waxhaw-Indian Trail Road.

NEPA/Section 404 Merger screening was conducted on September 17, 2012 with the Federal Highway Administration (FHWA), US Army Corps of Engineers (USACE), and NC Department of Environment and Natural Resources - Division of Water Resources (NCDENR-DWR). It was agreed the project would follow a modified process, with a joint Merger Team meeting for Concurrence Points 2A (Bridging Decisions and Alignment Review) and 4A (Avoidance and Minimization) after the public hearing.

A project scoping letter announcing the start of U-3467 project development and environmental and engineering studies was mailed out to federal, state, and local agencies in November, 2012. An External Scoping meeting was held on November 14, 2012. Representatives from NCDOT, FHWA, USACE, US Fish and Wildlife Service, US Environmental Protection Agency, NCDENR-DWR, and NC Wildlife Resources Commission participated in the meeting. Minutes of the November 2012 project scoping meeting are included in Appendix B.

1.2 Cost Estimates

Two build alternatives are currently under consideration for U-3467. Current estimated costs based on the project’s preliminary designs are shown in Table 1-1.

Table 1-1. Current Estimated Costs for U-3467

Implementation Phase	Alternative A2	Alternative C2
Construction	\$31,352,000	\$31,049,000
Right-of-Way Acquisition	\$15,250,000	\$15,225,000
Utility Relocation	\$797,000	\$797,000
Mitigation	\$1,082,000	\$2,252,000
Total	\$48,481,000	\$49,323,000

2.0 PURPOSE OF AND NEED FOR PROJECT

This chapter explains why improvements to the transportation system in the project area are proposed and why they should be implemented.

What purpose will the project serve and why do we need the project? What are the existing conditions? What benefits would the project provide?

2.1 Purpose of Project

The purpose of the proposed Rea Road Extension project is to improve the mobility and connectivity of Weddington Road (NC 84) in the project study area.

2.2 Need for Project

- Traffic volumes in 2035 are expected to exceed capacity on NC 84 in the project area.
- Vehicles traveling west on existing NC 84 to Rea Road must follow a circuitous, or “dog-leg”, route. Currently, westbound traffic on NC 84 must turn left onto NC 16, travel approximately 0.75 mile, and then turn right onto Rea Road.

NC 84 carries high traffic volumes as a major connection between southwestern Union County and southeastern Mecklenburg County and the City of Charlotte. Travel demand between Monroe/Union County and I-485/Charlotte remains high and other parallel routes are very congested. In addition, the project’s Demographic Study Area (DSA) experienced an 82.9 percent increase in population between 2000 and 2010, a relatively high rate of growth compared to a 62.8 percent increase for Union County as a whole. In the eastern half of the study area, which includes the Village of Wesley Chapel, there was an over 200 percent increase in population for the same time period.

The proposed project is included in the Western Union County Local Area Regional Transportation Plan as NC 84 Relocation (Rea Road Extension). The Plan ranks U-3467 as the No. 1 High Priority Recommended Thoroughfare Plan project.

The proposed project would provide a more direct link between western Union County and Charlotte/Mecklenburg County; it would provide an alternate route to I-485 and Charlotte, enhancing regional travel options. The proposed project would provide additional capacity on NC 84 in the project area.

Other Desirable Outcome / Secondary Benefit

Crash data for the period between May 1, 2010 and April 30, 2015 indicate the crash rate for NC 84 in the project area exceeds the statewide average crash rate for similar facilities. The most prevalent crash pattern along the corridor is rear end crashes, which is generally a symptom of congestion type issues. It is anticipated that a four-lane divided facility should address the predominant crash patterns currently present along the corridor. The area around the intersection of Waxhaw-Indian Trail Road and NC 84 met the 2012 Highway Safety Improvement Program (HSIP) “frontal impact” and “last year increase” warrants.

The proposed project would include improvements that can be expected to result in a safer facility.

2.2.1 Description of Existing Conditions

2.2.1.1 Functional Classification

Functional classification is the process of grouping streets and highways into classes according to the character of service they are intended to provide. Based on the North Carolina Functional Classification System, the classifications of the roadways in the project area are as follows:

Minor Arterial: Rea Road, NC 16 and NC 84

Major Collector: Weddington-Matthews Road and Waxhaw-Indian Trail Road

Local: All other roads, including Twelve Mile Creek Road, Deal Road, Lester Davis Road, and Antioch Church Road

2.2.1.2 Physical Description of Existing Facility

Roadway Cross-Section

NC 84 has multiple cross-sections within the project area. It is generally a two-lane roadway, but becomes a three-lane section with a two-way, left-turn lane east of Twelve Mile Creek Road. Between Weddington-Matthews Road and NC 16, NC 84 is a four-lane facility with a raised concrete median.

Within the project area, Rea Road is a four-lane divided facility with curb and gutter.



Looking East at NC 16 from Rea Road

Horizontal and Vertical Alignment

NC 84 is a curvilinear roadway on rolling terrain with areas of limited site distance.

Right-of-Way and Access Control

There is no control of access along NC 84 or Rea Road in the project area. The existing right-of-way width on NC 84 in the project area is generally 60 feet, but wider in some locations. The existing right-of-way width on Rea Road is approximately 100 feet according to Union County GIS data.

Speed Limit

The posted speed limit on NC 84 is 45 miles per hour (mph) through most of the project area, but reduces to 35 mph from just east of Weddington-Matthews Road to NC 16. The posted speed limit on Rea Road within the project area is 45 mph.

Intersections/Interchanges

There are numerous intersections along NC 16 and NC 84 in the project study area. All of the intersections are at-grade. Many of the intersections are entrances to residential subdivisions with only one access point. There are nine major road intersections in the project study area, five of which are signalized. All of the unsignalized intersections have stop sign control on the side street, with the exception of one intersection with a roundabout. These nine intersections are listed from west to east and are shown on Figures 2A through 2G in Appendix A:

- NC 16/Rea Road (signalized)
- NC 16/NC 84/Weddington United Methodist Church Driveway (signalized)
- NC 84/Weddington-Matthews Road (roundabout)
- NC 84/Cox Road (unsignalized)
- NC 84/Twelve Mile Creek Road (signalized)
- NC 84/Deal Road/Hollister Estates Drive (unsignalized)
- NC 84/Lester Davis Road/Southbrook Community Church Driveway (unsignalized)
- NC 84/Antioch Church Road (unsignalized)
- NC 84/Waxhaw-Indian Trail Road (signalized)

Railroad Crossings

There are no railroads in the project study area.

Structures

The following major stream crossings are located in the project study area:

- Crossing of Mundy Run under NC 84, with a six-foot by three-foot reinforced concrete box culvert (RCBC) (Figures 2B and 2C).
- Crossing of an unnamed tributary to Mundy Run under NC 84, with a six-foot by seven-foot RCBC (Figure 2D).
- Crossing of Culvert Branch under NC 84, with a two-foot by seven-foot RCBC (Hydraulic Site 3, Figure 2F).
- Crossing of West Fork Twelvemile Creek under NC 84, with a three-barrel 11-foot by 12-foot RCBC (Hydraulic Site 4, Figure 2F).
- Crossing of an unnamed tributary to West Fork Twelvemile Creek under Shannon Woods Lane, with a 72-inch corrugated metal pipe (Figure 2F).

Sidewalks, Bicycle Lanes, and Greenways/Multi-Use Trails

NC 16 has sidewalks on both sides of the road starting at the Rea Road intersection and continuing north through the project study area. There are marked crosswalks on all three approaches to the NC 16/Rea Road intersection. There are marked crosswalks with pedestrian crossing signals on all four approaches to the NC 16/NC 84 intersection.

NC 84 and Waxhaw-Indian Trail Road have sidewalks for a short distance adjacent to the commercial development at the intersection. There are marked crosswalks with pedestrian crossing signals at three legs of the intersection.

There are no sidewalks along Rea Road in the project area. There are no existing bicycle lanes or greenways/multi-use trails in the project study area.

Utilities

Water and sewer service within the project study area is provided by Union County Public Works. According to the *Union County Utilities Map* (updated December 4, 2008), there are water mains along the entire length of many of the major roads within the project study area, including NC 84, NC 16, Rea Road, and Waxhaw-Indian Trail Road. Sewer mains cross existing roads in several locations.

There are overhead utilities along existing Rea Road, NC 16 and NC 84. Power poles line NC 84 and switch from side to side depending on roadway curvature, shoulder widths and distribution of service. However, overhead utilities along much of NC 84 are located within a utility easement that parallels, but is not immediately adjacent to the roadway. A high voltage power transmission corridor crosses NC 84 at Weddington Optimist Park.

Additional utilities located along the length of many of the roads in the project area include buried cable television and telecommunication cables, as well as natural gas pipelines.

2.2.1.3 School Bus Usage

Weddington High School, Weddington Middle School, and Weddington Elementary School are all located on the northern side of NC 84 between Twelve Mile Creek Road and Deal Road. According to Union County Public Schools, a total of 72 bus trips per day access the high school from NC 84. The middle school and elementary school are accessed from Twelve Mile Creek Road and have 78 and 34 bus trips per day, respectively, some of which use NC 84.

2.2.1.4 Traffic Carrying Capacity

A Traffic Capacity Analysis Report (VHB, October 2013) was prepared for the proposed project. Using 2012 and 2035 traffic forecasts prepared by NCDOT, the traffic capacity analysis evaluates project-area roadway segments and intersections for 2012 Existing Conditions, 2035 No Build Conditions, and 2035 Build Conditions for the proposed project. The traffic forecasts are shown on Figures 3 through 5 in Appendix A.

The relationship of travel demand compared to the roadway capacity determines the level of service (LOS) of a roadway. Design requirements for roadways vary according to the desired capacity and level of service. Six levels are used, ranging from "A" to "F". LOS "A" indicates no congestion while LOS "F" represents more traffic demand than road capacity and extreme delays. LOS D indicates the capacity of a roadway at which the public begins to express dissatisfaction.

Existing Traffic Volumes

The 2012 average annual daily traffic (AADT) on NC 84 between NC 16 and Waxhaw-Indian Trail Road ranges from 14,800 vehicles per day (vpd) between Cox Road and Weddington-Matthews Road to 18,900 vpd between Antioch Church Road and Weddington Optimist Park East Driveway (see Figure 3). The 2012 AADT on NC 16 ranges from a low of 17,400 vpd to the south of Rea Road, to a high of 26,800 vpd to the north of NC 84. The 2012 AADT on Rea Road is 12,600 vpd.

The estimated 2012 truck percentage along NC 84 through the project area is four percent (three percent duals and one percent tractor trailer, semi-truck [TT-ST]). The estimated 2012 truck percentage along NC 16 to the south of NC 84 is six percent (five percent duals and one percent

TT-ST), and this percentage decreases slightly to five percent (four percent duals and one percent TT-ST) to the north of NC 84. The estimated 2012 truck percentage along Rea Road is six percent (five percent duals and one percent TT-ST).

Existing Levels of Service

Table 2-1 shows the existing LOS for the roadway segments analyzed. The eastern section of NC 84 between the proposed Rea Road Extension and Waxhaw-Indian Trail Road operates at an unacceptable LOS E under existing conditions.

Table 2-1. Summary of Roadway Segment Level of Service

Roadway Segment	From	To	Existing Conditions (2012)	2035 No Build	2035 Build Alternatives A2 and C2
NC 16	Rea Road	NC 84	B	C	C
NC 84	NC 16	Proposed Rea Road Extension	D	E	D
NC 84	Proposed Rea Road Extension	Waxhaw-Indian Trail Road	E	F	C
Proposed Rea Road Extension	NC 16	NC 84	N/A	N/A	A

Table 2-2 shows the delay and LOS for existing AM and PM peak conditions at the 12 intersections analyzed in the project study area. For signalized intersections, the delay and LOS shown are for the overall intersection. For unsignalized intersections, the delay and LOS shown are for the intersection approaches under stop sign control. As shown in Table 2-2, there are no signalized intersections operating below LOS D under existing conditions. However, there are five unsignalized intersections with at least one stop sign controlled approach operating below LOS D under existing conditions, three of them in both the AM and PM peak conditions.

Table 2-2. Summary of Intersection Delay (seconds) and Level of Service

Intersection Name ¹	Existing Intersection Control ²		Existing Conditions (2012)		2035 No Build		2035 Build Alternatives A2 and C2	
			Delay in seconds (LOS)					
			AM	PM	AM	PM	AM	PM
NC 16/Rea Road	Signalized		27.6 (C)	35.8 (D)	42.7 (D)	96.4 (F)	47.3 (D)	43.5 (D)
NC 84/NC 16/Weddington United Methodist Church Driveway	Signalized		36.5 (D)	29.7 (C)	62.9 (E)	32.6 (C)	32.2 (C)	31.1 (C)
NC 84/Weddington-Matthews Road	Unsignalized/ Roundabout ³	SB	45.0 (E)	34.1 (D)	18.8 (C)	40.1 (E)	9.7 (A)	11.4 (B)
NC 84/Cox Road	Unsignalized	SB	20.0 (C)	17.5 (C)	36.9 (E)	25.6 (D)	20.2 (C)	17.4 (C)
NC 84/Twelve Mile Creek Road	Signalized		26.9 (C)	27.4 (C)	78.4 (E)	95.2 (F)	22.1 (C)	19.3 (B)
NC 84/Weddington HS West Drive	Unsignalized	SB	27.0 (D)	* (F)	* (F)	* (F)	11.3 (B) ⁴	27.3 (C) ⁴
NC 84/Deal Road/Hollister Estates Drive	Unsignalized	NB	57.4 (F)	54.1 (F)	* (F)	* (F)	5.1 (A) ⁴	10.4 (B) ⁴
		SB	* (F)	* (F)	* (F)	* (F)		
NC 84/Southbrook Community Church West Drive	Unsignalized	SB	26.0 (D)	29.7 (D)	97.0 (F)	131.2 (F)	11.1 (B) ⁵	11.1 (B) ⁵
NC 84/Southbrook Community Church East Drive/Lester Davis Road	Unsignalized	NB	42.0 (E)	40.2 (E)	* (F)	* (F)	14.5 (B) ⁴	21.2 (C) ⁴
		SB	40.8 (E)	53.4 (F)	* (F)	* (F)		
NC 84/Antioch Church Road	Unsignalized	SB	156.3 (F)	103.1 (F)	* (F)	* (F)	9.6 (A) ⁴	8.1 (A) ⁴
NC 84/Waxhaw-Indian Trail Road	Signalized		40.3 (D)	31.8 (C)	96.8 (F)	53.9 (D)	41.7 (D)	40.6 (D)
Rea Road Extension/NC 84	Future Signalized		NA	NA	NA	NA	22.2 (C)	20.5 (C)

¹ Existing intersections are listed from west to east, as shown on Figures 2A through 2G.

² For signalized intersections, delay and LOS shown are for overall intersection.

For unsignalized intersections, delay and LOS shown are for intersection approaches under stop sign control; SB – southbound approach, NB – northbound approach.

³ Roundabout was completed in September 2013 at Weddington Road (NC 84)/Weddington-Matthews Road intersection as part of Project U-5325. Design Year 2035 delay and LOS for both Build and No Build conditions are for overall intersection with roundabout in place.

⁴ Highlighting indicates that traffic signal is required for 2035 Build Conditions with both alternatives for intersection to operate at an acceptable LOS regardless of additional intersection and/or roadway segment improvements implemented with the proposed project alternatives. Delay and LOS shown are for overall intersection with signal in place.

⁵ Southbrook Community Church West Driveway will be right-in/right-out only for 2035 Build Conditions with both alternatives.

*Delay greater than 250 seconds.

Future Traffic Volumes

The 2035 No Build Conditions traffic forecast (see Figure 4) represents the future traffic volumes in the project study area without the construction of the proposed project. The 2035 Build Conditions traffic forecast (see Figure 5) represents the future volumes with the proposed Rea Road Extension in place with either Alternative A2 or C2.

Under the No Build Conditions, 2035 AADT on NC 84 between NC 16 and Waxhaw-Indian Trail Road ranges between 19,400 vpd (between Cox Road and Weddington-Matthews Road) and 27,300 vpd (between Antioch Church Road and Weddington Optimist Park East Driveway). The 2035 AADT on NC 16 ranges from 23,700 vpd south of Rea Road to 34,800 vpd north of NC 84. The 2035 AADT on Rea Road is 20,000 vpd. The estimated 2035 truck percentages for NC 84, NC 16 and Rea Road are the same as for 2012 Existing Conditions.

With the construction of the proposed project, 2035 AADT on NC 84 between NC 16 and Waxhaw-Indian Trail Road ranges from 13,400 vpd (between Cox Road and Weddington-Matthews Road) to 28,300 vpd (between Antioch Church Road and Weddington Optimist Park East Driveway). The 2035 AADT on NC 16 ranges from 23,700 vpd to the south of Rea Road, to 34,800 vpd to the north of NC 84. The 2035 AADT on Rea Road is 23,200 vpd to the west of NC 16 and 11,400 vpd to the east of NC 16. The estimated 2035 truck percentages for NC 84, NC 16 and Rea Road are the same as for 2012 Existing Conditions. The estimated truck percentage for Rea Road Extension is four percent (three percent duals and one percent TT-ST).

In comparison to 2035 No Build Conditions, the 2035 Build Conditions forecast indicates traffic volumes will increase by approximately 1,000 vpd on the eastern section of NC 84 in the project study area as a result of the proposed project. However, traffic volumes will drop substantially on the western section of existing NC 84 as traffic is diverted to the new roadway. In addition, 2035 traffic volumes on existing Rea Road to the west of NC 16 will increase with the completion of the proposed project in comparison to the No Build Conditions forecast as a result of through traffic.

Future Levels of Service

Table 2-1 shows the Design Year 2035 LOS for the roadway segments analyzed under No Build and Build Conditions. As shown in Table 2-1, the eastern section of NC 84 between the proposed Rea Road Extension and Waxhaw-Indian Trail Road will operate at LOS F under 2035 No Build Conditions, and the western section will operate at an unacceptable LOS E. The target, or measurable goal, for LOS improvements on NC 84 is LOS D or better under 2035 Build Conditions. Under 2035 Build Conditions there would be substantial improvements in LOS for the NC 84 roadway segments analyzed. In addition, the proposed Rea Road Extension would operate at LOS A.

Table 2-2 shows the delay and LOS for Design Year 2035 AM and PM peak conditions at the 12 intersections analyzed for the No Build and Build Conditions. For signalized intersections, the delay and LOS shown are for the overall intersection. For unsignalized intersections, the delay and LOS shown are for the intersection approaches under stop sign control. Currently unsignalized intersections that will require a traffic signal under 2035 Build Conditions with both Alternatives A2 and C2 for the intersection to operate at an acceptable LOS are highlighted. The delay and LOS shown for these future signalized intersections are for the overall intersection with a traffic signal in place. The Southbrook Community Church west driveway will be right-in/right-out only for 2035 Build Conditions with both alternatives.

As shown in Table 2-2, under 2035 No Build Conditions, traffic operations degrade considerably

without any improvements in place. All 11 existing intersections in the study area operate at unacceptable LOS E or F during at least one peak period. Under 2035 Build Conditions, there would be substantial improvements at these intersections.

2.2.1.5 Airports

There is a small private airport with one paved runway located within the Aero Plantation subdivision. The entrance to the subdivision is located on NC 84 (see Figure 2E). The airport is located at the southern end of the subdivision, over one-half mile south of NC 84 and outside of the project study area.

2.2.1.6 Other Highway Projects in the Area

There are no other highway projects currently under construction in the project study area.

2.2.2 Transportation and Land Use Plans

2.2.2.1 NCDOT State Transportation Improvement Program

The Draft 2016-2025 STIP includes the following projects in the vicinity of U-3467:

- B-5243 – Replace Bridge No. 258 on Indian Trail Road (SR 1008) over South Fork Crooked Creek. The Draft STIP includes funding for construction in FY 2016.
- B-5791 – Replace Bridge No. 224 on SR 1301 (Marvin Road) over Twelvemile Creek. The Draft STIP includes funding for right-of-way acquisition in FY 2020 and construction in FY 2021.
- U-5769 – Widen NC 16 (Providence Road South) to multi-lanes from SR 1316 (Rea Road Extension) to SR 1321 (Cuthbertson Road). The Draft STIP includes funding for right-of-way acquisition in FY 2022 and construction in FY 2024.
- U-4714 – Widen John Street – Old Monroe Road (SR 1009) to multi-lanes from Trade Street (SR 3448 – SR 3474) in Mecklenburg County to Wesley Chapel – Stouts Road (SR 1377) in Union County. The Draft STIP includes funding for right-of-way acquisition beginning in FY 2021 and construction beginning in FY 2023. Funding is not currently proposed for Phase C right-of-way acquisition or construction.

Roadway improvements in the project area were completed in September 2013 under NCDOT project U-5325. The project constructed a roundabout at the NC 84/ Weddington-Matthews Road (SR 1344) intersection and relocated the NC 16/Weddington Church Road (SR 1317) intersection (completed October 2012).

2.2.2.2 Local Transportation and Thoroughfare Plans

Charlotte Regional Transportation Planning Organization (CRTPO)

The Charlotte Regional Transportation Planning Organization (CRTPO) is the federally designated Metropolitan Planning Organization (MPO) for the Charlotte Urbanized Area, which includes the Rea Road Extension project area. Due to the growth of the Charlotte Urbanized Area, and the subsequent expansion of the MPO planning area boundary, the CRTPO was established in 2013 in place of the former Mecklenburg-Union MPO (MUMPO). Future updates to MPO plans and

programs will be performed by CRTPO. CRTPO has the following plans in place to guide transportation planning in the MPO region:

- *CRTPO 2040 Metropolitan Transportation Plan (MTP)* (April 2014) – The CRTPO 2040 MTP includes the proposed project on its horizon year 2025 and 2030 fiscally constrained roadway projects lists. “Rea Road/Marvin School Road (NC 84)” is included as U-3467 A/B on the horizon year 2025 list as a new four-lane roadway with median, wide outside lanes, and sidewalks from NC 16 to Twelve Mile Creek Road. “Weddington Road (NC 84)” is included as U-3467C on the horizon year 2030 list as widening from two to four lanes with median, wide outside lanes and sidewalks from Twelve Mile Creek Road to Waxhaw-Indian Trail Road.

One additional project in the study area is also included in the fiscally constrained project list (2025). “Providence Road South (NC 16)” between Rea Road and Cuthbertson Road is described as a widening project from two lanes to four lanes with median, wide outside lanes, and sidewalks.

- *2004 Mecklenburg-Union Metropolitan Planning Organization Thoroughfare Plan* (Updated as of March 21, 2012) – The 2004 MUMPO Thoroughfare Plan includes the proposed Rea Road Extension as a Proposed Major Thoroughfare.
- *Mecklenburg-Union Metropolitan Planning Organization 2012-2018 Transportation Improvement Program (TIP)* (July 20, 2011) – The MUMPO 2012-2018 TIP includes a financially constrained list of transportation projects that the MPO and NCDOT plan to undertake over the next seven years. All projects receiving federal funding must be included in the TIP. Approved MPO TIP’s are incorporated directly, without change, into NCDOT’s STIP.
- *CRTPO Draft Comprehensive Transportation Plan* (May 2015) – The CRTPO Draft Comprehensive Transportation Plan (CTP) is a multi-modal transportation plan that ultimately will replace CRTPO’s existing Thoroughfare Plan. The Draft CTP includes “Rea Road Extension (relocate NC 84)” as a recommended boulevard on new location between NC 16 and NC 84. Existing NC 84 from the new location tie-in to Waxhaw-Indian Trail Road, and beyond the study area, is listed as a boulevard that “needs improvement”. The new location portion of the proposed CTP alignment for Rea Road Extension is on approximately the same alignment as Alternative C2 (see Section 3.1.4.4). The Draft CTP recommends bicycle accommodations, sidewalks and a multi-use path along the proposed project. The Draft MUMPO CTP Pedestrian Map also indicates that six existing roads in the project study area need improved pedestrian facilities. The following is a list of these roads, along with their recommended pedestrian facility improvements:
 - NC 16 south of Rea Road – sidewalks
 - Rea Road west of NC 16 – sidewalks and multi-use path
 - NC 84 east of Rea Road Extension – sidewalks and multi-use path
 - Waxhaw-Indian Trail Road – sidewalks (to the north and south of the existing sidewalks)
 - Lester Davis Road – sidewalks
 - Billy Howey Road – sidewalks

Other Regional Transportation Plans in the Project Area.

- *Western Union County Local Area Regional Transportation Plan (LARTP)* (MAB, November 2009) – The LARTP is a multi-modal plan that attempts to balance the needs of various modes of transportation, including vehicles, bicycles, pedestrians, and transit, within western Union County, including the Rea Road Extension project area. The local planning jurisdictions within

the Rea Road Extension project area adopted the LARTP. The projects and recommendations developed as part of the LARTP feed directly into the LRTP and CIP. The plan recognizes the NC 84 Relocation (Rea Road Extension) project to construct a four-lane boulevard on new location between NC 16 and NC 84 as the top ranked high priority project. The new location portion of the proposed LARTP alignment for the Rea Road Extension is on approximately the same alignment as Build Alternative C2 (see Section 3.1.4.4). The second highest priority project in the plan is the widening of NC 84 to the west of the Rea Road Extension to a four-lane boulevard. The recommended cross-sections include sidewalks and on street bicycle lanes along the proposed project.

- The *Union County Comprehensive Transportation Plan* (NCDOT, February 2012) is a long range multi-modal transportation plan that covers transportation needs through 2035 for the rural portions of Union County outside of the area included in the 2004 MUMPO Thoroughfare Plan. The project study area is completely within the area covered by the 2004 MUMPO Thoroughfare Plan.
- *Carolina Thread Trail Master Plan for Union County and Participating Municipalities* (September 2011) – The Carolina Thread Trail (CTT) initiative is an effort to encourage 15 counties in the south-central piedmont of North Carolina, including Union County, and the north-central portion of South Carolina to create an interconnected trail system that will preserve and increase the quality of life within the local communities. The CTT Master Plan for Union County presents a conceptual route for trails throughout the county to receive the CTT designation. The closest proposed CTT is within the Village of Wesley Chapel to the east of the project study area.

2.2.2.3 Land Use Plans

The *Town of Weddington, North Carolina Land Use Plan* (April 8, 2013) states “there are a number of critical road improvements scheduled in the Weddington vicinity over the next few years, the most important being the construction of the Rea Road Extension (known as the realignment of NC 84).”

The *Village of Wesley Chapel Land Use Plan* (December 8, 2003) includes policies and goals to limit the majority of planned non-residential development to strategic nodes on NC 84. The plan states driveway access onto NC 84 should be limited.

The *Village of Wesley Chapel Comprehensive Parks and Recreation Plan* (updated January 18, 2011) notes that as the Carolina Thread Trail develops its recommendations for an interconnected trail system for Union County, the Village also will explore ways to promote desired pedestrian connectivity within the Village.

The *Union County, North Carolina 2025 Comprehensive Plan* (October 18, 2010) notes two areas in the project study area are projected to experience significant circulation and congestion issues:

- Intersection of Rea Road/Providence Road: NC 16 will continue to be a major north-south commuting route. The ongoing widening improvements will increase the road’s capacity, which will in turn increase the volume of traffic on the road and at key intersections.
- Intersection of NC 84/Waxhaw-Indian Trail Road: NC 84 will continue to be a major east-west route, connecting NC 16 with downtown Monroe and US 74. Waxhaw-Indian Trail Road will increase in importance as a north/south route. This intersection is projected to experience

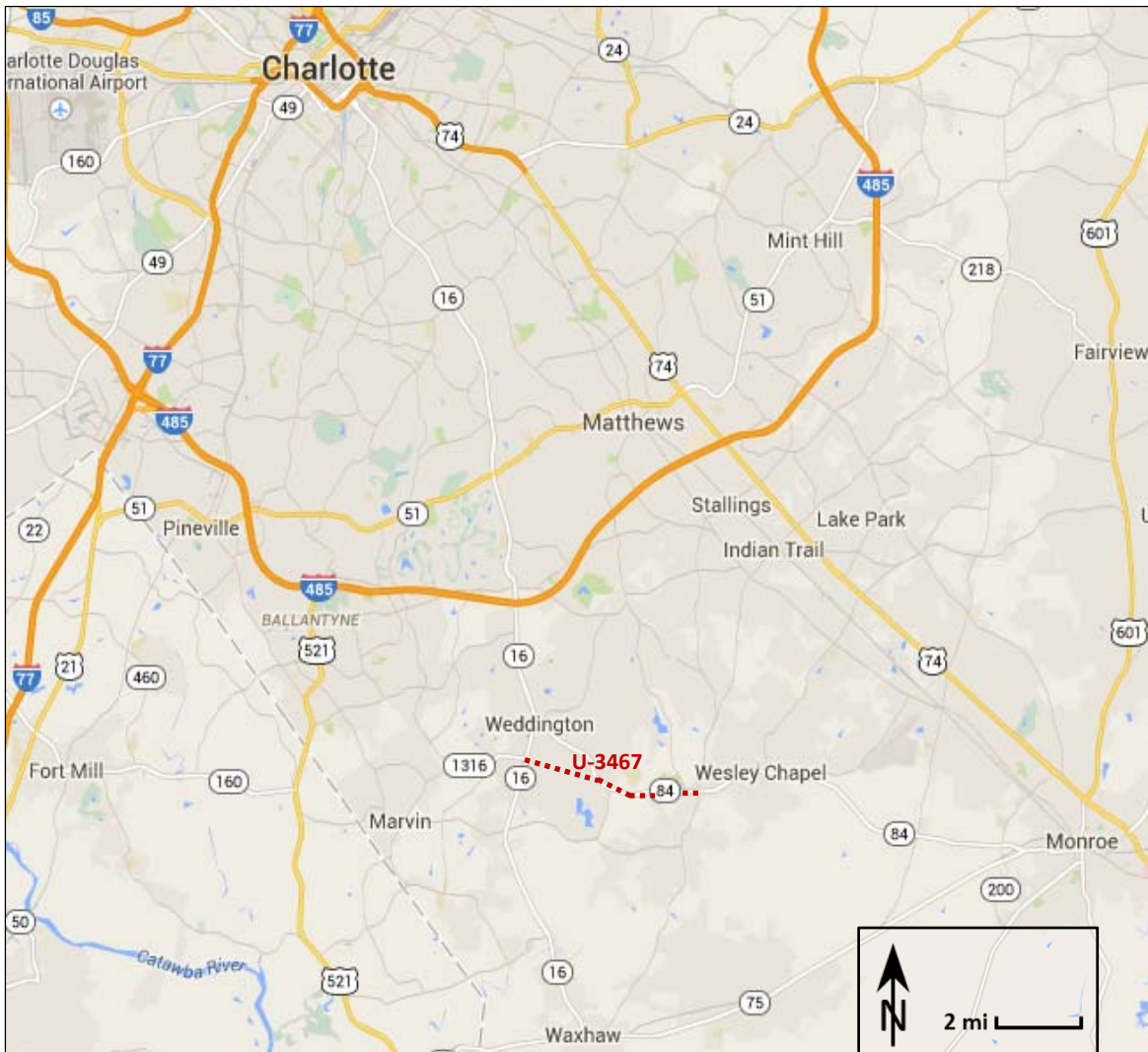
significant traffic volumes.

The *Union County 2006 Parks and Recreation Comprehensive Master Plan Update* (December 2006) includes a proposed multi-use trail within the project study area that would follow existing Rea Road to the west of NC 16, continue along the proposed Rea Road Extension to NC 84, and then follow NC 84 to the east of the study area. Union County noted the inclusion of sidewalks and wide outside lanes for bicycles would meet the intent of the County’s desire to serve pedestrians and bicyclists along this corridor (personal communication, September 2014).

2.2.3 System Linkage/Travel Time/Access Needs

2.2.3.1 Existing Road Network

Major roadways in the project area include Rea Road, NC 16, and Waxhaw-Indian Trail Road. Rea Road is a major connecting route between western Union County and the City of Charlotte. Rea Road has an interchange with I-485 approximately five miles northwest of the proposed project.



Existing Road Network

NC 16 runs north-south at the western end of the project area and provides another major connecting route to I-485 and the City of Charlotte to the north, as well as a connection to NC 75 and the Town of Waxhaw to the south. NC 16 connects with I-485 at an interchange approximately 2.7 miles north of NC 84. I-485 and NC 75 between Monroe and South Carolina are designated corridors in the North Carolina Strategic Highway Corridors system. Waxhaw-Indian Trail Road is located at the eastern end of the project area and runs north-south, providing a connection to the Town of Indian Trail and US 74 to the north and the Town of Waxhaw to the south.

2.2.3.2 Commuting Patterns

NC 16 and NC 84 are major commuting routes between southwestern Union County and the City of Charlotte/Mecklenburg County, where over half of the workers in the project study area are employed.

2.2.3.3 Modal Interrelationships

Public Transportation

The project study area is not currently served by mass transit. Union County Transportation provides demand response transportation services for Union County residents.

Rail Service

There are no freight or passenger rail service providers in the project area.

Motor Freight Service

There are no freight distribution facilities in the project area.

Air Service

There are no major public or private airports in the project area. There is a small private airport with one paved runway located just south of the project area within the Aero Plantation subdivision.

2.2.4 Safety Operations

Traffic crash data were obtained for NC 16 and NC 84 within the study area for the five-year period between May 1, 2010 and April 30, 2015. The data for NC 16 includes crashes that were reported from Lochaven Road (SR 1318) to NC 84. The data for NC 84 include crashes that were reported from NC 16 to Waxhaw-Indian Trail Road. Table 2-3 details the specific locations where five or more crashes were reported as well as the corridor-wide totals along the NC 16 corridor.

As shown in the summary table, the predominant collision type along the NC 16 corridor was rear-end crashes. Rear-end collisions generally indicate overall congestion issues. These types of collisions occur mainly in areas where there is frequent “stop-and-go” traffic or at locations where vehicles may stop suddenly or slow to turn. The intersection of NC 16 and Rea Road had the highest overall number of collisions with 27 total crashes reported. The most common collision type was rear-end collisions, accounting for 59 percent of crashes at this intersection. The NC 16 and NC 84 intersection had the second highest number of collisions with 21 total crashes reported.

Table 2-3. NC 16 Crash Data Summary from Lochaven Road to NC 84

Location along NC 16 Corridor / Traffic Control	Crash Type									Total
	Rear End	Left- Turns	Animal	Side Swipe	Object	Angle	Other	Ran Off Road	Right- Turns	
Lochaven Road / Unsignalized	6	0	0	0	1	0	0	0	2	9
North of Lochaven Road / Unsignalized	3	0	3	0	1	0	0	1	0	8
Rea Road / Signalized	16	2	2	3	0	2	1	0	1	27
North of Rea Road / Unsignalized	5	0	1	1	0	0	0	0	0	7
Lenny Stadler Way / Signalized	4	0	2	2	0	0	0	0	0	8
North of Lenny Stadler Way / Unsignalized	5	1	2	0	0	0	0	0	0	8
NC 84 / Signalized	13	3	0	3	0	1	1	0	0	21
Other Crash Locations / Unsignalized	6	0	4	1	0	0	0	0	0	11
Corridor-Wide Total	58	6	14	10	2	3	2	1	3	99

Note: Crash data is for period from May 1, 2010 to April 30, 2015.

Table 2-4 details the locations where five or more crashes were reported as well as the corridor-wide totals along the NC 84 corridor.

Table 2-4. NC 84 Crash Data Summary from NC 16 to Waxhaw-Indian Trail Road

Location along NC 84 Corridor / Traffic Control	Crash Type									Total
	Rear End	Left- Turns	Animal	Side Swipe	Object	Angle	Other	Ran Off Road	Right- Turns	
NC 16 / Signalized	27	1	0	4	1	1	1	0	1	36
Harris Teeter Driveway / Unsignalized	2	1	2	1	0	0	0	0	1	7
Weddington- Matthews Rd. / Unsignalized	9	1	1	12	1	4	2	0	2	32
Twelve Mile Creek Rd. / Signalized	12	6	0	1	1	1	0	0	0	21
East of Twelve Mile Creek Rd. / Unsignalized	12	0	1	0	0	0	0	0	0	13
Weddington HS Ent. / Unsignalized	4	2	0	0	1	0	0	0	0	7
West of Deal Road / Unsignalized	2	0	1	0	2	0	0	0	0	5
Deal Road / Unsignalized	3	1	0	0	0	1	1	0	0	6
East of Deal Road / Unsignalized	2	0	0	0	4	0	0	0	0	6
Lester Davis Road / Unsignalized	3	1	0	0	0	2	0	0	1	7
West of Antioch Church Rd. / Unsignalized	4	0	0	0	1	0	0	0	0	5
Antioch Church Rd. / Unsignalized	13	3	0	1	0	1	0	1	0	19
East of Antioch Church Rd. / Unsignalized	2	0	2	0	1	0	0	0	0	5
Harris Teeter-Village Commons / Unsignalized	6	5	0	2	3	4	0	0	1	21
Waxhaw-Indian Trail Rd. / Signalized	15	10	0	1	0	3	2	1	3	35
Other Crash Locations / Unsignalized	40	7	14	5	15	4	2	4	1	92
Corridor-Wide Total	156	38	21	27	30	21	8	6	10	317

Note: Crash data is for period from May 1, 2010 to April 30, 2015.

As shown in the summary table, the intersection of NC 84 and NC 16 had the highest overall number of collisions with 36 total crashes reported. The most common collision type was rear-end collisions, accounting for 75 percent of crashes at this intersection. The signalized NC 84 and Waxhaw-Indian Trail Road intersection had the second highest number of collisions (35) with the most common type also being rear-ends. The unsignalized NC 84 and Antioch Church Road intersection had 19 crashes, with the most common type again being rear-ends. This is particularly high for an unsignalized T-intersection of two-lane roadways. The lack of left-turn or right-turn lanes and skew angle likely contribute to the number of collisions at this location.

Table 2-5 compares the crash rates for NC 16 and NC 84 to similar corridors statewide. NCDOT provides calculated rates for facility types based on data collected statewide. For the purpose of comparison, both corridors are classified as undivided, two lane, rural NC routes. However, since NC 16 was recently upgraded to a four-lane divided facility, the statewide averages for similar four-lane divided facilities are listed as well. During the five years studied, there were no fatalities along either NC 16 or NC 84.

The facility-wide crash rates for NC 16 are higher than the statewide average for similar facilities. This corridor recorded above average crash rates for all crash rates examined, except fatal crashes. Similarly, the facility-wide crash rates for NC 84 are higher than the statewide average for similar facilities, with the exception of the fatal and night crash rates.

Table 2-5. Facility Crash Rate Comparison

Roadways	Total Crash Rate	Fatal Crash Rate	Non-Fatal Injury Crash Rate	Night Crash Rate	Wet Crash Rate
NC 16 between Lochaven Road and NC 84	329.77	0.00	63.29	116.59	46.63
NC 84 between NC 16 and Waxhaw-Indian Trail Road	284.15	0.00	62.75	64.54	45.72
Statewide Rural North Carolina Routes (2 lanes, undivided) ¹	170.45	1.70	51.58	68.70	22.84
Statewide Rural North Carolina Routes (4 lanes, divided) ¹	86.39	0.46	25.62	36.13	10.86

Note: Crash data is for period from May 1, 2010 to April 30, 2015. All crash rates per 100 million vehicle miles traveled.

¹ 2010-2012 statewide crash rates for rural North Carolina routes.

2.3 Benefits of Proposed Project

The proposed project includes capacity improvements to improve overall traffic congestion, as well as improvements at key intersections to improve intersection operations. The proposed improvements are expected to provide a safer facility as a secondary benefit by reducing the risk of collisions.

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3.0 ALTERNATIVES

A range of alternatives were reviewed for the proposed project. This chapter summarizes alternatives that were considered and eliminated, and the alternatives that were carried forward for detailed study. The alternatives carried forward for detailed study are shown on Figures 2A through 2G in Appendix A. Preliminary “Build” alternatives shown on Figure 6.

What alternatives were considered for the project?

3.1 Alternatives

3.1.1 No Build Alternative

With the No Build Alternative, no transportation improvements would be made beyond routine maintenance. This alternative assumes that future traffic would utilize existing roads and typical sections. The No Build Alternative would not improve the mobility and connectivity of NC 84 in the project study area. The No Build Alternative does not meet the Purpose and Need for the proposed project and was eliminated from further consideration.

3.1.2 Alternative Modes of Transportation

3.1.2.1 Travel Demand Management

Travel Demand Management (TDM) involves programs to encourage travelers to use alternatives to driving alone, and, in some cases, to encourage travelers not to travel at all. A major purpose of TDM is to reduce the number of single-occupant vehicles on the road during peak travel periods when roads are most congested. These programs can include van/car pools, flexible work schedules, telecommuting programs, and park & ride lots. The proposed project does not include any TDM measures. TDM improvements alone would not increase capacity or improve levels of service enough to prevent failing traffic conditions in the future design year 2035, nor would it improve system connectivity. The TDM Alternative does not meet Purpose and Need and was eliminated from further consideration.

3.1.2.2 Mass Transit

The project study area is not currently served by mass transit. The CTPs developed by CRTPO and Union County do not include any recommended public transportation improvements within the project study area or surrounding areas. A mass transit alternative would only minimally address mobility and would not improve connectivity in the project area. In addition, it would not be a reasonable alternative because of dispersed residential areas and employment centers, and diversity of trip origins and destinations. The Mass Transit Alternative does not meet Purpose and Need and was eliminated from further consideration.

3.1.2.3 Transportation Systems Management

Transportation Systems Management includes low-cost strategies to improve traffic flow and eliminate bottlenecks. Such improvements are typically implemented to maximize the efficiency of the existing roadway network, such that major widening projects and new roadways are not

necessary. These measures can include ramp lengthening, construction of auxiliary lanes, constructing new interchanges, improved signing and lane markings, and improved shoulder illumination. TSM improvements alone would not increase capacity or improve levels of service enough to prevent failing traffic conditions in the future design year 2035, nor would they improve system connectivity. The TSM Alternative does not meet Purpose and Need and was eliminated from further consideration.

3.1.3 Improve Existing

The “improve existing” alternative (Alternative B) would widen existing NC 84 to a four-lane median divided roadway from just east of the roundabout at Weddington-Matthews Road (SR 1344) to Waxhaw-Indian Trail Road. Alternative B would provide additional capacity on NC 84 in the project study; however, it would not to improve system connectivity. The “improve existing” alternative does not meet Purpose and Need and was eliminated from further consideration. Alternative B was shown at the June 2013 public meeting.

3.1.4 New Location (Relocate NC 84) Alternatives

Two new location alternatives extending Rea Road from the current intersection of Rea Road and NC 16 to existing NC 84 approximately 0.35 mile west of Twelve Mile Creek Road (relocation of NC 84) were developed for the proposed project (Alternatives A and C). Options for both of the new location alternatives were developed to minimize potential impacts to wetlands (Alternatives A2 and C2).

From the point where the new location alternatives tie to existing NC 84 west of Twelve Mile Creek Road to the project terminus just east of Waxhaw-Indian Trail Road, best-fit widening is proposed. The best-fit widening approach widens NC 84 to both sides of the existing roadway. The proposed alignment varies between symmetrical widening and widening north or south of the existing roadway as needed to minimize potential impacts to land use and important environmental features.

3.1.4.1 Alternative A

Alternative A begins approximately 0.12 mile west of the existing Rea Road/NC 16 intersection. From NC 16, Alternative A extends on new location to the east approximately 1.52 miles to tie into existing NC 84 approximately 0.40 mile west of Twelve Mile Creek Road. Alternative A then follows existing NC 84 to just east of Waxhaw-Indian Trail Road, a distance of approximately 2.67 miles. The total length of Alternative A is approximately 4.31 miles. Alternative A was shown at the June 2013 public meeting. Alternative A meets the Purpose and Need of the proposed project. However, Alternative A was eliminated from further consideration because it would result in approximately 0.39 acre of additional wetland impacts and approximately 351 more linear feet of stream impacts than Alternative A2.

3.1.4.2 Alternative A2

Alternative A2 is a variation of Alternative A that was developed to minimize potential wetland impacts. Alternative A2 begins approximately 0.12 mile west of the existing Rea Road/NC 16 intersection. From NC 16, Alternative A2 extends on new location to the northeast, then curves southeast to follow the same alignment as Alternative A. The new location portion of Alternative A2 is approximately 0.04 mile longer than Alternative A as a result of the alignment shift to reduce

wetland impacts. The total length of Alternative A2 is approximately 4.35 miles. Alternative A2 meets the Purpose and Need of the proposed project and was retained for further study.

3.1.4.3 Alternative C

Alternative C begins approximately 0.12 mile west of the existing Rea Road/NC 16 intersection. From NC 16, Alternative C extends on new location to the east following the same alignment as Alternative A for approximately 0.08 mile. Alternative C then turns southeast, roughly paralleling Alternative A to the north. The new location portion of Alternative C is approximately 1.73 miles long. Alternative C ties into existing NC 84 approximately 0.33 mile west of Twelve Mile Creek Road and then follows existing NC 84 to just east of Waxhaw-Indian Trail Road. The total length of Alternative C is approximately 4.35 miles. Alternative C meets the Purpose and Need of the proposed project. However, Alternative C was eliminated from further consideration because it would result in approximately 0.5 acre of additional wetland impacts and approximately 0.1 acre of additional pond impacts than Alternative C2.

3.1.4.4 Alternative C2

Alternative C2 is a variation of Alternative C that was developed to minimize potential wetland impacts. Alternative C2 begins approximately 0.12 mile west of the existing Rea Road/NC 16 intersection. From NC 16, Alternative C2 extends on new location to the southeast, then curves northeast to follow the Alternative C alignment. The new location portion of Alternative C2 is approximately 0.01 mile shorter than Alternative C. The total length of Alternative C2 is approximately 4.34 miles. Alternative C2 meets the Purpose and Need of the proposed project and was retained for further study.

3.2 Alternatives Considered

3.2.1 Detailed Study Alternatives

Alternatives A2 and C2 were selected for detailed study because they meet the project's Purpose and Need and minimize potential impacts to wetlands. Proposed improvements associated with Alternatives A2 and C2 are described in Chapter 4.0. Potential impacts to the human and natural environments that could result from the construction of the detailed study alternatives are described in Chapter 5.0.

3.2.2 Recommended Alternative

A preferred alternative will be selected after the Environmental Assessment is circulated for agency and public comment and a public hearing is conducted for the proposed project.

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4.0 PROPOSED IMPROVEMENTS

This chapter provides an overview of the proposed project's principal features as well as other features that are necessary to support the proposed improvements.

What are the principal features of the project?

4.1 Roadway Cross-Section and Alignment

The proposed typical section for the relocation and widening of NC 84, from the existing Rea Road intersection at NC 16 to Waxhaw-Indian Trail Road, consists of four lanes (two in each direction) with a 23-foot raised grass median (see Figure 7). A 12-foot inside lane, 14-foot outside lane (to accommodate bicycles) and a ten-foot berm are proposed in each direction. Mountable curb and gutter is provided on the inside lanes along the median. Curb and gutter along the outside lanes is 2.5 feet wide. The typical section includes side slopes of 2:1 (maximum) for all cut or fill heights.



The inclusion of sidewalks on both sides of the road is pending a cost-share agreement with local jurisdictions. The ten-foot berm provides sufficient room to allow for five-foot sidewalks, if desired by local jurisdictions. The Town of Weddington and the Village of Wesley Chapel have expressed an interest in a cost-share arrangement with NCDOT for the inclusion of sidewalks in the proposed project (see Appendix B).

4.2 Right-of-Way and Access Control

The proposed right-of-way width is 150 feet. No control of access is proposed; however, the project is expected to be a median-divided boulevard-type facility. While the addition of a median will not eliminate access to any parcels, it will change the way many parcels are accessed to right-in/right-out.



Changes in access design, such as incorporating a median or changing a full median opening to a directional opening, can reduce traffic conflicts and the potential for crashes.

In addition to median openings associated with intersections (see Section 4.6), the proposed project includes a directional median opening that allows left-turns into both Weddington Optimist Park entrances. Traffic exiting the park would be right-out only.

The proposed project will close the two existing entrances to Southbrook Community Church and provide a new entrance at a proposed four-way signalized intersection at Lester Davis Road.

Access to the Shops at Wesley Chapel Shopping Center and the Village Commons Shopping Center west of Waxhaw-Indian Trail Road is currently permitted from both eastbound and westbound lanes on NC 84. The proposed project will convert access to these shopping areas to right-in/right-out only.

Weddington High School

A detailed school traffic study was conducted for Weddington High School [*Final Traffic Assessment - Weddington High School* (VHB, 2014)].

The preliminary design for the proposed project incorporates recommendations from the school traffic study. In accordance with these recommendations, the central access drive currently utilized by buses will be closed.

Dedicated right-turn lanes and signals are proposed at the western and eastern (student and staff/carpool) entrances to reduce backups and improve traffic flow on NC 84. Left turns will be permitted into the school from NC 84; however, the access drives will be right-out only. NCDOT will continue to coordinate with Weddington High School through the project development and design process.



Weddington High School



4.3 Speed Limit

The proposed posted speed limit is 45 mph.

4.4 Design Speed

The proposed design speed is 50 mph.

4.5 Anticipated Design Exceptions

There are no anticipated design exceptions associated with the proposed project.

4.6 Intersections/Interchanges

No interchanges are proposed as part of the project. All existing and proposed intersections will be at-grade. There are no existing cross streets or proposed intersections along the new location portion of Alternatives A2 and C2 between NC 16 and NC 84. The proposed project includes signals at the following intersections:

- NC 16 and Rea Road - The existing three-way signalized intersection would be converted to a four-way signalized intersection, with dedicated left-turn and right-turn lanes and two through lanes at all approaches.
- Rea Road Extension (relocated NC 84) and existing NC 84 - Alternatives A2 and C2 include a new signalized “T” intersection where Rea Road Extension ties into existing NC 84 west of Twelve Mile Creek Road.
- Twelve Mile Creek Road and NC 84 – The existing signal will be retained. Two through lanes and a dedicated right-turn lane are proposed on NC 84 at this intersection. Dedicated right-turn and left-turn lanes and one through lane are proposed on Twelve Mile Creek Road.
- Weddington High School driveways and NC 84 – Signals are proposed at the eastern and western entrances to Weddington High School. The driveway to Grace Baptist Church will form the fourth leg of the western school entrance intersection. Left turns will be permitted into the church and school from NC 84; however, these access drives will be right-out only. A bulb-out is proposed adjacent to eastbound NC 84 at the signalized eastern school driveway signal for westbound traffic wanting to make a U-turn. Dedicated right-turn lanes into both school entrances are proposed.
- Deal Road, Hollister Estates Drive and NC 84 – A signal is proposed at this intersection. The preliminary design plans for Alternatives A2 and C2 include left-and right-turn lanes, and two through lanes on westbound NC 84. A left-turn lane, through lane and combined through-right lane are proposed on eastbound NC 84.
- Lester Davis Road, Southbrook Church entrance and NC 84 – A signal is proposed at this intersection. The proposed project realigns the Lester Davis Road intersection with NC 84 slightly to the west to eliminate the skew in the existing intersection. The eastern driveway of Southbrook Community Church is shifted slightly to the west to remain aligned with Lester Davis Road.
- Antioch Church Road and NC 84 – the proposed project realigns Antioch Church Road slightly to the west at NC 84 to eliminate the skew in the existing intersection. A signal is proposed at this intersection.

- Waxhaw-Indian Trail Road and NC 84 – This intersection is currently signalized, and will remain signalized with the proposed project. Intersection improvements include an additional left-turn lane from northbound Waxhaw-Indian Trail Road onto westbound NC 84 and an additional through lane on westbound NC 84.

4.7 Service Roads

There are no service roads in the project study area. No service roads are proposed as part of the project.

4.8 Railroad Crossings

There are no railroads in the project study area.

4.9 Structures

A *Preliminary Hydraulics Study for Environmental Impact* (Mulkey, September 2013) was prepared for the proposed project. The preliminary hydraulics analysis identified four major stream crossings in the project study area associated with the detailed study alternatives. Alternatives A2 and C2 each include two existing crossings and one new location crossing. Details related to these crossings are included in Table 4-1, and their locations are shown on Figures 2A through 2G.

Site 3 (Alternatives A2 and C2) is an existing crossing of Culvert Branch under NC 84. There is currently a single 12-foot by seven-foot reinforced concrete box culvert (RCBC) at this crossing. It is recommended that this structure be replaced with a triple barrel nine-foot by nine-foot RCBC.

Site 4 (Alternatives A2 and C2) is an existing crossing of West Fork Twelvemile Creek under NC 84. There is currently a triple barrel 11-foot by 12-foot RCBC at this crossing. It is recommended that this structure be replaced with dual 90-foot-long concrete girder bridges. A floodway modification may be required for this crossing.

Site 7 (Alternative A2) and **Site 8** (Alternative C2) are close enough in distance to be considered the same general hydraulic crossing for Mundys Run. A triple-barrel nine-foot by eight-foot RCBC is recommended for this new location crossing.



Site 3



Site 4



Sites 7 and 8

Table 4-1. Major Drainage Structures Recommendations

Site ¹ (Figure)	Alt. ID	Stream ID / Wetland ID ² (Stream Type ³)	Drainage Area (sq. mi.)	Existing Structure	Recommended Structure	Stream Impact ⁴ (linear ft.) / Wetland Impact (acres)	Structure Cost ⁵
				Number, Size, Structure Type (length)	Number, Size, Structure Type (length)		Recommended (vs. Bridge)
3 (2F)	A2, C2	Culvert Branch (P)	2.1	1@12'x7' RCBC (47 ft.)	3@9'x9' RCBC (145 ft.)	195 ft. / 0.0 ac.	\$477,015 (\$891,000)
4 (2F)	A2, C2	West Fork Twelve-mile Creek (P)	10.6	3@11'x12' RCBC (40 ft.)	Dual Concrete Girder Bridges (90 ft. long by 40.5 ft. wide)	0.0 ft. / 0.0 ac.	\$802,000
7 (2D)	A2	Mundys Run (P)	1.4	New Location	3@9'x8' RCBC (128 ft.)	210 ft. / 0.0 ac.	\$449,940 (\$623,700)
8 (2D)	C2	Mundys Run (P)	1.4	New Location	3@9'x8' RCBC (117 ft.)	189 ft. / 0.0 ac.	\$409,023 (\$891,000)

NOTES: Major drainage structures are defined as 72 inches in diameter or greater. Final structure sizes will be determined during final design.

¹ Site numbers correspond to the project's preliminary hydraulic study's site numbers. Some preliminary hydraulic sites were avoided during design and are therefore not included in the table.

² No wetlands impacted by proposed structures.

³ P = Perennial, I = Intermittent

⁴ Stream impacts calculated based on slope stake limits plus 25 feet (minus existing structures).

⁵ Cost estimates are preliminary and will be updated during final design. Structure costs (non-bridge) include estimated mitigation costs.

4.10 Bicycle and Pedestrian Facilities

NCDOT's *Complete Streets Policy* (adopted July 2009) requires consideration and incorporation of multimodal alternatives (e.g., bicycle accommodations and sidewalks) in the design and improvement of all appropriate transportation projects within a growth area of a town or city unless exceptional circumstances exist. As discussed in Sections 2.2.2.2 and 2.2.2.3, many of the transportation and land use plans for the local planning jurisdictions support bicycle and pedestrian facilities in the project area, including as part of the proposed project. The preliminary designs of the detailed study alternatives include 14-foot outside lanes to accommodate bicycles; however, no designated bicycle lane striping is proposed. The ten-foot berm on both sides of the proposed typical section provides sufficient room to allow for five-foot sidewalks, if desired by local jurisdictions.

The Village of Wesley Chapel expressed a desire to have sidewalks included as part of the proposed project in a May 13, 2015 letter (see Appendix B). At their January 12, 2015 meeting, the Weddington Town Council adopted a resolution expressing the Town's interest in having NCDOT include sidewalks as part of the proposed project (see Appendix B).

NCDOT will continue to coordinate with the Town of Weddington and the Village of Wesley Chapel regarding the inclusion of sidewalks as part of the proposed project within their jurisdiction.

4.11 Utilities

Utilities in the project area include water, sewer, gas, cable and telephone. Power poles line NC 84 and switch from side to side depending on roadway curvature, shoulder widths and distribution of service. There is a large power transmission tower near the roadway on the Weddington Optimist Park property. Utilities along the project will be relocated prior to construction. Moderate impacts to existing utility infrastructure are anticipated.

4.12 Landscaping

No special landscaping is proposed at this time.

4.13 Noise Barriers

Noise abatement measures are not proposed for this project because they do not meet the feasible and reasonable criteria within the NCDOT Traffic Noise Abatement Policy.

4.14 Work Zone, Traffic Control and Construction Phasing

The project area will be signed to alert drivers to changes in traffic patterns during construction. Where widening is proposed, traffic will be maintained on the existing road while the new lanes are constructed. When the new lanes are complete, traffic will be shifted onto the new construction and the existing lanes widened and resurfaced as necessary.

A Transportation Management Plan will be developed in accordance with NCDOT's Work Zone Safety and Mobility Policy. During construction of the project, the work zone strategies, practices and procedures that were put into place for the project will be continuously monitored, assessed and improved. Efforts will be made to provide continuous access to businesses and residences, while at the same time ensuring work zone safety and efficiency.

5.0 ENVIRONMENTAL EFFECTS OF PROPOSED ACTION

This chapter provides an overview of the natural and human environmental features within the project study area. The project's potential effects on resources and people are discussed.

What resources are in the project area? What are the potential effects of this proposed project to people and the natural environment?

5.1 Natural Resources

Field investigations were conducted by qualified biologists between May and September 2013 to assess the existing natural environment within the project study area. Details of the methodology and investigations supporting the information provided in this section are provided in the *Natural Resources Technical Report* (NRTR) (Mulkey, October 2014).

5.1.1 Biotic Resources

5.1.1.1 Terrestrial Communities and Wildlife

Terrestrial Communities

Two primary terrestrial communities were observed in the study area: dry-mesic oak-hickory forest and man-dominated maintained/disturbed land. These communities cover approximately 932 acres, which include approximately 388 acres of dry-mesic oak-hickory forest and 544 acres of maintained/disturbed land. Five other terrestrial communities were observed and are described below. Terrestrial communities in the study area may be impacted by project construction as a result of grading and paving of portions of the study area. Anticipated impacts to terrestrial communities by detailed study alternative are summarized in Table 5-1.

Table 5-1. Terrestrial Community Types and Anticipated Impacts

Community Type	Total Acres in Study Area	Percentage of Study Area	Anticipated Impacts (acres)	
			A2	C2
Maintained/Disturbed Land	544.5	48.3	75.1	71.5
Dry-Mesic Oak-Hickory Forest	387.9	34.4	28.5	32.0
Mesic Mixed Hardwood Forest	76.9	6.8	11.5	11.3
Cutover/Early Successional	62.6	5.6	6.3	7.3
Agriculture/Pasture	37.4	3.3	4.0	4.2
Pine Plantation	17.8	1.6	0.0	0.0
Piedmont/Low Mountain Alluvial Forest	0.8	<0.1	0.0	0.0
Total	1,127.9	100.0	125.4	126.3

Maintained/Disturbed

Maintained/disturbed areas are prevalent throughout the study area in places where the vegetation is periodically mowed, such as roadside shoulders and residential lawns. The dominant vegetation in this community is comprised of mostly of vines and low growing grasses and herbs, including fescue, shrub lespedeza, clover, heal-all, wild onion, plantain, broomsedge, goldenrod, Virginia creeper, common ragweed, poison ivy, dandelion, Japanese honeysuckle, and henbit. Dominant shrubs include Chinese privet and pokeweed. There are wetlands included in this community classified as headwater forest and non-tidal freshwater marsh using the North Carolina Wetland Assessment Method (NCWAM) classification.

Dry-Mesic Oak-Hickory Forest

The dry-mesic oak-hickory forest typically occurs on mid-slopes, low ridges, or upland flats on a variety of upland soils (Schafale and Weakley, 1990). The forest is dominated by white oak, northern red oak, pignut hickory, mockernut hickory, yellow poplar, red maple, sweet gum, and loblolly pine in the canopy. The shrub and sapling layer is dominated by sourwood, red maple, flowering dogwood, American holly, and eastern red cedar. The herbaceous layer is sparse with common species consisting of heartleaf and rattlesnake plantain. There are wetlands included in this community classified as headwater forest NCWAM classification.

Mesic Mixed Hardwood Forest

The mesic mixed hardwood forest community exists along slopes and in ravines, in well-drained, somewhat acidic soils (Schafale and Weakley, 1990). Dominant species in this community include American beech, red maple, yellow poplar, and northern red oak in the overstory, and flowering dogwood, Chinese privet, and Christmas fern in the shrub and ground layers. There are wetlands included in this community classified as bottomland hardwood forest, floodplain pool, and seep using the NCWAM classification.

Cutover/Early Successional

The cutover/early successional community consists of areas that have been logged within five years and are in early forest succession. Small loblolly pine, sweet gum, red maple, and yellow poplar are common pioneer tree/sapling species. Other dominant species include common greenbrier, blackberry, Japanese honeysuckle, broomsedge, and goldenrod. There are wetlands included in this community classified as headwater forest using the NCWAM classification.

Agriculture/Pasture

The agriculture/pasture community is scattered throughout the study area. This community includes land used to sustain livestock and is comprised of grasses and herbs similar to those in the maintained/disturbed community such as fescue, clover, wild onion, broomsedge, common ragweed, goldenrod, and henbit.

Pine Plantation

The pine plantation community occurs intermittently throughout the project study area and is characterized mostly by planted loblolly pine in the overstory, along with sweet gum and red maple in the sapling/shrub layer. Dominant shrubs, herbs and vines that also occur in this community include blackberry, common greenbrier, Virginia creeper, and Japanese honeysuckle.

Piedmont/Low Mountain Alluvial Forest

The piedmont/low mountain alluvial forest community, which occurs along river and stream floodplains on various alluvial soils, is only found in one location in the study area. This community is dominated by red maple, sweet gum, yellow poplar, and green ash in the canopy. Species present in the sapling and shrub layer include saplings of the canopy species, as well as eastern red cedar, musclewood, redbud, flowering dogwood, Chinese privet, common greenbrier, and multiflora rose. The herbaceous and vine layers contain more grasses, especially Japanese grass, sedges, Christmas fern, Virginia creeper, and muscadine. There are wetlands included in this community classified as headwater forest using the NCWAM classification.

Terrestrial Wildlife

Terrestrial communities in the study area are comprised of both natural and disturbed habitats that may support a diversity of wildlife species (those species actually observed are indicated with *). Mammal species that commonly use forested habitats and stream corridors found within the study area include species such as eastern cottontail*, raccoon*, white-footed mouse, gray squirrel*, Virginia opossum, beaver*, gray fox, woodchuck, striped skunk, coyote, and white-tailed deer*. Birds that commonly use forest and forest edge habitats include the American crow*, blue jay, Carolina chickadee*, northern cardinal*, Carolina wren*, northern flicker, downy woodpecker*, tufted titmouse*, mourning dove, northern bobwhite, barred owl, Cooper’s hawk, red-shouldered hawk*, American robin*, eastern phoebe*, northern mockingbird*, red-bellied woodpecker*, white-breasted nuthatch, wood thrush*, and yellow-rumped warbler. Birds that may use the open habitat or water bodies within the study area include eastern bluebird, red-tailed hawk*, mallard, great blue heron, wood duck, Canada goose*, red-winged blackbird, and turkey vulture*. Reptile and amphibian species that may use terrestrial communities located in the study area include the green tree frog*, eastern box turtle*, eastern fence lizard*, five-lined skink*, black racer, brown water snake, copperhead, eastern king snake, rat snake, rough green snake, and spring peeper*.

Fragmentation and loss of forested habitat may impact wildlife in the area by reducing potential nesting and foraging areas, as well as displacing animal populations. Forested areas provide connectivity between populations, allowing for gene flow, as well as a means of safe travel from one foraging area to another. The anticipated impacts to forests from the detailed study alternatives are summarized in Table 5-2.

Table 5-2. Anticipated Forest Impacts

	Alternatives	
	A2	C2
Forest Impacts (acres) ¹	39.9	43.2

¹ Forest impacts include the following terrestrial communities: Dry-Mesic Oak-Hickory Forest, Mesic Mixed Hardwood Forest, Pine Plantation, and Piedmont/Low Mountain Alluvial Forest.

5.1.1.2 Aquatic Communities

Aquatic communities in the study area consist of both perennial and intermittent piedmont streams, as well as still water ponds. Perennial streams in the study area could support banded water snake, eastern mosquito-fish, redear sunfish, pumpkinseed sunfish, warmouth, and redbreast sunfish. Intermittent streams in the study area are relatively small in size and would support aquatic communities of crayfish and various benthic macroinvertebrates. Pond habitats could support bluegill, bullhead catfish, bullfrog*, snapping turtle, yellowbelly slider*, and southern toad.

5.1.1.3 Invasive Species

Four species from the NCDOT Invasive Exotic Plant List for North Carolina were found to occur in the study area. The species identified were Chinese privet (Threat), multiflora rose (Threat), Japanese grass (Threat), and Japanese honeysuckle (Moderate Threat).

NCDOT's BMPs for the management of invasive plant species will be followed, which will comply with Executive Order 13112. NCDOT follows guidelines set forth in the *Invasive Exotic Plants of North Carolina Manual* (NCDOT, 2008) for BMPs. Management will be primarily done with herbicides identified in the *NC Agricultural Chemicals Manual* (NCSU, 2015), which lists treatments provided by North Carolina state law. When necessary, equipment sanitation requirements will be included to prevent soil with seeds and vegetative parts from spreading the invasive species. All state and federal rules for transporting and disposing restricted, contaminated, or quarantined material are also included in the management protocol.

5.1.1.4 Summary of Potential Biotic Community Effects

Anticipated biotic community impacts by alternative as shown in Tables 5-1 and 5-2 were calculated based on the proposed roadway widening slope stake limits plus an additional 25 feet. Impacts are based upon preliminary design and could change during final design.

Temporary fluctuation in populations of animal species that use terrestrial areas is anticipated during the course of construction. Slow-moving, burrowing, and subterranean organisms will be directly impacted by construction activities, while mobile organisms will be displaced to adjacent communities. Habitat reduction can occur when project construction affects undisturbed areas surrounding an existing man-dominated environment. When this occurs, competitive forces in the adapted communities will result in a redefinition of population equilibrium.

Aquatic organisms are very sensitive to the discharges and inputs resulting from construction activities. Impacts usually associated with in-stream construction include increased channelization and scouring of the streambed. In-stream construction alters the substrate and impacts adjacent stream-side vegetation. Such disturbances within the substrate lead to increased siltation that can clog the gills and feeding mechanisms of benthic organisms, fish, and amphibian species. The populations of these organisms are slow to recover and may not do so once a stream has been severely impacted.

During the construction stages of the proposed project, appropriate measures will be taken to avoid spillage of construction materials and control runoff. Such measures will include an erosion and sedimentation control plan, provisions for disposal and handling of waste materials and storage, stormwater management measures, and appropriate road maintenance measures. NCDOT's *Best Management Practices for Protection of Surface Waters* (BMP-PSW) and sedimentation control guidelines will be enforced during the construction stages of the project. Long-term

impacts to water resources may include permanent changes to the stream banks and temperature increases caused by the removal of stream-side vegetation.

5.1.2 Waters of the United States

Water resources within the project study area are part of the Catawba River Basin (US Geological Survey (USGS) Hydrologic Unit 03050103). There are 28 jurisdictional streams (Table 5-3), 15 jurisdictional ponds (Table 5-4), and 24 jurisdictional wetlands (Table 5-5) in the project study area (see Figures 2A through 2G). All of the jurisdictional streams identified within the project area have been assigned a primary water resource classification of “C”.

Jurisdictional areas identified in the project study area were initially verified by the USACE and NCDWR on April 14, 2014. Additional delineations were conducted as a result of the field verification meeting. Those jurisdictional features were verified during a second site review on June 19, 2014. A copy of the Preliminary Jurisdictional Determination letter is included in Appendix B.

5.1.2.1 Streams and Other Surface Waters

Mundys Run, Culvert Branch and West Fork Twelvemile Creek account for the named streams in the project study area. Unnamed tributaries (UTs) to the three streams are found throughout the study area.

Mundys Run flows southeast through the western portion of the study area (see Figures 2A through 2E). Alternatives A2 and C2 cross the stream at Hydraulic Sites 7 and 8, respectively.

Culvert Branch flows southeast in the central to eastern portion of the study area (see Figures 2A and 2F). Alternatives A2 and C2 cross Culvert Branch at Hydraulic Site 3.

West Fork Twelvemile Creek flows southwest in the eastern portion of the study area (see Figures 2A and 2F). Alternatives A2 and C2 cross West Fork Twelvemile Creek at Hydraulic Site 4.



Mundys Run



Culvert Branch



West Fork Twelvemile Creek

A total of 28 jurisdictional streams, including 20 intermittent streams, five perennial streams, and three streams with both perennial and intermittent reaches, were delineated in the project study area. Table 5-3 summarizes the physical characteristics of study area streams, as well as the anticipated impacts to these streams by detailed study alternative.

The project occurs within the Catawba River Basin, which is protected under provisions of the Catawba River Buffer Rules administered by NCDWR. However, Catawba River Buffer Rules only apply to the Catawba River mainstem below Lake James and along mainstem lakes from and including Lake James to the South Carolina border. Therefore, streams in the study area are not subject to Catawba River Buffer Rules.

Point source dischargers throughout North Carolina are regulated through the National Pollutant Discharge Elimination System (NPDES) program. There are no NPDES sites within or near the project study area.

There are no High Quality Waters (HQW), Outstanding Resource Waters (ORW), or water supply watersheds (WS-I or WS-II) within one mile downstream of the study area. There are no North Carolina 2014 Final 303(d) listed streams for sedimentation or turbidity, and no benthic and/or ambient water quality monitoring sites within one mile and downstream of the study area. There are no designated NC Wildlife Resources Commission (NCWRC) trout waters, anadromous fish waters, or Primary Nursery Areas (PNA) within one mile downstream of the study area. Union County is not a designated trout county. The National Marine Fisheries Service (NMFS) has not identified any streams within the project study area as an Essential Fish Habitat. There are no streams within the study area designated by the USACE as a Navigable Water under Section 10 of the Rivers and Harbors Act.

Table 5-3. Characteristics and Anticipated Impacts for Study Area Streams

Stream Name, ID	Figure	DWR Index No.	Best Use Class	Bank Height (ft.)	Bankfull Width (ft.)	Water Depth (in.)	Channel Substrate ¹	Velocity	Clarity	Stream Type ²	Length in Study Area (linear ft.)	Anticipated Impacts ³ (linear feet) by Alternative	
												A2	C2
UT to West Fork Twelvemile Creek, SA	2G	11-138-1	C	1	1-2	1	Sand	Slow	Clear	I	1,099	237	237
UT to West Fork Twelvemile Creek, SB	2F	11-138-1	C	3-5	4-6	4-12	S/S/B	Moderate	Slightly Turbid	P	1,356	0	0
West Fork Twelvemile Creek	2F	11-138-1	C	7-10	12-15	6-24	Cobble	Moderate	Clear	P	1,362	0	0
UT to West Fork Twelvemile Creek, SD	2F, 2G	11-138-1	C	1-2	3	1-2	Silt	Slow	Slightly Turbid	I	75	0	0
Culvert Branch	2F	11-138-1-1	C	3-4	6-14	1-3	S/S/G/C	Slow	Slightly Turbid	P	966	189	189
UT to Culvert Branch, SF	2F	11-138-1-1	C	0.2-1	1-2	1-2	Sand	Moderate	Clear	I	123	0	0
UT to Mundys Run, SG	2D	11-138-1-2	C	3-4	8-12	12-24	S/S/G/C	Moderate	Clear	P	1,262	0	0
Mundys Run	2B, 2D	11-138-1-2	C	1-4	2-12	2-24	S/S/G/C/B	Moderate	Clear	I	691	0	0
										P	5,311	211	190
UT to Mundys Run, SI	2B, 2C	11-138-1-2	C	6-7	4-6	3-6	Sand	Slow	Clear	P	4,560	0	0
UT to Mundys Run, SJ	2B, 2D	11-138-1-2	C	1-3	2	1-2	Sand	Slow	Slightly Turbid	I	68	0	0
UT to Mundys Run, SK	2D	11-138-1-2	C	3-4	3-5	4-10	S/S/G/C	Slow	Clear	I	2,441	76	0
UT to Mundys Run, SL	2D	11-138-1-2	C	3-4	3	0-1	Sand	N/A	N/A	I	54	0	0
UT to Mundys Run, SM	2B, 2D	11-138-1-2	C	3	3-4	2-6	Sand	Moderate	Clear	I	654	0	0
										P	1,172	0	0
UT to Mundys Run, SN	2D	11-138-1-2	C	0.5-1	2-3	3-4	Sand	Slow	Clear	I	195	0	0
UT to Mundys Run, SO	2B	11-138-1-2	C	5-6	3-4	2-5	Silt	Slow	Clear	I	453	0	0
UT to Mundys Run, SP	2B	11-138-1-2	C	2-3	2-3	2-5	Sand	Slow	Slightly Turbid	I	1,251	0	228
UT to Mundys Run, SQ	2B	11-138-1-2	C	3-5	2-3	4-10	S/S/C	Slow	Slightly Turbid	I	1,399	0	0
UT to Mundys Run, SR	2B	11-138-1-2	C	2-4	3-4	3-6	Sand	Slow	Slightly Turbid	I	659	0	344
UT to Mundys Run, SS	2B	11-138-1-2	C	2-4	3-5	3-5	Sand	Slow	Clear	I	3,005	414	870
UT to Mundys Run, ST	2C	11-138-1-2	C	4	4	3-6	Sand	Moderate	Slightly Turbid	I	446	0	0
UT to Mundys Run, SU	2C	11-138-1-2	C	2	2-3	3-6	Sand	Slow	Slightly Turbid	I	776	0	0
UT to Mundys Run, SV	2B	11-138-1-2	C	3-5	4-5	6-10	S/G/C/B	Moderate	Slightly Turbid	I	571	0	0
										P	899	0	226
UT to Mundys Run, SW	2D	11-138-1-2	C	3-4	4-5	0-1	S/G/C/B	Moderate	Slightly Turbid	I	1,163	0	0
UT to West Fork Twelvemile Creek, SX	2G	11-138-1	C	0.5-1	2	3-5	Sand	Moderate	Clear	I	396	0	0
UT to West Fork Twelvemile Creek, SZ	2G	11-138-1	C	1	2	4-6	Sand	Moderate	Clear	I	305	110	110
UT to Mundys Run, SAA	2E	11-138-1-2	C	1	1-1.5	2-3	Sand	Slow	Clear	I	896	0	281
UT to Mundys Run, SAB	2D	11-138-1-2	C	1	1	2-3	Sand	Slow	Clear	I	117	0	0
UT to Mundys Run, SAD	2D	11-138-1-2	C	3-5	3-4	2-3	Sand	Slow	Clear	I	622	160	258
Total Intermittent											17,459	997	2,328
Total Perennial											16,888	400	605
Total											34,347	1,397	2,933

¹ S/S/B – silt/sand/bedrock, S/S/G/C/B – silt/sand/gravel/cobble/bedrock, S/S/G/C – silt/sand/gravel/cobble, S/S/C – silt/sand/cobble, S/G/C/B – sand/gravel/cobble/bedrock

² P-Perennial, I-Intermittent

³ Impacts are calculated based on slope stake limits plus 25 feet.

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Fifteen ponds were identified within the study area. All of the ponds appear to be man-made. Table 5-4 summarizes the approximate size of each pond, as well as the anticipated impacts of the detailed study alternatives. If the pond is directly connected to a jurisdictional stream or wetland, the name of that feature is also indicated in Table 5-4.

Table 5-4. Characteristics and Anticipated Impacts for Other Surface Waters

Pond ID	Figure	Appearance	Connected Feature Map ID ¹	Area (acres)	Anticipated Impacts (acres) ²	
					A2	C2
PA	2G	Manmade	N/A	1.15	0.00	0.00
PB	2G	Manmade	SB/WB	0.62	0.00	0.00
PC	2E	Manmade	N/A	0.38	0.00	0.00
PD	2E	Manmade	N/A	1.81	0.00	0.00
PE	2D	Manmade	SN/WM	1.15	0.00	0.00
Varda Lake	2C	Manmade	N/A	1.58	0.00	0.00
PG	2B	Manmade	N/A	0.35	0.00	0.00
PH	2B	Manmade	WN	0.27	0.25	0.00
PI	2B	Manmade	SP	0.83	<0.01	0.00
PJ	2C	Manmade	SG	0.87	0.00	0.00
PK	2C	Manmade	ST	0.27	0.00	0.00
PL	2G	Manmade	N/A	0.09	0.00	0.00
PN	2B	Manmade	SV	2.14	0.00	0.00
PO	2B	Manmade	SV	1.05	0.00	0.00
PP	2E	Manmade	N/A	0.20	0.00	0.00
Total				12.76	0.25	0.00

¹ N/A indicates connection to a jurisdictional feature located outside of the study area.

² Impacts are calculated based on slope stake limits plus 25 feet.

5.1.2.2 Wetlands

A total of 24 jurisdictional wetlands were identified within the study area. USACE wetland delineation forms and NCDWR wetland rating forms for each site are included in the NRTR. Table 5-5 summarizes wetland classification and quality rating data, as well as the anticipated impacts to study area wetlands by detailed study alternative. Descriptions of the terrestrial communities found at each wetland location are presented in Section 5.1.1.1. Wetlands are present in all terrestrial communities in the study area except for the agriculture/pasture and pine plantation communities.

Table 5-5. Characteristics and Anticipated Impacts for Jurisdictional Wetlands

Wetland ID	Figure	NCDWR Wetland Rating	NCWAM Classification	Hydrologic Classification	Acres in Study Area	Anticipated Impacts (acres) ¹	
						A2	C2
WA	2G	12	Headwater Forest	Riparian	0.05	0.00	0.00
WB	2G	12	Headwater Forest	Riparian	0.08	0.00	0.00
WC	2F, 2G	18	Headwater Forest	Riparian	0.17	0.00	0.00
WD	2F	10	Headwater Forest	Riparian	0.08	0.00	0.00
WE	2F	18	Non-Tidal Freshwater Marsh	Riparian	0.01	0.01	0.01
WF	2F	49	Bottomland Hardwood Forest	Riparian	0.62	0.00	0.00
WG	2C	18	Headwater Forest	Riparian	0.10	0.00	0.00
WI	2D	45	Bottomland Hardwood Forest	Riparian	0.55	0.00	0.00
WJ	2D	8	Seep	Riparian	0.02	0.00	0.00
WL	2D	8	Headwater Forest	Riparian	0.02	0.00	0.00
WM	2D	16	Headwater Forest	Riparian	0.23	0.00	0.00
WN	2B	18	Headwater Forest	Riparian	0.46	0.08	0.00
WO	2B	12	Headwater Forest	Riparian	0.02	0.00	<0.01
WP	2B	24	Headwater Forest	Riparian	0.46	0.00	0.00
WQ	2B	20	Headwater Forest	Riparian	0.35	0.00	0.00
WR	2C	23	Headwater Forest	Riparian	0.17	0.00	0.00
WS	2C	22	Headwater Forest	Riparian	0.13	0.00	0.00
WT	2B	12	Headwater Forest	Riparian	0.01	0.00	0.01
WU	2G	10	Headwater Forest	Riparian	0.10	0.00	0.00
WV	2B	14	Headwater Forest	Riparian	0.06	0.00	0.00
WY	2D, 2E	14	Headwater Forest	Riparian	0.30	0.01	0.10
WZ	2C	28	Headwater Forest	Riparian	0.31	0.00	0.00
WAA	2B	4	Headwater Forest	Riparian	0.23	0.00	0.00
WZZ	2D	23	Headwater Forest	Riparian	0.11	0.00	0.00
Total Riparian					4.64	0.10	0.12
Total Non-Riparian					0.00	0.00	0.00
Total					4.64	0.10	0.12

¹ Impacts are calculated based on slope stake limits plus 25 feet.

5.1.2.3 Summary of Potential Waters of the United States Impacts

Anticipated impacts to streams, wetlands and other surface waters [as shown in Tables 5-3 through 5-5] are based upon preliminary design and could change during final design.

Construction activities for the proposed project would include the construction of a new bridge and replacing and extending existing culverts. The construction activities associated with the project will strictly follow NCDOT's *Best Management Practices for Construction and Maintenance Activities* (BMP-CMA) and *Protection of Surface Waters* (BMP-PSW). Sedimentation control guidelines will be strictly enforced during the construction stages of the project.

Primary sources of water quality degradation in urban and developed areas are non-point sources of discharge, which include surface water runoff and runoff from construction activities. Short-term impacts to water quality from construction-related activities include increased sedimentation and turbidity in nearby water resources. Long-term impacts include substrate destabilization, bank erosion, increased turbidity, altered flow rates, and possible temperature fluctuations within the channel due to removal of streamside vegetation.

5.1.2.4 Avoidance, Minimization and Mitigation

Section 404 Avoidance and Minimization

Detailed Study Alternatives A2 and C2 were designed to minimize impacts to resources. However, it is not feasible for the proposed project to completely avoid impacts to the Waters of the US and still meet the purpose and need of the project. NCDOT will attempt to avoid and minimize impacts to streams and wetlands to the greatest extent practicable in choosing a preferred alternative and during final design. The following avoidance and minimization measures have been incorporated into the proposed project:

- The new location alignments of Alternatives A2 and C2 were designed to avoid the confluence of tributaries to Mundys Run.
- Alternative A2 was developed as a variation of Alternative A to minimize potential wetland impacts. Alternative A2 includes an alignment shift near the western terminus that would eliminate impacts to Wetland WP and reduce impacts to Wetland WN. As a result, the total wetland impacts with Alternative A2 are reduced by approximately 0.39 acre and stream impacts are reduced by 351 linear feet. Pond impacts are increased by 0.16 acre with Alternative A2.
- Alternative C2 was developed as a variation of Alternative C to minimize potential wetland impacts. Alternative C2 includes an alignment shift near the western terminus that would eliminate impacts to Wetlands WN and WP, reducing total wetland impacts by approximately 0.50 acre. Alternative C2 has no pond impacts compared to Alternative C, which has 0.10 acre of pond impacts. Alternative C2 increases stream impacts by 710 linear feet.
- Intersection improvements at NC 84 and Shannon Woods Lane were designed to avoid a major hydraulic crossing of an unnamed tributary to West Fork Twelvemile Creek.
- Intersection improvements at NC 84 and Lester Davis Road were designed to avoid a major hydraulic crossing of an unnamed tributary to West Fork Twelvemile Creek.

- Widening associated with the roadway improvements will be performed within the existing right-of-way to the maximum extent possible to minimize the amount of impacts to undisturbed areas.

Other Avoidance and Minimization Measures

- Proposed improvements along NC 84 and Lester Davis Road in the vicinity of Dogwood Park were designed to avoid impacts to the park.
- Avoidance and minimization measures were incorporated into Alternatives A2 and C2 to avoid an adverse effect to historic properties.
- The widening portion of the proposed alignment varies between symmetrical widening and widening north or south of the existing roadway, as needed, to minimize impacts to land use and important environmental features.

Compensatory Mitigation

The purpose of compensatory mitigation is to replace the lost functions and values from a project's impacts to Waters of the United States, including wetlands. NCDOT will investigate potential on-site stream and wetland mitigation opportunities once a preferred alternative has been selected. Off-site mitigation needed to satisfy the federal Clean Water Act requirements for this project will be provided by the NCDENR Ecosystem Enhancement Program (EEP) in accordance with the "North Carolina Department of Environment and Natural Resources' Ecosystem Enhancement Program In-Lieu Fee Instrument", dated July 28, 2010.

5.1.2.5 Anticipated Permit Requirements

The proposed action will require the following environmental regulatory permits pursuant to Section 401 and 404 of the Clean Water Act of 1977, as amended:

- A Section 404 Permit from USACE is required for any activity occurring in water or wetlands that would discharge dredged or fill material into Waters of the United States and adjacent wetlands. Due to the size of the project and potential impacts an Individual Permit (IP) may be required. The USACE holds the final discretion as to what permit will be required to authorize project construction.
- A Section 401 Water Quality Certification from NCDWR is required for activities that may result in discharge to Waters of the United States to certify the discharge will be conducted in compliance with applicable state water quality standards. The Section 401 Water Quality Certification will be required prior to issuance of the Section 404 permit.

5.1.3 Rare and Protected Species

Some populations of fauna and flora have been, or are, in decline due to either natural forces or their inability to coexist with humans. Federal law (under the provisions of Section 7 of the Endangered Species Act [ESA] of 1973, as amended) requires that any federal action likely to adversely affect a species listed as federally protected be subject to review by USFWS or NMFS. Prohibited actions which may affect any species protected under the ESA are outlined in Section 9 of the Act.

Species identified as Endangered, Threatened, or Special Concern (SC) by the North Carolina Natural Heritage Program (NCNHP) list of rare plant and animal species are afforded state protection under the State Endangered Species Act and the North Carolina Plant Protection and Conservation Act of 1979.

5.1.3.1 Federally Protected Species

As of March 25, 2015, the USFWS lists three federally-protected species for Union County (Table 5-6). A brief description of each species' habitat requirements follows, along with the Biological Conclusion rendered based on survey results in the study area. Habitat requirements for each species are based on the current best available information from referenced literature and/or USFWS.

Table 5-6. Federally-Protected Species for Union County

Scientific Name	Common Name	Federal Status ¹	Habitat Present	Biological Conclusion
<i>Lasmigona decorata</i>	Carolina heelsplitter	E	Yes	No Effect
<i>Rhus michauxii</i>	Michaux's sumac	E	Yes	No Effect
<i>Helianthus schweinitzii</i>	Schweinitz's sunflower	E	Yes	No Effect

¹ E – Endangered

Carolina heelsplitter

Biological Conclusion: No Effect

The Carolina heelsplitter was historically known from several locations within the Catawba River and Pee Dee River systems in North Carolina and the Pee Dee River and Savannah River systems, and possibly the Saluda River system, in South Carolina. In North Carolina, the species is now known only from a handful of streams in the Pee Dee River and Catawba River systems. The species exists in very low abundances, usually within six feet of shorelines, throughout its known range. The general habitat requirements for the Carolina heelsplitter are shaded areas in large rivers to small streams, often burrowed into clay banks between the root systems of trees, or in runs along steep banks with moderate current. The more recent habitat where the Carolina heelsplitter has been found is in sections of streams containing bedrock with perpendicular crevices filled with sand and gravel, and with wide riparian buffers.

Mussel surveys were conducted for the project between August 6 and August 28, 2013 by qualified biologists. Nine stream reaches were surveyed, including multiple sections of West Fork Twelvemile Creek, Mundy's Run, and Culvert Branch. Only three freshwater mussel species were documented. Based on relatively poor habitat quality, extremely low mussel taxa diversity and abundances, and isolation of the surveyed stream reaches from known occurrences, the mussel surveys determined that the project will have no effect on Carolina heelsplitter. Additionally, a review of North Carolina Natural Heritage Program (NCNHP) records, updated January 2015 indicates no known Carolina heelsplitter occurrence within one mile of the study area.

Michaux's sumac

Biological Conclusion: No Effect

Michaux's sumac, endemic to the inner Coastal Plain and lower Piedmont, grows in sandy or rocky, open, upland woods on acidic or circumneutral, well-drained sands or sandy loam soils with low cation exchange capacities. The species is also found on sandy or submesic loamy swales and depressions in the fall line Sandhills region, as well as in openings along the rim of Carolina bays; maintained railroad, roadside, power line, and utility rights-of-way; areas where forest canopies have been opened up by blowdowns and/or storm damage; small wildlife food plots; abandoned building sites; under sparse to moderately dense pine or pine/hardwood canopies; and in and along edges of other artificially maintained clearings undergoing natural succession. In the central Piedmont, it occurs on clayey soils derived from mafic rocks. The plant is shade intolerant and, therefore, grows best where disturbance (e.g., mowing, clearing, grazing, periodic fire) maintains its open habitat.

Suitable habitat for Michaux's sumac, consisting of open, sandy or rocky upland woods, is present in the western portion of the project study area in the form of a large cutover and a long power line right-of-way paralleling NC 84. Additionally, maintained open roadsides are located throughout the project study area. Surveys were conducted by qualified biologists throughout areas of suitable habitat on September 23-24, 2013. No individuals of Michaux's sumac were observed. A review of NCNHP records, updated January 2015, indicates one historic record of Michaux's sumac within one mile of the study area. This occurrence was last surveyed for in 2004 and no stems were found.

Schweinitz's sunflower

Biological Conclusion: No Effect

Schweinitz's sunflower is endemic to the Piedmont of North and South Carolina. The few sites where this rhizomatous perennial herb occurs in relatively natural vegetation are found in xeric hardpan forests. The species is also found along roadside rights-of-way, maintained power lines and other utility rights-of-way, edges of thickets and old pastures, clearings and edges of upland oak-pine-hickory woods and Piedmont longleaf pine forests, and other sunny or semi-sunny habitats where disturbances (e.g., mowing, clearing, grazing, blowdowns, storms, frequent fire) help create open or partially open areas for sunlight. It is intolerant of full shade and excessive competition from other vegetation. Schweinitz's sunflower occurs in a variety of soil series, including Badin, Cecil, Cid, Enon, Gaston, Georgeville, Iredell, Mecklenburg, Misenheimer, Secrest, Tatum, Uwharrie, and Zion, among others. It is generally found growing on shallow sandy soils with high gravel content; shallow, poor, clayey hardpans; or shallow rocky soils, especially those derived from mafic rocks.

Suitable habitat for Schweinitz's sunflower, consisting of field edges, edges of upland oak-pine-hickory woods, and utility rights-of-way, is present in the western portion of the study area in the form of agricultural field edges, a long power line right-of-way paralleling NC 84, and cutover areas of oak-pine-hickory woods created by forestry activities. Additionally, maintained open roadsides are located throughout the study area. Surveys were conducted by qualified biologists throughout areas of suitable habitat on September 23-24, 2013. No individuals of Schweinitz's sunflower were

observed. A review of NCNHP records, updated January 2015, indicates no known Schweinitz's sunflower occurrence within one mile of the study area.

5.1.3.2 Endangered Species Act Candidate Species

As of March 25, 2015, Georgia aster (*Symphytotrichum georgianum*) is the only Candidate species listed by USFWS for Union County. Although suitable habitat for this species is present within the study area, a review of NCNHP records, updated January 2015, indicates no known occurrence of Georgia aster within one mile of the study area.

5.1.3.3 Bald and Golden Eagle Protection Act

Habitat for the bald eagle primarily consists of mature forest in proximity to large bodies of open water for foraging. Large dominant trees are used for nesting sites, typically within one mile of open water.

A desktop-GIS assessment of the project study area, as well as the area within a 1.13-mile radius (1.0 mile plus 660 feet) of the project limits, was performed prior to field investigations in May 2013 using 2013 color aerials. Numerous water bodies, including large ponds, impoundments, and a named lake, were identified. A survey of the project study area and the area within 660 feet of the project limits was conducted during field investigations with no occurrence of bald eagle observed. Additionally, a review of NCNHP records, updated January 2015, revealed no known occurrences of this species within one mile of the project study area. Due to the lack of observed nests, known occurrences, and minimal impact anticipated for this project, it has been determined that this project will not affect this species.

5.1.4 Soils

The study area lies in the central piedmont physiographic region of North Carolina. Topography in the project vicinity ranges from gently rolling hills to moderately flat, well-defined stream valleys. The elevation ranges from approximately 550 feet above mean sea level at Culvert Branch near the center of the study area to approximately 720 feet above mean sea level near Weddington in the northwest corner of the study area.

The process of soil development depends on both biotic and abiotic influences. These influences include past geologic activities, nature of parent materials, environmental and human influences, plant and animal activity, time, climate, and topographical position. The *Union County Soil Survey* identifies 16 soil types within the study area (Table 5-7).

Table 5-7. Soils in the Study Area

Soil Series	Mapping Unit	Drainage Class	Hydric Status
Appling sandy loam, 2-8 percent slopes	ApB	Well drained	Non-hydric
Badin channery silt loam, 8-15 percent slopes	BaC	Well drained	Non-hydric
Badin channery silty clay loam, 2-8 percent slopes, eroded	BdB2	Well drained	Non-hydric
Cecil gravelly sandy clay loam, 2-8 percent slopes, eroded	CeB2	Well drained	Non-hydric
Cecil gravelly sandy clay loam, 8-15 percent slopes, eroded	CeC2	Well drained	Non-hydric
Chewacla silt loam, 0-2 percent slopes, frequently flooded	ChA	Somewhat poorly drained	Hydric*
Cid channery silt loam, 1-5 percent slopes	CmB	Moderately well and somewhat poorly drained	Non-hydric
Colfax sandy loam, 0-3 percent slopes	CoA	Somewhat poorly drained	Hydric*
Georgeville silty clay loam, 2-8 percent slopes, eroded	GfB2	Well drained	Non-hydric
Goldston-Badin complex, 2-8 percent slopes	GsB	Well drained to excessively drained	Non-hydric
Helena fine sandy loam, 2-8 percent slopes	HeB	Moderately well drained	Hydric*
Secrest-Cid complex, 0-3 percent slopes	ScA	Moderately well and somewhat poorly drained	Hydric*
Tatum gravelly silt loam, 8-15 percent slopes	TaC	Well drained	Non-hydric
Tatum gravelly silty clay loam, 2-8 percent slopes, eroded	TbB2	Well drained	Non-hydric
Tatum gravelly silty clay loam, 8-15 percent slopes, eroded	TbC2	Well drained	Non-hydric
Zion gravelly loam, 2-8 percent slopes	ZnB	Well drained	Non-hydric

* Soils which are primarily non-hydric, but which may contain hydric inclusions.

5.2 Cultural Resources

This project is subject to compliance with Section 106 of the National Historic Preservation Act of 1966, as amended, and implemented by the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106, codified in 36 CFR Part 800. Section 106 requires federal agencies to take into account the effect of their undertakings (federally-funded, licensed or permitted) on properties included in or eligible for inclusion in the National Register of Historic Places and to afford the Advisory Council a reasonable opportunity to comment on such undertakings.

5.2.1 Historical Architectural Resources

A historic architectural resources survey was conducted for the proposed project in November 2013 pursuant to Section 106 of the National Historic Preservation Act. In a July 2014 memorandum, the North Carolina Historic Preservation Office (HPO) concurred that two properties within the project's Area of Potential Effects (APE), John Walker Matthews House and Howard House, remain eligible for listing in the National Register of Historic Places (NRHP). HPO also concurred that one new property, Jacob Allen Deal Farm, is eligible for listing in the NRHP.

The potential effect of the proposed project on historic architectural resources was evaluated in accordance with Section 106 of the Historic Preservation Act at meetings on September 2, 2014 and September 30, 2014.

It was determined Detailed Study Alternatives A2 and C2 would have No Effect on the John Walker Matthews House at the September 2, 2014 effects meeting. Although the property falls within the Area of Potential Effects, there will be no work performed in the vicinity of the property.

The preliminary designs for Detailed Study Alternatives A2 and C2 were revised to avoid impacts to Howard House. HPO concurred there will be No Adverse Effect to the property with the condition that construction fencing shall be erected at the back of the ditch line. No work shall take place in, and no utilities shall encroach into, the historic boundary.

The preliminary designs for Detailed Study Alternatives A2 and C2 were revised to minimize impacts to Jacob Allen Deal Farm. HPO concurred there will be No Adverse Effect to the property with the condition of a 25-foot buffer from the historic boundary, delineated by



Howard House



Jacob Allen Deal Farm

construction fencing erected at the back of the ditch line. The fencing shall extend 500 feet from each access drive, or to the property boundary, whichever is closer.

Determinations regarding the detailed study alternatives are summarized in Table 5-8 below. A copy of HPO's October 28, 2014 concurrence form is included in Appendix B.

Table 5-8. Historic Architectural Resource Effects

Historic Property and Status	Effects Determination	
	A2	C2
John Walker Matthews House Determined Eligible 1996, Remains Eligible	No Effect	No Effect
Howard House Determined Eligible 1996, Remains Eligible	No Adverse Effect	No Adverse Effect
Jacob Allen Deal Farm Determined Eligible	No Adverse Effect	No Adverse Effect

5.2.2 Archaeological Resources

In a November 30, 2012 memorandum, HPO indicated they would provide comments regarding archaeological resources after a preferred alternative is selected. Based on the size of the study area, and given the presence of a previously recorded archaeological site within the study area, HPO noted it is likely a comprehensive archaeological investigation will be recommended.

5.3 Section 6(f)/4(f) Resources

5.3.1 Section 6(f)

There are no Section 6(f) properties in the project area.

5.3.2 Section 4(f)

Section 4(f) of the US Department of Transportation Act of 1966 specifies that publicly owned land from a public park, recreation area, wildlife and waterfowl refuge, and all historic sites of national, state, and local significance may be used for federal projects only if there is no feasible and prudent alternative to the use of such land (23 CFR 774.3(a)(1)) and the project includes all possible planning to minimize impacts to 4(f) lands resulting from such use (23 CFR 774.3(a)(2)).

Weddington Optimist Park is a privately-owned 52-acre park located on the northern side of NC 84 just west of Lester Davis Road (see Figure 2F). The eastern section of the park is owned by the Weddington Optimist Club and the western portion is owned by the Wesley Chapel-Weddington Athletic Association (WCWAA). The proposed project will impact approximately 0.8 acre of Weddington Optimist Park property and approximately 1.8 acres of WCWAA property,

including ball fields adjacent to NC 84. Impacts to this resource are not subject to Section 4(f) requirements because this park is privately owned.

Dogwood Park is located on the southeast corner of the NC 84/Lester Davis Road intersection in the Village of Wesley Chapel (see Figure 2G). The park is a Section 4(f) resource because the property is owned by the Village of Wesley Chapel and operated as a public park. The detailed study alternatives share a common alignment along NC 84 adjacent to Dogwood Park. The preliminary design widens NC 84 to the north to avoid impacting the park property. There will be no construction or right-of-way impacts to the park.



Dogwood Park

Siler Presbyterian Recreation Park is a small privately-owned recreation area on Siler Presbyterian Church property located in the northeast corner of the NC 84/Waxhaw-Indian Trail Road intersection (see Figure 2G). Use of the facilities must be approved by the church office. Impacts to this resource are not subject to Section 4(f) requirements because this park is privately owned. Siler Presbyterian Recreation Park will not be impacted by the proposed project.

John Walker Matthews House, Howard House and Jacob Allen Deal Farm are subject to Section 4(f) requirements because they have been determined Eligible for the NRHP. No work will be performed in the vicinity of **John Walker Matthews House**. The HPO found the detailed study alternatives would have No Effect on the property on October 28, 2014.

The preliminary designs for Detailed Study Alternatives A2 and C2 were revised to avoid impacts to **Howard House**. Construction of the proposed project would result in no impacts to the property. NCHPO determined Alternatives A2 and C2 would have No Adverse Effect on Howard House on October 28, 2014 with conditions.

The preliminary designs for Detailed Study Alternatives A2 and C2 were revised to minimize impacts to **Jacob Allen Deal Farm**.

Alternative A2 will impact 0.2 acre of the property and Alternative C2 will impact 0.56 acre of the property. On October 28, 2014, NCHPO determined Alternatives A2 and C2 would have No Adverse Effect on Jacob Allen Deal Farm with conditions.

Federal law (SAFETEA-LU Section 6009(a)) amended Section 4(f) to simplify the processing and approval of projects that have only *de minimis* impacts on lands protected by Section 4(f). Under the new provisions, once the

A de minimis impact is one that, after taking into account any measures to minimize harm (such as avoidance, minimization, mitigation or enhancement measures), results in either:

- A Section 106 finding of no adverse effect or no historic properties affected on a historic property; or
- A determination that the project would not adversely affect the activities, features, or attributes qualifying a park, recreation area, or refuge for protection under Section 4(f).

US Department of Transportation (USDOT) determines that a transportation use of Section 4(f) property results in a *de minimis* impact, analysis of avoidance alternatives is not required and the Section 4(f) evaluation process is complete (FHWA, 2014).

As identified on the October 28, 2014 Concurrence Form for Assessment of Effects (see Appendix B), FHWA intends to use HPO’s concurrence as a basis for a *de minimis* finding for Jacob Allen Deal Farm, pursuant to Section 4(f).

5.4 Farmland

It is anticipated the proposed project will impact soils that are recognized as important farmlands by the US Department of Agriculture, Natural Resources Conservation Service (NRCS) (www.nc.nrcs.usda.gov/programs/soilsurvey/primefarmland.html). Table 5-9 shows the anticipated prime, statewide, and unique farmland soils impacts with the detailed study alternatives. State construction projects that receive funding from federal sources are directed to consider impacts to important farmlands under the Farmland Protection Policy Act (FPPA). State agencies are directed to consider impacts to farmlands under North Carolina Executive Order 96, Preservation of Prime Agricultural and Forest Lands.

As required by the FPPA, a preliminary screening of farmland conversion impacts in the project area was completed. Part VI of the NRCS-CPA-106 form was completed and a total score of 7 out of 160 points was calculated for both alternatives (see Appendix B). Since the total site assessment score does not exceed the 60 point threshold established by NRCS, farmland conversion impacts may be anticipated, but are not considered notable. No other alternatives other than those already discussed in this document will be considered without a re-evaluation of the project’s potential impacts upon farmland soils.

Union County adopted a Voluntary Agricultural District Ordinance on September 21, 2009. There are no Voluntary Agricultural District properties in the project study area.

Table 5-9. Prime, Statewide, and Unique Farmland Soils Anticipated Impacts

	Alternative	
	A2	C2
Prime, Statewide, and Unique Farmland Soils (acres)	62.4	63.7

There are active agricultural fields (each less than 20 acres) located on both sides of NC 84 where the proposed alignment transitions from new location to existing NC 84. These fields are directly adjacent to NC 84 and the eastern boundaries of the Aero Plantation and Weddington Hills subdivisions. The proposed project would result in approximately 3.5 acres of right-of-way impacts to these agricultural fields. No active crops were observed in the fields during a site visit on March 16, 2012. The two fields do not have the same owner and there did not appear to be any access across NC 84 between the two fields.

An additional agricultural field is located to the northeast of Southbrook Community Church, and is part of a collection of agricultural parcels totaling approximately 90 acres. This field is separated

from NC 84 by an approximately 400-foot forested buffer and is accessed from Antioch Church Road.

5.5 Social Effects

5.5.1 Neighborhoods/Communities

There are several cohesive residential subdivisions in the project study area, as shown on Figures 2A through 2G. Major resources in the project study area that contribute to community cohesion include the Weddington Schools campus, Dogwood Park, Weddington Optimist Park, and three shopping centers (Weddington Corners, Shops at Wesley Chapel, and Village Commons). Weddington Optimist Park hosts numerous athletic events throughout the year that draw people from the community and surrounding areas. Several community events are also held at the park throughout the year. Weddington Corners at the western



Village Commons Shopping Center on NC 84

end of the study area, along with Shops at Wesley Chapel and Village Commons at the eastern end of the study area, include grocery stores, restaurants, banks, medical offices, and a variety of other services that are used by the community on a daily basis. Shops at Wesley Chapel also hosts Wesley Chapel's annual Fall Heritage Festival, held the first Saturday in October.

The proposed project is not expected to separate or isolate existing residential subdivisions, isolate portions of the community, create a barrier between residents and community facilities, or cause interruption in community cohesion or interaction. It also is not expected to adversely affect the community resources discussed above that contribute to community cohesion, although impacts will occur to Weddington Optimist Park where property along NC 84 will be reduced because of right-of-way requirements associated with the proposed widening.

The proposed project would change the character of the existing facility from a rural two-lane road to a divided four-lane boulevard. There would be changes to the viewshed at the western end of the project where the roadway would be constructed on new location through existing wooded areas. These changes to the viewshed would be most likely to impact the residents of Stratford on Providence and Abelia Estates.



5.5.2 Relocation of Residences and Businesses

The proposed project is expected to result in the displacement of five residences, one business and one non-profit (Table 5-10). Copies of the relocation reports for Alternatives A2 and C2 are located in Appendix C.

Table 5-10. Anticipated Residential, Business, and Non-Profit Relocations

	Alternative	
	A2	C2
Residential Relocations	5	5
Business Relocations	1	1
Non-Profit Relocations	1	1
Total	7	7

The relocation program for the proposed action will be conducted in accordance with the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended (Public Law 91-646), and/or the North Carolina Relocation Assistance Act (GS-133-5 through 133-18). The program is designed to provide assistance to displaced persons in relocating to a replacement site in which to live or do business. At least one relocation agent is assigned to each highway project for this purpose.

For Residential Displacees:

It is the policy of NCDOT to ensure comparable replacement housing will be available prior to construction of state and federally-assisted projects. No person will be displaced by NCDOT's State or Federally-assisted construction projects unless and until comparable replacement housing has been offered or provided for each displacee within a reasonable period of time prior to displacement. All attempts will be made to find decent, safe, and sanitary replacement dwellings within the financial means of the residential displacee. NCDOT offers the following relocation assistance to residential displacees:

- Replacement Housing Payment for Owner-Occupant Displacees
- Rent Supplement Payment for Tenant Displacees
- Relocation Moving Payments
- Advisory Services

Last Resort Housing is a program used when comparable replacement housing is not available, or when it is unavailable within the displacee's financial means, and the replacement payment exceeds the federal/state legal limitation. The purpose of the program is to allow broad latitude in methods of implementation by the State so that decent, safe, and sanitary replacement housing can be provided.

Non-Residential Displacees:

Displaced Businesses, Farms, and Non-Profit Organizations are eligible for the following relocation assistance:

- Relocation Moving Expenses
- Reestablishment Reimbursement up to the maximum Federal amount
- Searching expenses up to the maximum Federal amount
- Business Fixed Payment up to the Federal maximum (in lieu of the items above)
- Advisory Services

No relocation payment received will be considered as income for the purposes of the Internal Revenue Code of 1954 or for the purposes of determining eligibility or the extent of eligibility of any person for assistance under Social Security Act or any federal law.

These relocation benefits are only available to persons lawfully present in the United States.

Based upon the preliminary relocation study performed for this project, NCDOT anticipates that special relocation services will not be necessary. The project will not cause a housing shortage, additional housing programs will not be needed, and replacement housing within financial means will not be an issue. Last Resort Housing may need to be considered. Business services will still be available after the project is complete, and suitable replacement business sites are available in the project area.

5.5.3 Environmental Justice

Title VI of the Civil Rights Act of 1964 protects individuals from discrimination on the grounds of race, age, color, religion, disability, sex, and national origin. Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, directs that “each federal agency make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health and environmental effects of its programs, policies, and activities on minority populations and low-income populations.” Special populations may include the elderly, children, the disabled, low-income areas, American Indians, and other minority groups. Disproportionately high and adverse effects on minority and low-income populations are defined as adverse effects that are:

- Predominantly borne by a minority population and/or low-income population, or
- Will be suffered by a minority population and/or low-income population and are appreciably more severe or greater in magnitude than the adverse effects that will be suffered by the non-minority population and/or non-low-income population.

To assess social aspects associated with the proposed project, a field review and review of demographic information, available through the US Census Bureau, were performed. The demographics of the Census Tract Block Groups in which the project corridor is located (Demographic Study Area) were obtained, as were the demographics of Union County and North Carolina.

The 2010 Census data does not indicate a notable presence of minority or low income populations meeting the criteria for Environmental Justice within the Demographic Study Area (DSA). Minority or low income communities were not noted within the project study area during the site

visit, which is supported by input from local planners. The 2010 Census data indicate the population of the DSA is approximately 88.5 percent white. Black or African American persons comprise approximately 5.5 percent of the population within the DSA, 11.7 percent in Union County, and 21.5 percent in North Carolina. The Hispanic or Latino population within the DSA, at approximately 3.9 percent, is less than half of the Hispanic or Latino populations for Union County (10.4 percent) and North Carolina (8.4 percent).

The Census data (American Community Survey 5-year Estimates 2006-2010) indicate approximately 1.7 percent of the population within the DSA live below the poverty level. This is substantially less than the percentage of the population living below the poverty level within Union County (8.5 percent) or North Carolina (15.5 percent).

As noted in the Relocation Reports in Appendix C, none of the five residences anticipated to be relocated as a result of the proposed project are owned or rented by minority individuals. The anticipated relocation of a commercial building will impact two tenants: one business and one non-profit. The business and non-profit both have ten employees, including two minorities each. One of the five residential relocatees fall within the \$15,000 - \$25,000 income level, with the other relocatees in the \$50,000 and over income level. No driveway control of access is proposed for the project and changes in access to homes and services are not anticipated.

In accordance with Title VI of the Civil Rights Act of 1964 and Executive Order 12898, it has been determined that the proposed project would not directly, or through contractual or other arrangements, use criteria, methods, or practices that discriminate on the basis of race, color, or national origin, nor would it have a disproportionate effect on minority or low-income communities.

Public outreach activities have extended to the entire study area. A project newsletter was mailed to property owners within the study area in June 2013, and a public meeting was held at a local school in the project study area on June 25, 2013. Additional public involvement and outreach activities, including a project newsletter and public hearing, are planned.

5.5.4 Bicycle and Pedestrian Facilities

The inclusion of sidewalks in the proposed project would improve conditions for persons with mobility issues and improve overall pedestrian safety along NC 84 in the project area. The provision of 14-foot outside lanes to accommodate bicycles would improve safety for cyclists along NC 84 in the project area.

5.5.5 Recreational Facilities

Dogwood Park is the first community park in the Village of Wesley Chapel. It is located on the southeast corner of the NC 84/Lester Davis Road intersection (see Figure 2G). Some park facilities, including a fishing pier, an amphitheater, grilling areas, and walking and biking trails, opened in July 2014. Additional amenities within the park are still under development. There will be no construction or right-of-way impacts to the park.

Weddington Optimist Park is a privately-owned 52-acre park facility located on the northern side of NC 84 just west of Lester Davis Road (see Figure 2F). The portions of Weddington Optimist Park adjacent to NC 84 include soccer fields, an unpaved parking area, a tee ball field, and a baseball field, which are located approximately 45 feet from the existing edge of pavement. The park has two access points to NC 84 and can generate notable vehicular traffic, especially on weekends when there are games and tournaments.



Weddington Optimist Park

The eastern section of the park is owned by the Weddington Optimist Club and the western portion is owned by the Wesley Chapel-Weddington Athletic Association (WCWAA). The proposed project will impact approximately 0.8 acre of Weddington Optimist Park property and approximately 1.8 acres of WCWAA property, including ball fields adjacent to NC 84.

Siler Presbyterian Recreation Park is a small privately-owned recreation area that is part of the Siler Presbyterian Church property located in the northeast corner of the NC 84/Waxhaw-Indian Trail Road intersection (see Figure 2G). Use of the facilities must be approved by the church office. Siler Presbyterian Recreation Park will not be impacted by the proposed project.

5.5.6 Other Public Facilities and Services

There are numerous public facilities and services in the project study area, including public and private schools, a daycare, churches, and government facilities. These facilities are shown on Figures 2A through 2G in Appendix A and are described below. Unless noted, impacts to these facilities and services are not anticipated.

Weddington Town Hall is located at NC 84 and Weddington-Matthews Road (Figure 2C). In addition to Weddington staff, the Town contracts with the Union County Sheriff's Office for three Deputies who are stationed at the Town Hall.

The Village of Wesley Chapel Town Hall is located on NC 84 just east of Waxhaw-Indian Trail Road (Figure 2G). Wesley Chapel Volunteer Fire Department Station 26 is located on the eastern side of Waxhaw-Indian Trail Road, just to the south of the Billy Howey Road intersection.

There are no US Post Offices or EMS stations in the project study area.

Weddington High School, Weddington Middle School, and Weddington Elementary School are located on the northern side of NC 84 between Twelve Mile Creek Road and Deal



Weddington High School

Road (Figure 2F). The proposed project incorporates recommendations from the Weddington High School Traffic Assessment discussed in Section 4.2.

Chesterbrook Academy is a private daycare facility located on the northeast corner of the NC 84 and Cox Road intersection (Figure 2D).

Several churches are located within the project study area:

- First Baptist Church of Weddington is located on the western side of NC 16 at the Lochaven Road intersection (Figure 2B). An addition to the existing church facility is currently under construction. The proposed project will result in right-of-way impacts to church property along NC 16.
- According to the Planner/Zoning Administrator for the Town of Weddington, there are preliminary plans for a church near the NC 16 and Old Mill Road (SR 1320) intersection (Figure 2B). Alternative A2 crosses the southern portion of the property.
- The Weddington United Methodist Church campus is located on NC 16 at the NC 16/NC 84 intersection (Figure 2C). Church facilities include the sanctuary, Weddington Christian Preschool, the Family Life Center, and Weddington Christian Academy on the western side of NC 16. The church offices and cemetery are located on the southeast corner of the NC 16/NC 84 intersection. The church also has a facility, the Hemby House, located on the eastern side of Weddington-Matthews Road just north of NC 84.
- Grace Baptist Church of South Charlotte is located on NC 84 across from Weddington High School (Figure 2F). A signal is proposed on NC 84 at the Weddington High School eastern driveway/Grace Baptist Church driveway intersection. Property from Grace Baptist Church will be required for right-of-way and easements along NC 84.
- All Nations Christian Fellowship is located on the northern side of NC 84 adjacent to Weddington Optimist Park (Figure 2F). Property from All Nations Christian Fellowship will be required for right-of-way and easements along NC 84.
- Southbrook Community Church is located on the northern side of NC 84 at the Lester Davis Road intersection (Figures 2F and 2G). The detailed study alternatives widen NC 84 to the north in this area to avoid impacts to Dogwood Park, a Section 4(f) resource. Property will be required for right-of-way and easements from Southbrook Community Church, resulting in the loss of parking spaces adjacent to NC 84. Preliminary design plans for the detailed study alternatives close the two existing entrances to the church and provide a new entrance at a signalized intersection with Lester Davis Road.
- Siler Presbyterian Church is located on the northeast corner of the NC 84 and Waxhaw-Indian Trail Road intersection (Figure 2G). Siler Cemetery is located on the eastern side of Waxhaw-



Southbrook Church parking lot adjacent to NC 84 (looking west)

Indian Trail Road, just to the south of the Billy Howey Road intersection. Property will be required for right-of-way and easements from Siler Presbyterian Church, resulting in the loss of parking spaces adjacent to NC 84 and Waxhaw-Indian Trail Road.

5.6 Economic Effects

There may be some economic benefit during construction of the project due to increased revenue for businesses providing services to construction crews. Conversely, businesses could temporarily experience minor decreases in revenue resulting from construction traffic or decreased access caused by construction activities. However, since most of the businesses in the project area are destination businesses that are not dependent on drive-by traffic, it is not likely they will experience notable impacts either during or after construction.

Property values may increase in the western portion of the study area where new or improved access to developable land is provided. A decrease in value to some properties could be possible along existing NC 84 where the roadway is widened because of potential loss in aesthetics, increase in noise, or partial taking of some properties.

5.7 Land Use

5.7.1 Existing Land Use and Zoning

5.7.1.1 Existing Land Use

Land use in the project study area consists largely of residential subdivisions and undeveloped land, with some commercial, institutional, agricultural, and recreational uses.

Land in the vicinity of the proposed new location portion of the project is mostly undeveloped.

The Hunter Farm property on the west side of NC 16 just north of NC 84 is managed by the Catawba Lands Conservancy (CLC). CLC is a non-profit, local land trust that permanently conserves and manages land for public benefit. Hunter Farm is a 48-acre farm that allows visitors to pick their own strawberries and also provides a learning experience about farm life and activities for school children. Adjacent to Hunter Farm is the Weddington Tract, an additional 2.3-acre farmland tract that is also managed by CLC.

Existing land use along NC 84 within the project study area includes commercial development at the western and eastern ends; the Weddington Schools complex between the Twelve Mile Creek Road and Deal Road intersections; the Weddington Optimist Park recreational complex to the east of Deal Road; Dogwood Park to the east of Lester Davis Road; scattered small pockets of agricultural fields; numerous residential subdivisions; and, some undeveloped land. Several churches are interspersed among the other land uses along the NC 84 corridor.

The Weddington Corners shopping center is a strip center with outparcels located in the northeast quadrant of the NC 84/NC 16 intersection. The shopping center is anchored by a Harris Teeter grocery store and includes other smaller businesses, such as a gas station/convenience store, a bank, a family medical practice, a dentist office, and several restaurants.

The Shops at Wesley Chapel shopping center is a strip center with outparcels located in the northwest quadrant of the NC 84/Waxhaw-Indian Trail Road intersection. The Village Commons shopping center is located in both the southwest and the southeast quadrants of this same

intersection. Shops at Wesley Chapel is anchored by a Lowe's Foods grocery store and also includes a Walgreen's pharmacy. Village Commons is anchored by a Target store and a Harris Teeter grocery store, and also includes a CVS pharmacy and a YMCA. The YMCA and the adjoining business, an AT&T retail store, are expected to be relocated as a result of the proposed project. Both shopping centers include restaurants, banks, medical offices, and a variety of other businesses. Phase II of Village Commons to the east of Waxhaw-Indian Trail Road is still under development and is expected to include approximately 360,000 square feet of commercial space at full build-out.

5.7.1.2 Existing Zoning

Town of Weddington

The Town of Weddington has a zoning ordinance (adopted April 8, 1987, as amended through March 13, 2006) and a corresponding zoning map (updated December 10, 2012). Most property within the Weddington portion of the project study area has a zoning designation of Residential Conservation District (R-CD) or Single-Family District (R-40), both of which require a minimum lot size of 40,000 square feet. The portion of the Aero Plantation subdivision within the project study area has an R-80 Single-Family District designation, which requires a minimum lot size of 80,000 square feet. The Weddington Brook subdivision on the southern side of NC 84 near Weddington High School is zoned Residential Established (R-E), which is intended for areas that have been annexed and do not conform to other Town zoning districts. The Weddington Schools complex is zoned as an Educational District (E-D). The existing commercial development at the corner of NC 84 and NC 16 is zoned as General Business District – Conditional Zoning [B-1(CD)], Local Shopping Center District – Conditional Zoning [B-2(CD)], and Mixed-Use District (MX). According to the Town's zoning ordinance, the Town intends to use conditional zoning for future retail, commercial, and business development.

Village of Wesley Chapel

The Village of Wesley Chapel has a zoning ordinance (February 12, 2007) and a corresponding zoning map (June 14, 2011). The shopping centers and businesses at the NC 84/Waxhaw-Indian Trail Road intersection are zoned either Local Shopping Center District (B-2), General Business District (B-1) or Office-Institutional District (O-I). The remaining land within the Wesley Chapel portion of the project study area is zoned for single-family residential use in the R-40 Single-Family District, which requires a minimum lot size of 40,000 square feet.

Union County

The project study area includes some pockets of unincorporated land that are within the jurisdiction of Union County. The *Union County, North Carolina Land Use Ordinance* (May 7, 2001, last updated August 31, 2008) regulates development in Union County. According to the *Union County Zoning Map* (December 4, 2008), all of the County parcels within the project study area are zoned for large lot, single-family residential (R-40) with a minimum lot size of 40,000 square feet.

5.7.2 Future Land Use

Land use and development in the project study area is guided by land use plans and ordinances adopted by the Town of Weddington, the Village of Wesley Chapel, and Union County.

5.7.2.1 Town of Weddington

The Town of Weddington, North Carolina Land Use Plan (April 8, 2013) states that “single-family subdivisions are the preferred land use type; residents continue to show limited interest in having additional commercial development in the town.” Land use policies presented in the plan include: limiting development in designated 100-year floodplains, wetlands, and along natural waterways; retaining the character of the community by ensuring that new residential development consists of single-family homes; and, prohibiting medium- and high-density residential development and large-scale commercial development that could create potential traffic and safety problems. The plan also includes a goal to retain a single business center within the town at the intersection of NC 16 and NC 84. The plan indicates increased development pressure is occurring along NC 16 within the Town as a result of the road’s recent widening. It also states “there are a number of critical road improvements scheduled in the Weddington vicinity over the next few years, the most important being the construction of the Rea Road Extension.”

Atherton Estates is a planned single-family subdivision located on the north side of NC 84 just east of Weddington-Matthews Road (see Figure 2C). Phase I of Atherton Estates, consisting of 23 lots adjacent to NC 84, has been approved by the Town of Weddington and is already under construction. The entire planned development, consisting of 130 lots on approximately 170 acres, has not yet been approved by the Town. Entrances to the subdivision are proposed off of NC 84, Cox Road, and Weddington-Matthews Road.

Preliminary applications have been submitted to the Town of Weddington for three additional planned residential subdivisions (totaling approximately 340 acres) in the project study area. However, final plans have not been approved and permits have not been issued. These planned subdivisions are shown on Figures 2A through 2G and include the following:

- Crown Estates at Lochaven is a proposed 18-lot single-family subdivision in the western portion of the project study area just south of the Stratford on Providence subdivision. This subdivision would be accessed from NC 16 via Lochaven Road.
- The Woods subdivision is currently planned as a 204-lot single-family subdivision on 265 acres in the western portion of the project study area. This is the largest tract of available land in the project study area. The portion of the Rea Road Extension project proposed on new location would pass through, and provide access to, this proposed subdivision. The developer has petitioned Union County for sewer allocation to the proposed development.
- Sugar Magnolia is a proposed 12-lot single-family residential subdivision located on the southern side of NC 84 at Cox Road.

5.7.2.2 Village of Wesley Chapel

The *Village of Wesley Chapel Land Use Plan* (December 8, 2003) includes policies and goals to limit the majority of planned non-residential development to strategic nodes on NC 84, which is the primary gateway through Wesley Chapel. The plan states that community retail development should be located at the intersection of NC 84 and Waxhaw-Indian Trail Road, and that driveway access onto NC 84 should be limited. According to the plan, the standard housing type will continue to be single-family residential at densities of approximately one unit per acre, except in the vicinity of preferred non-residential nodes.

The Village adopted a Flood Damage Prevention Ordinance (amended September 2009) that requires a Floodplain Development Permit for construction or alteration of any structures in the 100-year floodplain.

5.7.2.3 Union County

The purpose of the *Union County, North Carolina 2025 Comprehensive Plan* (October 18, 2010) is to serve as a guide to decision-making on a variety of planning issues, including transportation and land use. The 2035 horizon year for the proposed Rea Road Extension project is beyond the planning horizon of the County's comprehensive plan. However, this plan is becoming outdated and Union County is in the process of updating it. The Future Land Use Map included in the County's comprehensive plan calls for low density residential development (0 to 1 dwelling units per acre) in most of the unincorporated portions of the project study area.

Union County's Land Use Ordinance requires a minimum 30-foot vegetative buffer for development activities along all perennial waters. The County's Flood Damage Prevention Ordinance applies to land within the 100-year floodplain and requires a Floodplain Development Permit for any development activities.

Union County is designated as a Phase II County for implementation of federal Phase II stormwater management requirements. This means the county is required to have a post-construction stormwater management program and obtain a Phase II National Pollutant Discharge Elimination System (NPDES) permit. In Union County, the post-construction stormwater management ordinance is included as Sections 261 through 267 of the County's land use ordinance. The ordinance includes requirements for drainage, runoff control, and riparian buffers (30-foot streamside buffer on intermittent and perennial streams, with an additional 20-foot upland buffer on perennial streams). The Town of Weddington and the Village of Wesley Chapel are Phase II exempted municipalities.

5.7.3 Project Compatibility with Local Plans

The proposed project is consistent with the various uses and plans that exist for the project study area.

5.8 Indirect and Cumulative Effects

An *Indirect and Cumulative Effects Screening Report* was prepared for the proposed project in June 2013. In addition, a *Community Characteristics Report* was completed in July 2012. Additional details of the methodology and analysis supporting the information and conclusions provided in this section are provided in these reports, appended by reference.

The North Carolina Department of Environment and Natural Resources, in 15A NCAC 1C .0101 *Conformity with North Carolina Environmental Policy Act, Statement of Purpose, Policy and Scope*, defines "Cumulative Effects" as those effects resulting "from the incremental impact of the proposed activity when added to other past, present, and reasonably foreseeable future activities regardless of what entities undertake such other activities." Cumulative effects can result when activities taking place over time are collectively significant, even when individually those activities are minor. The Code defines "Indirect Effects" as those effects "caused by and resulting from the proposed activity although they are later in time or further removed in distance, but they are still reasonably foreseeable."

5.8.1 Analysis of Indirect and Cumulative Effects

5.8.1.1 Indirect Land Use Effects Screening Results

The evaluation of certain indicators helps to determine the potential for land use change induced by transportation projects. These factors include scope of project, change in accessibility, forecasted population and employment growth, available land, water and sewer availability, market for development, local public policy, and notable environmental features. The relative ratings of these factors determine whether or not a Land Use Scenario Assessment needs to be completed. The Indirect Land Use Effects Screening Tool is shown in Table 5-11 and summarized below.

Six of the nine categories in the screening matrix reflect a moderate to high level of concern for indirect and cumulative effects potential. The three categories that reflect a high or moderately high level of concern are forecasted population growth, water and sewer availability, and market for development. The population of the study area is expected to grow at an average annualized rate of two to three percent through 2030, which is a higher rate than is projected for Union County and the state, and makes population growth of higher concern. Water and sewer availability is of higher concern because water service, provided by Union County Public Works, is generally available throughout the study area. Sewer service is provided in the eastern half of the study area and there are plans to extend service to portions of the western study area as part of the development of the proposed Woods subdivision. Finally, the market for development is of higher concern because there is ongoing development in the Village Commons commercial center at the eastern end of the study area and at Dogwood Park, and several residential subdivisions are either planned or already under construction within the western study area, along with a proposed church.

Table 5-11. Indirect Land Use Effects Screening

Rating	Scope of Project	Change in Accessibility	Forecasted Population Growth	Forecasted Employment Growth	Available Land	Water/ Sewer Availability	Market for Development	Public Policy	Notable Environmental Features	Result
More Concern	Major New Location	> 10 minute travel time savings	> 3% annual population growth	Substantial # of New Jobs Expected	5000+ Acres of Land	All services existing / available	Development activity abundant	Less stringent, no growth management	Targeted or Threatened Resource	
	↑		X							
						X	X			
	X	X		X						
										Indirect Scenario Assessment Not Likely
Less Concern					X			X	X	
	Very Limited Scope	No travel time savings	No population growth or decline	No new Jobs or Job Losses	Limited Land Available	No service available now or in future	Development activity lacking	More stringent, growth management	Features incorporated in local protection	

The scope of the project, change in accessibility, and forecasted employment growth reflect a moderate level of concern for indirect and cumulative effect potential. The scope of the project is of moderate concern because the majority of the project is widening an existing roadway. The change in accessibility is of moderate concern because the project will provide a more direct link between eastern Union County and Charlotte/Mecklenburg County while opening up new land for development; however, travel time savings as a result of the project are estimated to be less than five minutes. Forecasted employment growth is of moderate concern because the project area primarily consists of residential uses, with the exception of the commercial centers at both ends of the study area. The average annual rate of employment growth in the area covered by the Centralina Workforce Development Board (WDB), which includes Union County and several surrounding counties, is projected to be 1.8 percent between 2006 and 2016. Employment growth in the study area is expected to be approximately 1.5 percent annually through 2030, which is slightly less than the WDB average based on the residential nature of the study area, but taking into account the continued expansion of the shopping centers at the eastern end of the study area.

Approximately 845 acres in the study area are available for development, and there are already plans for development on 340 acres of this available land. Based on current land use plans and zoning ordinances applicable to the study area, any development on available land in the study area will likely be single-family residential on large lots.

Public policy and notable environmental features are also of low concern with regard to the indirect effects of this project. The Town of Weddington and the Village of Wesley Chapel have zoning, subdivision, and environmental ordinances, as well as land use plans, to regulate development within the study area. In addition, Union County has a comprehensive plan and land use ordinance to regulate development in unincorporated areas of the study area. The proposed project crosses three streams, but there are no 303(d)-listed streams for sediment or turbidity, or protected or critical water supply watersheds within the study area. Union County, the Town of Weddington, and the Village of Wesley Chapel also have ordinances to protect natural environmental features. They all have policies to limit development in designated 100-year floodplains, wetlands, and along natural waterways.

5.8.1.2 Indirect Land Use Summary

The purpose of the project is to improve the mobility and connectivity of NC 84 in the project study area. NC 84 is a major connecting route between western Union County and the City of Charlotte/Mecklenburg County, where over half of the workers in the project study area are employed. Access to major roadways is not a major limiting factor for development in the study area, but the capacity of NC 84 through the study area is projected to exceed capacity by 2030. The availability of public water service is not a limiting factor for development, but access to public sewer service is currently a limiting factor in the western portion of the study area. As noted in Section 5.7.2.1, there is a proposal to extend sewer service to the proposed Woods development, which may expedite development of available land in the western portion of the study area.

The project is expected to reduce travel times (by less than five minutes) and the new location portion of the project will provide new access to parcels in the western portion of the study area, including the proposed Woods development. The new connection of NC 84 to Rea Road has the potential to alter travel patterns, particularly in the western portion of the study area, since it will provide an alternate route to I-485 and Charlotte via Rea Road. Development projects in the study area are not necessarily dependent upon construction of the project since the available land and proposed subdivisions in the study area have access to existing roadways. However, development

of available land in the western portion of the study area, particularly the proposed Woods development, would likely benefit from the increased exposure and access provided by the new location portion of the project.

5.8.1.3 Water Quality Statement

There are three named streams within the project study area, two of which are crossed by the existing alignment of NC 84 and one that will be crossed by the new location portion of the project. There is potential for direct or indirect impacts to water resources as a result of the proposed project. However, use of best management practices during construction, such as NCDOT's BMP-PSW, will minimize direct water quality impacts. Direct natural environmental impacts are addressed programmatically through avoidance, minimization, and mitigation actions consistent with agreements with environmental resource and regulatory agencies and will be further evaluated by the NCDOT Natural Environment Unit during project permitting.

Indirect effects, in the form of changes in land use, will be mitigated by existing development regulations such as ordinances that limit development in designated floodplains and require riparian buffers along streams (see Section 5.1.2.4). The project is located in an urbanizing area where growth and infill development are planned for, and anticipated by local governments. The proposed project is in accordance with local plans and will support planned growth and development through increased network connectivity. All present and future projects within the project study area must be consistent with local land use plans and development ordinances.

5.8.1.4 Conclusion

Based on the information analyzed, there is a lower level of concern for indirect and cumulative effects potential as a result of the proposed project. Therefore, further examination of indirect and cumulative effects is not likely to be warranted.

5.9 Flood Hazard Evaluation

Union County participates in the National Flood Insurance Regulatory Program. As discussed in Section 5.1.2.1, the preliminary hydraulics analysis for the proposed project determined there are a total of four major stream crossings associated with Detailed Study Alternatives A2 and C2, with each including two existing crossings and one new location crossing. The following is a summary of the flood hazard evaluation for each of the major stream crossings associated with the proposed project:

- **Site 3** (Alternatives A2 and C2) is an existing crossing of Culvert Branch under NC 84 (Figure 2F). The stream crossing is in a FEMA limited detailed flood study area in a Special Flood Hazard Zone AE.
- **Site 4** (Alternatives A2 and C2) is an existing crossing of West Fork Twelvemile Creek under NC 84 (Figure 2F). The stream crossing is in a FEMA detailed flood study area in a Special Flood Hazard Zone AE. This is the only proposed crossing over a stream with a published floodway, and a floodway modification may be required at this site. NC 84 is proposed to be widened from two lanes to a four-lane divided facility at this stream crossing. Based on the preliminary hydraulic analysis of this site, it is recommended that the existing culvert be replaced with dual 90-foot-long concrete girder bridges.

- **Site 7** (Alternative A2) and **Site 8** (Alternative C2) are close enough in distance to be considered the same general hydraulic crossing of Mundys Run (Figure 2D). These new location stream crossings are in a FEMA limited detailed flood study area in a Special Flood Hazard Zone AE.

In accordance with Executive Order 11988, the Hydraulics Unit will coordinate with the NC Floodplain Mapping Program (FMP), the delegated state agency for administering FEMA’s National Flood Insurance Program, to determine the status of the project with regard to applicability of NCDOT’s Memorandum of Agreement with FMP (dated April 22, 2013), or approval of a Conditional Letter of Map Revision (CLOMR) and subsequent final Letter of Map Revision (LOMR).

This project involves construction activities on or adjacent to FEMA-regulated streams. Therefore, NCDOT Division 10 shall submit sealed as-built construction plans to the Hydraulics Unit upon completion of project construction, certifying the drainage structure(s) and roadway embankment located within the 100-year floodplain were built as shown in the construction plans, both horizontally and vertically.

Further detailed analysis will be required during final design to adequately address all of the impacts associated with the floodplain at each site. Table 5-12 shows the anticipated floodplain impacts with the detailed study alternatives. There are no properties that have been acquired with FEMA funds in the project study area.

Table 5-12. Floodplain/Floodway Impacts

	Alternative	
	A2	C2
100-Year Floodplain and Floodway Impacts (acres)	7.2	7.3

5.10 Traffic Noise Analysis

5.10.1 Introduction

The magnitude of noise is usually described by its sound pressure. Since the range of sound pressure varies greatly, a logarithmic scale is used to relate sound pressures to some common reference level, usually the decibel (dB). Sound pressures described in decibels are called sound pressure levels and are often defined in terms of frequency-weighted scales (A, B, C, or D). The weighted-A decibel scale is used almost exclusively in vehicle noise measurements because it places the most emphasis on the frequency range to which the human ear is most sensitive (1,000-6,000 Hertz). Sound levels measured using a weighted-A decibel scale are often

Noise is generally defined as unwanted sound. It is emitted from many natural and man-made sources. Highway traffic noise is usually a composite of noises from engine exhaust, drive train, and tire-roadway interaction.

expressed as dBA. Examples of noise pressure levels in dBA are a jackhammer at 120 dBA, a garbage disposal at 80 dBA, a window air-conditioner at 60 dBA, and a dripping faucet at 30 dBA.

In accordance with Title 23 Code of Federal Regulations Part 772, *Procedures for Abatement of Highway Traffic Noise and Construction Noise* (23 CFR 772) and the NCDOT *Traffic Noise Abatement Policy* (July 2011), each Type I highway project must be analyzed for predicted traffic noise impacts. In general, Type I projects are proposed State or Federal highway projects for construction of a highway or interchange on new location, improvements of an existing highway which substantially changes the horizontal or vertical alignment or increases the vehicle capacity, or projects that involve new construction or substantial alteration of transportation facilities such as weigh stations, rest stops, ride-share lots, or toll plazas.

Traffic noise impacts are determined through implementing the current Traffic Noise Model (TNM) approved by the FHWA and following procedures detailed in 23 CFR 772, the NCDOT *Traffic Noise Abatement Policy*, and the NCDOT *Traffic Noise Analysis and Abatement Manual*. When traffic noise impacts are predicted, examination and evaluation of alternative noise abatement measures must be considered for reducing or eliminating these impacts. Temporary and localized noise impacts will likely occur as a result of project construction activities. Construction noise control measures will be incorporated into the project plans and specifications.

Details of the methodology and analysis supporting the information provided in this section are provided in the *Traffic Noise Analysis – Proposed SR 1316 (Rea Road) Extension from NC 16 (Providence Road) to SR 1008 (Indian Trail-Waxhaw Road)* completed in January 2015.

The NCDOT Traffic Noise Abatement Policy requires a traffic noise analysis be completed for each project alternative for each of the activity categories listed in Table 5-13.

5.10.2 Traffic Noise Impacts and Noise Contours

The maximum number of receptors predicted to become impacted by future traffic noise is shown in Table 5-14. The table includes those receptors expected to experience traffic noise impacts by either approaching or exceeding the FHWA Noise Abatement Criteria or by a substantial increase in exterior noise levels. Alternative A2 is predicted to impact a total of 8 receptors. Alternative C2 is predicted to impact a total of 7 receptors. Both alternatives are predicted to impact the front section of the athletic fields at Weddington Optimist Park closest to NC 84.

The maximum extent of the 71- and 66-dB(A) noise level contours measured from the center of the proposed roadway is 20 feet and 105 feet, respectively. This information should assist local authorities in exercising land use control over the remaining undeveloped lands, so as to avoid development of incompatible activities adjacent to the roadway within local jurisdictions.

Table 5-13. Noise Abatement Criteria

Noise Abatement Criteria (NAC) Hourly Equivalent A-Weighted Sound Level (decibels (dB(A)))			
Activity Category	Activity Criteria ¹ L _{eq(h)} ²	Evaluation Location	Activity Description
A	57	Exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B ³	67	Exterior	Residential
C ³	67	Exterior	Active sport areas, amphitheatres, auditoriums, campgrounds, cemeteries, daycare centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings.
D	52	Interior	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios.
E ³	72	Exterior	Hotels, motels, offices, restaurants/bars, and other developed lands, properties or activities not included in A-D or F.
F	--	--	Agriculture, airports, bus yards, emergency services, industrial, logging maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing.
G	--	--	Undeveloped lands that are not permitted.

¹The L_{eq(h)} Activity Criteria values are for impact determination only and are not design standards for noise abatement measures.

²The equivalent steady-state sound level which, in a stated period of time, contains the same acoustic energy as the time-varying sound level during the same time period, with L_{eq(h)} being the hourly value of L_{eq}.

³Includes undeveloped lands permitted for this activity category.

Table 5-14. Predicted Traffic Noise Impact Summary

Impact Description	Alternative	
	A2	C2
Impacted Receptors Approaching or Exceeding FHWA NAC ¹ for Activity Category B	6	6
Impacted Receptors Approaching or Exceeding FHWA NAC ¹ for Activity Category C	1	1
Substantial Noise Level Increase	1	0
Impacts Due to Both Criteria ²	0	0
Total Impacts Per 23 CFR 772	8	7

¹ Per TNM 2.5 and in accordance with 23 CFR 772 (refer to Table 5-13). No impacts are anticipated for Activity Categories A, D, E, F or G.

² Predicted traffic noise level impact due to exceeding NAC and substantial increase in build-condition noise levels.

5.10.3 No Build Alternative

The Traffic Noise Analysis also considered traffic noise impacts for the No Build Alternative. The No Build Alternative is anticipated to experience similar noise conditions as the existing scenario. Existing noise levels range between 42 dB(A) and 66 dB(A).

5.10.4 Traffic Noise Abatement Measures

Feasible and reasonable noise abatement measures for reducing or eliminating the traffic noise impacts were considered for all impacted build-condition traffic noise receptors. The primary noise abatement measures evaluated for highway projects include highway alignment selection, traffic system management measures, buffer zones, and noise barriers. For each of these measures, benefits versus costs, engineering feasibility, effectiveness and practicability, land use issues, and other factors were included in the noise abatement considerations.

The detailed study alternative alignments were selected based on their ability to meet the purpose and need of the proposed project and minimization of impacts to people and natural resources. As a result, alignment modifications are not a likely source of noise abatement and are not recommended.

Traffic System Management Measures such as prohibition of truck traffic, reduction of the speed limit below the existing and proposed speeds, or screening total traffic volumes would diminish the functional capacity of the major thoroughfare and are not considered practicable.

Buffer zones are typically not practical and/or cost effective for noise mitigation due to the substantial amount of right-of-way required, and would not be a feasible noise mitigation measure for this project. In addition, had they been feasible, the associated costs would exceed the NCDOT policy for reasonable abatement cost threshold per benefitted receptor.

5.10.5 Noise Barriers

Highway sound barriers are primarily constructed as earth berms or solid-mass walls adjacent to limited access freeways that are in proximity to noise-sensitive land use(s). To be effective, a sound barrier must be long enough and tall enough to shield the impacted receptor(s). Generally, the noise wall length must be eight times the distance from the barrier to the receptor. For example, if a receptor is 200 feet from the roadway, an effective barrier would be approximately 1,600 feet long – with the receptor in the horizontal center. On roadway facilities with direct access for driveways, sound barriers are typically not feasible because the openings render the barrier ineffective in impeding the transmission of traffic noise. Due to the requisite lengths for effectiveness, sound barriers are typically not economical for isolated or most low-density areas. However, sound barriers may be economical for the benefit of as few as one predicted traffic noise impact if the barrier can benefit enough total receptors – impacted and non-impacted combined – to meet applicable reasonableness criteria.

Consideration for noise abatement measures was given to all impacted receptors in each of the future build alternatives. However, noise abatement measures are not recommended for this project. Noise abatement along NC 84 was determined not to be feasible due to site access constraints where the driveways of each property and other side streets were located such that a noise barrier would not be able to be constructed to adequately provide the required abatement.

Abatement along the new location portion of the project was determined to be feasible, but not reasonable because the noise reduction design goal of 7 dB(A) would not be met and the 2,500 ft² per benefitted receptor limit would be exceeded due to the low-density development.

5.10.6 Summary

The Traffic Noise Analysis presents a preliminary analysis of traffic noise impacts and consideration of noise abatement measures for feasibility and reasonableness in accordance with the NCDOT Traffic Noise Abatement Policy. Based on this preliminary study, traffic noise abatement is not recommended and no noise abatement measures are proposed. A final determination of noise abatement measures will be made upon completion of the project design, the public involvement process, concurrence with NCDOT policy, and FHWA approval.

In accordance with NCDOT Traffic Noise Abatement Policy, the Federal/State governments are not responsible for providing noise abatement measures for new development for which building permits are issued after the Date of Public Knowledge. The Date of Public Knowledge of the proposed highway project will be the approval date of the Finding of No Significant Impact. For development occurring after this date, local governing bodies are responsible to insure that noise compatible designs are used along the proposed facility.

5.11 Air Quality Analysis

5.11.1 Introduction

Air pollution originates from various sources. Emissions from industry and internal combustion engines are the most prevalent sources. The impact resulting from highway construction ranges from intensifying existing air pollution problems to improving the ambient air quality. Changing traffic patterns are a primary concern when determining the impact of a new highway facility or the improvement of an existing highway facility.

The Federal Clean Air Act of 1970 established the National Ambient Air Quality Standards (NAAQS). These standards were established to protect the public from known or anticipated effects of air pollutants. The most recent amendments to the NAAQS contain criteria for sulfur dioxide (SO₂), particulate matter (PM), carbon monoxide (CO), nitrogen dioxide (NO₂), ozone (O₃), and lead (Pb).

The primary pollutants from motor vehicles are unburned hydrocarbons, nitrous oxides, carbon monoxide, and particulates. Hydrocarbons and nitrogen oxides can combine in a complex series of reactions catalyzed by sunlight to produce photochemical oxidants such as ozone and NO₂. Because these reactions take place over a period of several hours, maximum concentrations of photochemical oxidants are often found far downwind of the precursor sources.

A project-level qualitative air quality analysis was prepared for this project (*Air Quality Analysis for U-3467*, June 2014).

5.11.2 Attainment Status

The project is located in Union County, which is within the Charlotte-Gastonia-Rock Hill nonattainment area for ozone (O₃) as defined by the US Environmental Protection Agency (EPA). The area was designated marginal nonattainment for O₃ under the 2008 eight-hour ozone standard on July 20, 2012. Section 176(c) of the Clean Air Act Amendments (CAAA) of 1990 requires that

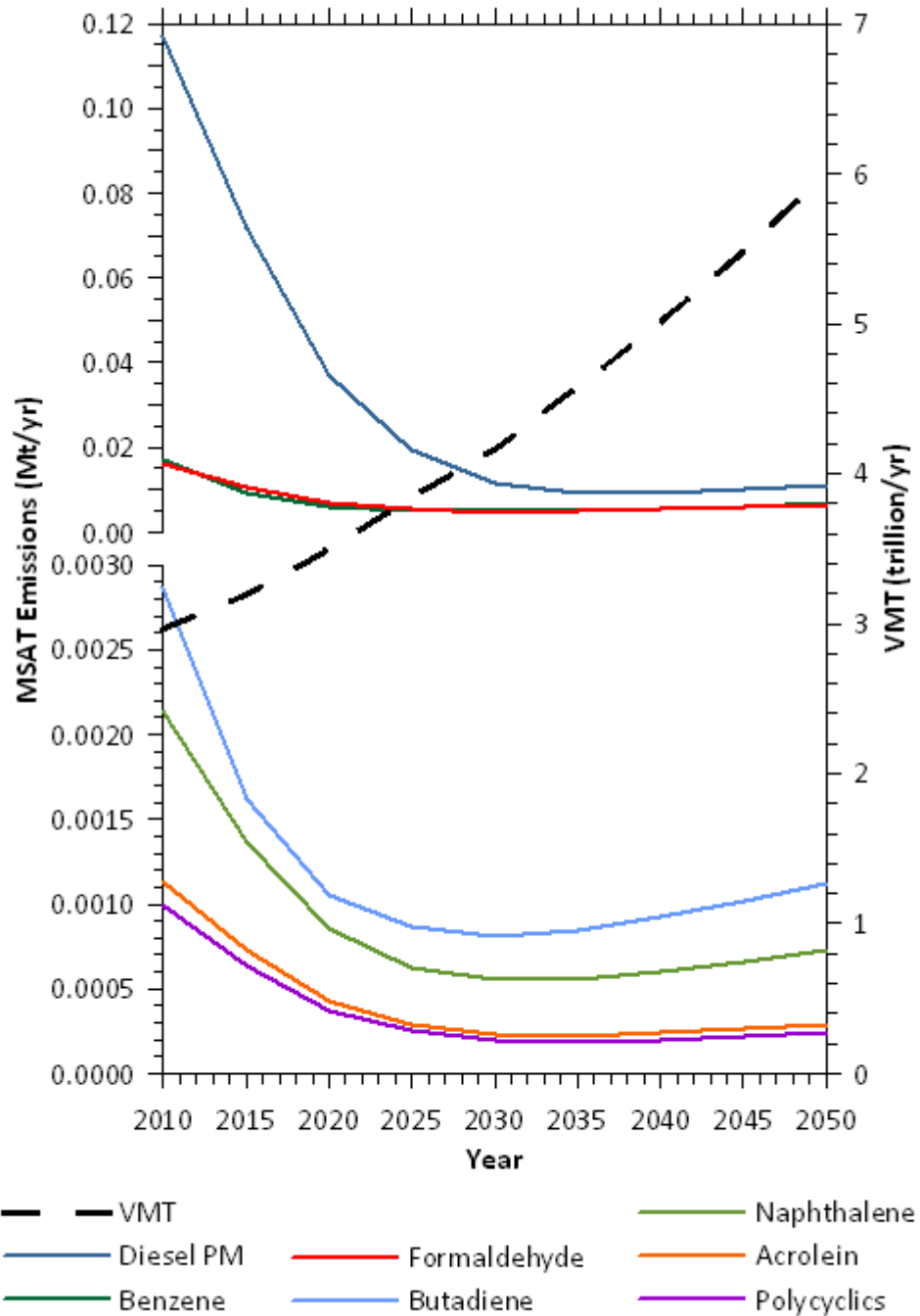
transportation plans, programs, and projects conform to the intent of the state air quality implementation plan (SIP). The current SIP does not contain any transportation control measures for Union County. The Charlotte Regional Transportation Planning Organization *2035 Long Range Transportation Plan* (LRTP) and the 2012-2018 Transportation Improvement Program (TIP) conform to the intent of the SIP. USDOT made a conformity determination on the LRTP on May 2, 2014, the STIP on May 2, 2014, and Union County projects from the STIP on May 2, 2014. For the portion of the project area located in Union County, the projects from the 2035 LRTP conform to the intent of the SIP. The current conformity determination is consistent with the final conformity rule found in 40 CFR Parts 51 and 93. There are no significant changes in the project's design concept or scope, as used in the conformity analyses.

5.11.3 Mobile Source Air Toxics (MSAT)

5.11.3.1 Background

Controlling air toxic emissions became a national priority with the passage of the Clean Air Act Amendments (CAAA) of 1990, whereby Congress mandated that EPA regulate 188 air toxics, also known as hazardous air pollutants. The EPA has assessed this expansive list in their latest rule on the Control of Hazardous Air Pollutants from Mobile Sources (Federal Register, Vol. 72, No. 37, page 8430, February 26, 2007), and identified a group of 93 compounds emitted from mobile sources that are listed in their Integrated Risk Information System (IRIS) (<http://www.epa.gov/iris/>). In addition, EPA identified seven compounds with significant contributions from mobile sources that are among the national and regional-scale cancer risk drivers from their 1999 National Air Toxics Assessment (NATA) (<http://www.epa.gov/ttn/atw/nata1999/>). These are acrolein, benzene, 1,3-butadiene, diesel particulate matter plus diesel exhaust organic gases (diesel PM), formaldehyde, naphthalene, and polycyclic organic matter. While FHWA considers these the priority mobile source air toxics, the list is subject to change and may be adjusted in consideration of future EPA rules. The 2007 EPA rule mentioned above requires controls that will dramatically decrease MSAT emissions through cleaner fuels and cleaner engines. According to an FHWA analysis using EPA's MOBILE6.2 model, even if vehicle activity (vehicle-miles travelled, VMT) increases by 145 percent as assumed, a combined reduction of 72 percent in the total annual emission rate for the priority MSAT is projected from 1999 to 2050, as shown in Table 5-15.

Table 5-15. National MSAT Emission Trends 1999 – 2050 for Vehicles Operating on Roadways Using USEPA’s MOVES2010b Model



Note: Trends for specific locations may be different, depending on locally derived information representing vehicle-miles travelled, vehicle speeds, vehicle mix, fuels, emission control programs, meteorology, and other factors.

Source: EPA MOVES2010b model runs conducted during May – June 2012 by FHWA.

5.11.3.1 Motor Vehicle Emissions Simulator (MOVES)

According to EPA, MOVES improves upon the previous MOBILE model in several key aspects: MOVES is based on a vast amount of in-use vehicle data collected and analyzed since the latest release of MOBILE, including millions of emissions measurements from light-duty vehicles. Analysis of this data enhanced EPA's understanding of how mobile sources contribute to emissions inventories and the relative effectiveness of various control strategies. In addition, MOVES accounts for the significant effects that vehicle speed and temperature have on PM emissions estimates, whereas MOBILE did not. MOVES2010b includes all air toxic pollutants in NATA that are emitted by mobile sources. EPA has incorporated more recent data into MOVES2010b to update and enhance the quality of MSAT emission estimates. These data reflect advanced emission control technology and modern fuels, plus additional data for older technology vehicles.

Based on an FHWA analysis using EPA's MOVES2010b model, as shown in Table 5-15, even if vehicle-miles travelled (VMT) increases by 102 percent as assumed from 2010 to 2050, a combined reduction of 83 percent in the total annual emissions for the priority MSAT is projected for the same time period.

The implications of MOVES on MSAT emissions estimates compared to MOBILE are: lower estimates of total MSAT emissions; significantly lower benzene emissions; and significantly higher diesel PM emissions, especially for lower speeds. Consequently, diesel PM is projected to be the dominant component of the emissions total.

5.11.3.2 MSAT Research

Air toxics analysis is a continuing area of research. While much work has been done to assess the overall health risk of air toxics, many questions remain unanswered. In particular, the tools and techniques for assessing project-specific health outcomes as a result of lifetime MSAT exposure remain limited. These limitations impede the ability to evaluate how potential public health risks posed by MSAT exposure should be factored into project-level decision-making within the context of NEPA.

Nonetheless, air toxics concerns continue to be raised on highway projects during the NEPA process. Even as the science emerges, we are duly expected by the public and other agencies to address MSAT impacts in our environmental documents. FHWA, EPA, the Health Effects Institute, and others have funded and conducted research studies to try to more clearly define potential risks from MSAT emissions associated with highway projects. FHWA will continue to monitor the developing research in this field.

NEPA Context

NEPA requires, to the fullest extent possible, that the policies, regulations, and laws of the federal government be interpreted and administered in accordance with its environmental protection goals. NEPA also requires federal agencies to use an interdisciplinary approach in planning and decision-making for any action that adversely impacts the environment. NEPA requires, and FHWA is committed to, the examination and avoidance of potential impacts to the natural and human environment when considering approval of proposed transportation projects. In addition to evaluating the potential environmental effects, we must also take into account the need for safe and efficient transportation in reaching a decision that is in the best overall public interest. The

FHWA policies and procedures for implementing NEPA are contained in regulation at 23 CFR Part 771.

Consideration of MSAT in NEPA Documents

FHWA developed a tiered approach with three categories for analyzing MSAT in NEPA documents, depending on specific project circumstances:

1. No analysis for projects with no potential for meaningful MSAT effects;
2. Qualitative analysis for projects with low potential MSAT effects; or
3. Quantitative analysis to differentiate alternatives for projects with higher potential MSAT effects.

For projects warranting MSAT analysis, the seven priority MSATs should be analyzed.

(1) Projects with No Meaningful Potential MSAT Effects, or Exempt Projects

The types of projects included in this category are:

- Projects qualifying as a Categorical Exclusion under 23 CFR 771.117(c) (subject to consideration whether unusual circumstances exist under 23 CFR 771.117(b));
- Projects exempt under the Clean Air Act conformity rule under 40 CFR 93.126; or
- Other projects with no meaningful impacts on traffic volumes or vehicle mix.

For projects that are categorically excluded under 23 CFR 771.117(c), or are exempt from conformity requirements under the Clean Air Act pursuant to 40 CFR 93.126, no analysis or discussion of MSAT is necessary. Documentation sufficient to demonstrate that the project qualifies as a Categorical Exclusion and/or exempt project will suffice. For other projects with no or negligible traffic impacts, regardless of the class of NEPA environmental document, no MSAT analysis is recommended. The types of projects categorically excluded under 23 CFR 771.117(d), or exempt from certain conformity requirements under 40 CFR 93.127, does not warrant an automatic exemption from an MSAT analysis, but they usually will have no meaningful impact. However, the project record should document the basis for the determination of “no meaningful potential impacts” with a brief description of the factors considered.

(2) Projects with Low Potential MSAT Effects

The types of projects included in this category are those that serve to improve the operations of a highway, transit, or freight without adding substantial new capacity or without creating a facility that is likely to meaningfully increase MSAT emissions. This category covers a broad range of projects.

We anticipate that most highway projects that need an MSAT assessment will fall into this category. Any projects not meeting the criteria in category (1) or category (3) below should be included in this category. Examples of these types of projects are minor widening projects; new interchanges or replacing a signalized intersection on a surface street; or projects where design year traffic is projected to be less than 140,000 to 150,000 annual average daily traffic (AADT).

For these projects, a qualitative assessment of emissions projections should be conducted. This qualitative assessment would compare, in narrative form, the expected effect of the project on traffic volumes, vehicle mix, or routing of traffic and the associated changes in MSAT for the project alternatives, including No Build, based on VMT, vehicle mix, and speed. It would also discuss national trend data projecting substantial overall reductions in emissions due to stricter

engine and fuel regulations issued by EPA. Because the emission effects of these projects typically are low, we expect there would be no appreciable difference in overall MSAT emissions among the various alternatives.

In addition to the qualitative assessment, a project-level air quality analysis for this category of projects must include a discussion of information that is incomplete or unavailable for a project specific assessment of MSAT impacts, in compliance with the Council on Environmental Quality regulations (40 CFR 1502.22(b)). This discussion should explain how current scientific techniques, tools, and data are not sufficient to accurately estimate human health impacts that could result from a transportation project in a way that would be useful to decision-makers. Also, in compliance with 40 CFR 150.22(b), it should contain information regarding the health impacts of MSAT.

(3) Projects with Higher Potential MSAT Effects

This category includes projects that have the potential for meaningful differences in MSAT emissions among project alternatives. We expect a limited number of projects to meet this two-pronged test. To fall into this category, a project should:

- Create or significantly alter a major intermodal freight facility that has the potential to concentrate high levels of diesel particulate matter in a single location, involving a significant number of diesel vehicles for new projects or accommodating with a significant increase in the number of diesel vehicles for expansion projects; or
- Create new capacity or add significant capacity to urban highways such as interstates, urban arterials, or urban collector-distributor routes with traffic volumes where the AADT is projected to be in the range of 140,000 to 150,000 or greater by the design year;

And also

- Proposed to be located in proximity to populated areas.

Projects falling within this category should be more rigorously assessed for impacts, including completion of a quantitative analysis to forecast local-specific emission trends of the priority MSAT for each alternative, to use as a basis of comparison. This analysis also may address the potential for cumulative impacts, where appropriate, based on local conditions. How and when cumulative impacts should be considered would be addressed as part of a project-level air quality analysis. If the analysis for a project in this category indicates meaningful differences in levels of MSAT emissions among alternatives, mitigation options should be identified and considered.

This project falls under Category (2) because it is intended to improve the operations of a highway, transit, or freight without adding substantial new capacity or without creating a facility that is likely to meaningfully increase emissions, and the Design Year traffic is not projected to meet or exceed the 140,000 to 150,000 AADT criterion.

5.11.3.3 Qualitative MSAT Analysis

A qualitative MSAT analysis provides a basis for identifying and comparing the potential differences among MSAT emissions, if any, from the project alternatives. The qualitative assessment presented below is derived in part from a study conducted by FHWA titled A Methodology for Evaluating Mobile Source Air Toxic Emissions among Transportation Project Alternatives, found at: www.fhwa.dot.gov/environment/airtoxic/msatcompare/msatemissions.htm.

For alternatives in this proposed project, the amount of MSAT emitted would be proportional to the vehicle miles traveled, or VMT, assuming that other variables such as fleet mix are the same for the alternative. Because the VMT estimated for the No Build Alternative is less than the Build Alternatives, higher levels of MSAT are expected from the Build Alternatives compared to the No Build.

As shown in Table 5-16, the estimated daily VMT would increase by 22 percent with the Rea Road Extension Build Alternatives, primarily because of the alternatives' distance length and traffic volumes. Thus, while MSAT emissions would increase because of the longer NC 84 length and changing local traffic patterns with Rea Road Extension Build Alternatives, the potential local impact of MSAT's would be reduced.

Table 5-16. Average Daily VMTs for Rea Road Extension/NC 84

2035 Alternative	2035 Average Daily VMT	Increase in VMT Over No Build Alternative
No Build Alternative NC 84	95,853	N/A
Build Alternatives (A2, C2) Rea Road Extension	117,040	22%

The additional travel lanes included as part of the proposed Rea Road Extension (relocate NC 84) and the proposed widening of existing NC 84 in the project area will have the effect of moving some traffic closer to nearby homes, and businesses; therefore, under each alternative there may be localized areas where ambient concentrations of MSAT could be higher under Build Alternatives than the No Build Alternative. However, the magnitude and the duration of these potential increases compared to the No Build Alternative cannot be reliably quantified due to incomplete or unavailable information in forecasting project-specific MSAT health impacts. In summary, when a highway is widened, the localized level of MSAT emissions for the Build Alternative could be higher relative to the No Build Alternative, but this could be offset due to increases in speeds and reductions in congestion (which are associated with lower MSAT emissions). Also, MSAT will be lower in other locations when traffic shifts away from them. However, on a regional basis, EPA's vehicle and fuel regulations, coupled with fleet turnover, will over time cause substantial reductions that, in almost all cases, will cause region-wide MSAT levels to be significantly lower than today.

Regardless of the alternative chosen, emissions will likely be lower than present levels in the design year as a result of EPA's national control programs that are projected to reduce annual MSAT emissions by over 80 percent from 2010 to 2050. Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the EPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the study area are likely to be lower in the future in virtually all locations.

In summary, under the Build Alternatives in the design year it is expected there would be reduced MSAT emissions in the immediate area of the project, relative to the No Build Alternative, due to EPA's MSAT reduction programs.

5.11.3.4 Incomplete or Unavailable Information for Project-Specific MSAT Health Impacts Analysis

In FHWA's view, information is incomplete or unavailable to credibly predict the project-specific health impacts due to changes in MSAT emissions associated with a proposed set of highway alternatives. The outcome of such an assessment, adverse or not, would be influenced more by the uncertainty introduced into the process through assumption and speculation rather than any genuine insight into the actual health impacts directly attributable to MSAT exposure associated with a proposed action.

EPA is responsible for protecting the public health and welfare from any known or anticipated effect of an air pollutant. They are the lead authority for administering the Clean Air Act and its amendments and have specific statutory obligations with respect to hazardous air pollutants and MSAT. EPA is in the continual process of assessing human health effects, exposures, and risks posed by air pollutants. They maintain the Integrated Risk Information System (IRIS), which is "a compilation of electronic reports on specific substances found in the environment and their potential to cause human health effects" (EPA, www.epa.gov/iris/). Each report contains assessments of non-cancerous and cancerous effects for individual compounds and quantitative estimates of risk levels from lifetime oral and inhalation exposures with uncertainty spanning perhaps an order of magnitude.

Other organizations are also active in the research and analyses of the human health effects of MSAT, including the Health Effects Institute (HEI). Two HEI studies are summarized in Appendix D of FHWA's *Interim Guidance Update on Mobile Source Air Toxic Analysis in NEPA Documents*. Among the adverse health effects linked to MSAT compounds at high exposures are; cancer in humans in occupational settings; cancer in animals; and irritation to the respiratory tract, including the exacerbation of asthma. Less obvious is the adverse human health effects of MSAT compounds at current environmental concentrations (HEI, <http://pubs.healtheffects.org/view.php?id=282>) or in the future as vehicle emissions substantially decrease (HEI, <http://pubs.healtheffects.org/view.php?id=306>).

The methodologies for forecasting health impacts include emissions modeling; dispersion modeling; exposure modeling; and then final determination of health impacts – each step in the process building on the model predictions obtained in the previous step. All are encumbered by technical shortcomings or uncertain science that prevents a more complete differentiation of the MSAT health impacts among a set of project alternatives. These difficulties are magnified for lifetime (i.e., 70 year) assessments, particularly because unsupported assumptions would have to be made regarding changes in travel patterns and vehicle technology (which affects emissions rates) over that time frame, since such information is unavailable.

It is particularly difficult to reliably forecast 70-year lifetime MSAT concentrations and exposure near roadways; to determine the portion of time that people are actually exposed at a specific location; and to establish the extent attributable to a proposed action, especially given that some of the information needed is unavailable.

There are considerable uncertainties associated with the existing estimates of toxicity of the various MSAT because of factors such as low-dose extrapolation and translation of occupational exposure data to the general population, a concern expressed by HEI (<http://pubs.healtheffects.org/view.php?id=282>). As a result, there is no national consensus on air dose-response values assumed to protect the public health and welfare for MSAT compounds,

and in particular for diesel PM. EPA (www.epa.gov/risk/basicinformation.htm#g) and HEI (<http://pubs.healtheffects.org/getfile.php?u=395>) have not established a basis for quantitative risk assessment of diesel PM in ambient settings.

There is also the lack of a national consensus on an acceptable level of risk. The current context is the process used by EPA as provided by the Clean Air Act to determine whether more stringent controls are required in order to provide an ample margin of safety to protect public health or to prevent an adverse environmental effect for industrial sources subject to the maximum achievable control technology standards, such as benzene emissions from refineries. The decision framework is a two-step process. The first step requires EPA to determine an “acceptable” level of risk due to emissions from a source, which is generally no greater than approximately 100 in a million. Additional factors are considered in the second step, the goal of which is to maximize the number of people with risks less than one in a million due to emissions from a source. The results of this statutory two-step process do not guarantee that cancer risks from exposure to air toxics are less than one in a million; in some cases, the residual risk determination could result in maximum individual cancer risks that are as high as approximately 100 in a million. In a June 2008 decision, the U.S. Court of Appeals for the District of Columbia Circuit upheld EPA’s approach to addressing risk in its two-step decision framework. Information is incomplete or unavailable to establish that even the largest of highway projects would result in levels of risk greater than deemed acceptable.

Because of the limitations in the methodologies for forecasting health impacts described, any predicted difference in health impacts between alternatives is likely to be much smaller than the uncertainties associated with predicting the impacts. Consequently, the results of such assessments would not be useful to decision-makers, who would need to weigh this information against project benefits, such as reducing traffic congestion, accident rates, and fatalities, plus improved access for emergency response, that are better suited for quantitative analysis.

5.11.3.5 MSAT Conclusion

What we know about mobile source air toxics is still evolving. As the science progresses FHWA will continue to revise and update this guidance. FHWA is working with stakeholders, EPA, and others to better understand the strengths and weaknesses of developing analysis tools and the applicability on the project level decision documentation process.

5.11.4 Summary

Vehicles are a major contributor to decreased air quality because they emit a variety of pollutants into the air. Changing traffic patterns are a primary concern when determining the impact of a new highway facility or the improvement of an existing highway facility. New highways or the widening of existing highways increase localized levels of vehicle emissions, but these increases could be offset due to increases in speeds from reductions in congestion and because vehicle emissions will decrease in areas where traffic shifts to the new roadway. Significant progress has been made in reducing criteria pollutant emissions from motor vehicles and improving air quality, even as vehicle travel has increased rapidly.

The project is located in Union County, which complies with the National Ambient Air Quality Standards. The Rea Road Extension project is not anticipated to create any adverse effects on the air quality of the Union County attainment area. This evaluation completes the assessment

requirements for air quality of the 1990 Clean Air Act Amendments and the NEPA process, and no additional reports are necessary.

5.12 Hazardous Materials

Geographic Information Systems (GIS) data was reviewed in October 2012 to identify known sites of concern in the project study area. A search of the appropriate environmental agencies' databases was also performed to assist in evaluating identified sites. Seven sites presently or formerly containing petroleum underground storage tanks (USTs) were identified within the project area (see Table 5-17). In addition, two sites regulated by the Resource Conservation and Recovery Act (RCRA) as hazardous waste generators were identified. Figures 2A through 2G show the locations of these sites.

Hazardous materials are any materials that may have a harmful effect on humans or the natural environment. Examples of potentially hazardous materials and waste sites include service stations, regulated landfills, unregulated dump sites, salvage yards, industrial sites, and aboveground and underground storage tanks.

Table 5-17. Underground Storage Tanks in the Project Area

Site	Type	Location	UST Facility ID No.	Property	UST/Property Owner	Anticipated Impact ¹ / Risk	Comments
1	UST	206 Providence Rd. (NC 16)	N/A	Matthews Property	Mary Matthews	PCS / Low	Heating oil UST, GWI 36104
2	UST	13801 Providence Rd.	0-034467	Weddington Center	Jerry Pressley, Pressley Stores, Inc.	PCS / Low	Active gas station & convenience store, GWI 8505 and 9945
3	UST	13633 Providence Rd.	0-008145	Weddington Shops	Weddington Associates	PCS / Low	Former gas Station / Current shopping center, GWI 6551
4	UST	13601 Providence Rd.	N/A	Weddington Activity Center	M Squared Holdings, LLC	PCS / Low	Former BCS Ferrari Tractor / Current clubhouse, GWI 27343
5	UST	5900 block of Weddington Monroe Rd.	N/A	Wesley Chapel Retail Investors, LLC	Earnhardt-Price Family, LLC	PCGW / Low	Site now Walgreens, GWI 27933, closed out 2007
6	UST	6320 Weddington Monroe Rd.	0-036876	Market Express	Village Commons Branch II, LLC	PCS / Low	Active gas station and convenience store, GWI 36733
7	UST	213 Waxhaw-Indian Trail Rd.	0-002276	Doug Plyler	Plyler Family LLC	PCS / Low	Registered farm tank, closed 1990

¹ Petroleum Contaminated Soils (PCS), Petroleum Contaminated Groundwater (PCGW)

Both detailed study alternatives may impact Sites 5 and 6, as well as one site identified as a hazardous waste generator. Preliminary site assessments to identify the nature and extent of any contamination will be performed on these sites prior to right-of-way acquisition.

CVS Pharmacy, located in the southeast quadrant of the NC 84/Waxhaw-Indian Trail Road intersection, is regulated by RCRA as a conditionally exempt small quantity generator of hazardous waste. Based on the preliminary design for all of the preliminary build alternatives, a small amount of property along NC 84 at this site is located within the proposed right-of-way. It is anticipated that this site would have a low impact to the proposed project.

No landfills or other geoenvironmental concerns were identified in the project area.

5.13 Construction Impacts

Impacts from ground disturbing activities will occur during construction within the project right-of-way. Examples of activities related to construction include: clearing and grubbing; traffic maintenance; bridge construction; utility construction; and roadway paving.

Short-term construction impacts associated with the proposed project may occur in the areas of water quality, natural resources, noise, and air quality. A temporary peak in local spending from contractors and construction workers would be a benefit during construction of the proposed project. Since construction operations would be limited to the time needed to complete the project, both benefits and impacts to resources would be considered temporary. Potential construction-related impacts can be minimized by adherence to the following established construction methods:

- All materials resulting from clearing and grubbing, demolition, or other operations will be removed from the project, burned or otherwise disposed of by the contractor. Any burning will be done in accordance with applicable local laws and ordinances and regulations of the North Carolina State Air Quality Implementation Plan (SIP) in compliance with 15 NCAC 2D.0520. Care will be taken to ensure burning will be done at the greatest distance practical from dwellings and not when atmospheric conditions are such as to create a hazard to the public. Burning will be performed under constant surveillance.
- Measures will be taken to reduce the dust generated by construction when the control of dust is necessary for the protection and comfort of motorists or area residents.
- The major construction elements of this project are expected to be earth removal, hauling, grading, and paving. General construction noise impacts such as temporary speech interference for passersby and those individuals living or working near the project, can be expected particularly from paving operations and from earth-moving equipment during grading operations. Noise construction impacts during project construction are of short duration and transmission loss characteristics of surrounding wooded areas and other natural and man-made features will moderate the effects of intrusive construction noise. Such noise will be limited to daylight hours as much as possible.
- Provisions will be taken during construction to prevent erosion, sedimentation, and construction damage to forested areas outside of the right-of-way and construction limits. Trees outside of the construction limits should be protected from construction activities to prevent skinning tree trunks by heavy equipment, exposing roots, and smothering trees from fill dirt around the base.

- Strict adherence to the sedimentation and erosion control plan will be required, including limiting areas and duration of exposed earth and stabilizing exposed areas as quickly as possible.
- Traffic service in specific areas of the project may be subject to brief disruptions during construction. Measures will be taken to maintain the flow of traffic. Access to residential and commercial areas is expected to be maintained during project construction.

5.14 Summary of Social, Economic, and Environmental Effects

Table 5-18 summarizes the environmental effects of detailed study alternatives A2 and C2. The proposed project is not expected to cause substantial adverse impacts to the human, natural or physical environments.

Table 5-18. Summary of Environmental Effects

Impact Category ¹		Build Alternatives	
		A2	C2
Natural Resources Impacts			
Federally-Listed Species Present in Study Area		No	No
100-Year Floodplain and Floodway Impacts (acres)		7.2	7.3
Delineated Wetland Impacts (no. crossings/acres)		3/0.10	4/0.12
Delineated Stream Impacts (no. crossings/linear feet)		8/1,397	11/2,933
Delineated Other Surface Water Impacts (acres)		0.25	0.00
Forest Impacts (acres)		39.9	43.2
Human Environment Impacts			
Relocations	Residential	5	5
	Business	1	1
	Non-Profit	1	1
	Total	7	7
Low Income/Minority Populations Present		No	No
Schools ²		1	1
Recreational Areas/Parks ³		1	1
Churches ⁴		2	2

Table 5-18. Summary of Environmental Effects *continued*

Impact Category ¹	Build Alternatives	
	A2	C2
Cemeteries	0	0
Historic Sites	2/No Adverse Effect ⁵	2/No Adverse Effect ⁵
Section 4(f) Impacts	1 (<i>de minimis</i>)	1 (<i>de minimis</i>)
Traffic Noise Impacts (receptors)	8	7
Physical Environment Impacts		
Prime, Statewide, and Unique Farmland Soils (acres)	62.4	63.7
Underground Storage Tanks/HazMat Sites	3	3
Preliminary Cost Estimates		
Construction	\$31,352,000	\$31,049,000
Right-of-Way Acquisition	\$8,685,000	\$8,666,000
Utility Relocation	\$797,000	\$797,000
Mitigation	\$1,082,000	\$2,252,000
Total Cost	\$48,481,000	\$49,323,000

¹ Impacts are calculated based on slope stake limits plus 25 feet.

² Current access to Weddington High School will be changed as a result of the proposed project.

³ Right-of-way impacts, including impacts to recreational fields, will occur at Weddington Optimist Park.

⁴ Parking spaces will be impacted at Southbrook Community Church and Siler Presbyterian Church as a result of the proposed project.

⁵ No Adverse Effect with conditions identified in Section 5.2.1.

5.15 Conclusion

5.15.1 What Are the Next Steps in the Project Development Process?

Based on the current project schedule a public hearing will be held in 2015 following FHWA approval of this document. Comments received at the hearing will be reviewed by the NCDOT and will be incorporated into the project as feasible and practicable. Before the final environmental document is approved a decision will be made determining whether the project will cause significant environmental effects. If there are no significant environmental effects then the Finding of No Significant Impacts (FONSI) decision document will be prepared. If there are significant environmental effects, then a higher level planning document will need to be developed. Based on the level of impacts discussed in this document, a FONSI is anticipated. The flowchart below from *A Citizen's Guide to the NEPA, Having Your Voice Heard* (Council on Environmental Quality, 2007) illustrates the NEPA process:

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6.0 COMMENTS AND COORDINATION

This project was coordinated with appropriate federal, state, and local agencies and the public. This chapter describes the public involvement and agency coordination that has taken place for the proposed project. Planned future public involvement activities and agency coordination are also discussed.

How has the public been or how will they be involved with this project?

6.1 Public Involvement and Outreach

6.1.1 Newsletter

A newsletter was mailed to citizens on the project mailing list in June 2013. The newsletter announced the June 25, 2013 public meeting and provided background information on the proposed project.

6.1.2 Project Webpage

A project website (www.ncdot.gov/projects/ReaRoad) was developed in 2013 to make project mapping, newsletters, and other project information available to the public. The website also provides contact information for project representatives. NCDOT mailed a postcard to citizens on the project mailing list in December 2013 announcing the launch of the project website.

6.1.3 Public Meeting

NCDOT conducted a public meeting on June 25, 2013 at the Weddington Middle School Cafeteria in Matthews, North Carolina. In addition to the newsletter announcing the workshop, NCDOT issued a press release on June 7, 2013. The purpose of the meeting was to provide information to, and receive feedback from, the public on the proposed project. Information presented included the project's study area, Purpose and Need, and preliminary alternatives.

Approximately 60 community members attended the meeting. Public meeting participants included residents, business owners, elected/appointed officials, and media representatives. Citizens had the opportunity to submit written comments and questions at the meeting or via mail and e-mail after the meeting. A total of 13 written comments were received. Most citizens indicated a preference that the western end of the project extend from existing Rea Road on new alignment rather than widening existing NC 84. Many citizens also indicated support for sidewalks and bicycle accommodations. The public's main concerns were how the raised median would impact the ability to turn left and impacts to individual properties.

Information presented at the public meeting and public comments may be viewed at the Project Development & Environmental Analysis Unit, Century Center Building A, 1010 Birch Ridge Drive, Raleigh.

6.1.4 Public Hearing

NCDOT will conduct a public hearing for the proposed project to review the detailed study alternatives and Environmental Assessment with the public, and receive their comments. Formal notices will be included in local newspapers a minimum of 30 days prior to the public hearing. Additional notices for the public hearing will also be sent to persons on the project mailing list.

6.2 Agency Coordination

How have government agencies been or will be involved with this project?

6.2.1 Early Coordination Meetings

Early coordination meetings were held in July 2012 with representatives from Union County, the Town of Weddington, and the Village of Wesley Chapel to discuss the proposed project and receive input. Representatives from the local jurisdictions indicated the project was important locally.

6.2.2 External Scoping Meeting

A project scoping letter announcing the start of U-3467 project development, environmental, and engineering studies was distributed to federal, state, and local agencies on November 9, 2012. The letter requested recipients supply information that would be helpful in evaluating potential environmental impacts of the project and invited them to the external scoping meeting held on November 14, 2012. An asterisk (*) next to the name indicates that either a written response was received, or an agency representative attended the meeting. A summary of the external scoping meeting is included in Appendix B.

- Federal Highway Administration*
- Federal Emergency Management Agency Regional Office
- US Environmental Protection Agency*
- US Army Corps of Engineers, Wilmington District*
- US Fish and Wildlife Service*
- US Forest Service
- NC Department of Administration
- NC Department of Agriculture
- NC Department of Cultural Resources, Division of Historical Resources, State Historic Preservation Office*
- NC Department of Environment and Natural Resources
 - Division of Water Resources*
 - Natural Heritage Program*
 - NC Wildlife Resources Commission*
- Local Agencies
 - Charlotte Regional Transportation Planning Organization
 - Union County
 - Town of Weddington
 - Village of Wesley Chapel

6.2.3 Local Officials Informational Meeting

NCDOT conducted a local officials informational meeting on June 25, 2013 at the Weddington Middle School Cafeteria in Matthews, North Carolina. An invitation was mailed to local officials inviting them to attend the meeting. The purpose of the meeting was to provide information to, and receive feedback from, local officials on the proposed project.

The local officials informational meeting was held from 2:30 to 3:30 p.m. and was attended by six representatives from Union County, the Village of Wesley Chapel, and the Town of Weddington. A formal presentation on the proposed project was given, followed by questions and comments. A variety of topics was discussed during the comment session, including: current and future development within, or adjacent to, the project area; current and future traffic operations; project cost and timeline; project prioritization; and anticipated project design details. Meeting attendees noted they would not be supportive of an Improve Existing Alternative.

6.2.4 Weddington Town Council Meeting

NCDOT representatives met with the Weddington Town Council and staff regarding the proposed project at a Special Town Council Meeting on August 19, 2013. In addition to Town and NCDOT representatives, a number of citizens were also in attendance at the meeting. NCDOT Division 10 requested a meeting with the Town of Weddington to obtain feedback on a potential project alternative that was noted by former Weddington Mayor Nancy Anderson and a citizen at the June 2013 public meeting. Subsequent to the public meeting, the project team obtained information indicating that on March 9, 1999 the Weddington Town Council voted to recommend the alignment identified as Alternative 4C in the *NC 84 Relocation, from NC 16 (Providence Road), to Twelve Mile Creek Road, Union County, Location and Environmental Screening Report* (Presnell Associates, 1999) to the Charlotte Regional Transportation Planning Organization (formerly Mecklenburg-Union Metropolitan Planning Organization [MUMPO]). MUMPO endorsed the 4C alignment as the preferred alignment for the proposed project on March 17, 1999. The new location portion of Alternative 4C is on approximately the same alignment as Detailed Study Alternative C2.

6.2.5 NEPA/Section 404 Merger Process

The NEPA/Section 404 Merger process is an interagency procedure integrating the regulatory requirements of Section 404 of the Clean Water Act into the NEPA decision-making process. A NEPA/Section 404 Merger screening meeting was conducted via e-mail on September 17, 2012 with the project's Co-Team Leaders: NCDOT, FHWA, USACE, and NCDENR-DWR. The Co-Team Leaders determined the project would follow a modified Merger process with a joint Merger Team meeting for Concurrence Points 2A (Bridging Decisions and Alignment Review) and 4A (Avoidance and Minimization). This meeting will be held after a public hearing has been held for the proposed project.

The agencies represented on the U-3467 NEPA/Section 404 Merger Team are:

- Federal Highway Administration
- US Environmental Protection Agency
- US Army Corps of Engineers
- US Fish and Wildlife Service

- NC Department of Transportation
- NC Wildlife Resources Commission
- NC Department of Environment and Natural Resources, Division of Water Resources
- NC Department of Cultural Resources, State Historic Preservation Office
- Charlotte Regional Transportation Planning Organization

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* Available for review at the NCDOT Project Development and Environmental Analysis Unit, Century Center Building A, 1000 Birch Ridge Drive, Raleigh, NC.

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Appendix A

Figures

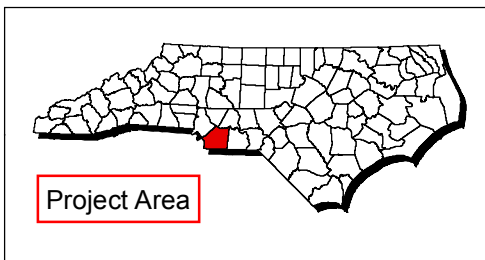
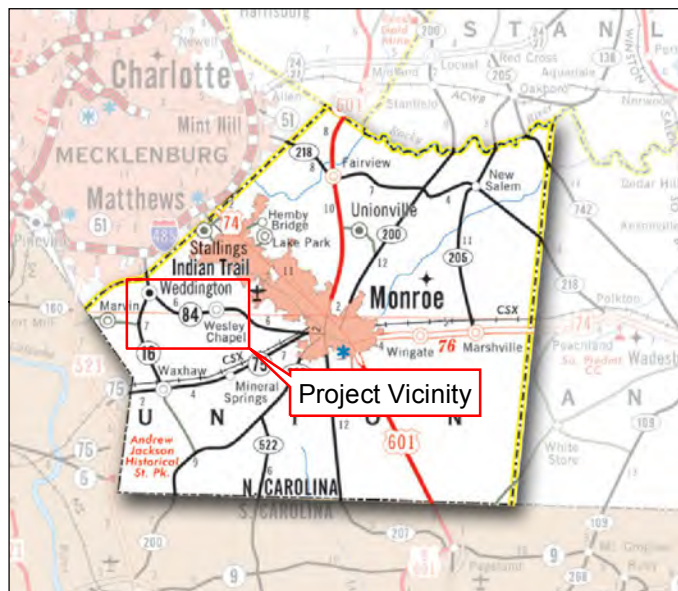


Figure 1

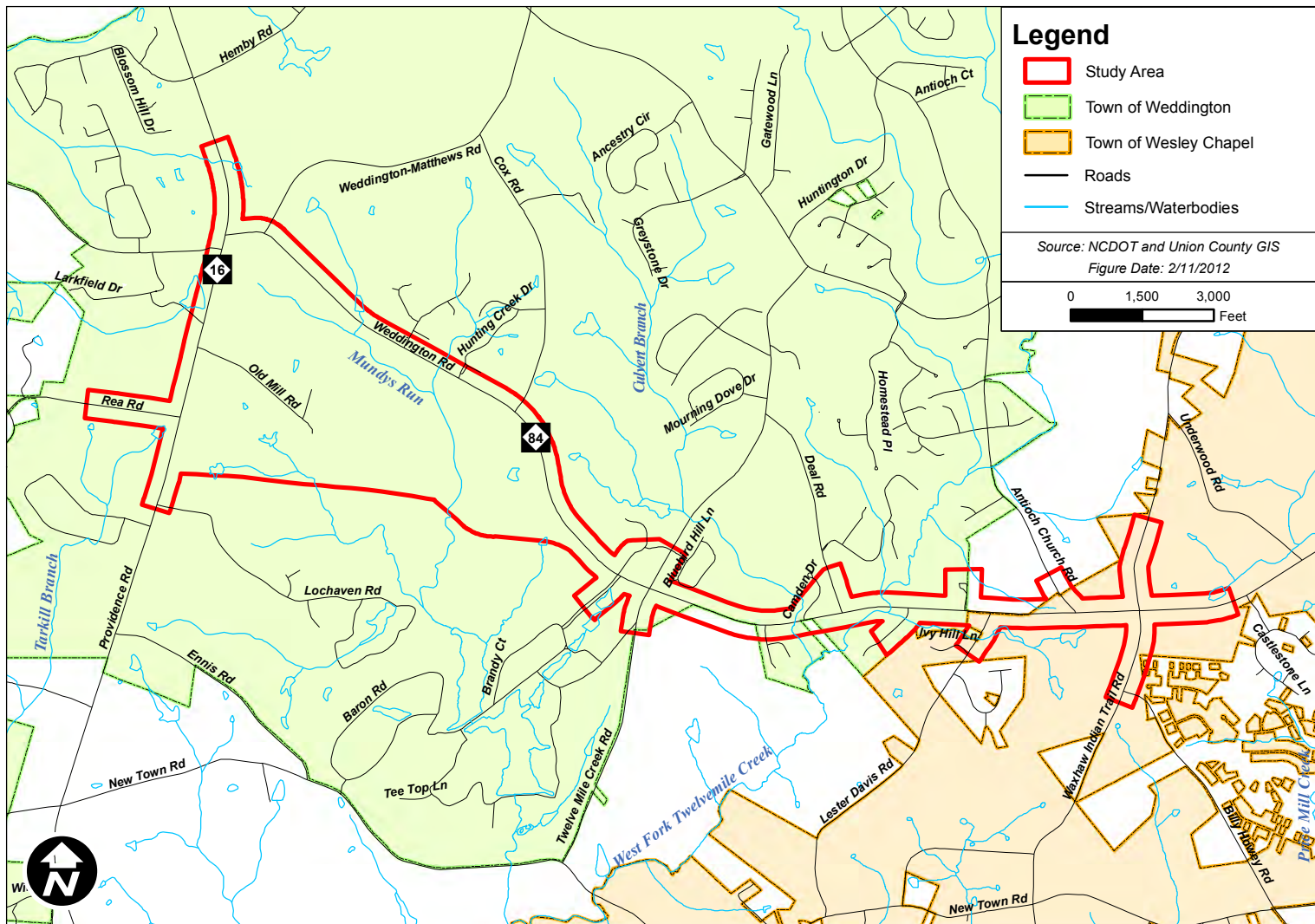
Project Vicinity

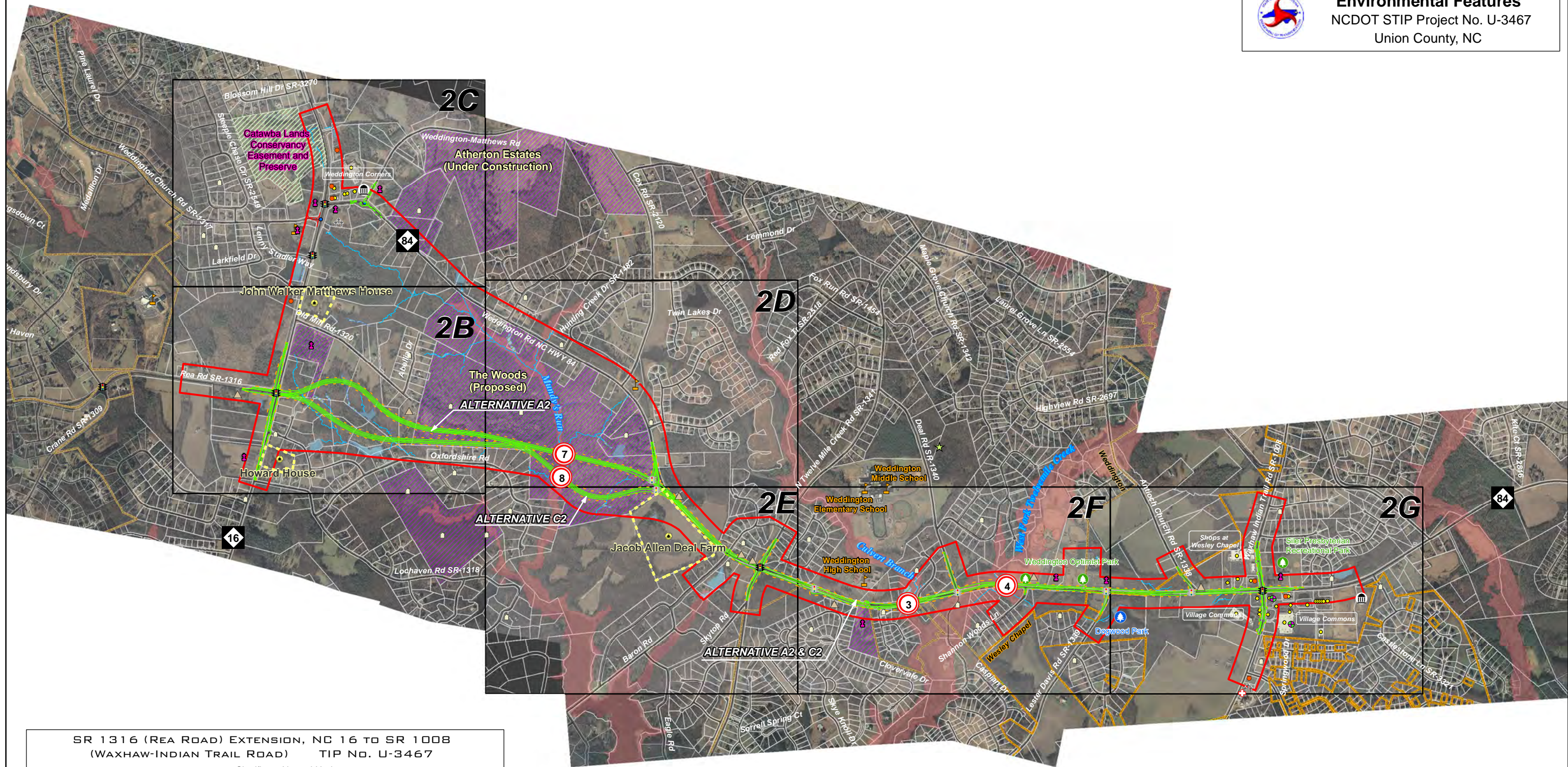
SR 1316 (Rea Road) Extension, NC 16 to SR 1008
 (Waxhaw-Indian Trail Road)
 NCDOT STIP Project No. U-3467

Union County, North Carolina



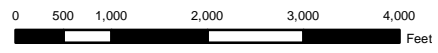
North Carolina
 Department of Transportation





**SR 1316 (REA ROAD) EXTENSION, NC 16 TO SR 1008
 (WAXHAW-INDIAN TRAIL ROAD) TIP NO. U-3467**

- | | | |
|-------------------------------------|--|----------------------|
| Study Area | Significant Natural Heritage Area & Managed Area | Privately Owned Park |
| Map Book Grid | Proposed Development | Publicly Owned Park |
| Alternatives | Floodplain | Business |
| Cut/Fill Limit | Delineated Wetland | School |
| Town of Weddington | Delineated Waterbody | Subdivision |
| Town of Wesley Chapel | Delineated Stream | Emergency Facility |
| Roads | Underground Storage Tank | Church |
| Existing Traffic Signal | Hazardous Waste | Cemetery |
| Proposed Traffic Signal | Government Facility | Historic Property |
| Natural Heritage Element Occurrence | Hazardous Waste | Hydraulic Site |
| | | Hydraulic Structure |

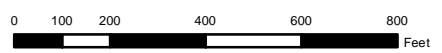


Map Prepared: 2/10/2015 Data Source: NCDOT, NC HPO, Union County, NC OneMap and NHP Aerial Imagery: NCDOT 2012

Figure - 2A

SR 1316 (REA ROAD) EXTENSION, NC 16 TO SR 1008
(WAXHAW-INDIAN TRAIL ROAD) TIP NO. U-3467

- | | | |
|-------------------------------------|--|----------------------|
| Study Area | Significant Natural Heritage Area & Managed Area | Privately Owned Park |
| Map Book Grid | Proposed Development | Publicly Owned Park |
| Alternatives | Floodplain | Business |
| Cut/Fill Limit | Delineated Wetland | School |
| Town of Weddington | Delineated Waterbody | Subdivision |
| Town of Wesley Chapel | Delineated Stream | Emergency Facility |
| Roads | Underground Storage Tank | Church |
| Existing Traffic Signal | Hazardous Waste | Cemetery |
| Proposed Traffic Signal | Government Facility | Historic Property |
| Natural Heritage Element Occurrence | Hazardous Waste Occurrence | Hydraulic Site |
| | | Hydraulic Structure |



Map Prepared: 2/10/2015
Data Source: NCDOT, NC HPO, Union County, NC OneMap and NHP
Aerial Imagery: NCDOT 2012

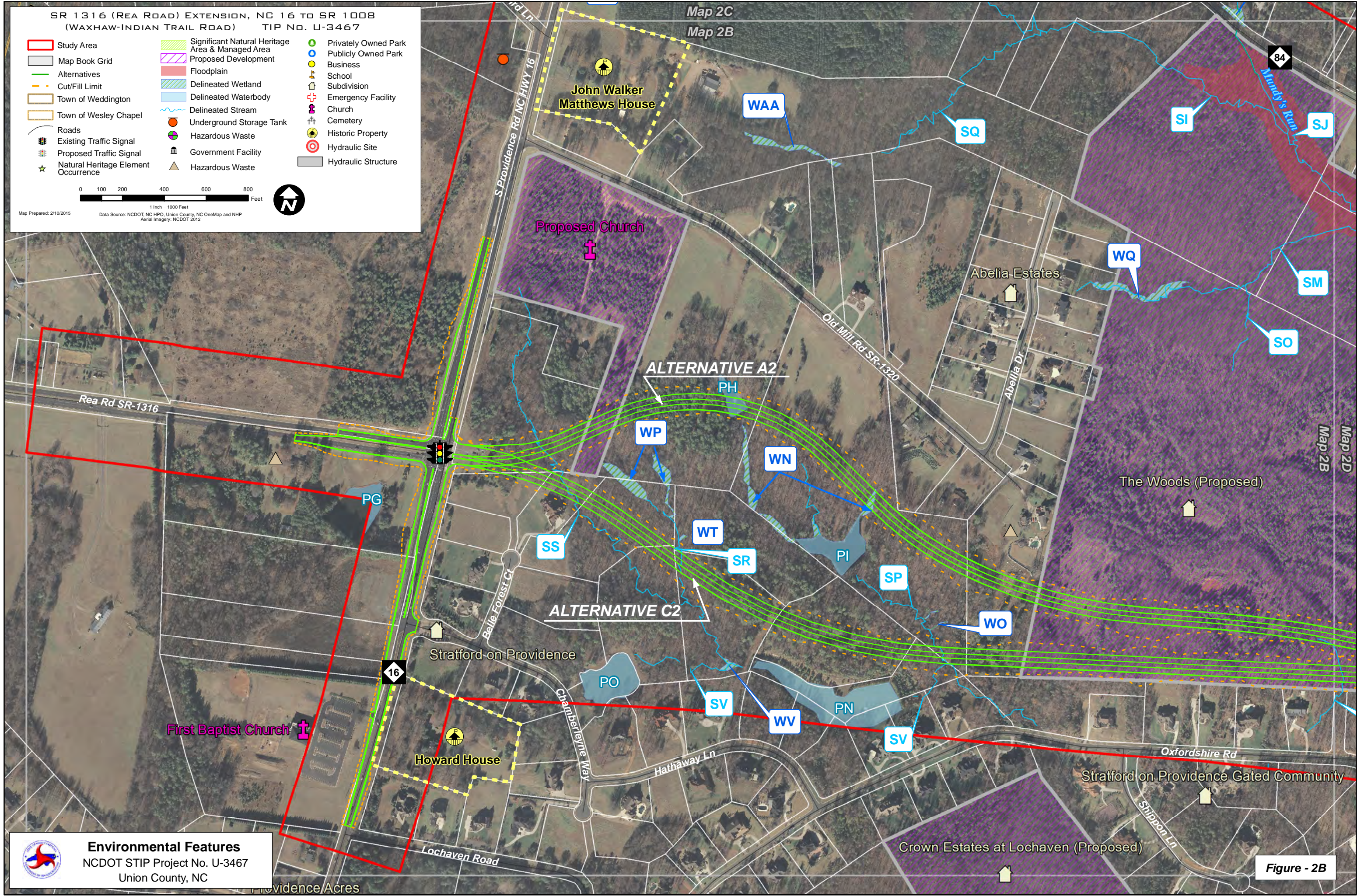


Figure - 2B

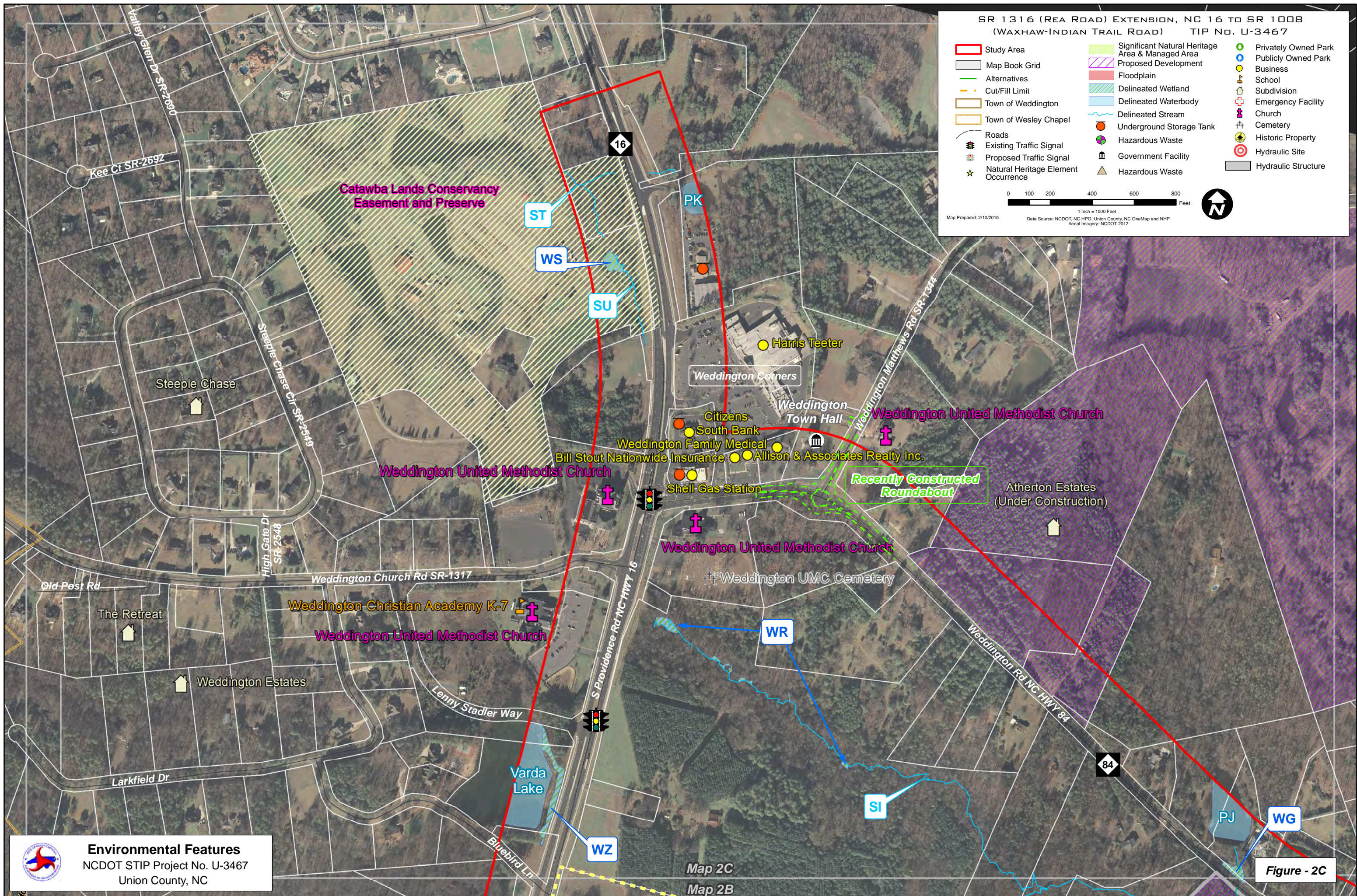
SR 1316 (REA ROAD) EXTENSION, NC 16 TO SR 1008
(WAXHAW-INDIAN TRAIL ROAD) TIP NO. U-3467

Study Area	Significant Natural Heritage Area & Managed Area	Privately Owned Park
Map Book Grid	Proposed Development	Publicly Owned Park
Alternatives	Floodplain	Business
Cut/Fill Limit	Delineated Wetland	School
Town of Weddington	Delineated Waterbody	Subdivision
Town of Wesley Chapel	Delineated Stream	Emergency Facility
Roads	Underground Storage Tank	Church
Existing Traffic Signal	Hazardous Waste	Cemetery
Proposed Traffic Signal	Government Facility	Historic Property
Natural Heritage Element Occurrence	Hazardous Waste	Hydraulic Site
		Hydraulic Structure

0 100 200 400 600 800 Feet

1 Inch = 1000 Feet

Map Prepared: 2/10/2015 Data Source: NCDOT, NC HPO, Union County, NC OneMap and NHP Aerial Imagery: NCDOT 2012



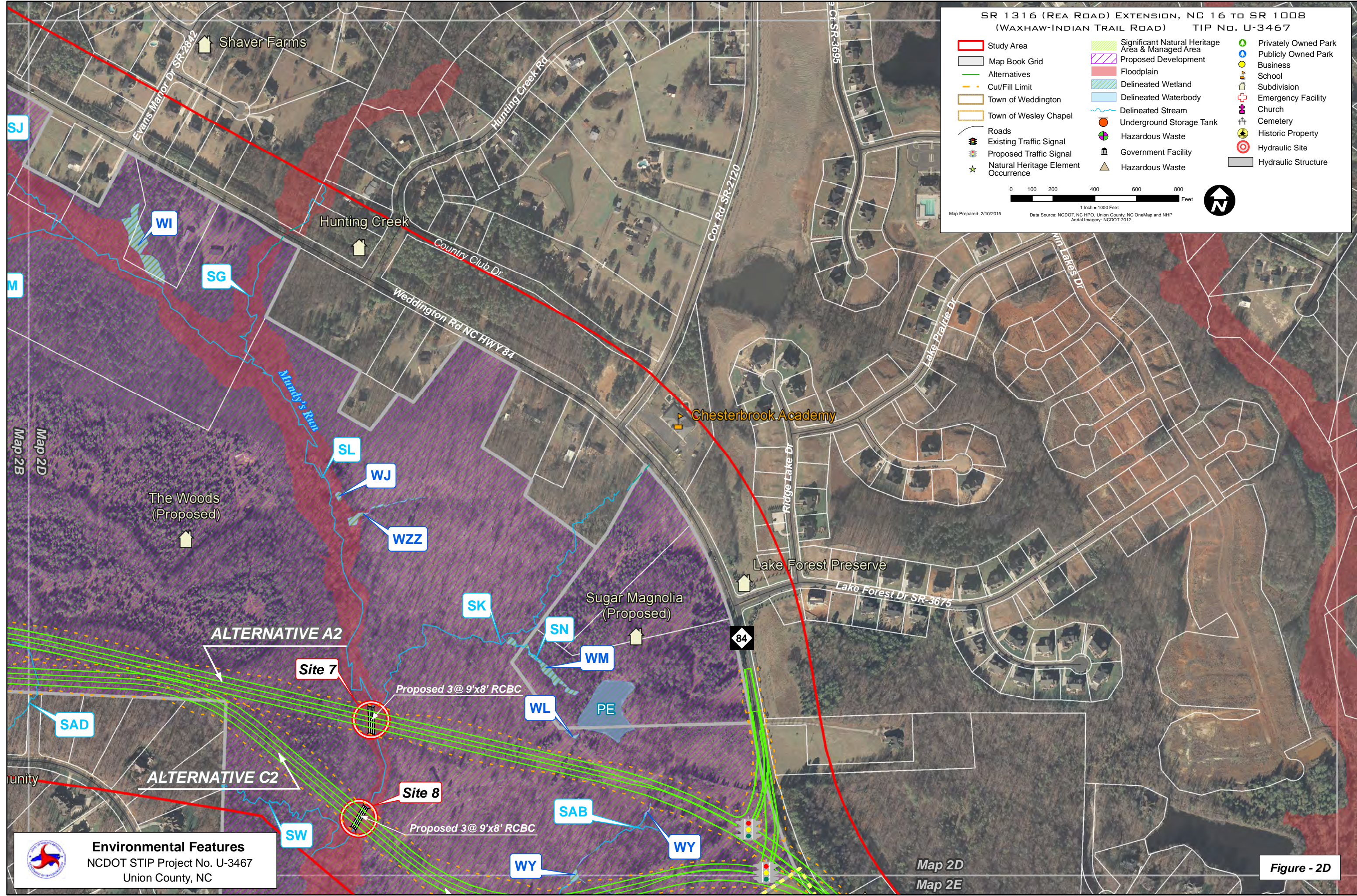
SR 1316 (REA ROAD) EXTENSION, NC 16 TO SR 1008
(WAXHAW-INDIAN TRAIL ROAD) TIP NO. U-3467

Study Area	Significant Natural Heritage Area & Managed Area	Privately Owned Park
Map Book Grid	Proposed Development	Publicly Owned Park
Alternatives	Floodplain	Business
Cut/Fill Limit	Delineated Wetland	School
Town of Weddington	Delineated Waterbody	Subdivision
Town of Wesley Chapel	Delineated Stream	Emergency Facility
Roads	Underground Storage Tank	Church
Existing Traffic Signal	Hazardous Waste	Cemetery
Proposed Traffic Signal	Hazardous Waste	Historic Property
Natural Heritage Element Occurrence	Hazardous Waste	Hydraulic Site
		Hydraulic Structure

0 100 200 400 600 800 Feet

1 Inch = 1000 Feet

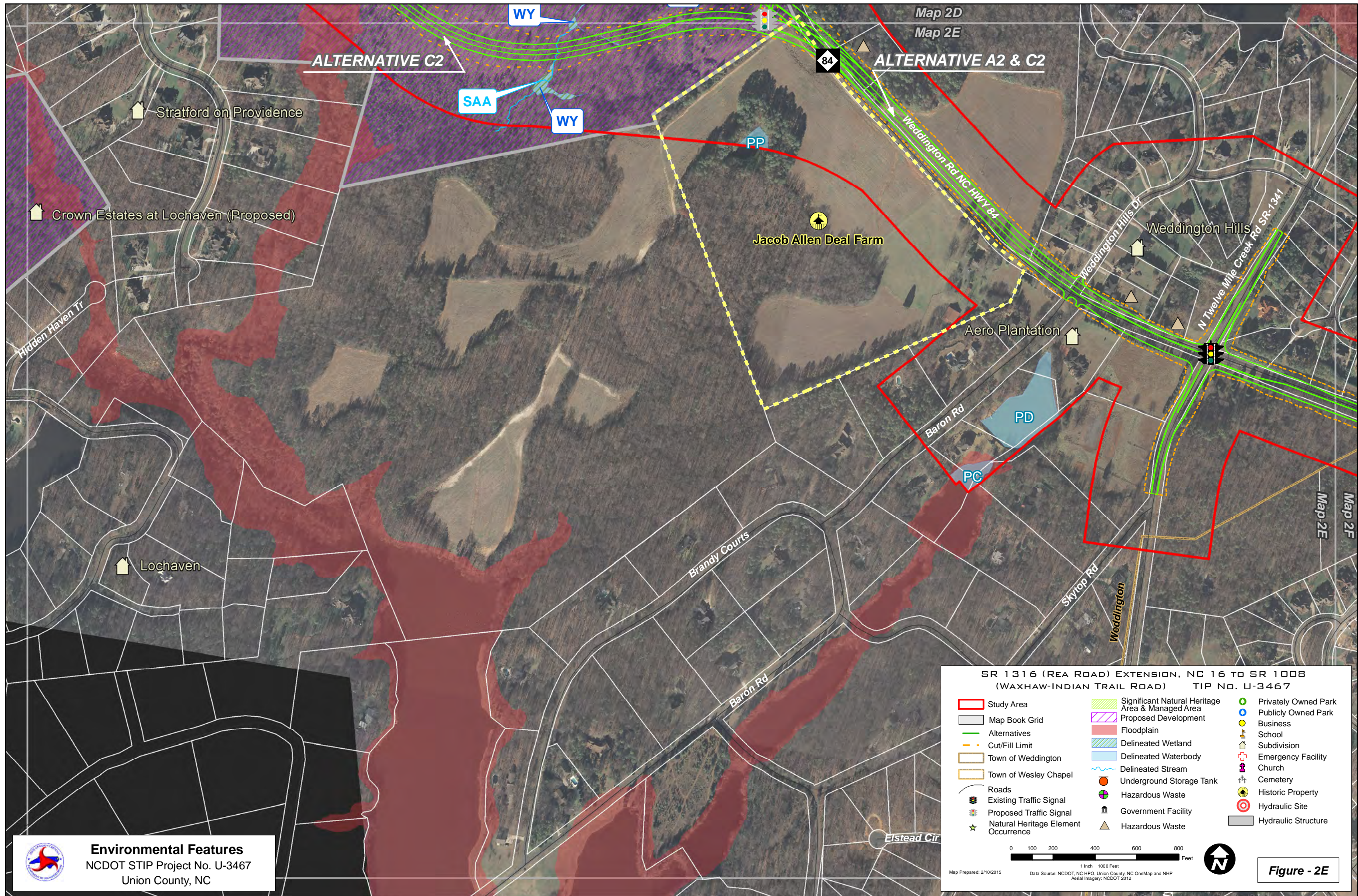
Map Prepared: 2/10/2015 Data Source: NCDOT, NC HPO, Union County, NC OneMap and NHP Aerial Imagery: NCDOT 2012



Environmental Features
NCDOT STIP Project No. U-3467
Union County, NC

Map 2D
Map 2E

Figure - 2D

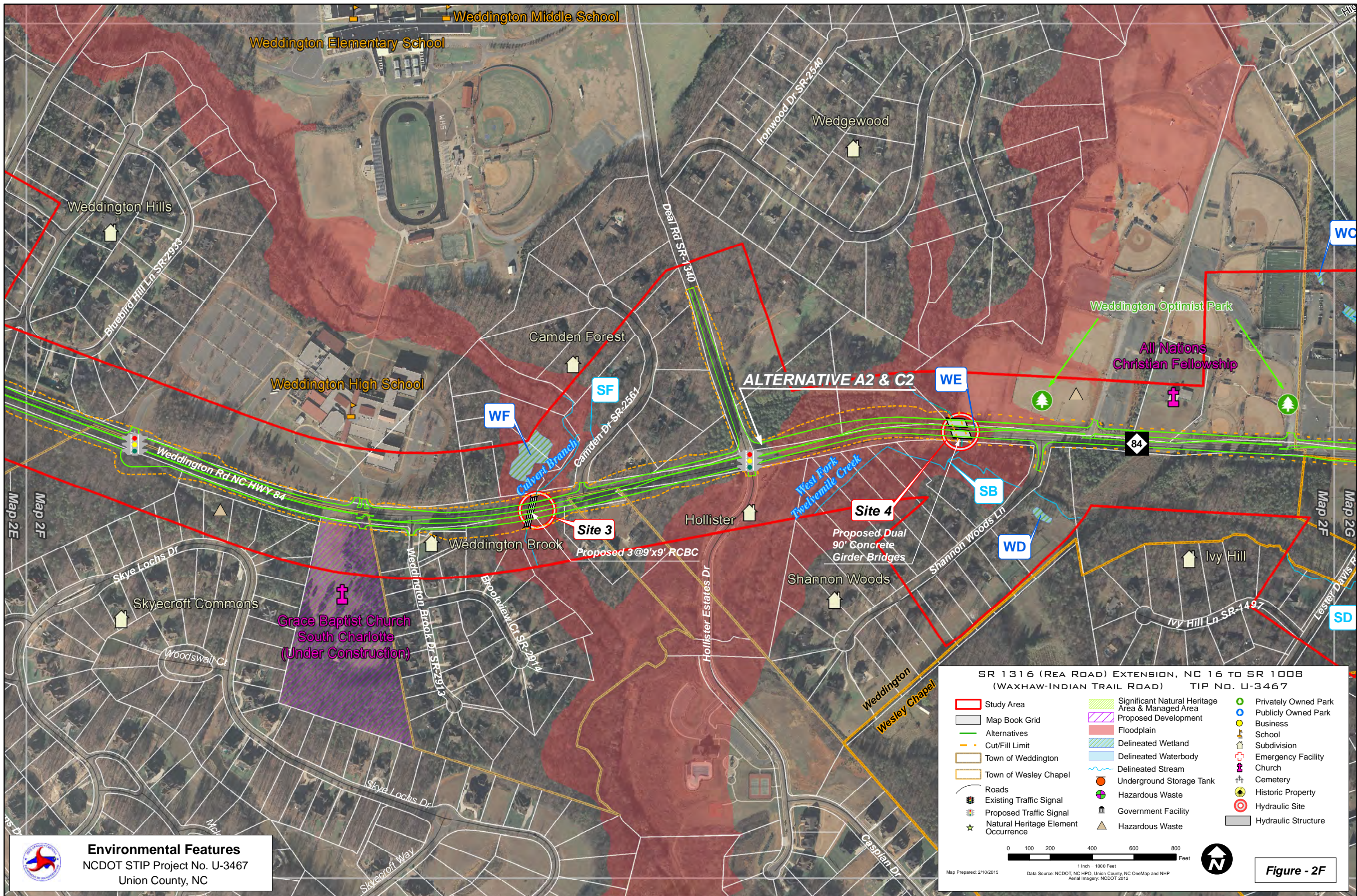



SR 1316 (REA ROAD) EXTENSION, NC 16 TO SR 1008 (WAXHAW-INDIAN TRAIL ROAD) TIP NO. U-3467

Study Area	Significant Natural Heritage Area & Managed Area	Privately Owned Park
Map Book Grid	Proposed Development	Publicly Owned Park
Alternatives	Floodplain	Business
Cut/Fill Limit	Delineated Wetland	School
Town of Weddington	Delineated Waterbody	Subdivision
Town of Wesley Chapel	Delineated Stream	Emergency Facility
Roads	Underground Storage Tank	Church
Existing Traffic Signal	Hazardous Waste	Cemetery
Proposed Traffic Signal	Government Facility	Historic Property
Natural Heritage Element Occurrence	Hazardous Waste	Hydraulic Site
		Hydraulic Structure

0 100 200 400 600 800 Feet
 1 Inch = 1000 Feet
 Map Prepared: 2/10/2015 Data Source: NCDOT, NC HPO, Union County, NC OneMap and NHP Aerial Imagery: NCDOT 2012

Figure - 2E



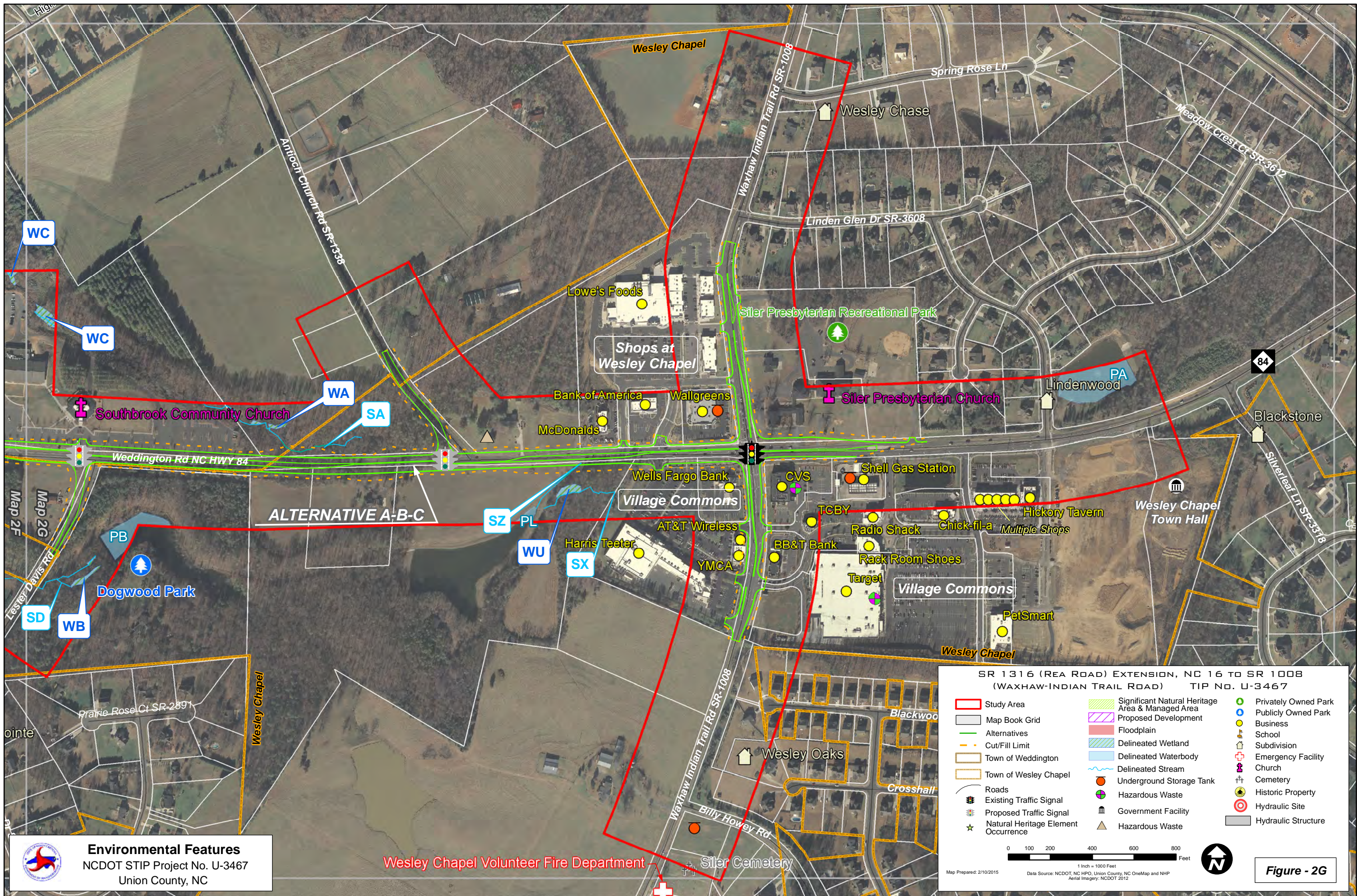

Environmental Features
 NCDOT STIP Project No. U-3467
 Union County, NC

SR 1316 (REA ROAD) EXTENSION, NC 16 TO SR 1008 (WAXHAW-INDIAN TRAIL ROAD) TIP NO. U-3467

Study Area	Significant Natural Heritage Area & Managed Area	Privately Owned Park
Map Book Grid	Proposed Development	Publicly Owned Park
Alternatives	Floodplain	Business
Cut/Fill Limit	Delineated Wetland	School
Town of Weddington	Delineated Waterbody	Subdivision
Town of Wesley Chapel	Delineated Stream	Emergency Facility
Roads	Underground Storage Tank	Church
Existing Traffic Signal	Hazardous Waste	Cemetery
Proposed Traffic Signal	Government Facility	Historic Property
Natural Heritage Element Occurrence	Hazardous Waste	Hydraulic Site
		Hydraulic Structure

0 100 200 400 600 800 Feet
 1 Inch = 1000 Feet
 Map Prepared: 2/10/2015 Data Source: NCDOT, NC HPO, Union County, NC OneMap and NHP Aerial Imagery: NCDOT 2012

Figure - 2F



WC
WC
WA
SA
SZ
PL
WU
SX
SD
WB
PB

Environmental Features
 NCDOT STIP Project No. U-3467
 Union County, NC

Wesley Chapel Volunteer Fire Department

SR 1316 (REA ROAD) EXTENSION, NC 16 TO SR 1008 (WAXHAW-INDIAN TRAIL ROAD) TIP NO. U-3467

Study Area	Significant Natural Heritage Area & Managed Area	Privately Owned Park
Map Book Grid	Proposed Development	Publicly Owned Park
Alternatives	Floodplain	Business
Cut/Fill Limit	Delineated Wetland	School
Town of Weddington	Delineated Waterbody	Subdivision
Town of Wesley Chapel	Delineated Stream	Emergency Facility
Roads	Underground Storage Tank	Church
Existing Traffic Signal	Hazardous Waste	Cemetery
Proposed Traffic Signal	Government Facility	Historic Property
Natural Heritage Element Occurrence	Hazardous Waste	Hydraulic Site
		Hydraulic Structure

0 100 200 400 600 800 Feet
 1 Inch = 1000 Feet
 Map Prepared: 2/10/2015
 Data Source: NCDOT, NC HPO, Union County, NC OneMap and NHP
 Aerial Imagery: NCDOT 2012

Figure - 2G

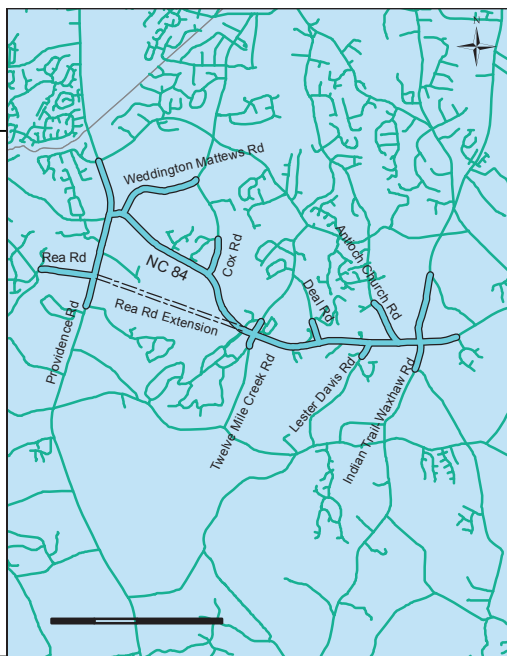
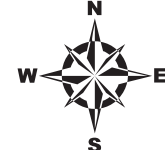
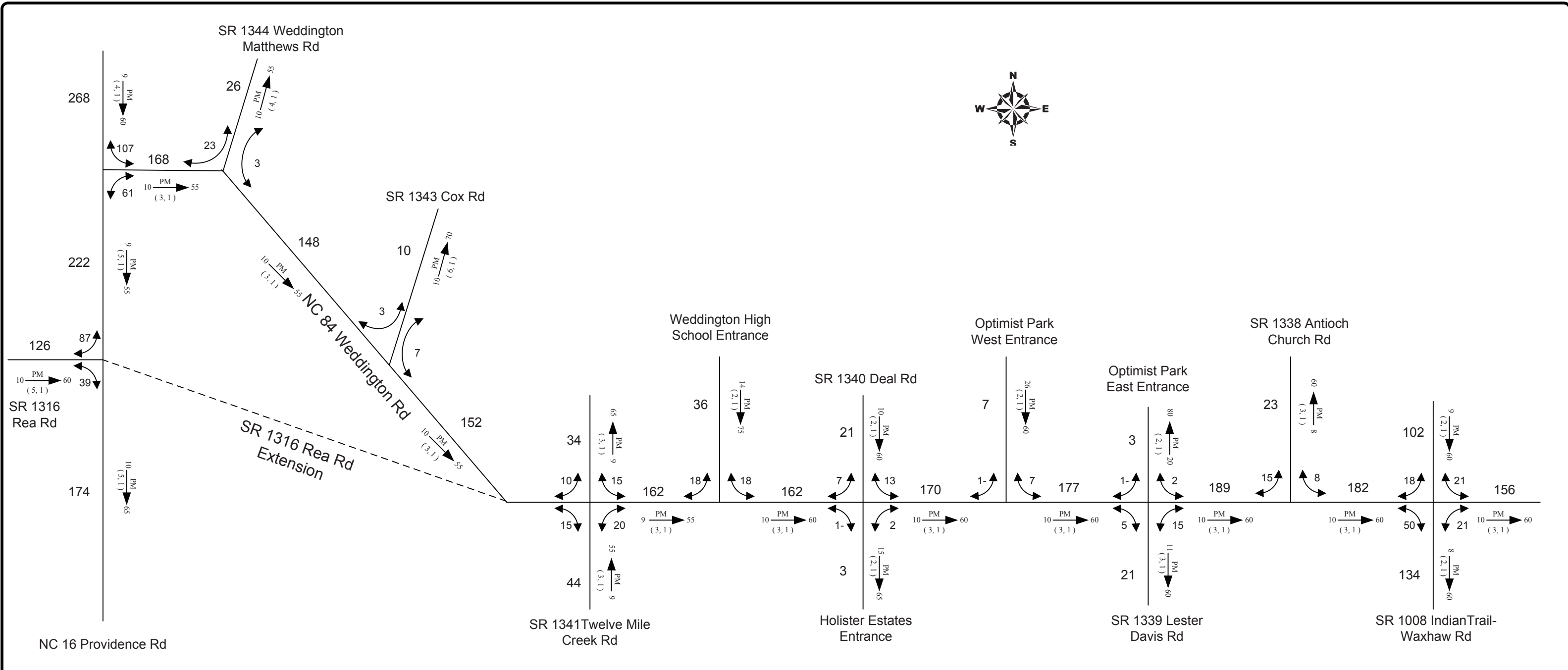


Figure 3

2012

LEGEND

- ### No. of Vehicles Per Day (VPD) in 100s
- 1- Less than 50 VPD
- x Movement Prohibited
- Proposed Roadway
- K Design Hour Factor (%)
- PM PM Peak Period
- D Peak Hour Directional Split
- Indicates Direction of D
- (d,t) Duals, TT-STs (%)

AVERAGE ANNUAL DAILY TRAFFIC		No Build Sheet 1 - 1
TIP: U-3467	COUNTY: Union	WBS: 39019.1.1
DATE: May 9, 2012	PREPARED BY: Paul Schroeder, PhD, PE	DIVISION: 10
LOCATION: NC 84 Weddington Road southeast of Charlotte		
PROJECT: SR 1316 Rea Road extension from NC 16 to SR 1008 Indian Trail-Waxhaw Road		

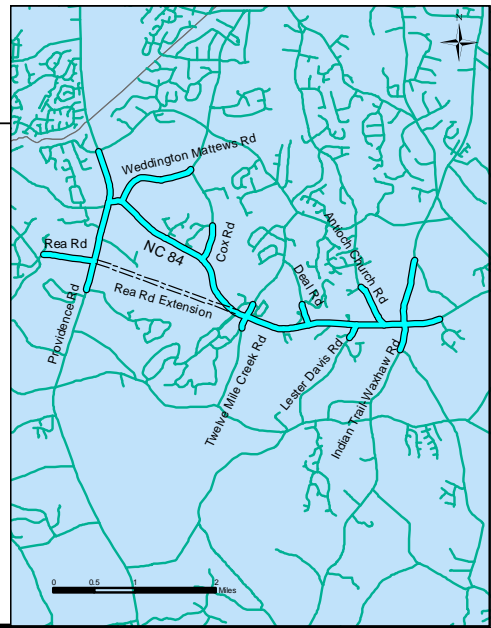
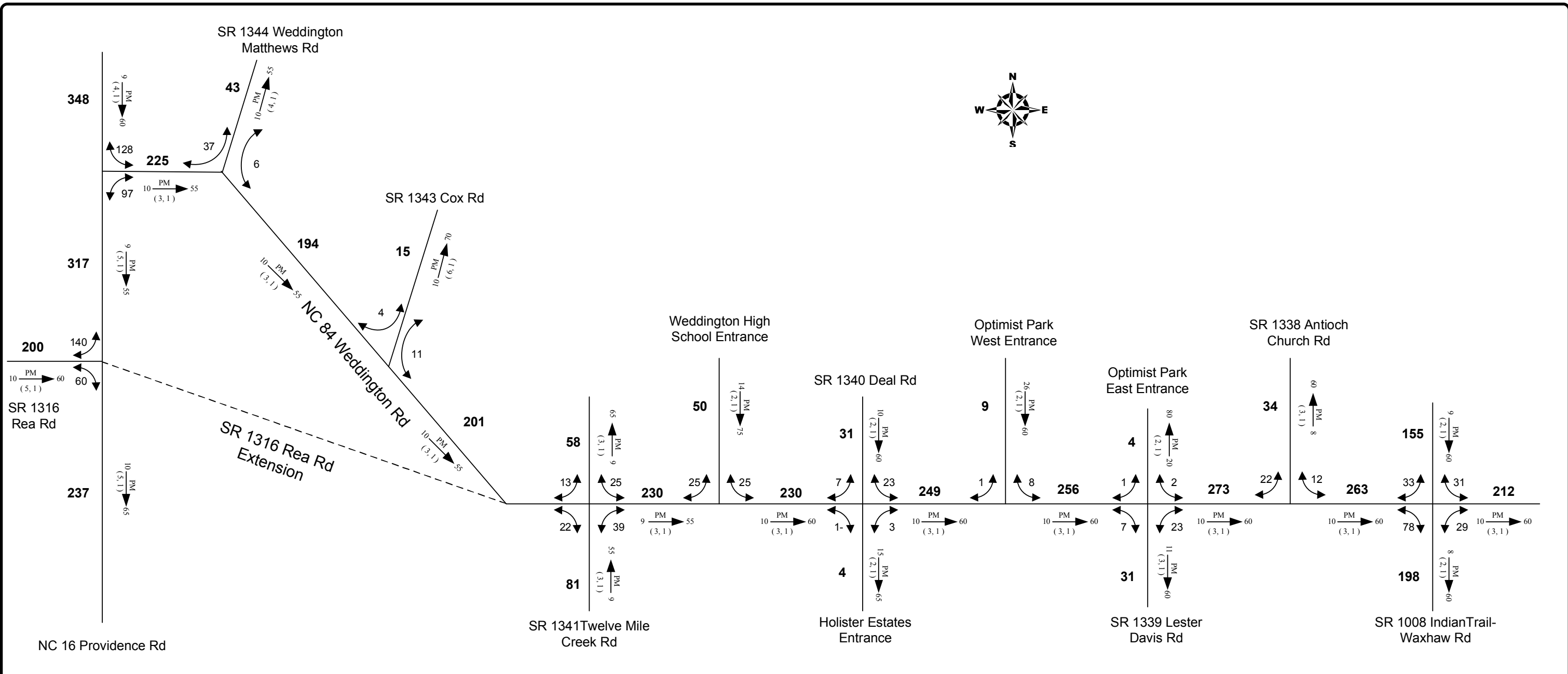


Figure 4

2035

AVERAGE ANNUAL DAILY TRAFFIC

No Build Sheet 1 - 1

LEGEND

- ### No. of Vehicles Per Day (VPD) in 100s
- 1- Less than 50 VPD
- X Movement Prohibited
- Proposed Roadway
- K Design Hour Factor (%)
- PM PM Peak Period
- D Peak Hour Directional Split
- Indicates Direction of D
- (d, t) Duals, TT-STs (%)

TIP: U-3467	WBS: 39019.1.1
COUNTY: Union	DIVISION: 10
DATE: January 23, 2013	
PREPARED BY: Paul Schroeder, PhD, PE	
LOCATION: NC 84 Weddington Road southeast of Charlotte	
PROJECT: SR 1316 Rea Road extension from NC 16 to SR 1008 Indian Trail-Waxhaw Road	

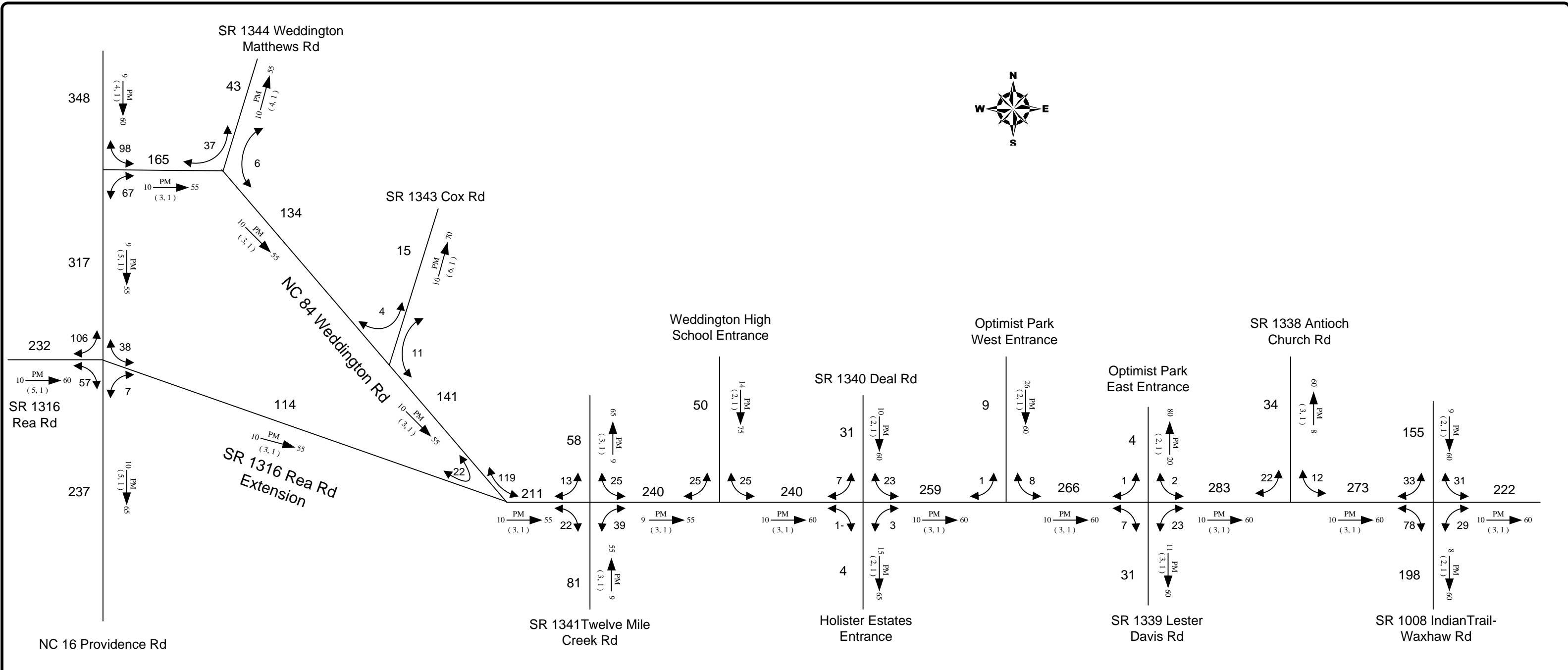
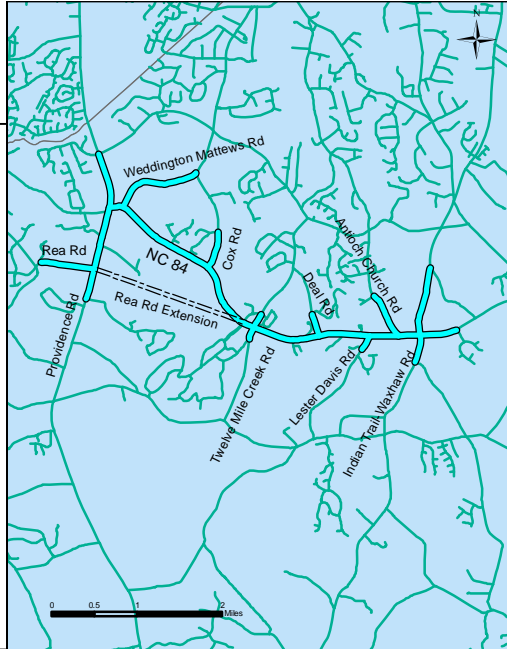


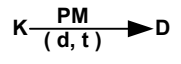
Figure 5



2035

LEGEND

- ### No. of Vehicles Per Day (VPD) in 100s
- 1- Less than 50 VPD
- x Movement Prohibited
- Proposed Roadway
- K** Design Hour Factor (%)
- PM** PM Peak Period
- D** Peak Hour Directional Split
- ➔ Indicates Direction of D
- (d, t)** Duals, TT-STs (%)



AVERAGE ANNUAL DAILY TRAFFIC **Build Sheet 1 - 1**

TIP: U-3467	WBS: 39019.1.1
COUNTY: Union	DIVISION: 10
DATE: May 9, 2012	
PREPARED BY: Paul Schroeder, PhD, PE	
LOCATION: NC 84 Weddington Road southeast of Charlotte	
PROJECT: SR 1316 Rea Road extension from NC 16 to SR 1008 Indian Trail-Waxhaw Road	

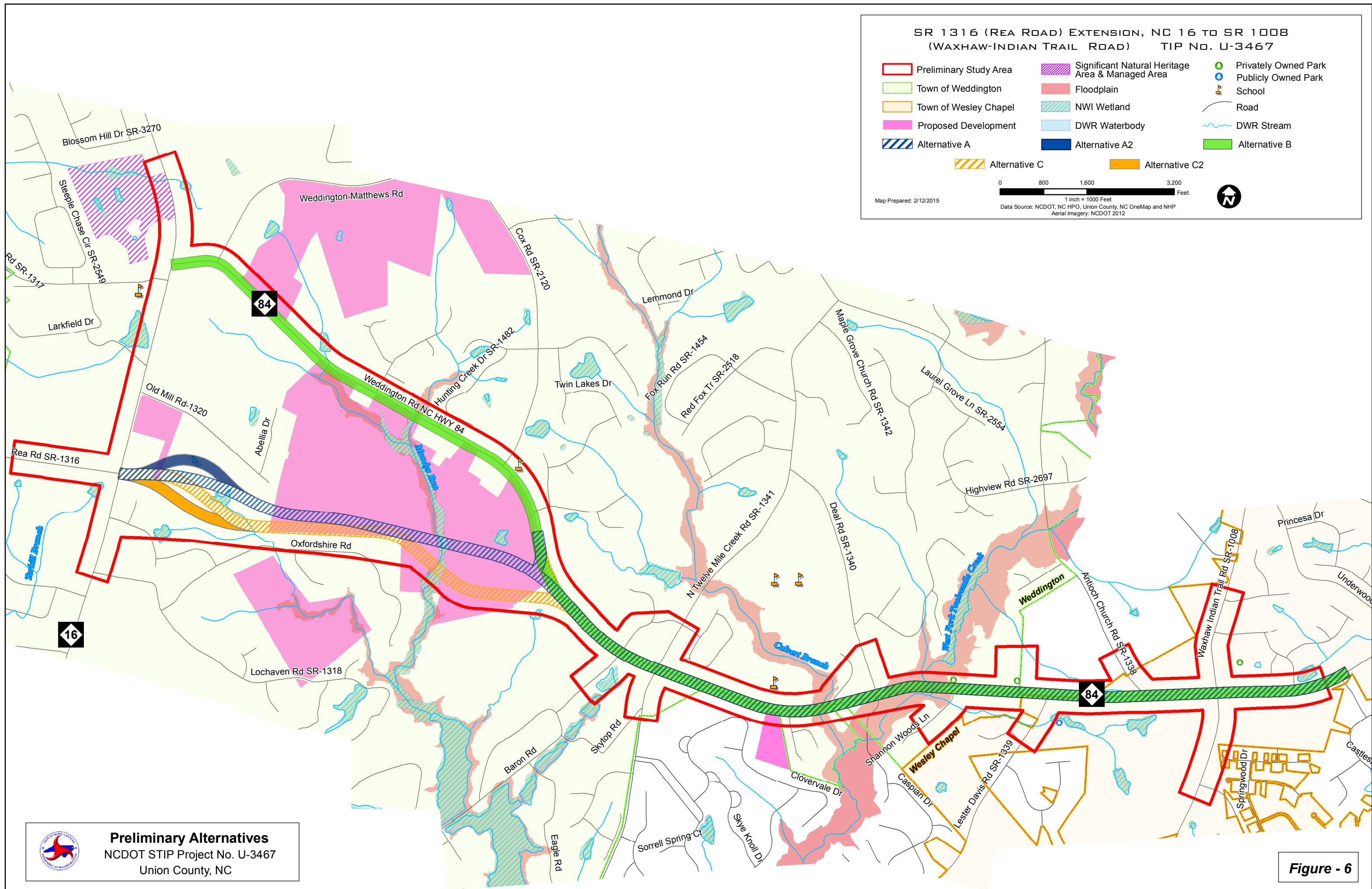
SR 1316 (REA ROAD) EXTENSION, NC 16 TO SR 1008
(WAXHAW-INDIAN TRAIL ROAD) TIP NO. U-3467

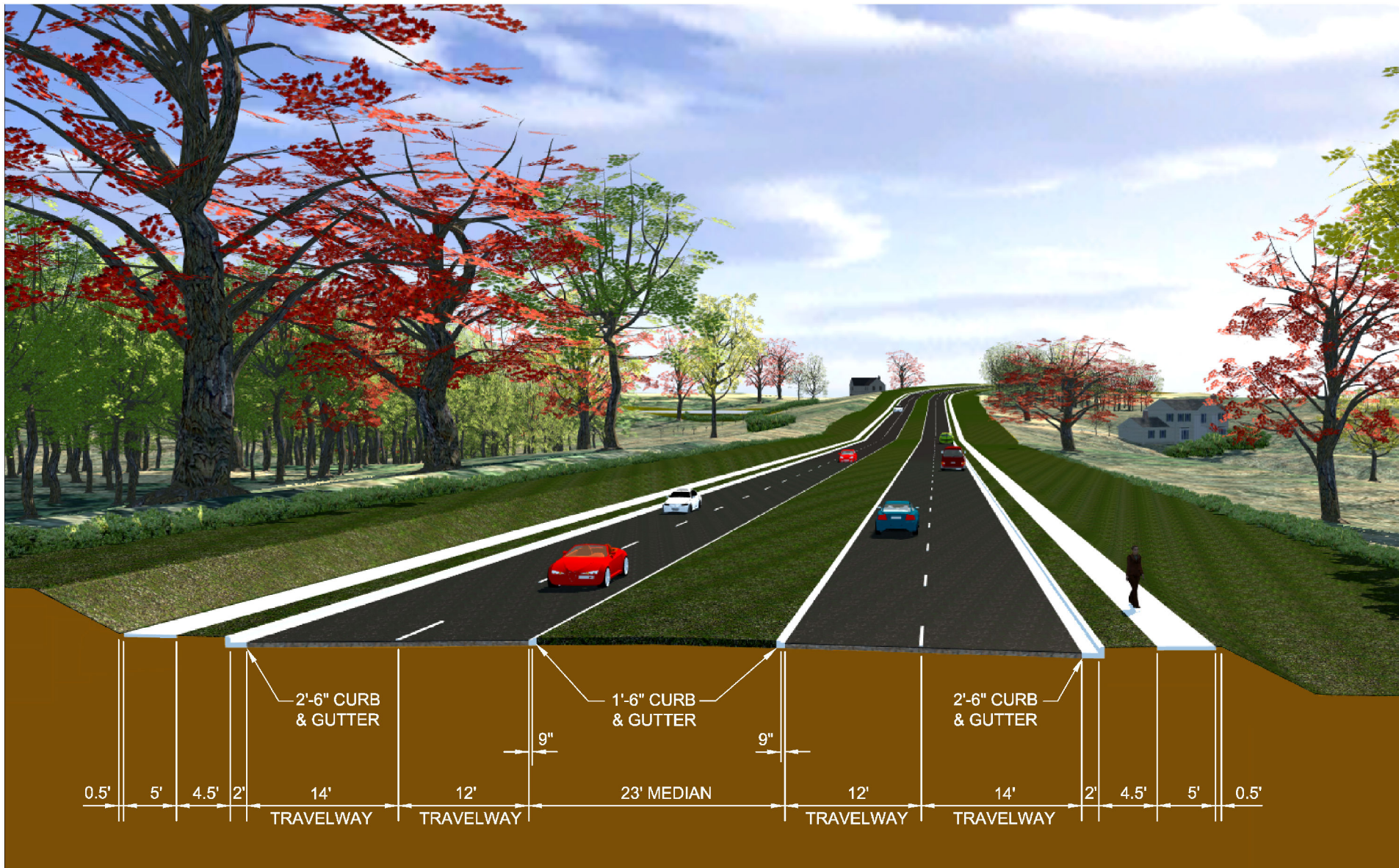
- | | | |
|------------------------|--|----------------------|
| Preliminary Study Area | Significant Natural Heritage Area & Managed Area | Privately Owned Park |
| Town of Weddington | Floodplain | Publicly Owned Park |
| Town of Wesley Chapel | NWI Wetland | School |
| Proposed Development | DWR Waterbody | Road |
| Alternative A | Alternative A2 | DWR Stream |
| Alternative C | Alternative C2 | Alternative B |

Map Prepared: 2/12/2015

1 inch = 1000 Feet

Data Source: NCDOT, NC HPO, Union County, NC OneMap and NHP
Aerial Imagery: NCDOT 2012



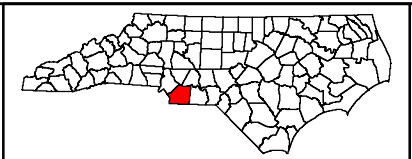


Note: The inclusion of sidewalks is dependent upon a cost-share agreement with local jurisdictions.

Prepared by:



Prepared for:

Rea Road (SR 1316) Extension Typical Section
 From Providence Road (NC 16) to Waxhaw - Indian Trail Road (SR 1008)
 NCDOT STIP Project Number: U-3467
 Union County, NC

Not to Scale
 Figure Prepared: 2/11/2015

Figure
7

Appendix B

Federal, State, and Local Correspondence and Coordination

**U.S. ARMY CORPS OF ENGINEERS
WILMINGTON DISTRICT**

Action Id. SAW-2013-02321 County: Union U.S.G.S. Quad: NC-WAXHAW

NOTIFICATION OF JURISDICTIONAL DETERMINATION

Property Owner: North Carolina Department of Transportation, Natural Environment Section
Attn: Ms. Erin Cheely
Address: 1598 Mail Service Center
Raleigh, NC, 27699
Telephone Number: 919-707-6135

Size (acres)	<u>Approximately 1200 acres</u>	Nearest Town	<u>Weddington</u>
Nearest Waterway	<u>Mundys Run</u>	River Basin	<u>Lower Catawba</u>
USGS HUC	<u>3050103</u>	Coordinates	Latitude: <u>35.0091032245903</u> Longitude: <u>-80.743885218397</u>

Location description: The project review area starts along Providence Road South (NC Hwy 16), just south of the intersection of Blossom Hill Drive with NC 16 and south to the intersection of NC 16 with Lochaven Road, and then extends east/southeast, primarily following Weddington Road (Hwy 84) approximately 4.6 miles before terminating east of the intersection of Hwy 84 with Waxhaw-Indian Trail Road, in Weddington, Union County, North Carolina.

Indicate Which of the Following Apply:

A. Preliminary Determination

Based on preliminary information, there may be waters of the U.S. including wetlands on the above described project area. We strongly suggest you have this property inspected to determine the extent of Department of the Army (DA) jurisdiction. To be considered final, a jurisdictional determination must be verified by the Corps. This preliminary determination is not an appealable action under the Regulatory Program Administrative Appeal Process (Reference 33 CFR Part 331). If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also, you may provide new information for further consideration by the Corps to reevaluate the JD.

B. Approved Determination

There are Navigable Waters of the United States within the above described property subject to the permit requirements of Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act. Unless there is a change in the law or our published regulations, this determination may be relied upon for a period not to exceed five years from the date of this notification.

There are waters of the U.S. including wetlands on the above described property subject to the permit requirements of Section 404 of the Clean Water Act (CWA)(33 USC § 1344). Unless there is a change in the law or our published regulations, this determination may be relied upon for a period not to exceed five years from the date of this notification.

We strongly suggest you have the wetlands on your property delineated. Due to the size of your property and/or our present workload, the Corps may not be able to accomplish this wetland delineation in a timely manner. For a more timely delineation, you may wish to obtain a consultant. To be considered final, any delineation must be verified by the Corps.

The waters of the U.S. including wetlands on your project area have been delineated and the delineation has been verified by the Corps. We strongly suggest you have this delineation surveyed. Upon completion, this survey should be reviewed and verified by the Corps. Once verified, this survey will provide an accurate depiction of all areas subject to CWA jurisdiction on your property which, provided there is no change in the law or our published regulations, may be relied upon for a period not to exceed five years.

The waters of the U.S. including wetlands have been delineated and surveyed and are accurately depicted on the plat signed by the Corps Regulatory Official identified below on _____. Unless there is a change in the law or our published regulations, this determination may be relied upon for a period not to exceed five years from the date of this notification.

- There are no waters of the U.S., to include wetlands, present on the above described project area which are subject to the permit requirements of Section 404 of the Clean Water Act (33 USC 1344). Unless there is a change in the law or our published regulations, this determination may be relied upon for a period not to exceed five years from the date of this notification.
- The property is located in one of the 20 Coastal Counties subject to regulation under the Coastal Area Management Act (CAMA). You should contact the Division of Coastal Management in Morehead City, NC, at (252) 808-2808 to determine their requirements.

Placement of dredged or fill material within waters of the US and/or wetlands without a Department of the Army permit may constitute a violation of Section 301 of the Clean Water Act (33 USC § 1311). If you have any questions regarding this determination and/or the Corps regulatory program, please contact Crystal Amschler at 828-271-7980 x231 or Crystal.C.Amschler@usace.army.mil.

C. Basis For Determination: Determination was based on review of aerial photography, USGS, soils and Lidar maps and observations made during the site visit. Wetlands met criteria set forth in the Corps 1987 delineation manual and the Eastern Mountains and Piedmont Region Supplement and tributaries were identified using OHWM as observed in the field. Wetlands are adjacent to tributaries and the multiple on-site tributaries include Mundys Run, Twelvemile Creek, and tributaries to Tarkill Branch, which flows into Sixmile Creek and tributaries to Sixmile Creek itself which flows into Twelvemile Creek, Mundys Run and Culvert Branch, which flow into West Fork Twelvemile Creek, which flows into Twelvemile Creek, and Price Mill Creek, which flows into East Fork Twelvemile Creek which flows into Twelvemile Creek. Twelvemile Creek flows into the Catawba River, a Section 10 Water.

D. Remarks:

E. Attention USDA Program Participants

This delineation/determination has been conducted to identify the limits of Corps' Clean Water Act jurisdiction for the particular site identified in this request. The delineation/determination may not be valid for the wetland conservation provisions of the Food Security Act of 1985. If you or your tenant are USDA Program participants, or anticipate participation in USDA programs, you should request a certified wetland determination from the local office of the Natural Resources Conservation Service, prior to starting work.

F. Appeals Information (This information applies only to approved jurisdictional determinations as indicated in B. above)

This correspondence constitutes an approved jurisdictional determination for the above described site. If you object to this determination, you may request an administrative appeal under Corps regulations at 33 CFR Part 331. Enclosed you will find a Notification of Appeal Process (NAP) fact sheet and request for appeal (RFA) form. If you request to appeal this determination you must submit a completed RFA form to the following address:

US Army Corps of Engineers
South Atlantic Division
Attn: Jason Steele, Review Officer
60 Forsyth Street SW, Room 10M15
Atlanta, Georgia 30303-8801

In order for an RFA to be accepted by the Corps, the Corps must determine that it is complete, that it meets the criteria for appeal under 33 CFR part 331.5, and that it has been received by the Division Office within 60 days of the date of the NAP. Should you decide to submit an RFA form, it must be received at the above address by _____.

****It is not necessary to submit an RFA form to the Division Office if you do not object to the determination in this correspondence.****

Corps Regulatory Official: _____

Date: September 23, 2014

Expiration Date: September 23, 2019

The Wilmington District is committed to providing the highest level of support to the public. To help us ensure we continue to do so, please complete our Customer Satisfaction Survey, located online at <http://regulatory.usacesurvey.com/>.

Copy furnished: Mulkey Engineers and Consultants, Attn: Brian Dustin, 6750 Tryon Road, Cary, North Carolina 27518

**FARMLAND CONVERSION IMPACT RATING
FOR CORRIDOR TYPE PROJECTS**

PART I (To be completed by Federal Agency)	3. Date of Land Evaluation Request	4. Sheet 1 of <u>1</u>
---	------------------------------------	------------------------

1. Name of Project U-3467 Rea Road (SR 1316) Extension	5. Federal Agency Involved FHWA
---	--

2. Type of Project Corridor on new location	6. County and State Union County, NC
--	---

PART II (To be completed by NRCS)	1. Date Request Received by NRCS	2. Person Completing Form
--	----------------------------------	---------------------------

3. Does the corridor contain prime, unique statewide or local important farmland? (If no, the FPPA does not apply - Do not complete additional parts of this form). YES <input type="checkbox"/> NO <input type="checkbox"/>	4. Acres Irrigated Average Farm Size
---	--

5. Major Crop(s)	6. Farmable Land in Government Jurisdiction Acres: _____ %	7. Amount of Farmland As Defined in FPPA Acres: _____ %
------------------	---	--

8. Name Of Land Evaluation System Used	9. Name of Local Site Assessment System	10. Date Land Evaluation Returned by NRCS
--	---	---

PART III (To be completed by Federal Agency)	Alternative Corridor For Segment _____			
	Corridor A2	Corridor C2	Corridor C	Corridor D

A. Total Acres To Be Converted Directly	88.9	89.7		
---	-------------	-------------	--	--

B. Total Acres To Be Converted Indirectly, Or To Receive Services				
---	--	--	--	--

C. Total Acres In Corridor	88.9	89.7		
----------------------------	-------------	-------------	--	--

PART IV (To be completed by NRCS) Land Evaluation Information

A. Total Acres Prime And Unique Farmland				
--	--	--	--	--

B. Total Acres Statewide And Local Important Farmland				
---	--	--	--	--

C. Percentage Of Farmland in County Or Local Govt Unit To Be Converted				
--	--	--	--	--

D. Percentage Of Farmland in Govt Jurisdiction With Same Or Higher Relative Value				
---	--	--	--	--

PART V (To be completed by NRCS) Land Evaluation Information Criterion Relative value of Farmland to Be Serviced or Converted (Scale of 0 - 100 Points)

PART VI (To be completed by Federal Agency) Corridor Assessment Criteria (These criteria are explained in 7 CFR 658.5(c))	Maximum Points				
--	-----------------------	--	--	--	--

1. Area in Nonurban Use	15	2	2		
-------------------------	----	---	---	--	--

2. Perimeter in Nonurban Use	10	2	2		
------------------------------	----	---	---	--	--

3. Percent Of Corridor Being Farmed	20	0	0		
-------------------------------------	----	---	---	--	--

4. Protection Provided By State And Local Government	20	0	0		
--	----	---	---	--	--

5. Size of Present Farm Unit Compared To Average	10	0	0		
--	----	---	---	--	--

6. Creation Of Nonfarmable Farmland	25	0	0		
-------------------------------------	----	---	---	--	--

7. Availability Of Farm Support Services	5	0	0		
--	---	---	---	--	--

8. On-Farm Investments	20	1	1		
------------------------	----	---	---	--	--

9. Effects Of Conversion On Farm Support Services	25	0	0		
---	----	---	---	--	--

10. Compatibility With Existing Agricultural Use	10	2	2		
--	----	---	---	--	--

TOTAL CORRIDOR ASSESSMENT POINTS	160	7	7	0	0
---	------------	----------	----------	----------	----------

PART VII (To be completed by Federal Agency)

Relative Value Of Farmland (From Part V)	100	0	0	0	0
--	-----	---	---	---	---

Total Corridor Assessment (From Part VI above or a local site assessment)	160	7	7	0	0
---	-----	---	---	---	---

TOTAL POINTS (Total of above 2 lines)	260	7	7	0	0
--	------------	----------	----------	----------	----------

1. Corridor Selected:	2. Total Acres of Farmlands to be Converted by Project:	3. Date Of Selection:	4. Was A Local Site Assessment Used? YES <input type="checkbox"/> NO <input type="checkbox"/>
-----------------------	---	-----------------------	--

5. Reason For Selection:

Signature of Person Completing this Part: Kat Bukowcy DATE 19 March 15

NOTE: Complete a form for each segment with more than one Alternate Corridor

CORRIDOR - TYPE SITE ASSESSMENT CRITERIA

The following criteria are to be used for projects that have a linear or corridor - type site configuration connecting two distant points, and crossing several different tracts of land. These include utility lines, highways, railroads, stream improvements, and flood control systems. Federal agencies are to assess the suitability of each corridor - type site or design alternative for protection as farmland along with the land evaluation information.

(1) How much land is in nonurban use within a radius of 1.0 mile from where the project is intended?

More than 90 percent - 15 points
90 to 20 percent - 14 to 1 point(s)
Less than 20 percent - 0 points

(2) How much of the perimeter of the site borders on land in nonurban use?

More than 90 percent - 10 points
90 to 20 percent - 9 to 1 point(s)
Less than 20 percent - 0 points

(3) How much of the site has been farmed (managed for a scheduled harvest or timber activity) more than five of the last 10 years?

More than 90 percent - 20 points
90 to 20 percent - 19 to 1 point(s)
Less than 20 percent - 0 points

(4) Is the site subject to state or unit of local government policies or programs to protect farmland or covered by private programs to protect farmland?

Site is protected - 20 points
Site is not protected - 0 points

(5) Is the farm unit(s) containing the site (before the project) as large as the average - size farming unit in the County ?

(Average farm sizes in each county are available from the NRCS field offices in each state. Data are from the latest available Census of Agriculture, Acreage or Farm Units in Operation with \$1,000 or more in sales.)
As large or larger - 10 points
Below average - deduct 1 point for each 5 percent below the average, down to 0 points if 50 percent or more below average - 9 to 0 points

(6) If the site is chosen for the project, how much of the remaining land on the farm will become non-farmable because of interference with land patterns?

Acreage equal to more than 25 percent of acres directly converted by the project - 25 points
Acreage equal to between 25 and 5 percent of the acres directly converted by the project - 1 to 24 point(s)
Acreage equal to less than 5 percent of the acres directly converted by the project - 0 points

(7) Does the site have available adequate supply of farm support services and markets, i.e., farm suppliers, equipment dealers, processing and storage facilities and farmer's markets?

All required services are available - 5 points
Some required services are available - 4 to 1 point(s)
No required services are available - 0 points

(8) Does the site have substantial and well-maintained on-farm investments such as barns, other storage building, fruit trees and vines, field terraces, drainage, irrigation, waterways, or other soil and water conservation measures?

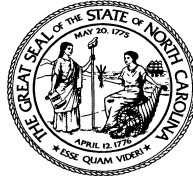
High amount of on-farm investment - 20 points
Moderate amount of on-farm investment - 19 to 1 point(s)
No on-farm investment - 0 points

(9) Would the project at this site, by converting farmland to nonagricultural use, reduce the demand for farm support services so as to jeopardize the continued existence of these support services and thus, the viability of the farms remaining in the area?

Substantial reduction in demand for support services if the site is converted - 25 points
Some reduction in demand for support services if the site is converted - 1 to 24 point(s)
No significant reduction in demand for support services if the site is converted - 0 points

(10) Is the kind and intensity of the proposed use of the site sufficiently incompatible with agriculture that it is likely to contribute to the eventual conversion of surrounding farmland to nonagricultural use?

Proposed project is incompatible to existing agricultural use of surrounding farmland - 10 points
Proposed project is tolerable to existing agricultural use of surrounding farmland - 9 to 1 point(s)
Proposed project is fully compatible with existing agricultural use of surrounding farmland - 0 points



North Carolina Department of Cultural Resources
State Historic Preservation Office

Ramona M. Bartos, Administrator

Beverly Eaves Perdue, Governor
Linda A. Carlisle, Secretary
Jeffrey J. Crow, Deputy Secretary

Office of Archives and History
Division of Historical Resources
David Brook, Director

November 30, 2012

MEMORANDUM

TO: Paul Schroeder, Ph.D
Transportation Planning Branch
NC Department of Transportation

FROM: Ramona M. Bartos *RM for Ramona M. Bartos*

SUBJECT: Rea Road Extension from NC 16 to SR 1008, Weddington, U-3467, Union County,
ER 12-2134

Thank you for your email of November 14, 2012, concerning the above project.

After reviewing the information provided and based on the overall size of the project our office will await comments until a preferred alternative is chosen. However, given the presence of a previously recorded archaeological site (31UN135) situated within the study area, there is a great likelihood that we will recommend a comprehensive archaeological investigation in respect to this project.

We have conducted a search of our maps and files and located the following structures of historical or architectural importance within the general area of this project:

- | | |
|--|-----------|
| ▪ John Walker Matthews House (UN 0249) | SL/DOE/LL |
| ▪ Thomas-Wrenn House (UN 0388) | SL/DOE/LL |
| ▪ Howard Family House (UN 0831) | SL/DOE |
| ▪ Weddington School (UN 0418) | SL |
| ▪ Weddington Historic District (UN 0829) | SL |
| ▪ Weddington United Methodist Church (UN 0419) | SL |
| ▪ Jacob Allen Deal House (UN 0097) | Survey |
| ▪ James Stanhope Delancey House (UN 0100) | Survey |
| ▪ Kitty Byrum Price House (UN 0321) | Survey |
| ▪ Morris Peace House (UN 0322) | Survey |
| ▪ James Newton Price Tenant House (UN 0486) | Survey |
| ▪ Siler Presbyterian Church (UN 0491) | Survey |

DOE: Determined eligible for listing in the National Register

SL: Placed on the State Study List

LL: Local Landmark or Locally-Designated Historic District

Survey: Identified during the 1982 Union County Survey by Joe Schuchman

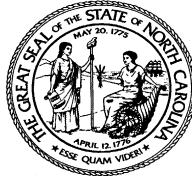
We recommend that a Department of Transportation architectural historian identify and evaluate any structures over fifty (50) years of age within the project area, and report the findings to us. The last architectural survey of Union County was completed in 1982.

The locations of these properties are available on our GIS website: <http://gis.ncdcr.gov/hpoweb/>.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation's Regulations for compliance with Section 106 codified at 36 CFR Part 800.

Thank you for your cooperation and considerations. If you have any questions concerning the above comment, please contact Renee Gledhill-Earley, environmental review coordinator, at 919.807.6579. In all future communication concerning this project, please cite the above referenced tracking number.

cc: Mary Pope Furr, NCDOT
Matt Wilkerson, NCDOT



North Carolina Department of Cultural Resources
State Historic Preservation Office

Ramona M. Bartos, Administrator

Governor Pat McCrory
Secretary Susan Kluttz

Office of Archives and History
Deputy Secretary Kevin Cherry

July 29, 2014

MEMORANDUM

TO: Kate Husband
Office of Human Environment
NCDOT Division of Highways

FROM: Renee Gledhill-Earley *Renee Gledhill-Earley*
Environmental Review Coordinator

SUBJECT: Historic Structures Survey Report, Rea Road Extension from Providence Road (NC 16)
To Waxhaw-Indian Trail Road, U-3467, Union County, ER 12-2134

Thank you for your June 26, 2014, transmittal of the above-referenced report. We apologize for the delay in offering the following comments.

We concur that the **John Walker Matthews House (UN0249)** and the **Howard House (UN0831)** remain eligible for listing in the National Register of Historic Places under Criterion C, and that the **Jacob Deal Allen Farm (UN1147)** is eligible for listing under Criterion A for agriculture and Criterion C for architecture. Was the intact farm acreage across the road part of the Allen Farm, or was it the Moore Farm? If the former is the case, it should be included in the National Register-eligible property boundary. The National Register eligible boundary for each property should extend to the ditch next to the road - not the edge of the right-of-way, as all of the farmland and residential rural setting are part of each property's importance.

We concur with the determination that the following properties are not eligible for listing in the National Register:

Matthews-Price House (UN0250/UN1150), which in addition to its having been moved, has also been altered (1970s porch, new windows, new chimneys, and the interior appears to have lost key features, like the staircase balustrade).

Hemby House (UN0177at original location/UN1146), which like the Matthews-Price House, has lost interior integrity. Moved buildings can qualify for their architectural merit, not just because they are the last resource associated with a person or event

John O. Hunter Farm (UN1145)

Thomas-Wrenn House (UN0388).

Moore House (UN1148)

We do not concur that the **Weddington Methodist Church (UN0419)** is eligible for the National Register. In 1983 it was evaluated as a contributing resource in the Study-Listed Weddington Historic District, not as an individual building. The 1924 church does not meet Criterion A as it does not represent the 19th century settlement and development of the town of Weddington and the report does not document the importance of the church to the community after 1924. In terms of the eligibility of the cemetery, while it contains an area of 19th century burials and markers, no information is offered in the report about how it qualifies for Criterion Consideration B for its age, distinctive design features, the graves of persons of transcendent importance, or from association with historic events.

The **Siler Presbyterian Church (UN1149)** is not eligible for listing in the National Register under Criterion C due to the impact of the large non-historic addition attached to its rear corner. Even though the footprint of the original church building is still discernible, the “courtyard” effect of the large L-shaped addition has changed the property’s integrity of setting and feeling. While the report notes that the eligible property is only the 1919 church, it cannot be separated from Honeycutt Hall and the office wing when evaluating its National Register eligibility. The National Register states that all additions are part of a single building. This opinion on the church’s architectural merit is not related to the much larger buildings to the rear, as in the eyes of the National Register, the open walkway does not physically connect the church to the office wing hyphen. Given the above, we believe that there are a number of other Gothic Revival style churches in this section of the county that appear to have better integrity than the Siler Presbyterian Church.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation’s Regulations for Compliance with Section 106 codified at 36 CFR Part 800.

Thank you for your cooperation and consideration. If you have questions concerning the above comment, contact Renee Gledhill-Earley, environmental review coordinator, at 919-807-6579 or renee.gledhill-earley@ncdcr.gov. In all future communication concerning this project, please cite the above referenced tracking number.

cc: Mary Pope Furr, NCDOT/HES

CONCURRENCE FORM FOR ASSESSMENT OF EFFECTS

Project Description: Rea Road Extension from Providence Road (NC 16) to Waxhaw-Indian Trail Road (SR 1008).

On September 2, and September 30, 2014, representatives of the

- North Carolina Department of Transportation (NCDOT)
- Federal Highway Administration (FHWA)
- North Carolina State Historic Preservation Office (HPO)
- Other

Reviewed the subject project and agreed on the effects findings listed within the table on the reverse of this signature page.

Signed:

Katherine Husband 10/28/2014
 Representative, NCDOT Date

Debbie Brown 10-28-14
 FHWA, for the Division Administrator, or other Federal Agency Date

Renee Medhill-Easley 10.28.14
 Representative, HPO Date

Property and Status	Alternative	Effect Finding	Reasons
Property No. 5 John Walker Matthews House Determined Eligible 1996, Remains Eligible	Alternative A/A2	No Effect	It was determined there would be no effect on the property at the September 2, 2014 effects meeting. Although the property falls within the Area of Potential Effects, there will be no work performed within the vicinity of the property.
Property No. 5 John Walker Matthews House Determined Eligible 1996, Remains Eligible	Alternative B	No Effect	It was determined there would be no effect on the property at the September 2, 2014 effects meeting. Although the property falls within the Area of Potential Effects, there will be no work performed within the vicinity of the property.
Property No. 5 John Walker Matthews House Determined Eligible 1996, Remains Eligible	Alternative C/C2	No Effect	It was determined there would be no effect on the property at the September 2, 2014 effects meeting. Although the property falls within the Area of Potential Effects, there will be no work performed within the vicinity of the property.
Property No. 8 Howard House Determined Eligible 1996, Remains Eligible	Alternative A/A2 Original Avoidance Option	Adverse Effect No Adverse Effect	The original design had potential issues with the impact of hydro, utilities, and drainage work, as well as access to the property, which could create an adverse effect. The alternative impacts 0.25 acres of 5.904 acres. There will be no adverse effect with the minimized footprint and improved access. Construction fencing shall be erected at the back of the ditch line. No work shall take place in, and no utilities shall encroach into, the historic boundary. There will be 0.0 acres of the 5.904 acres impacted.
Property No. 8 Howard House Determined Eligible 1996, Remains Eligible	Alternative B	No Effect	It was determined there would be no effect on the property at the September 2, 2014 effects meeting. Although the property falls within the Area of Potential Effects, there will be no work performed within the vicinity of the property for this alternative.
Property No. 8 Howard House Determined Eligible 1996, Remains Eligible	Alternative C/C2 Original Avoidance Option	Adverse Effect No Adverse Effect	The original design had potential issues with the impact of hydro, utilities, and drainage work, as well as access to the property, which could create an adverse effect. The alternative impacts 0.25 acres of 5.904 acres. There will be no adverse effect with the minimized footprint and improved access. Construction fencing shall be erected at the back of the ditch line. No work shall take place in, and no utilities shall encroach into, the historic boundary. There will be 0.0 acres of the 5.904 acres impacted.

Property and Status	Alternative	Effect Finding	Reasons
Property No. 15 Jacob Allen Deal Farm Determined Eligible	Alternative A/A2 Original Option Avoidance Option Minimization Option	Adverse Effect No Adverse Effect No Adverse Effect	The original design of Alternative A would impact 3.02 acres of 39.79 acres and is an adverse effect on the property. There will be no adverse effect with the condition of a 25' buffer from the historic boundary, delineated by construction fencing erected at the back of the ditch line. The fencing shall extend 500' from each access drive, or to the property boundary, whichever is closer. Minimization option will impact 0.2 acres of 39.79 acres, which will have no adverse effect on the property.
Property No. 15 Jacob Allen Deal Farm Determined Eligible	Alternative B Original Avoidance Option	Adverse Effect No Adverse Effect	The original design of Alternative B would impact 2.78 of 39.79 acres and is an adverse effect on the property. There will be no adverse effect with the condition of a 25' buffer from the historic boundary, delineated by construction fencing erected at the back of the ditch line. The fencing shall extend 500' from each access drive, or to the property boundary, whichever is closer. Minimization option will impact 0.0 acres of 39.79 acres, which will have no adverse effect on the property.
Property No. 15 Jacob Allen Deal Farm Determined Eligible	Alternative C/C2 Avoidance Option Avoidance Option Minimization Option	Adverse Effect No Adverse Effect No Adverse Effect	The original design of Alternative C would impact 6.34 acres of 39.79 acres and is an adverse effect on the property. There will be no adverse effect with the condition of a 25' buffer from the historic boundary, delineated by construction fencing erected at the back of the ditch line). The fencing shall extend 500' from each access drive, or to the property boundary, whichever is closer. Minimization option will impact 0.56 acres of 39.79 acres, which will have no adverse effect on the property.

Initialed: NCDOT KHFHWA DBHPO RJR

FHWA Intends to use the SHPO's concurrence as a basis for a "de minimis" finding for the following properties, pursuant to Section 4(f):

Alternatives A and C Minimization for the Jacob Allen Deal Farm



TOWN OF
WEDDINGTON

1924 Weddington Road • Weddington, North Carolina 28104

**TOWN OF WEDDINGTON
RESOLUTION ADDRESSING SIDEWALK DESIGN
ALONG THE REA ROAD EXTENSION
R-2015-02**

WHEREAS, the North Carolina Department of Transportation is considering the extension of Rea Road from Providence Road to Highway 84; and

WHEREAS, in preparation for the construction of the Rea Road extension, the North Carolina Department of Transportation is evaluating its construction planning and design for the road with sidewalks; and

WHEREAS, the North Carolina Department of Transportation has inquired of the Town its interest in including sidewalk design in the construction plans for the Rea Road extension; and

WHEREAS, it is economically feasible for North Carolina Department of Transportation and the Town to include the sidewalk design in the construction plans at this point rather than to retrofit the road for sidewalks after the construction has begun; and

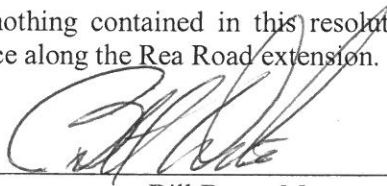
WHEREAS, the North Carolina Department of Transportation has indicated that before its construction of the Rea Road extension with the sidewalks, the Town will be provided with an estimate of the total cost of the sidewalk construction and the Town could, at that point, decide against the construction of the sidewalk with no cost to the Town; and

WHEREAS, contingent upon the Town's ability to opt out of the sidewalk construction, the Town desires for the North Carolina Department of Transportation to include sidewalk design in the overall construction plans for the Rea Road extension.

NOW THEREFORE BE IT RESOLVED that the Town hereby supports the inclusion of sidewalk design in the overall construction plans for Rea Road conditioned upon the Town's ability to opt out of the sidewalk construction once the sidewalk construction estimates are provided and prior to the Town's entry into a municipal agreement.


BE IT FURTHER RESOLVED that nothing contained in this resolution shall obligate the Town to fund sidewalk construction or maintenance along the Rea Road extension.

Adopted this 12th day of January, 2015.



Bill Deter, Mayor

Attest:



Amy S. McCollum, Town Clerk

THE VILLAGE OF WESLEY CHAPEL

May 13, 2015

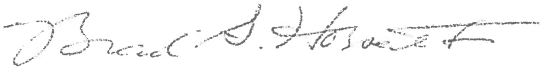
North Carolina Department of Transportation
Marshall Edwards, Project Planning Engineer
Project Development & Environmental Analysis
1548 Mail Service Center
Raleigh, NC 27699-1548

Dear Mr. Edwards;

The Wesley Chapel Village Council, at their November 10, 2014 meeting, approved a motion authorizing funding for sidewalks along NC 84. The motion was to approve the village's financial contribution to the portion of sidewalk both within the Village corporate limits and also outside the corporate limits on the north side of NC 84; as part of the motion the village will furnish the entire \$23,721 to NC DOT no sooner than the year 2023, as it will fund it in the seven years prior to that time.

If you have any questions about this, feel free to contact Cheryl Bennett, Village Clerk or Bill Duston, Planning Director at 704 839-0182. Thank you.

Sincerely,



Brad Horvath, Mayor

cc: Cheryl Bennett, Clerk
Bill Duston, Planning Director

6490 Weddington Road
Wesley Chapel, NC 28104

Phone: 704/839-0157
Email: planner@wesleychapelnc.com

*Note: The Village of Wesley Chapel is in the process of drafting a revised letter.

MEETING NOTES

TO: Meeting Participants
FROM: Liz Kovasckitz, Mulkey Engineers and Consultants
DATE: December 12, 2012
SUBJECT: External Scoping Meeting: SR 1316 (Rea Road) Extension, NC 16 to SR 1008 (Indian Trail-Waxhaw Road) in Weddington. Multi-lanes, part on new location. Union County, NCDOT TIP Project No. U-3467.

An external scoping meeting was held for the subject project on November 14, 2012 in the NCDOT Structure Design Conference Room. The objectives of the meeting were to begin early coordination through the discussion of known information about the project and project area, to obtain information that would be helpful in evaluating the potential environmental impacts of the project, and to strategize solutions and next steps in the project development process. Meeting attendees are listed below. A summary of the meeting follows.

Meeting Participants

Mitch Batuzich	FHWA
Rick Baucom	NCDOT Division 10 (by phone)
J. Derek Bradner	NCDOT Location & Surveys
Greg Brew	NCDOT Roadway
Monroe Brown	NCDOT Utilities
Marella Buncick	USFWS (by phone)
Marla Chambers	NCWRC (by phone)
Erin Cheely	NCDOT PDEA NES
Scott Cole	NCDOT Division 10 (by phone)
Carla Dagnino	NCDOT PDEA NES
Thad Duncan	NCDOT Roadway
Marshall Edwards	NCDOT PDEA
Liz Hair	USACE (by phone)
Jennifer Harris	NCDOT PDEA
Herman Huang	NCDOT PDEA HES-PICS
Alan Johnson	NC DENR DWQ (by phone)
Liz Kovasckitz	Mulkey
Chris Militscher	USEPA (by phone)
Stephen Morgan	NCDOT Hydraulics
Brian Murphy	NCDOT Traffic Safety
Stacy Oberhausen	NCDOT PDEA
Anil Panicker	NCDOT TPB (by phone)
Craig Parker	Mulkey

Meeting Participants *continued*

Michael Reese	NCDOT Congestion Management
Jamille Robbins	NCDOT PDEA HES-PICS
Paul Schroeder	NCDOT TPB
Andrew Topp	M/A/B
John Underwood	NCDOT Division 10 (by phone)

Meeting Summary

Marshall Edwards opened the meeting and asked for introductions from the attendees. Liz Kovasckitz reviewed the meeting agenda and objectives.

PRESENTATION

Ms. Kovasckitz reviewed a PowerPoint presentation. The presentation summarized information contained in the Project Data Sheets as well as other project details obtained through a site visit and meetings with local planners. Ms. Kovasckitz presented an overview of the project, followed by a brief history of the project, a discussion of the general project need, a review of the preliminary study area, and identification of known notable features in the study area.

Project Overview

Ms. Kovasckitz noted the proposed project is included in the *2012-2018 NCDOT STIP* as U-3467. The project is located in Union County, with part in the Town of Weddington and part in the Village of Wesley Chapel. The project proposes to extend SR 1316 (Rea Road) from NC 16 (Providence Road) east to Weddington Road (NC 84) on new location. The extension would be designated as NC 84. The proposed project would also widen NC 84 from the new location segment to SR 1008 (Indian Trail-Waxhaw Road). The project is approximately 3.8 miles in length and is proposed as multi-lanes, part on new location, with partial control of access.

A federal Environmental Assessment (EA) will be prepared for the project. The EA is currently scheduled for completion in December 2013, with the FONSI in December 2014. The project has been screened for placement in the Merger process. A modified Merger process including Concurrence Points 2A and 4A will be followed.

Ms. Kovasckitz stated the proposed project is broken into three segments. Discussions during the Internal Scoping Meeting regarding the project as included in the current TIP identified potential concerns related to project phasing and logical termini. The project phasing is revised in the Draft 2013-2023 TIP as follows:

U-3467 A - From NC 16 to NC 84; construct two lanes on four lanes of right-of-way, with right-of-way acquisition in fiscal year (FY) 2016 and construction in FY 2017.

U-3467 B - From NC 16 to NC 84; construct two additional lanes, unfunded for construction

U-3467 C - NC 84 to Indian Trail-Waxhaw Road, (widening) unfunded for right-of-way and construction.

Chris Militscher asked if the NEPA document would cover all three segments. Ms. Kovasckitz replied that it would. Mr. Militscher clarified the project is proposing phased construction. Mitch Batuzich noted there should be a clear distinction of terms when describing the project segments and phasing. Mr. Militscher followed that EPA is fine with the phasing of projects as long as the NEPA document covered all segments.

Ms. Kovasckitz noted Figure 2 showed other TIP projects in the project area. There is a proposed roundabout at Weddington Matthews Road and NC 84 (TIP Project U-5325B). Construction is anticipated after school is out in June 2013. TIP Project U-5325A, which relocated the intersection of Weddington Church Road and NC 16, was recently completed. TIP Project U-2510A, which widened NC 16 from I-485 to Rea Road, was completed in 2010 and included improvements to the NC 84/NC 16 intersection, including a median and dedicated turn-lanes.

Ms. Kovasckitz noted the total estimated project cost included in the Draft 2013-2023 TIP is \$27,411,000.

Project History and Purpose

Ms. Kovasckitz indicated a feasibility study was prepared for the new location portion of the project in 1996, prior to the construction of Rea Road (TIP Project U-2506). The feasibility study noted the purpose of this project "...is to eliminate a potential dog-leg between the proposed Rea Road and NC 84. Construction of this project will eliminate turning movements associated with east-west traffic along these two roads."

Ms. Kovasckitz briefly reviewed local transportation and land use plans, including the Mecklenburg-Union Metropolitan Planning Organization (MUMPO) *Thoroughfare Plan* (November 2004), The Town of Weddington's *Land Use Plan* (March 2002, amended through April 2011), The Village of Wesley Chapel's *Land Use Plan* (December 2003), the Union County *2025 Comprehensive Plan* (October 2010), and the *Western Union County Local Area Regional Transportation Plan* (LARTP) (November 2009).

The LARTP is a multi-modal plan that attempts to balance the needs of various modes of transportation within western Union County, including the project area. The projects and recommendations developed as part of the LARTP feed directly into the MUMPO Long Range Transportation Plan and Comprehensive Transportation Plan. The LARTP recommendations include a thoroughfare plan that prioritizes roadway projects as high, medium, or low priority projects. The plan recognizes the Rea Road Extension project to construct a four-lane boulevard as the top ranked high priority project. The plan also calls for on-street bicycle accommodations along the length of the project. Intersection improvements are recommended at four intersections on NC 84 within the project area: North Twelve Mile Creek Road (SR 1341), Deal Road (SR 1340), Antioch Church Road (SR 1338), and Indian Trail-Waxhaw Road.

Ms. Kovasckitz stated the purpose of the project is to improve the mobility and connectivity of NC 84 in the project study area.

General Project Need

Ms. Kovasckitz identified the general project needs as follows:

- The proposed project is included in the Western Union County Local Area Regional Transportation Plan [NC 84 Relocation (Rea Road Extension)] as the No. 1 High Priority Recommended Thoroughfare Plan project.
- Vehicles traveling west on existing NC 84 (Weddington Road) to SR 1316 (Rea Road) must turn left onto NC 16 (Providence Road), travel approximately 0.75 mile, then turn right onto Rea Road.
- Traffic volumes in 2035 are expected to exceed capacity on NC 84 in the project area.

Ms. Kovasckitz noted NC 84 carries high traffic volumes as a major connection between southwestern Union County and southeastern Mecklenburg County and the City of Charlotte. Ms. Kovasckitz reviewed traffic forecast data currently available for the project. Travel demand between Monroe/Union County and I-485/Charlotte remains high and other parallel routes are very congested. In addition, the Demographic Study Area (DSA) experienced an 82.9 percent increase in population between 2000 and 2010, a relatively high rate of growth compared to a 62.8 percent increase for Union County as a whole. In the eastern half of the study area that includes the Village of Wesley Chapel, there was an over 200 percent increase in population for the same time period.

The proposed project would provide a more direct link between western Union County and Charlotte/Mecklenburg County; it would provide an alternate route to I-485 and Charlotte, enhancing regional travel options. The proposed project would provide additional capacity on NC 84 in the project area.

Other Desirable Outcome / Secondary Benefit

- The crash rate for NC 84 in the project area exceeds the statewide average crash rate for similar facilities.

Ms. Kovasckitz reviewed NC 84 crash data for the period between October 1, 2007 and September 30, 2012. She noted the most prevalent crash pattern along the corridor is rear end crashes, which is generally a symptom of congestion type issues. It is anticipated that a properly designed four-lane divided facility should address the predominant crash patterns currently present along the corridor. Ms. Kovasckitz noted the number of crashes at the intersection of NC 16 and NC 84 have decreased since improvements were made to the intersection as part of the NC 16 widening project. The area around the intersection of Indian Trail-Waxhaw Road and NC 84 met the 2012 Highway Safety Improvement Program (HSIP) “frontal impact” and “last year increase” warrants.

The proposed project would include improvements that can be expected to result in a safer facility.

Preliminary Study Area

Ms. Kovasckitz reviewed the proposed study area, which extends from NC 16 on the western end of the project to Indian Trail-Waxhaw Road on the eastern end of the project. The proposed study area is 600 feet wide along the portion of the project to be widened and extends down the Y-lines 1,000 feet. At the project termini, the proposed study area extends 2,000 feet along the Y-lines, Rea Road

and NC 84. The proposed study area is expanded on the western end to accommodate the TIP and Feasibility Study alignment, as well as an “improve existing” alternative along NC 84.

Study Area Overview and Notable Features

Ms. Kovasckitz reviewed the existing roadway conditions and notable features in the study area. She noted existing Rea Road currently terminates at NC 16 in Weddington. Within the project study area, Rea Road and a section of NC 16 are four-lane divided roadways with curb and gutter. NC 84 is predominantly a rural, curvilinear two or three-lane roadway with narrow, turf shoulders and some areas with limited sight distance. The speed is 45 mph for much of the project area with reductions to 35 mph approaching the NC 16 intersection and in the school zone for Weddington High School from North Twelve Mile Creek Road to just west of Deal Road.

The following intersections are currently signalized: Rea Road/NC 16, NC 16/NC 84, NC 84/North Twelve Mile Creek Road, and NC 84/ Indian Trail-Waxhaw Road. Turn lanes and other miscellaneous widening occur at various intermittent points along NC 84 due to traffic demands created by subdivisions and/or commercial development. Pedestrian facilities, curb and gutter, lighting, and medians are largely absent along NC 84. Existing pedestrian facilities are limited to the area around the Village Commons shopping area at the intersection of NC 84 and Indian Trail-Waxhaw Road, and along NC 16 from just south of Rea Road to north of the project area.

Existing development in the project area consists largely of residential subdivisions with some institutional, agricultural, and recreational uses. Commercial development is located at the NC 84 intersections with NC 16 and Indian Trail-Waxhaw Road. Several churches and parks are located within the project area. Environmental Justice concerns and populations with limited English proficiency are not anticipated.

Ms. Kovasckitz reviewed the detailed project maps and highlighted notable features in the study area.

Figure 3B:

- Two sites eligible for inclusion on the National Register of Historic Places (NRHP): John Walker Matthews House, Howard Family House.
- The Stratford on Providence subdivision is located across from and just south of the Rea Road intersection with NC 16. It was first developed about ten years ago. The developer provided a 50-foot buffer on the back edge of the parcels bordering the potential Rea Road corridor as well as an easement to tie the proposed Rea Road Extension into a subdivision street (Oxfordshire Road). It was disclosed to potential home buyers that Rea Road was going to be extended at some time in the future. However, according to the Town of Weddington Planner, many of the residents oppose the project. He noted that overall, the community thinks the project is desirable and the project is backed by the majority of the Town Council.

Figure 3C:

- One site eligible for inclusion on the NRHP: Thomas Wrenn House, which currently serves as Weddington Town Hall.

- Weddington United Methodist Church (UMC) is located on the west side of NC 16 across from the NC 84 intersection. Several other UMC properties, including a cemetery and a Christian Academy are also located near the intersection.

Figure 3D:

- There is an existing NC 84 crossing of UT to Mundys Run. A crossing of Mundys Run is anticipated with the proposed Rea Road Extension.
- The Woods Subdivision is a proposed 265-acre development located south of NC 84 and east of NC 16 near the western end of project. The proposed development is within the Town of Weddington. The proposed Rea Road Extension TIP alignment would be located on, and provide access to, this property. The developer of The Woods Subdivision has petitioned Union County for sewer allocation to the proposed development. A local planner noted the developer has indicated he is willing to donate right-of-way for the new location portion of the proposed project that falls within the planned subdivision. The sewer allocation requested by the developer would serve approximately 260 lots. The Town of Weddington adopted a resolution in support of this request on March 7, 2011.

Figure 3E:

- There is a small private airport with one paved runway located within the Aero Plantation subdivision. The airport is located at the southern end of the subdivision, over one-half mile south of NC 84.
- There are active agricultural fields (each less than 20 acres) located on both sides of NC 84 where the proposed alignment transitions from new location to existing NC 84.
- The intersection of NC 84 and North Twelve Mile Creek Road is signalized.

Figure 3F:

- Numerous underground utilities were noted along the roadway throughout the project area including water, sewer, gas, cable and telephone. Power poles line NC 84 and switch from side to side depending on roadway curvature, shoulder widths and distribution of service. There is a large power transmission tower near the roadway on the Weddington Optimist Park property.
- Weddington Optimist Park is a privately-owned 52-acre facility located in the eastern portion of the study area. Portions of the park are open to the public; however, it is not a Section 4(f) resource since the park is privately owned and no public entities have a proprietary interest in the property. The eastern section of the park is owned by the Weddington Optimist Club and the western portion is owned by the Wesley Chapel Weddington Athletic Association (WCWAA).
- According to the local planner, numerous loads of fill were placed in the floodplain on the east side of the West Fork of Twelvemile Creek during the creation of the WCWAA Park. Area residents have stated their opposition to the park, mainly due to the resultant flooding, including overtopping of NC 84.

Mr. Militscher inquired how the flooding would be attributed to the park, in particular if the facilities there did not result in an increase in impervious surface. Scott Cole responded he was serving in the

role of District Engineer when the work was done and it was his understanding park developers filled in a floodplain without a CLOMR. The illegal filling caused the level of floodwaters to rise.

- Stream crossings are located along this section of NC 84 at Culvert Branch and West Fork Twelvemile Creek.
- Weddington High School, Weddington Middle School and Weddington Elementary School are located together in a joint educational complex. These schools generate notable traffic on NC 84, especially in the morning. Access for buses and cars to Weddington High School was noted as a concern by the Director of Facilities for Union County Public Schools since the school has three entrances on NC 84. According to the Director of Facilities, a total of 80 bus trips per day access the high school from NC 84. The middle school and elementary school are accessed from Twelve Mile Creek Road and have 60 and 20 bus trips per day, respectively, some of which use NC 84. In addition, the car-rider line backs up onto NC 84 in the mornings, especially in the westbound direction. According to the Town Planner, the Mayor of Weddington has indicated that safely making a left turn into and out of the schools from NC 84 has been a growing problem.

Figure 3G:

- A preliminary search of potential hazardous material sites identified two properties in the southeast quadrant of Indian Trail-Waxhaw Road and NC 84: CVS (conditionally exempt small generator) and Target (large quantity generator).
- Siler Presbyterian Church occupies a large parcel on the northeast quadrant of Indian Trail-Waxhaw Road and NC 84. Siler Presbyterian Recreation Park is a small, privately-owned recreation area located on the Siler Presbyterian Church property. Use of the facility must be approved by the church office.
- The Shops at Wesley Chapel and Village Commons are located in and around the intersection of Indian Trail-Waxhaw Road and NC 84 and include grocery stores, restaurants, banks, medical offices, and a variety of other services that are used by the community on a daily basis. There is a short section of existing sidewalk on the north side of NC 84 adjacent to the Shops at Wesley Chapel.
- Additional commercial property is being developed adjacent to the shopping area on the southeast corner of NC 84 and Indian Trail-Waxhaw Road. This development is referred to as Village Commons II and plans include a new town hall for the Village of Wesley Chapel by late 2013.
- Proposed Dogwood Park is located on the southeast corner of NC 84 and Lester Davis Road and would be the first community park for the Village of Wesley Chapel. The Village of Wesley Chapel owns the 22.6-acre property and plans to develop a passive park that will feature walking and hiking trails, an amphitheater, and a fishing pier. The Town Administrator indicates ground-breaking will happen any time.

Ms. Kovasckitz then reviewed the Preliminary Corridor Resources Inventory Table included in the Project Data Sheets. She noted that although the currently available GIS data layer shows West Fork Twelvemile Creek as a 303(d) stream, it is not included on the EPA approved 2012 NC Category 5 303(d) list. A call to the DWQ Mooresville Regional Office confirmed West Fork Twelvemile Creek should not be displayed as a 303(d) stream. Ms. Kovasckitz noted the Catawba River Basin Rules do

not apply. However, DWQ has indicated work on the west side of NC 16 would be subject to the Goose Creek Rule. The USFWS Threatened and Endangered Species list for Union County identifies three endangered species. Preliminary surveys indicate habitat for Michaux's Sumac (*Rhus michauxii*) and Schweinitz's sunflower (*Helianthus schweinitzii*) is present in the study area. Carolina heelsplitter (*Lasmigona decorata*) is also listed for Union County. There are several gas stations in the study area.

Ms. Kovasckitz presented the potential project alternatives as shown on Figure 4. The green alignment represents an "Improve Existing" alternative, which would involve a best-fit widening of existing NC 84 in the project area. The white hatched alignment is a general representation of the TIP alignment. It would relocate NC 84 to connect with Rea Road (Rea Road Extension) and include a best-fit widening from where it would tie in to existing NC 84 to Indian Trail – Waxhaw Road.

It is anticipated that a boulevard-type facility with partial control of access would be constructed within a 110-foot right-of-way. The proposed cross section includes a four-lane divided curb and gutter facility with 12-foot inside travel lanes and 14-foot outside lanes (to accommodate bicycles), a 23-foot raised median and minimum 10-foot berms. The inclusion of sidewalks as part of the proposed project will be coordinated with the local jurisdictions. There are currently no Safe Routes to School projects located in the project area.

INPUT AND DISCUSSION

Mr. Edwards asked meeting participants to provide input from their areas of expertise in regard to the proposed project.

Input from State and Federal Resource Agencies / NCDOT PDEA

Natural Systems

- U. S. Fish and Wildlife Service

Marella Buncick noted the plant surveys will be particularly important for the new location portion of the project. The ability to potentially avoid listed plants will be an important factor in choosing an alternative. Mr. Edwards indicated biologists attempted to conduct surveys during the appropriate window but it was his understanding severe weather had shortened the flowering period. Ms. Kovasckitz noted potential habitat did exist for the species in the project area. Erin Cheely indicated there was a Michaux's sumac occurrence less than a mile away, a Schweinitz's sunflower occurrence less than two miles away and a Carolina heelsplitter occurrence less than three miles away. Ms. Buncick reiterated it will be important to know if listed species are in the study area and to choose an alternative that would result in the least impacts to protected species.

- U. S. Army Corps of Engineers

Liz Hair noted the earlier statement indicating the NEPA document would cover the entire project (all sections) and construction would be phased. Ms. Hair stated the Corps is fine with that approach. She asked where the project was in the jurisdictional determination process and if any wetland and stream delineations had taken place, especially within the new location corridor. Ms. Kovasckitz noted stream and wetland delineations have not started but given the project schedule

they would need to start as soon as possible. Information included in the scoping packet was based on GIS data and general field observations.

- U.S. Environmental Protection Agency

Mr. Militscher recommended the typical section, currently proposed as a partial control of access boulevard-type facility, be evaluated to ensure it would provide safe movements at the school complex. Consideration of a modified typical section, which might include additional turn lanes, was suggested for inclusion in the project study given the high volume of bus trips associated with the schools.

- N. C. Division of Water Quality

Alan Johnson asked if the boulevard typical section was proposed for the entire length of the project or the new location portion of the project only. Ms. Kovasckitz replied it was still early in the process; however, the current thought is to continue the existing Rea Road typical section into and through the project, both on the new location (NC 84 relocation) and widening portions of the project. Mr. Johnson asked if NC 84 is relocated, would the existing section of NC 84 need to be widened in the future or would it remain two lanes? Ms. Kovasckitz noted the recent improvements associated with the NC 16 intersection and the proposed roundabout are both located along that segment. Greg Brew stated if an alternative including a new location section relocating NC 84 was selected, then he would not anticipate widening existing NC 84 from NC 16 to where the new location section tied in.

- N. C. Wildlife Resources Commission

Marla Chambers noted Twelvemile Creek is home to a number of listed species including three state-listed mussels (*Villosa delumbis*, *Villosa constricta* and *Villosa vaughaniana*), one of which is a Federal Species of Concern as well as State Endangered.

- NCDOT Natural Environment Section

Ms. Cheely indicated she did not have any additional concerns other than the listed species. All waters within the study area are Class C.

- N. C. Natural Heritage Program

A representative from the NC Natural Heritage Program (NHP) was not in attendance. Ms. Chambers noted she received a communication from NHP regarding the species she listed. Stacy Oberhausen asked Ms. Chambers to forward a copy of the communication to Mr. Edwards.

Human Environment

- NC Historic Preservation Office / NCDOT Historic Architecture and Archaeology Groups

Mr. Edwards noted email correspondence received from Mary Pope Furr indicated there were no particular concerns regarding historic architecture at this time. Mr. Edwards noted additional information regarding historic resources would be requested. [*Post Meeting Note: A November 30, 2012 memorandum from the State historic Preservation Office provided additional information on a previously recorded*

archaeological site (31UN135) and structures of historical or architectural importance. The memo noted a comprehensive archaeological investigation may be recommended. The memo recommended NCDOT identify and evaluate any structures over 50 years of age in the project area.

- NCDOT Public Involvement & Community Studies

Herman Huang noted that although the DSA does not meet the Department of Justice threshold in regard to Limited English Proficiency, some speakers of Spanish and a few other European languages were identified there. This should be considered when planning the public involvement process. Mr. Huang stated there is a moderate concern regarding indirect and cumulative effects for the alternative that includes new location (relocation of NC 84) based on the project area's forecasted population growth. A Land Use Scenario Assessment may be warranted. This will be evaluated again after an alternative is selected and the preliminary design is available.

Jamille Robbins noted he did not have any special concerns regarding public involvement. Mr. Robbins anticipates a Citizens Informational Workshop in early 2013 to get feedback from the public on the study area and alternatives.

Input from FHWA / Division 10 / NCDOT

- FHWA

Mr. Batuzich stated he did not have any comments: The concerns he identified at the Internal Scoping Meeting were all addressed.

- Division 10

Jennifer Harris asked if the Division had any additional information on the proposed development. Scott Cole noted his understanding from the District Office is a commercial development may now be under consideration for the property. John Underwood followed that he recently met with the developer and the concept for the development is now leaning toward mixed use. The developer is interested in working with NCDOT, both on the location of the road and through the provision of right-of-way on the property. Mr. Cole noted a recent sketch shows the development's proposed Main Street intersecting with existing NC 84 as it approaches NC 16. Ms. Harris noted the configuration shown on the sketch would require traffic to travel through the development to continue on NC 84. Mr. Underwood indicated he believed NCDOT could work through that with the developer. He noted the developer indicated it would be important to have a new location alignment located as close as possible to the southern property boundary closest to Oxfordshire Road.

Mr. Cole noted NCDOT recently realigned the Weddington Church Road intersection with NC 16 to go around the church property at the western end of the study area. Ms. Harris asked if the Division thought the study area needed to be expanded. Mr. Cole responded he did not believe changes were needed to the study area.

- Roadway Design Unit

Greg brew stated NCDOT is not directing municipalities in one direction or the other; however, wide outside lanes are preferred in lieu of the designated four-foot bike lanes currently included in

the Complete Streets Guidelines. After a decision is made about the type of bicycle accommodations that will be provided, the presentation of that information to stakeholders and the public should be very clear. Ms. Harris noted it will be important to make sure everyone is in agreement, particularly with the schools located along NC 84.

- Hydraulics Unit

Stephen Morgan indicated some work may be needed at Twelvemile Creek due to the floodplain and overtopping in this area. Mr. Morgan indicated it would be a good time to coordinate with the municipalities in regard to any greenway plans near Mundys Run or Twelvemile Creek, especially as additional hydro conveyance may be needed at Twelvemile Creek. Ms. Harris asked if there were any known plans for greenways. Ms. Kovasckitz indicated there were no known plans at this time. She stated the local planners had a difference in opinion about what the public's opinion would be on the provision of bicycle and pedestrian accommodations in their jurisdictions. She noted additional coordination is needed to make sure everyone is in agreement. Mr. Morgan indicated nothing appears to be out of the ordinary for the project at this time.

- Geotechnical Engineering Unit

A representative from the GeoTechnical Engineering Unit was not present at the meeting. Craig Haden provided pre-scoping comments in an October 16, 2012 memorandum to Marshall Edwards.

- Bicycle and Pedestrian Division

Mr. Edwards indicated he would follow up with Bob Mosher after the meeting as Mr. Mosher had a scheduling conflict and was unable to attend.

- Location & Surveys Unit

Mr. Bradner noted the types of utilities located in the project area were mentioned during the presentation and he had no additional comments at this time.

- Transportation Planning Branch

Anil Panicker stated the Draft Comprehensive Transportation Plan (CTP) shows existing Weddington Road as a minor thoroughfare with no proposed improvements. The entire length of the proposed road is shown as a boulevard cross section. Mr. Panicker noted the Draft CTP also shows a road on new location in the northeast corner of the study area connecting Weddington-Matthews Road to NC 16 (just north of the study area).

- Congestion Management

Mike Reese noted the traffic forecasts do not include the proposed development as it was not permitted at the time nor included in the model. Mr. Reese noted Congestion Management will coordinate with M/A/B, who will be preparing the capacity analysis for the project. Rick Baucom stated the development is still in the concept phase and no official requests or site plans have been submitted. Mr. Underwood agreed the development is in the concept phase. Mr. Cole noted there have not been any commitments made to the developer regarding the road network they are proposing.

Regarding the proposed road connecting Weddington-Matthews Road to NC 16 included in the Draft CTP, Mr. Baucom indicated he was not sure that would be needed with the roundabout going in at Weddington Matthews Road and NC 84. Mr. Reese indicated he had been involved in some of the early analysis and the intent of the connecting road was to relieve congestion on NC 84 between the proposed roundabout and NC 16. Mr. Underwood noted the proposed road is something the Town has indicated they would like to see done but it hasn't gone beyond that at this time. Mr. Underwood agreed that with the construction of the roundabout, it may not be need to be pursued.

Input from Local Government /Others

- Mecklenburg Union MPO
- Union County
- Town of Weddington
- Village of Wesley Chapel

Representatives from the local jurisdictions and MPO were not in attendance. Coordination with local government representatives will continue throughout the project development process.

Mr. Edwards noted a hard copy of the packet would be sent to Merger Team members. The meeting was adjourned.

CORRECTIONS & OMISSIONS: This summary is the writer's interpretation of the events, discussions, and transactions that took place during the meeting. If there are any additions and/or corrections, please inform Marshall Edwards at medwards@ncdot.gov or the writer in writing within seven (7) days.

cc: Richard Black, Union County
Jordan Cook, Town of Weddington
Robert Cook, MUMPO
Renee Gledhill-Early, SHPO
Joshua Langen, Village of Wesley Chapel
Louis Mitchell, NCDOT Division 10
File 2012003.00

Appendix C

Relocation Reports

EIS RELOCATION REPORT

**North Carolina Department of Transportation
RELOCATION ASSISTANCE PROGRAM**

E.I.S. CORRIDOR DESIGN

WBS ELEMENT:	39019.1.1	COUNTY	Union	Alternate A2 of 5 (A,A2,B,C,C2) Alternate
T.I.P. No.:	U-3467			
DESCRIPTION OF PROJECT:	SR 1316 (Rea Road) Extension			

ESTIMATED DISPLACEDS					INCOME LEVEL				
Type of Displacees	Owners	Tenants	Total	Minorities	0-15M	15-25M	25-35M	35-50M	50 UP
Residential	4	1	5	0	0	1	0	0	4
Businesses	0	1	1	0	VALUE OF DWELLING		DSS DWELLING AVAILABLE		
Farms	0	0	0	0	Owners	Tenants	For Sale	For Rent	
Non-Profit	0	1	1	0	0-20M	\$ 0-150	0-20M	\$ 0-150	0
ANSWER ALL QUESTIONS					20-40M	150-250	20-40M	150-250	0
Yes	No	<i>Explain all "YES" answers.</i>			40-70M	250-400	40-70M	250-400	0
	X	1. Will special relocation services be necessary?			70-100M	400-600	70-100M	400-600	5
	X	2. Will schools or churches be affected by displacement?			100 UP	600 UP	100 UP	25	15
X		3. Will business services still be available after project?			TOTAL	4	1	25	20
X		4. Will any business be displaced? If so, indicate size, type, estimated number of employees, minorities, etc.			REMARKS (Respond by number)				
	X	5. Will relocation cause a housing shortage?			3. Businesses will still be available in the area. 4. YMCA fitness center & AT&T retail store located as tenants in (1) structure – \$620,000 – Total 5000 sq. ft. storefront. YMCA – 5000 sq. ft. – 10 employees – 2 minority AT&T – 2500 sq. ft. – 10 employees – 2 minority 6. MLS, Newspaper, Realtor, Real Estate publications, Internet 8. As required by law. 11. Union County has public housing. 12. Based on current market, housing & storefront business Locations should be available. 14. MLS, Newspaper, Realtor, Real Estate publications, Internet **NOTE** • Possible 4-F exchange needed due to proposed acquisition on 2 ballfields owned by Weddington Optimist Park.				
		6. Source for available housing (list).							
	X	7. Will additional housing programs be needed?							
X		8. Should Last Resort Housing be considered?							
	X	9. Are there large, disabled, elderly, etc. families?							
	X	10. Will public housing be needed for project?							
X		11. Is public housing available?							
X		12. Is it felt there will be adequate DSS housing available during relocation period?							
	X	13. Will there be a problem of housing within financial means?							
X		14. Are suitable business sites available (list source).							
		15. Number months estimated to complete RELOCATION?							
		24 months							

12-17-14 Date Right of Way Agent		12/29/14 Date Relocation Coordinator
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EIS RELOCATION REPORT

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RELOCATION ASSISTANCE PROGRAM**

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Type of Displacees	Owners	Tenants	Total	Minorities	0-15M	15-25M	25-35M	35-50M	50 UP			
Residential	4	1	5	0	0	1	0	0	4			
Businesses	0	1	1	0	VALUE OF DWELLING DSS DWELLING AVAILABLE							
Farms	0	0	0	0	Owners		Tenants		For Sale For Rent			
Non-Profit	0	1	1	0	0-20M	0	\$ 0-150	1	0-20M	0	\$ 0-150	0
					20-40M	0	150-250	0	20-40M	0	150-250	0
					40-70M	0	250-400	0	40-70M	0	250-400	0
					70-100M	0	400-600	0	70-100M	0	400-600	5
					100 UP	4	600 UP	0	100 UP	25	600 UP	15
					TOTAL	4		1		25		20

ANSWER ALL QUESTIONS		
Yes	No	Explain all "YES" answers.
	X	1. Will special relocation services be necessary?
	X	2. Will schools or churches be affected by displacement?
X		3. Will business services still be available after project?
X		4. Will any business be displaced? If so, indicate size, type, estimated number of employees, minorities, etc.
	X	5. Will relocation cause a housing shortage?
		6. Source for available housing (list).
	X	7. Will additional housing programs be needed?
X		8. Should Last Resort Housing be considered?
	X	9. Are there large, disabled, elderly, etc. families?
	X	10. Will public housing be needed for project?
X		11. Is public housing available?
X		12. Is it felt there will be adequate DSS housing available during relocation period?
	X	13. Will there be a problem of housing within financial means?
X		14. Are suitable business sites available (list source).
		15. Number months estimated to complete RELOCATION? 24 months

REMARKS (Respond by number)							
3. Businesses will still be available.							
4. YMCA fitness center & AT&T retail store located as tenants in (1) structure – \$620,000 – Total 5000 sq. ft. storefront. YMCA – 5000 sq. ft. – 10 employees – 2 minority AT&T – 2500 sq. ft. – 10 employees – 2 minority							
6. MLS, Newspaper, Realtor, Real Estate publications, Internet							
8. As required by law.							
11. Union County has public housing.							
12. Based on current market, housing & storefront business Locations should be available.							
14. MLS, Newspaper, Realtor, Real Estate publications, Internet							
NOTE							
<ul style="list-style-type: none"> • Possible 4-F exchange needed due to proposed acquisition on 2 ballfields owned by Weddington Optimist Park. 							

 Date: 12-17-14		 Date: 12/29/14
Right of Way Agent		Relocation Coordinator