FEASIBILITY STUDY

US 70
From SR 2372 (Edwards Road) to the US 70 Goldsboro Bypass

Wayne and Johnston Counties, Division 4
FS-1204A

Prepared for:

N.C. Department of Transportation
Program Development Branch
Feasibility Studies Unit

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1.0 INTRODUCTION

The proposed project is planned to improve the existing US 70 facility between SR 2372 (Edwards Road) and the US 70 Goldsboro Bypass. This report evaluates various improvement alternatives including upgrading the existing US 70 facility to a freeway and new location alternatives. The project study area is located primarily in Wayne County with some overlap into Johnston County and is incorporated mostly into the Goldsboro Metropolitan Area. The purpose of the project is to improve regional mobility and provide better connectivity between Raleigh and Morehead City. This report provides an examination of the feasibility of this proposed project for the improvement alternatives.

This is the initial step in the planning and design process for this project and is not the product of exhaustive environmental or design investigations. The purpose of this study is to describe the proposed project including cost and to identify potential problems that may require consideration in the planning and design phases. Once a candidate project is identified for funding in the STIP, the Feasibility Study is followed by a rigorous planning and design process that meets the requirements of the National Environmental Policy Act (NEPA), where either an Environmental Impact Statement (EIS) or an Environmental Assessment (EA) is done.

1.1 BACKGROUND

US 70 is an important regional facility in the eastern part of North Carolina as it serves to connect many municipalities of all sizes including Raleigh, Goldsboro, New Bern and Morehead City. There are a number of improvement projects along the US 70 corridor between Raleigh and Morehead City in various stages of planning, construction and completion. The US 70 Corridor Commission was formed to provide a central location for the multiple US 70 projects to be discussed and provide ongoing updates to planning studies and construction schedules. The intent of the US 70 Corridor Commission is "to partner with local, regional and state government agencies to effectively support initiatives enhancing safety, mobility and economic vitality along the Highway 70 corridor through land use planning, transportation improvement and economic development strategies."

1.2 STUDY AREA

The scope of the study area for this project includes approximately 1,000 feet on either side of the alternatives, although this width varies along the project where there are known constraints or environmental concerns. The southern border of the study area generally follows the existing railroad corridor, with a portion extending southwest of the railroad around Luby Smith Road.

The northern portion of the study area extends approximately 1,000 feet north of the proposed North Alternative. At its widest point, the study area is approximately 7,000 feet (1.3 miles) wide, encompassing a 1,000 foot buffer around the Improve Existing Alternative, the South Alternative, and the North Alternative, collectively. The study area, as shown in Figure 1-1, extends approximately one mile northwest of the project beginning point toward Edwards Road so as to include an area large enough for all potential improvement solutions.

Furthermore, the study area includes existing intersections along US 70. These intersections are included as part of the traffic capacity analysis to determine the impact that a freeway facility may have on the existing infrastructure.

The following are the major intersections included in the study area, as shown in Figure 1-1:

- US 70 and SR 2371 (Old Cornwallis Road)
- US 70 and SR 1229 (Luby Smith Road)
- US 70 and SR 1331 (Bridgers Road)
- US 70 and SR 1232 (Whitley Church Road)
- US 70 and SR 1234 (Capps Bridge Road/Ebenezer Church Road)
- US 70 and SR 1381/SR 1237 (Aulander Road/Community Drive)
- US 70 and SR 2372 (Edwards Road)

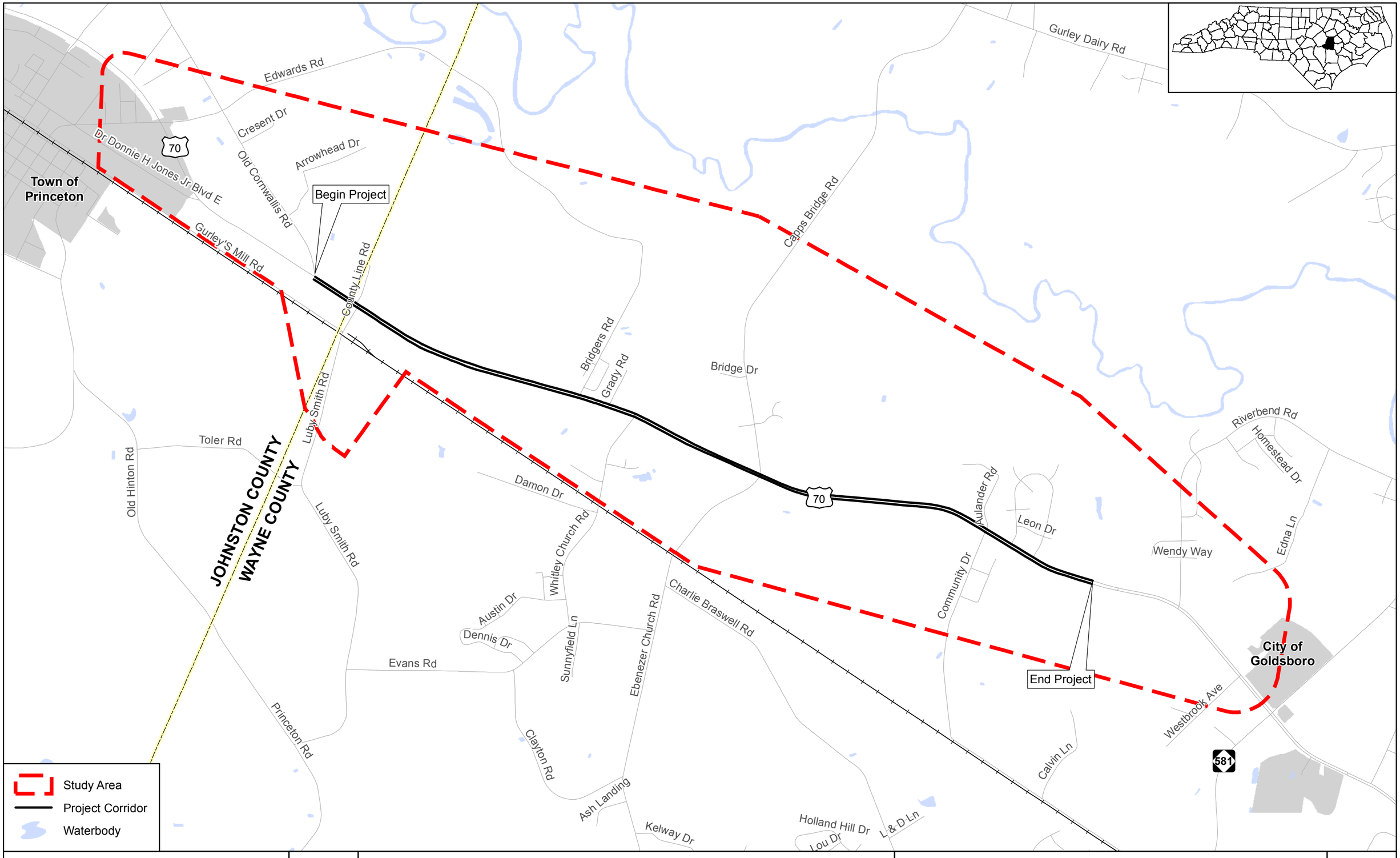


Figure 1-1
Project Study Area

FS-1204A US 70
From SR 2372 (Edwards Road) to
the US 70 Goldsboro Bypass

1.3 PROJECT ALTERNATIVES

This study analyzed various base year and future year scenarios. These scenarios are based on multiple design alternatives and present traffic projections for each condition, as described below.

- **Base Year (2013) – No-Build:** This scenario represents existing roadway conditions and accounts for base year volumes.
- **Base Year (2013) – Improve Existing Alternative:** This scenario includes upgrading the existing facility to a four-lane freeway facility and includes the completion of the US 70 Goldsboro Bypass (STIP R-2554A) to the east; it accounts for base year volumes.
- **Base Year (2013) – North Alternative:** This scenario includes the proposed North Alternative as a four-lane freeway facility and includes the completion of the US 70 Goldsboro Bypass (STIP R-2554A) to the east; it accounts for base year volumes.
- **Base Year (2013) – South Alternative:** This scenario includes the proposed South Alternative as a four-lane freeway facility and includes the completion of the US 70 Goldsboro Bypass (STIP R-2554A) to the east; it accounts for base year volumes.
- **Design Year (2035) – No-Build:** This scenario projects the traffic conditions along the study corridor with forecasted volumes; future roadway conditions excluding the proposed project are reflected including the US 70 Goldsboro Bypass (STIP R-2554A).
- **Design Year (2035) – Improve Existing Alternative:** This scenario includes the existing location as a four-lane freeway facility and accounts for projected roadway volumes and improvement conditions including the US 70 Goldsboro Bypass (STIP R-2554A).
- **Design Year (2035) – North Alternative:** This scenario includes the proposed North Alternative as a four-lane freeway facility and accounts for projected roadway volumes and improvement conditions including the US 70 Goldsboro Bypass (STIP R-2554A).
- **Design Year (2035) – South Alternative:** This scenario includes the proposed South Alternative as a four-lane freeway facility and accounts for projected roadway volumes and improvement conditions including the US 70 Goldsboro Bypass (STIP R-2554A).

Figure 1-2 illustrates the conceptual alternatives that were evaluated as part of this study.

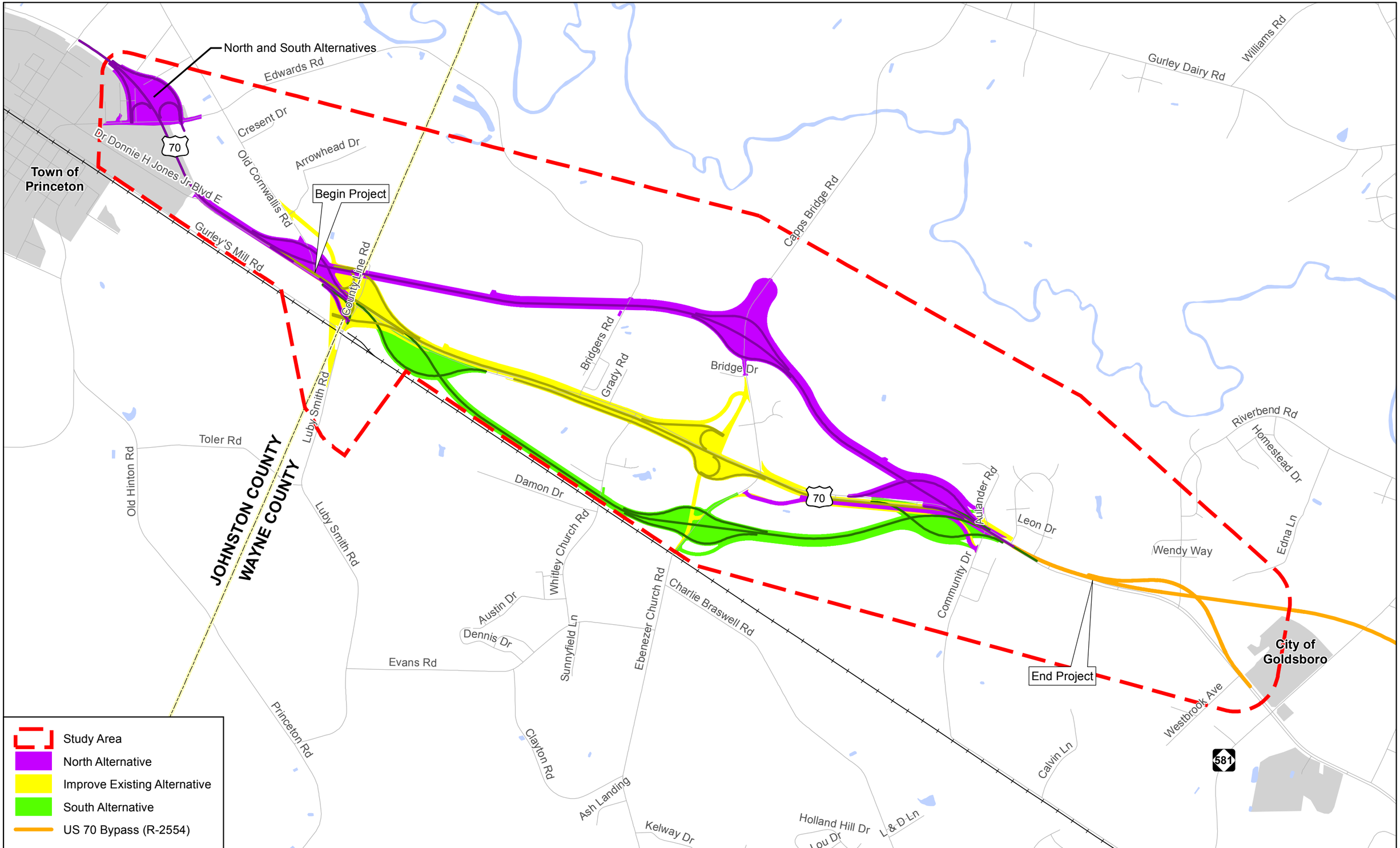


Figure 1-2
Project Alternative Concepts

FS-1204A US 70
From SR 2372 (Edwards Road) to the US 70 Goldsboro Bypass

2.0 EXISTING CONDITIONS

2.1 EXISTING ROADWAY AND TRAFFIC CONDITIONS

2.1.1 Existing Roadway

US 70 is classified by NCDOT as Other Principal Arterial. It provides connectivity between Raleigh and Morehead City as well as regional mobility in the Goldsboro area. It is a median divided, four-lane highway with grassy median and exclusive turn lanes present at major intersections. U-turn bulbs were recently constructed at two locations along the project corridor, on either side of the Capps Bridge Road/Ebenezer Church Road intersection, resulting in a superstreet configuration at this intersection.

2.1.2 Existing Traffic

The traffic volumes utilized in the traffic capacity analysis were taken from the forecasts completed by NCDOT in December 2012 and November 2013 for purpose and use in this project. The volumes utilized for the existing conditions analysis are derived from the Base Year (2013) volumes provided in the November 2013 forecast.

The 2013 daily volumes vary within the study area from between 20,800 – 21,400 vehicles per day (vpd) at the western end of the US 70 project corridor to 22,900 – 26,700 vpd at the eastern end. Side streets within the study area are relatively minor in volume, and range from 700 – 1,300 vpd with the exception of NC 581 which has daily volumes of 6,500 – 7,700 vpd.

2.2 ENVIRONMENTAL FEATURES

An environmental screening was completed for the project study area utilizing existing GIS resources. This screening analysis indicated areas of possible environmental concern, including wetland areas, historic resources, and locations of inactive hazardous material sites. These data were obtained from a variety of sources including the GIS sources listed below:

- Johnston and Wayne County GIS
- NC Center for Geographic Information and Analysis – NC One Map Geospatial Portal
- NC Conservation Planning Tool (CPT)
- NC Department of Cultural Resources – State Historic Preservation Office (NCSHPO)
- NCDENR Division of Water Resources (DWR)
- NCDOT GIS Unit
- NC Ecosystem Enhancement Program (EEP)
- NC Natural Heritage Program (NHP)

- NC Wildlife Resources Commission (WRC)
- USDA National Resource Conservation Service (NRCS)
- US Environmental Protection Agency (EPA)
- US Fish and Wildlife Services (FWS)

Figure 2-1 illustrates the known environmental features present within the project study area as indicated by the environmental screening process.

2.2.1 Historic and Cultural Resources

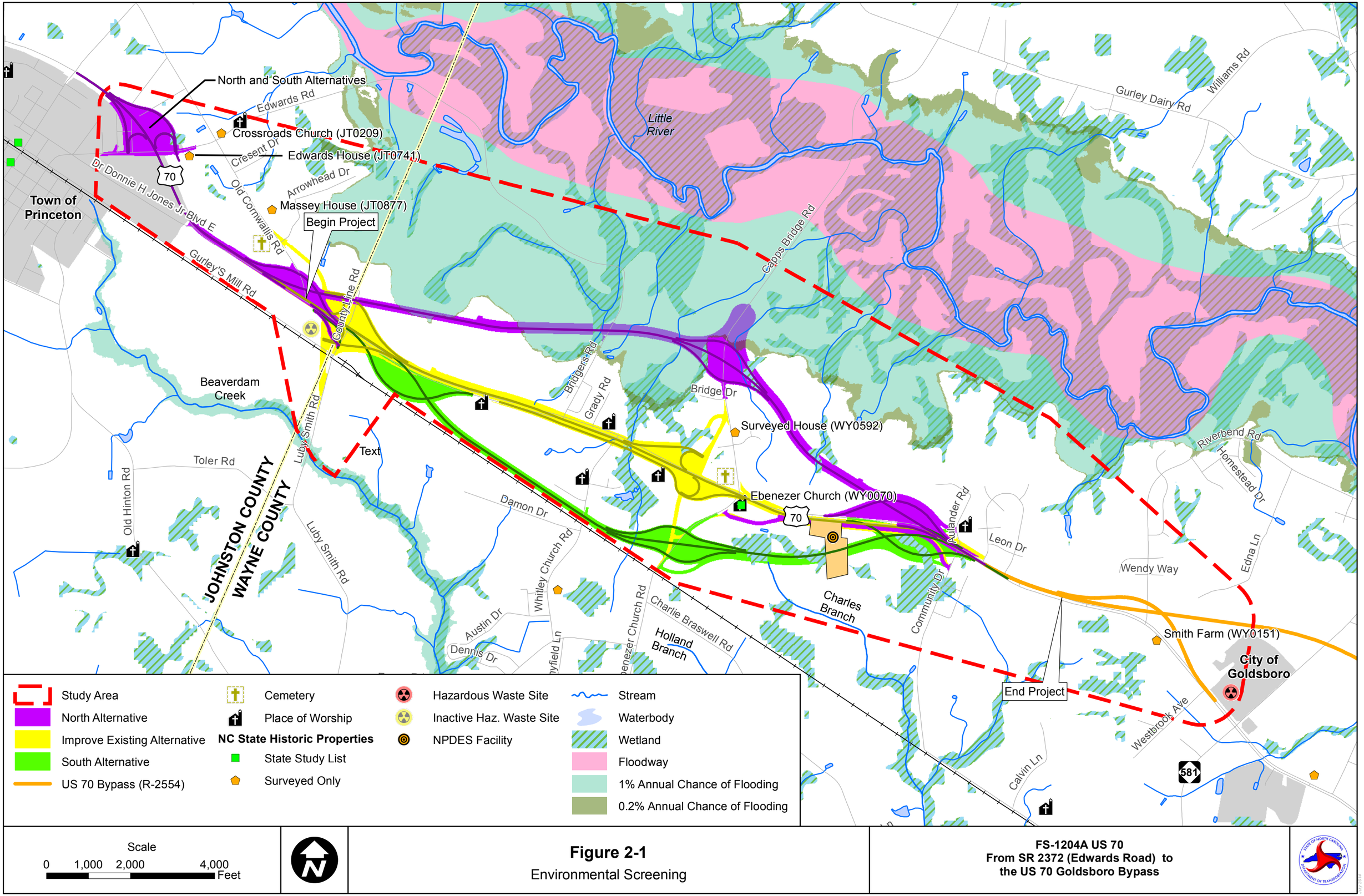
A review of cultural resources in the vicinity of the study area identified one State (NC) Study List feature along the corridor. Being placed on the State Study List is the first step towards nomination to the National Register of Historic Places (NRHP). Ebenezer United Methodist Church (ID WY0070) has been listed on the State Study List since 1980 and is located at 3859 US 70, near its intersection with Ebenezer Church Road (SR-1234). Parking lot access and an existing church sign are immediately adjacent to the existing right-of-way of US 70. There are no known listed or eligible NRHP properties within the study area at this time.

There are a number of structures along the corridor that have been surveyed, but determined not to be eligible for the NRHP, including:

- The William Smith Farm Complex (WY0151); located at 3049 US 70
- A house (WY0592); located at 208 Capps Bridge Road
- West Massey House (JT0877); located along Old Cornwallis Road, northwest of Arrowhead Drive
- Waverly H. Edwards House(JT0741); located along Edwards Road, west of Old Cornwallis Road
- Crossroads Primitive Baptist Church (JT0209); located along Edwards Road, east of Old Cornwallis Road

2.2.2 Streams, Wetlands, and Flood Plains

The Division of Water Resources (DWR), a subset of the NC Department of the Environment and Natural Resources, is responsible for the protection, classification and enhancement of all streams and water bodies within North Carolina. The project study area is located within the Neuse River Basin of North Carolina. The Neuse River Basin is divided into four sections: the Upper, Middle and Lower Neuse, as well as the Contentnea Creek sub basins. The project study area straddles the boundary between the Little River and Moccasin Creek watersheds, both of which are part of the Upper Neuse sub basin. There are four named streams that drain water from the study area, none of which are classified as impaired (303(d) list) as of the 2012 Integrated Report.


North and South Alternatives
Edwards Rd
Crossroads Church (JT0209)
Edwards House (JT0741)
Cresent Dr
Dr Donnie H Jones Jr Blvd E
70
Old Cornwallis Rd
Arrowhead Dr
Massey House (JT0877)
Begin Project
Town of Princeton
Gurley'S Mill Rd
County Line Rd
Little River
Gurley Dairy Rd
Williams Rd
Capps Bridge Rd
Bridgers Rd
Grady Rd
Bridge Dr
Surveyed House (WY0592)
Riverbend Rd
Homestead Dr
Beaverdam Creek
Luby Smith Rd
Text
Toler Rd
Old Hinton Rd
JOHNSTON COUNTY
WAYNE COUNTY
Damon Dr
Whitley Church Rd
Ebenezer Church (WY0070)
70
Autander Rd
Leon Dr
Wendy Way
Edna Ln
Austin Dr
Dennis Dr
Charlie Braswell Rd
Holland Branch
Charles Branch
Community Dr
Smith Farm (WY0151)
City of Goldsboro
End Project
Westbrook Ave
Calvin Ln
581
Study Area
North Alternative
Improve Existing Alternative
South Alternative
US 70 Bypass (R-2554)
Cemetery
Place of Worship
NC State Historic Properties
State Study List
Surveyed Only
Hazardous Waste Site
Inactive Haz. Waste Site
NPDES Facility
Stream
Waterbody
Wetland
Floodway
1% Annual Chance of Flooding
0.2% Annual Chance of Flooding
Scale
0 1,000 2,000 4,000 Feet
Figure 2-1
Environmental Screening
FS-1204A US 70
From SR 2372 (Edwards Road) to
the US 70 Goldsboro Bypass

All four streams are classified as WS-IV in moderately to highly developed watersheds and are nutrient sensitive waters (NSW):

- Beaverdam Creek (WS-IV; NSW) – Moccasin Creek watershed
- Holland Branch (WS-IV; NSW) – Moccasin Creek watershed
- Charles Branch (WS-IV; NSW) – Moccasin Creek watershed
- Lower Little River (WS-IV; NSW) – Little River watershed

According to DWR datasets there are two stream crossings of US 70 within the project limits. An unnamed tributary of the Little River crosses US 70 just west of its intersection with Bridgers Road; this crossing is visible on aerial imagery as well as LiDAR elevation datasets. While, the culvert size (diameter) is not large enough to be included in the NCDOT bridge and culvert inventory, field observations indicate that this crossing is a concrete pipe culvert approximately 48 inches in diameter. Another crossing of an unnamed tributary to the Little River occurs just east of Whitley Church Road (SR 1232). This crossing, which is also not included on the NCDOT inventory, was inaccessible during a field visit, but it is approximated to be similar to the previously described crossing, with a pipe culvert of at least 48 inches in diameter. There are numerous streams that feed into Little River to the north of US 70 that would be impacted by a northern alternative, as well as tributaries to Beaverdam Creek to the south which may be crossed by a southern alternative. These impacts are quantified and discussed further in Section 6.7.

Johnston and Wayne are both Coastal Plain counties of North Carolina and are included within the Division of Coastal Management's wetland dataset collection. Available wetland GIS datasets include numerous wetland features located within the project study area, including features along the existing roadway as well as to the north and south of US 70. The existing US 70 roadway crosses one wetland feature, which is in the same area as the stream crossing near Whitley Church Road (SR 1232).

There are areas of designated 100-year and 500-year floodplain within the project study area, along Little River to the north of US 70. Additionally, an area of designated 100-year floodplain along Beaverdam Creek is near the project study area to the south.

2.2.3 Water Supply Watersheds and Public Water Sources

The project study area straddles two public supply watersheds with intakes located downstream from the project. Both are classified as protected water supply watersheds (WS-IV NSW) and the intakes are owned by the City of Goldsboro. These watersheds flow into the Little River and Moccasin Creek, both of which flow into the Neuse River and through Wayne County.

2.2.4 Natural Heritage Program

The Little River Aquatic Habitat, which includes all of the Little River north of US 70, has been designated by the Natural Heritage Program as a Significant Natural Heritage Area (SNHA, Site ID 1807), which "contains ecologically significant natural communities or rare species." The river itself is not within the project study area; however, all activities north of US 70 would drain into tributaries of the Little River, and thus may impact this environment. Within this SNHA are several known occurrences of, and habitat for, a number of species identified in the Natural Heritage Program, as detailed in Table 2-1.

Table 2-1
Natural Heritage Program Species

Species Common Name	NC Threat Level	Location from Study Area
Southern Hognose Snake*	Special Concern	Within Study Area
Carolina Madtom	Threatened	Upstream
Eastern Lampmussel	Threatened	Upstream
Creeper	Threatened	Upstream
Neuse River Waterdog	Special Concern	Downstream
Roanoke Slabshell	Threatened	Upstream
Neuse River Waterdog	Special Concern	Upstream
Atlantic Pigtoe	Endangered	Upstream

*This species is a terrestrial species, rather than aquatic; thus its occurrence is also present outside of Little River, including within the project study area.

While it is not expected that the project would directly impact these species, caution should be taken to protect the habitats of these species downstream of the project study area. A formal screening of federally protected species was not completed as part of this report but should be completed during later stages of project planning and design.

2.2.5 Conservation Areas

There are no dedicated nature preserves, federally owned lands, or managed natural areas within the project study area.

2.2.6 Hazardous Materials and NPDES Sites

According to the most recently available NCDENR Division of Waste Management GIS data, there is one active hazardous material substance disposal site located within the project study area. This site is a Wal-Mart Supercenter located approximately one mile east from the project

endpoint along US 70. This location generates an acute amount of hazardous waste that is monitored by NCDENR; however, this project is not expected to have an impact on this location.

There is one inactive hazardous waste site, Gurmico Chemicals, located on the south side of US 70, just west of the Luby Smith Road intersection. This site was inspected by the NC Superfund Section in April 2011 and was determined to have no groundwater contamination that would warrant any further action.

There is one NPDES facility located within the project study area. Worthington Ag Parts, which is a tractor parts supplier, is located approximately 0.35 miles east of Capps Bridge Road and operates under a general permit issued by US EPA.

There is one gas station located at the intersection of US 70 and Old Cornwallis Road that actively operates underground storage tanks; however, there is no current indication that these tanks pose an environmental threat nor are they expected to be impacted by the proposed project.

2.2.7 Animal Operations

There are six animal farm operations located along the project corridor, primarily swine farms, operating under permit. While these lands are not specifically protected, impacts to these operations should be considered in later stages of project planning and design.

2.2.8 Community Resources

There are seven identified churches located within the study area. While most of these churches are located adjacent to US 70, the proposed project is not expected to directly impact any of the church buildings or result in any significant acquisition of the church properties. One exception to this is Ebenezer United Methodist Church, which was mentioned previously as a NC Study List property for historic resources. There is one cemetery, Evergreen Memorial Cemetery, located directly adjacent to US 70, west of Capps Bridge Road.

2.3 CRASH ANALYSIS

The crash analysis was derived from five years of available collision data obtained from the NCDOT Safety Planning Group. The data covered the period from May 1, 2008 to April 30, 2013. The summary includes collisions that were reported along the 3.5 mile stretch of US 70 from Old Cornwallis Road (SR 2371) in Johnston County to 0.5 mile east of Aulander Road (SR 1381) in Wayne County.

The main type of collision in the study area was fixed object collisions, which constituted 18 percent of the overall collisions during the study period; animal, side-swipe, and rear-end collisions were also common, composing 16 percent, 12 percent, and 12 percent of the total collisions in the area, respectively. Table 2-2 summarizes the total number of crashes by type; Table 2-3 summarizes the severity of crashes within the study area.

The Safety Planning Group provides calculated rates for facility types based on data collected statewide. For comparison purposes, the analyzed corridor is classified as a Rural US Route with 4 or more lanes (divided, no access control). As shown in Table 2-4, the crash rates for the facility are generally lower than the statewide averages for similar facilities across the state, except in the category of fatalities. There were three fatal crashes in the five year data period, which correlates to a rate approximately twice that of similar roadways. Two of these three fatal crashes involved a pedestrian and all three occurred between Ebenezer Church Road and Aulander Road.

Table 2-2
Crash Types and Totals

Intersection	Angle	Animal	Fixed Object	Left Turn	Rear End	Side-swipe	Other	Total
Old Cornwallis Rd (SR 2371)	4	0	0	3	1	0	0	**8**
Between Intersections	1	1	0	0	1	2	1	**6**
COUNTY LINE	0	0	0	0	1	0	0	**1**
Luby Smith Rd (SR 1229)	1	0	0	0	0	0	0	**1**
Between Intersections	0	5	6	0	3	5	5	**24**
Bridger Rd (SR 1331)	1	0	0	0	1	1	0	**3**
Between Intersections	0	0	1	0	0	0	0	**1**
Grady Rd	0	0	1	0	0	2	0	**3**
Whitley Church Rd (SR 1232)	2	0	1	1	0	0	1	**5**
Between Intersections	1	4	2	0	3	1	6	**17**
Ebenezer Church Rd (SR 1234)	2	0	0	6	0	0	5	**13**
Between Intersections	0	9	9	0	5	5	11	**39**
Aulander Rd / Community Dr (SR 1237)	0	0	0	0	1	0	2	**3**
Between Intersections	0	0	1	0	0	0	0	**1**
Earl Dr (SR 1408) west	0	1	1	0	0	0	1	**3**
Earl Dr (SR 1408) east	0	0	0	0	0	0	1	**1**
Between Intersections	0	1	1	0	0	0	0	**2**
Totals	***12***	***21***	***23***	***10***	***16***	***16***	***33***	***131***
	9%	**16%**	**18%**	**8%**	**12%**	**12%**	**25%**	**100%**

Table 2-3
Crash Severity and Totals

Intersection	Fatal	Injury	PDO	Total
Old Cornwallis Rd (SR 2371)	0	6	2	**8**
Between Intersections	0	2	4	**6**
COUNTY LINE	0	1	0	**1**
Luby Smith Rd (SR 1229)	0	1	0	**1**
Between Intersections	0	6	18	**24**
Bridger Rd (SR 1331)	0	0	3	**3**
Between Intersections	0	0	1	**1**
Grady Rd	0	1	2	**3**
Whitley Church Rd (SR 1232)	0	3	2	**5**
Between Intersections	0	5	12	**17**
Ebenezer Church Rd (SR 1234)	0	7	6	**13**
Between Intersections	2	13	24	**39**
Aulander Rd / Community Dr (SR 1237)	1	0	2	**3**
Between Intersections	0	0	1	**1**
Earl Dr (SR 1408) west	0	1	2	**3**
Earl Dr (SR 1408) east	0	1	0	**1**
Between Intersections	0	2	0	**2**
Totals	***3***	***49***	***79***	***131***

Table 2-4

Crash Rate* Comparison of Study Area to Statewide Averages

Rural US Routes	Total Crash Rate	Fatal Crash Rate	Non-Fatal Injury Crash Rate	Night Crash Rate	Wet Crash Rate
US 70	87.97	2.01	31.56	29.55	11.42
4+ Lanes (Divided, No Access Control)	125.52	1.01	38.24	44.23	22.62
Exceeds Statewide Average?	*N*	*Y*	*N*	*N*	*N*

**All crash rates per 100 Million Vehicle Miles Traveled (VMT)*

3.0 BACKGROUND TRANSPORTATION AND LAND USE PLANS

This section presents an overview of published and adopted transportation and land use plans that include the project study area. A review of these plans builds the framework for the project need and gives insight into the history of the vision for the proposed project.

3.1 TRANSPORTATION PLANS

A review of existing transportation plans that influence the future of the US 70 corridor was completed; each document and recommendations pertinent to the project study area are summarized below.

3.1.1 NCDOT State Transportation Improvement Plan

The North Carolina Department of Transportation (NCDOT) has established a multi-year schedule for all its transportation projects called the State Transportation Improvement Program (STIP). This project is listed in the currently adopted 2016-2025 STIP (June 2015) as FS-1204A indicating that a feasibility study of upgrading the existing facility to a freeway from the US 70 Goldsboro Bypass to the Johnston County line is currently in progress.

3.1.2 Goldsboro Urban Area MPO 2040 Long Range Transportation Plan

The most recent Goldsboro Urban Area Metropolitan Planning Organization (MPO) Long Range Transportation Plan (LRTP) was published in October 2014. The LRTP "addresses expected growth in the City of Goldsboro, the Village of Walnut Creek, and surrounding areas of Wayne County. The plan focuses on the continued development of a truly multimodal transportation plan to help the city continue to grow while preserving the area's appeal and character." Chapter 4 of the LRTP discusses recommended future roadway improvements, including the US 70 corridor, calling for the "widening/improvement" of the section of US 70 in the project study area.

3.1.3 Envision 35: Goldsboro Urbanized Area Comprehensive Plan

The *Envision 35: Goldsboro Urbanized Area Comprehensive Plan* includes land use and planning strategies for the Goldsboro urbanized area and was adopted in May 2013. The majority of the project area is located outside the designated Goldsboro Urbanized area; thus, this project is not directly included in the Envision 35 Plan. The implementation strategies presented in Section 9 of the plan, however, recommend supporting action items in the Goldsboro Urban Area MPO 2035 Long Range Transportation Plan, including the "Super 70" concept which represents a

united effort to create short-term improvements to US 70 that will improve regional mobility and set the stage for the long-term vision of a freeway facility from Raleigh to Morehead City.

3.1.4 Wayne County Comprehensive Plan

The Wayne County Comprehensive Plan, published in 2009, briefly discusses the county's vision for transportation improvements. It states that opportunities to enhance regional transportation connections shall be supported. Specific mention of the construction of the new US 70 Bypass is also made; while this reference is more specific to the R-2554 US 70 Goldsboro Bypass plan, the Comprehensive Plan appears to support improvement of US 70 as a whole, including the project study area.

3.1.5 North Carolina Strategic Transportation Corridor Policy

The project study area is included in the *North Carolina Strategic Transportation Corridor Policy* (August 2015) as Corridor P, which serves as a regional link across the Coastal Plains, linking Raleigh to Morehead City. This plan recommends upgrading the existing alignment to freeway standards, increasing access management and improving safety along the rural, uncontrolled access sections.

3.2 LAND USE AND ZONING

The project corridor is outside the Goldsboro City Limits, thus is not included in the City's land use and zoning maps.

3.2.1 County Land Use Plan

The Wayne County Comprehensive Plan, mentioned previously, discusses the growth strategy for the County and in so doing designates general land use areas. The project corridor is located in an area designated as "Urban Transition," meaning that the area is not currently urban in character; however, during the next two decades, it is likely to reach a level of development requiring urban services.

4.0 TRAFFIC FORECAST

The traffic volumes utilized in the traffic capacity analysis were taken from the forecasts completed by NCDOT in December 2012 and November 2013 for purpose and use in this project. The volumes utilized for the existing conditions analysis are derived from the Base Year (2013) volumes provided in the November 2013 forecast.

The forecasts are fiscally constrained to match the assumptions in the latest approved Long Range Transportation Plan (LRTP) for the area. At the time the forecasts were completed, the adoption date for the Goldsboro Metropolitan Planning Organization (MPO) LRTP was September 24, 2009. A newer LRTP has since been adopted (October 2014). The 2009 plan on which the forecasts were based included the completion of R-2554A, the Goldsboro Bypass, from west of NC 581 to the US 117 Bypass which will directly impact the study area for the proposed project.

Additionally, assumptions about development activity in the area are accounted for in the forecast, including:

- Small medical offices (dental offices or family practice) being built near NC 581;
- A Sheetz gas station near NC 581, which would replace the existing gas station;
- The opening of a new distribution center (Agrium) west of the project area which is a retail supplier of agricultural products and services.

These developments were not included in the Base Year (2013) scenarios, but related traffic was captured in the growth rates used to calculate Design Year (2035) volumes.

For the new location scenarios, North and South Alternatives, it was assumed that 75 percent of through traffic along US 70 would divert to the proposed facility. The remaining 25 percent was assumed to be local traffic or traffic destined for businesses along the existing US 70 facility. A formal traffic forecast to validate this assumption should be completed during later stages of project planning and design.

The November 2013 forecast did not include Base Year (2013) Build or Design Year (2035) Build volumes for an Improve Existing Alternative; thus, volumes for these scenarios were interpolated from and taken from, respectively, the December 2012 forecast.

The traffic forecasts for this project can be found in Appendix A. All peak hour turning movement volumes used in the capacity analysis efforts were derived using the NCDOT Intersection Analysis Utility (IAU) tool.

5.0 NO-BUILD ALTERNATIVES

A capacity analysis was performed for each of the alternative scenarios, examining operations at key intersections within the project area. Intersection capacity analyses were conducted for the AM and PM peak hours. Levels of service range from A through F, based on the average control delay experienced by vehicles traveling through the intersection during the peak hour. Control delay represents the portion of total delay attributed to traffic control devices (e.g., signals or stop signs). Table 5-1 provides a general description of the various levels of service categories and delay ranges for the intersection levels of service.

Table 5-1
Level of Service Descriptions for Intersections

Level of Service	Description	Signalized Intersection	Unsignalized Intersection
A	Little or no delay	<= 10 sec.	<= 10 sec.
B	Short traffic delay	10-20 sec.	10-15 sec.
C	Average traffic delay	20-35 sec.	15-25 sec.
D	Long traffic delay	35-55 sec.	25-35 sec.
E	Very long traffic delay	55-80 sec.	35-50 sec.
F	Unacceptable delay	> 80 sec.	> 50 sec.

Intersection capacity analysis was completed using the *Synchro, Version 7* software package, within which signal timings were optimized. Analyzed intersections included key intersections along US 70 to quantify the impact the proposed project would have on the surrounding roadway network. The following intersections were analyzed for AM and PM peak hour operations, where applicable.

- US 70 and SR 2371 (Old Cornwallis Road)
- US 70 and SR 1229 (Luby Smith Road)
- US 70 and SR 1232 (Whitley Church Road)
- US 70 and SR 1234 (Capps Bridge Road/Ebenezer Church Road)
- US 70 and SR 1381/SR 1237 (Aulander Road/Community Drive)
- US 70 and Goldsboro Bypass (R-2554A)
- US 70 and NC 581
- Proposed US 70 North and South Alternative interchanges (various locations, depending on alternative)

5.1 BASE YEAR (2013) NO-BUILD

This scenario takes into account the existing roadway conditions at the time of a field visit in July 2013. The volumes used in this analysis scenario were derived from the forecasts provided by the Transportation Planning Branch (TPB) and discussed previously by using the NCDOT IAU tool. Figures 5-1 and 5-2 summarize the volumes and lane geometrics, respectively, used in the analysis.

Based on the results of the intersection capacity analysis, all intersections operate acceptably under the No-Build (2013) conditions with no indicators that any of the unsignalized approaches or the signalized intersection are approaching their operating capacity. Table 5-2 summarizes the LOS results for the No-Build (2013) scenario.

5.2 DESIGN YEAR (2035) NO-BUILD

This scenario projects traffic conditions along the study corridor with the forecasted volumes along the roadway and the future year geometric and traffic control conditions, but without the proposed project in place. Specific geometric improvements along the corridor are those associated with the R-2554A – US 70 Goldsboro Bypass project. The No-Build (2035) scenario includes the closure of SR 1381/SR 1237 (Aulander Road/Community Drive) on both sides of its intersection with US 70. Also, this scenario accounts for the opening of the R-2554 – US 70 Goldsboro Bypass project which includes a free-flow interchange with US 70. Otherwise, no geometric improvements to the corridor were included in the analysis. The volumes used in this analysis scenario were derived from the forecasts provided by NCDOT and discussed previously by using the NCDOT IAU tool. Figure 5-3 summarizes the peak hour turning movement volumes used in the analysis.

Based on the results of the intersection capacity analysis shown in Table 5-3, all intersections are expected to decline in operations due to additional travel demand. The US 70 and SR 2371 (Old Cornwallis Road) intersection is projected to decline to LOS E during the PM peak hour; US 70 at SR 1234 (Capps Bridge Road/Ebenezer Church Road) is projected to fail during both peak hours. The signalized intersection of US 70 and NC 581 is projected to operate at LOS D during both peak hours; while this is not considered failing operations, it may be indicative that the intersection is approaching its effective capacity.

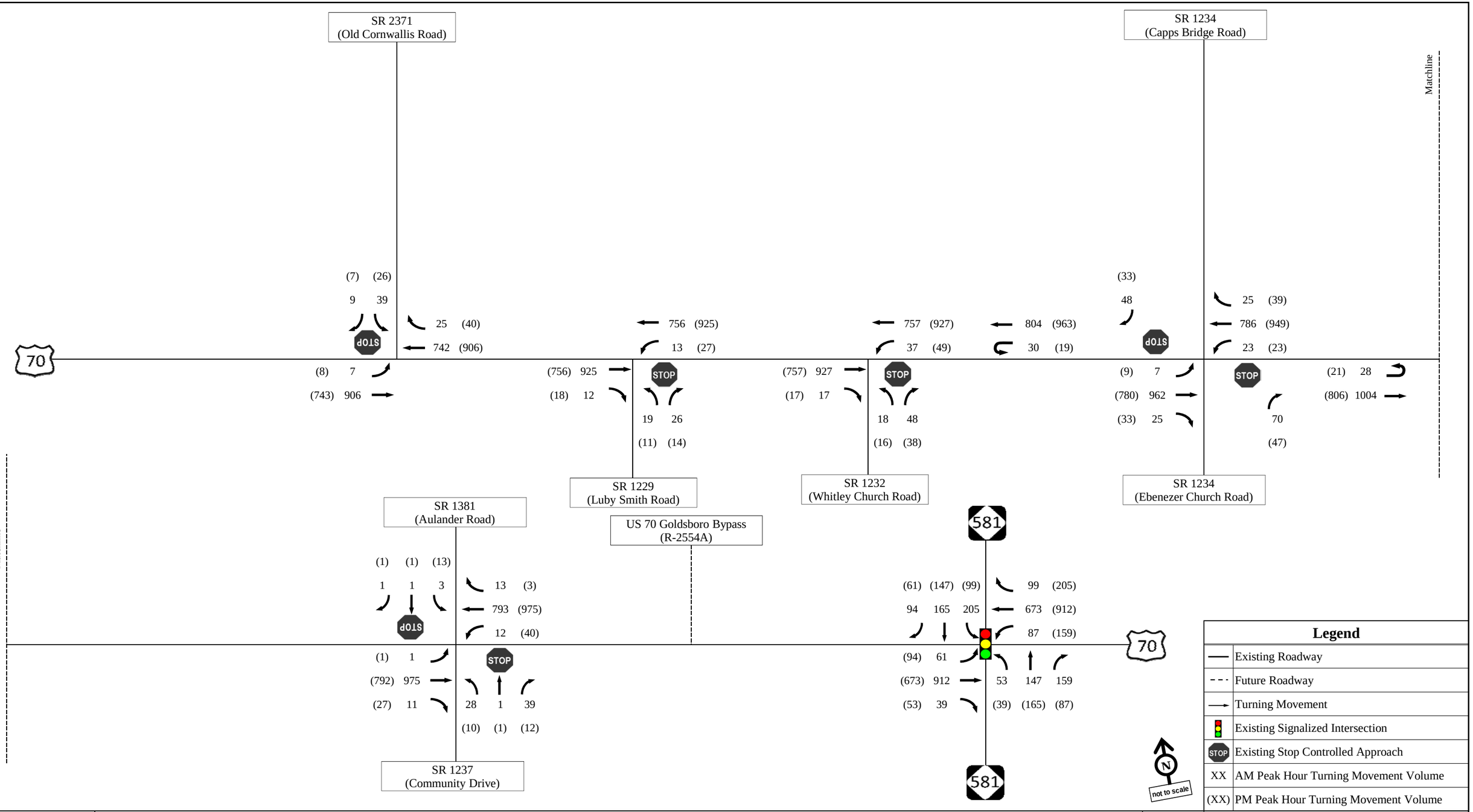


Figure 5-1
Base Year (2013) No-Build AM and PM Peak Hour Turning Movement Volumes

FS-1204A US 70 from
SR 2372 (Edwards Road) to the
US 70 Goldsboro Bypass

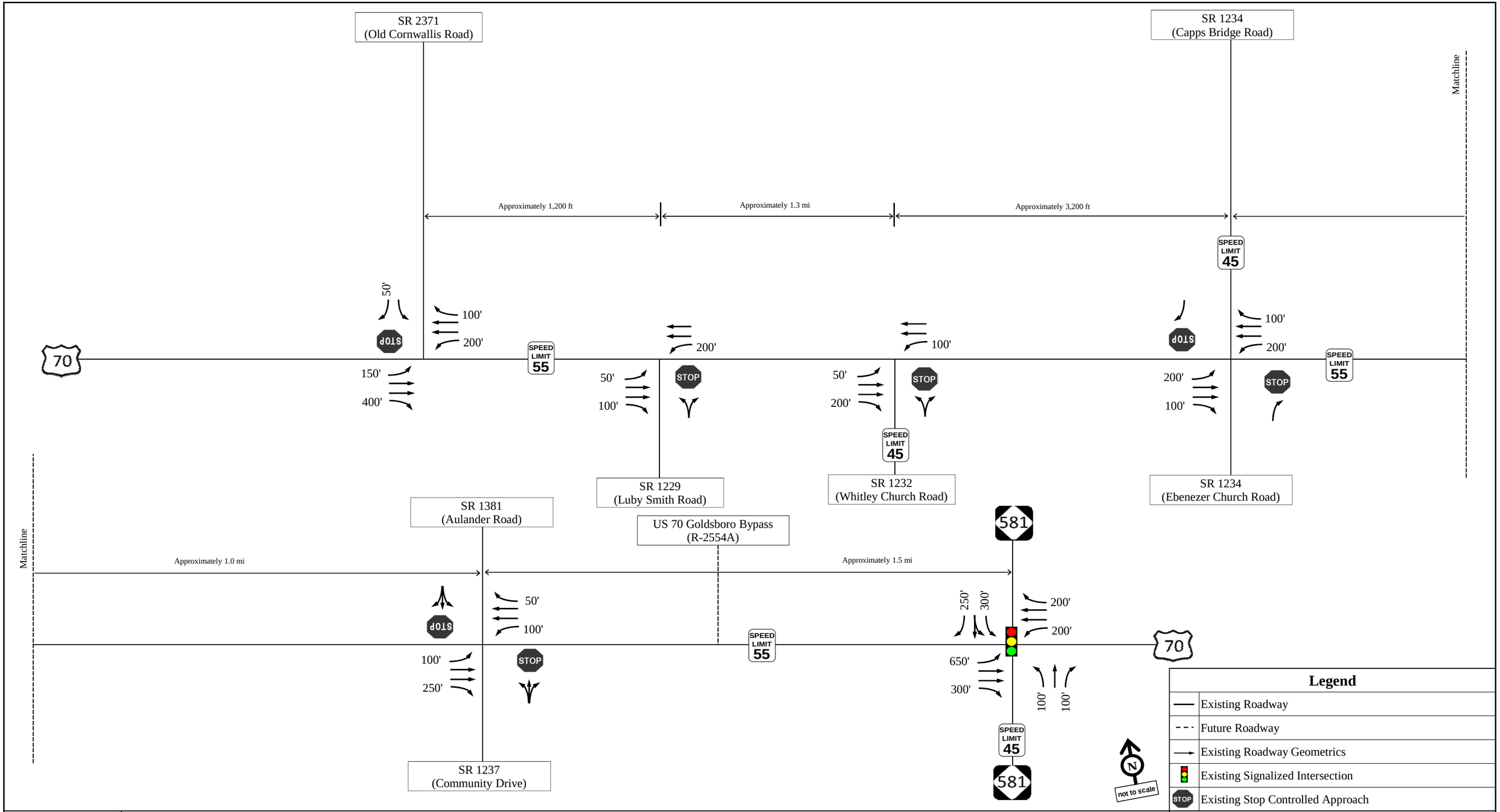


Figure 5-2
Base Year (2013) No-Build Lane Geometrics and Traffic Control

FS-1204A US 70 from SR 2372 (Edwards Road) to the US 70 Goldsboro Bypass

Table 5-2
Base Year (2013) No-Build LOS Results

Intersection and Approach	Base Year (2013) No-Build	
	AM Peak	**PM Peak**
US 70 and SR 2371 (Old Cornwallis Road)	**N/A**	**N/A**
Southbound	C	C
US 70 and SR 1229 (Luby Smith Road)	**N/A**	**N/A**
Northbound	B	B
US 70 and SR 1232 (Whitley Church Road)	**N/A**	**N/A**
Northbound	C	B
US 70 and SR 1234 (Capps Bridge Road/Ebenezer Church Road)	**N/A**	**N/A**
Eastbound Lefts	C	C
Westbound Lefts	D	C
US 70 and SR 1381 (Aulander Road)/SR 1237 (Community Drive)	**N/A**	**N/A**
Northbound	C	C
Southbound	C	C
US 70 and NC 581	**C (34.4 sec)**	**C (31.8 sec)**
Eastbound	C	C
Westbound	C	C
Northbound	D	C
Southbound	D	D

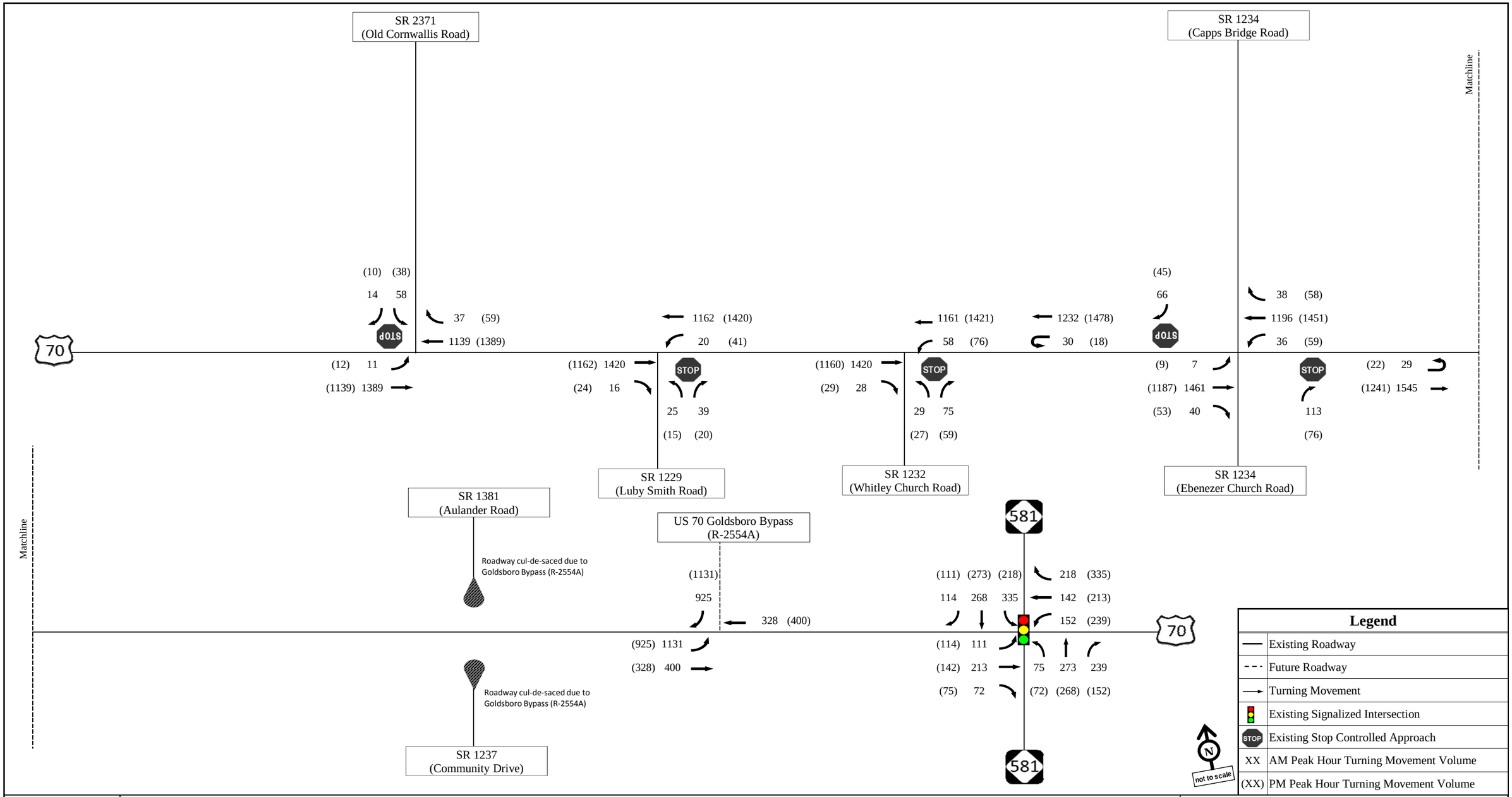


Figure 5-3
Design Year (2035) No-Build AM and PM Peak Hour Turning Movement Volumes

FS-1204A US 70 from
SR 2372 (Edwards Road) to the
US 70 Goldsboro Bypass

Table 5-3
Design Year (2035) No-Build LOS Results

Intersection and Approach	Design Year (2035) No-Build	
	AM Peak	**PM Peak**
US 70 and SR 2371 (Old Cornwallis Road)	**N/A**	**N/A**
Southbound	D	E
US 70 and SR 1229 (Luby Smith Road)	**N/A**	**N/A**
Northbound	D	C
US 70 and SR 1232 (Whitley Church Road)	**N/A**	**N/A**
Northbound	D	C
US 70 and SR 1234 (Capps Bridge Road/Ebenezer Church Road)	**N/A**	**N/A**
Eastbound Lefts	D	F
Westbound Lefts	F	F
US 70 and SR 1381 (Aulander Road)/SR 1237 (Community Drive)	**-**	**-**
Northbound	-	-
Southbound	-	-
US 70 and NC 581	**D (36.2 sec)**	**D (36.6 sec)**
Eastbound	D	D
Westbound	C	C
Northbound	C	D
Southbound	D	D

6.0 BUILD ALTERNATIVES

There are three build alternatives that were developed for evaluation as shown in Figure 1-2. This section presents each alternative and describes the design criteria used to develop the conceptual designs.

6.1 DESIGN CRITERIA

The design criteria for this project include upgrading the facility to a principal arterial with a 70 mph design speed and 65 mph posted speed. The proposed future right-of-way would be between 180 and 200 feet; however, some existing 160 foot right-of-way widths are adequate. The facility was designed with full control of access, with no sidewalks or bicycle lanes. The same design criteria, summarized in Table 6-1, applies to all alternatives.

6.2 TYPICAL SECTIONS

The proposed typical section for this project includes a 46-foot depressed grass median, two 12-foot lanes in each direction, and a 10-foot paved shoulder. This typical section is applicable to all freeway portions of the proposed project and is shown in Figure 6-1.

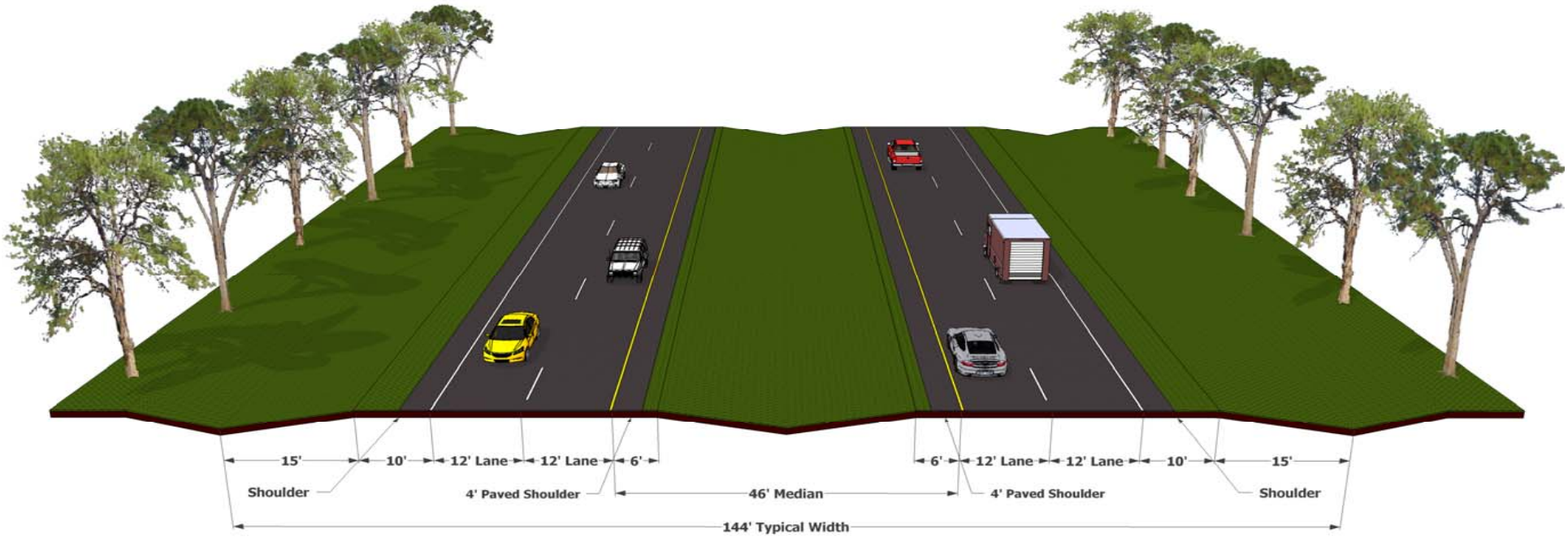
6.3 DEVELOPMENT OF ALTERNATIVES

In an effort to upgrade the current US 70 facility to freeway standards from Raleigh to Morehead City, two alternatives were considered initially between the US 70 Goldsboro Bypass (STIP R-2554A) and the Johnston County line – improving the existing facility and constructing a new location alternative to the north of the existing facility. During development of the northern alternative, two unique options were considered – one with an interchange at Capps Bridge Road where there are homes existing, and another with an interchange at Capps Bridge Road to the north of the existing homes. The northern alignment of this initial northern alternative was to tie into the US 70 Goldsboro Bypass (STIP R-2554A) approximately one mile east of Aulander Road/Community Drive.

At a scoping meeting with NCDOT staff and local officials, the northern alignment of the northern alternative was eliminated from further consideration for multiple reasons. The interchange would be almost entirely in the floodplain and an additional one mile of highway would have to be constructed which would not fully utilize the US 70 Goldsboro Bypass (STIP R-2554A), which is already under construction with completion expected in 2016. It was also decided at the scoping meeting to analyze a southern alternative between the existing facility and the North Carolina Railroad.

Table 6-1 Design Criteria

ROUTE	US 70 Johnston CL to the Goldsboro BP			REFERENCE
LINE	-L-	-L-	Ser Roads	OR REMARKS
TRAFFIC DATA	Existing 46	New Loc.	2-Lane	
ADT BASE YR = 2013 (ADT)	23,200	17,100	varies	
ADT DESIGN YR = 2035 (ADT	35,400	24,500	varies	
TTST	10%	12%	varies	
DUALS	6%	5%	varies	
DHV	8%	8%	varies	
DIR	55%	55%	varies	
CLASSIFICATION	Prin. Arterial	Prin. Arterial	Local	
TERRAIN TYPE	Level	Level	Level	
DESIGN SPEED	70 mph	70 mph	50 mph	
POSTED SPEED	70 mph	70 mph	45 mph	
PROP. R/W WIDTH	160-180 ft.	180-200 ft.	60-90 ft.	
CONTROL OF ACCESS	Y	Y	N	
RUMBLE STRIPS (Y/N)	Y	Y	N	1-4P Roadway Design Manual (RDM)
TYPICAL SECTION TYPE	SHLDR	SHLDR	SHLDR	
LANE WIDTH	12 ft.	12 ft.	12 ft.	AASHTO 7-13
SIDEWALKS	N	N	N	
BICYCLE LANES	N	N	N	
MEDIAN WIDTH	46 ft.**	46 ft.	N/A	**Propose 46' from December 12, 2013 meeting
MED. PROTECT.	Y	Y	N/A	Cable, G/R at bridges
SHOULDER WIDTH (total)				
MEDIAN	6 ft.	6 ft.	N/A	
OUTSIDE w/o GR	10 ft.	10 ft.	8 ft.	p. 1-4B (RDM) (TTST=283)
OUTSIDE w/ GR	13 ft.	13 ft.	11 ft.	
PAVED SHOULDER				
OUTSIDE TOTAL/FDPS (ft.)	10/4	10/4	N/A	p. 1-4O F-1 (RDM)
MEDIAN TOTAL/FDPS (ft.)	4/4	4/4	N/A	p. 1-4O F-1 (RDM)
GRADE				
MAX.	3%	3%	6%	AASHTO 7-29, 6-3
MIN. (Desirable)	0.5%	0.5%	0.5%	AASHTO 3-119 (0.3% min)
K VALUE				
SAG	181	181	96	AASHTO 3-161
CREST	247	247	84	AASHTO 3-155
HORIZ. ALIGN.				
MAX. SUPER.	.08	.08	.08	
MIN. RADIUS	1,810 ft.	1,810 ft.	758 ft.	AASHTO 3-45
SPIRAL	Y	Y	Y	Do not include in conceptual designs
CROSS SLOPES				
PAVEMENT	0.02	0.02	0.02	Multilane Divided Non-Freeways - p. 1-4O and 1-2B Fig, 2-B (RDM)
PAVED SHOULDER	FDPS=0.02 PDPS =0.04	FDPS=0.02 PDPS =0.04	N/A	Multilane Divided Non-Freeways - p. 1-4O and 1-2B Fig, 2-B (RDM)
TURF SHOULDER	0.08	0.08	0.08	Multilane Divided Non-Freeways - p. 1-4O and 1-2B Fig, 1-B (RDM)
MEDIAN DITCH	6:1	6:1	N/A	Multilane Divided Non-Freeways - p. 1-4O (RDM)
DITCH TYPICAL	A	A		
CLEAR ZONE	30-34 ft.	30-34 ft.	18 ft.*	*Design speed 45-50, 6:1 or flatter, 1,500-6,000 ADT 1-4N (RDM)



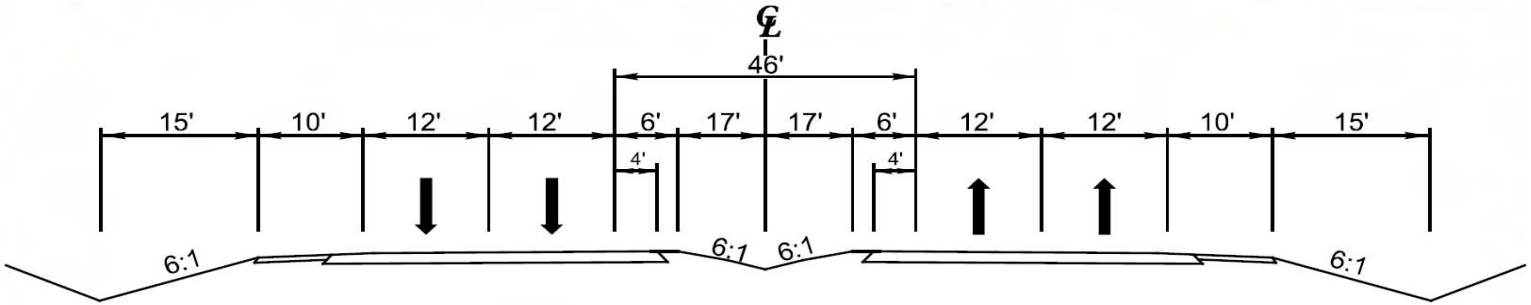


Figure 6-1
Proposed Typical Section

FS-1204A US 70
From Johnston County Line to
Future US 70 Goldsboro Bypass

These discussions and preliminary evaluations culminated with the three alternatives analyzed in this feasibility study – Improve Existing Alternative, North Alternative, and South Alternative.

6.4 IMPROVE EXISTING ALTERNATIVE

The Improve Existing Alternative proposes to upgrade the existing roadway to a freeway facility, including interchanges and service roads. This alternative includes the realignment of SR 2371 (Old Cornwallis Road) and SR 1229 (Luby Smith Road) such that they form a single, partial cloverleaf interchange. SR 1234 (Capps Bridge Road/Ebenezer Church Road) would also be realigned to minimize interchange related impacts to Evergreen Memorial Cemetery and Ebenezer United Methodist Church. All other roadways would access the freeway via these interchanges through service roads running parallel to the new freeway facility.

6.4.1 Roadway Improvements

The roadway improvements associated with this alternative include widening the existing roadway to accommodate the proposed freeway typical section and construct interchange ramps and service roads. The interchange ramps are all proposed to operate under stop control and lane configurations include:

US 70 at SR 2371/SR 1229 (Old Cornwallis Road/Luby Smith Road) Interchange

- Construct a new partial cloverleaf interchange with ramps and loops located in the northeast and southeast quadrants.

US 70 Westbound at SR 2371 (Old Cornwallis Road)

- Shared through/right-turn lane on northbound approach;
- Exclusive left-turn lane with at least 100 feet of storage and appropriate taper on southbound approach; and
- Exclusive left-turn and right-turn lanes on Westbound Off-ramp approach, with at least 100 feet of storage and appropriate taper for the left-turn lane.

US 70 Eastbound at SR 1229 (Luby Smith Road)

- Shared through/right-turn lane on northbound approach;
- Exclusive left-turn lane with at least 100 feet of storage and appropriate taper on southbound approach; and
- Exclusive left-turn and right-turn lanes on Eastbound Off-ramp approach, with at least 100 feet of storage and appropriate taper for the left-turn lane.

US 70 at SR 2371/SR 1234 (Capps Bridge Road/Ebenezer Church Road) Interchange

- Construct a new partial cloverleaf interchange with ramps and loops located in the northwest and southeast quadrants; and
- Construct a fourth leg across from the eastbound ramps to accommodate the service road connection.

US 70 Westbound at SR 1234 (Capps Bridge Road)

- Shared through/right-turn lane on southbound approach;
- Exclusive left-turn lane with at least 100 feet of storage and appropriate taper on northbound approach; and
- Exclusive left-turn and right-turn lanes on Westbound Off-ramp approach, with at least 100 feet of storage and appropriate taper for the left-turn lane.

US 70 Eastbound at SR 1234 (Ebenezer Church Road)

- Shared through/right-turn lane and exclusive left-turn lane with at least 100 feet of storage and appropriate taper on northbound approach;
- Shared through/right-turn lane and exclusive left-turn lane with at least 100 feet of storage and appropriate taper on southbound approach;
- Exclusive left-turn lane on Eastbound Off-ramp approach, with at least 100 feet of storage and appropriate taper for the left-turn lane; and
- Single lane eastbound approach from the service road.

The conceptual sketch for this alternative, including these improvements, is illustrated in Figure 6-2.

6.4.2 Base Year (2013) Build – Improve Existing Alternative Capacity Analysis

This scenario represents operations at the network intersections given the base year volumes and accounting for the construction of a freeway facility along the existing roadway. To be consistent with the provided traffic forecasts, this scenario does account for the completion of R-2554A, the US 70 Goldsboro Bypass east of the project area. All other roadway improvements are consistent with those detailed in Section 6.4.1.

Traffic capacity analysis indicates that the signalized intersection of US 70 at NC 581 and all unsignalized approaches at the interchange ramps operate acceptably under this scenario. Table 6-2 summarizes the LOS results and Figure 6-3 illustrates the volumes used in this scenario analysis.

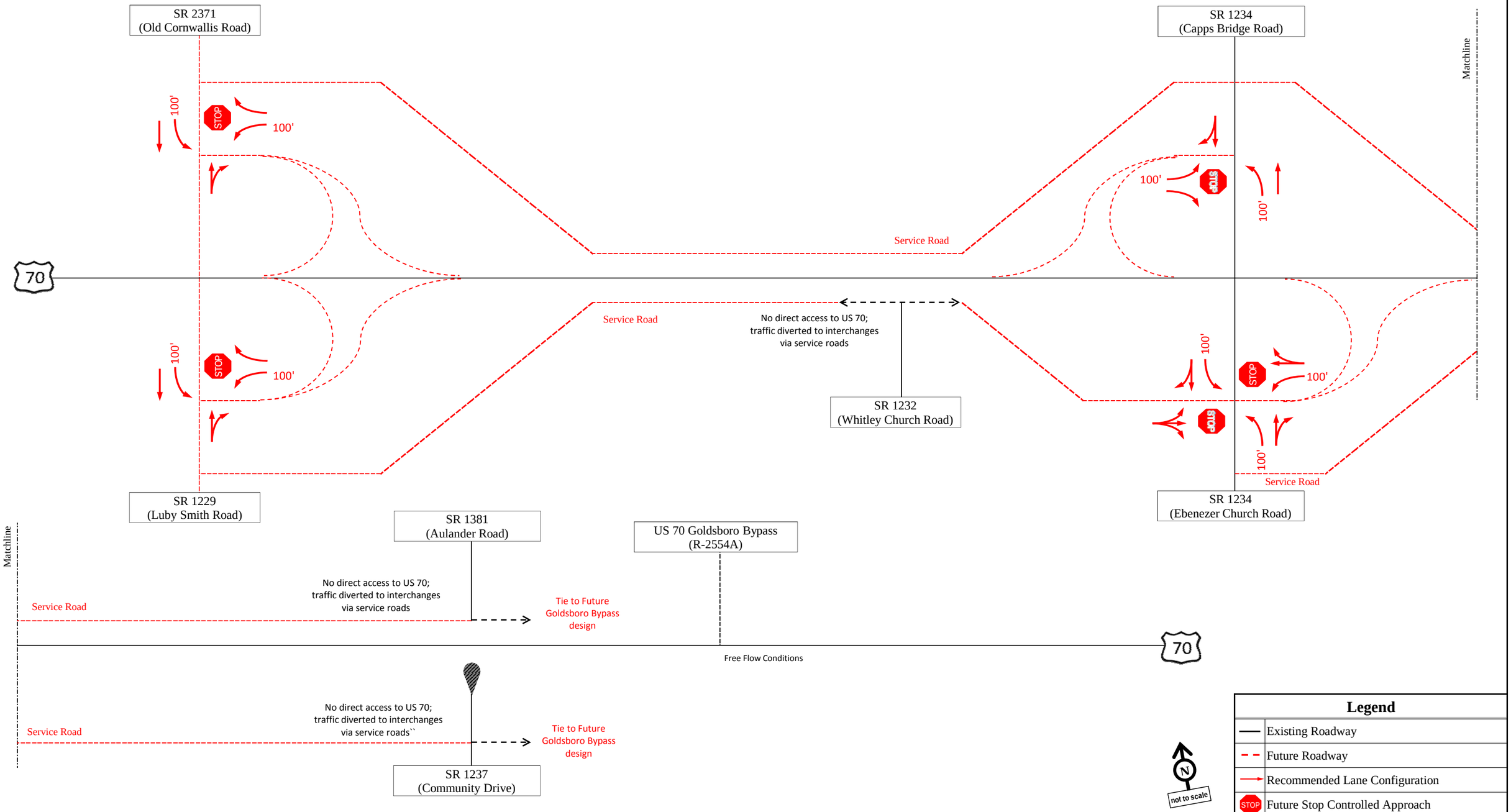


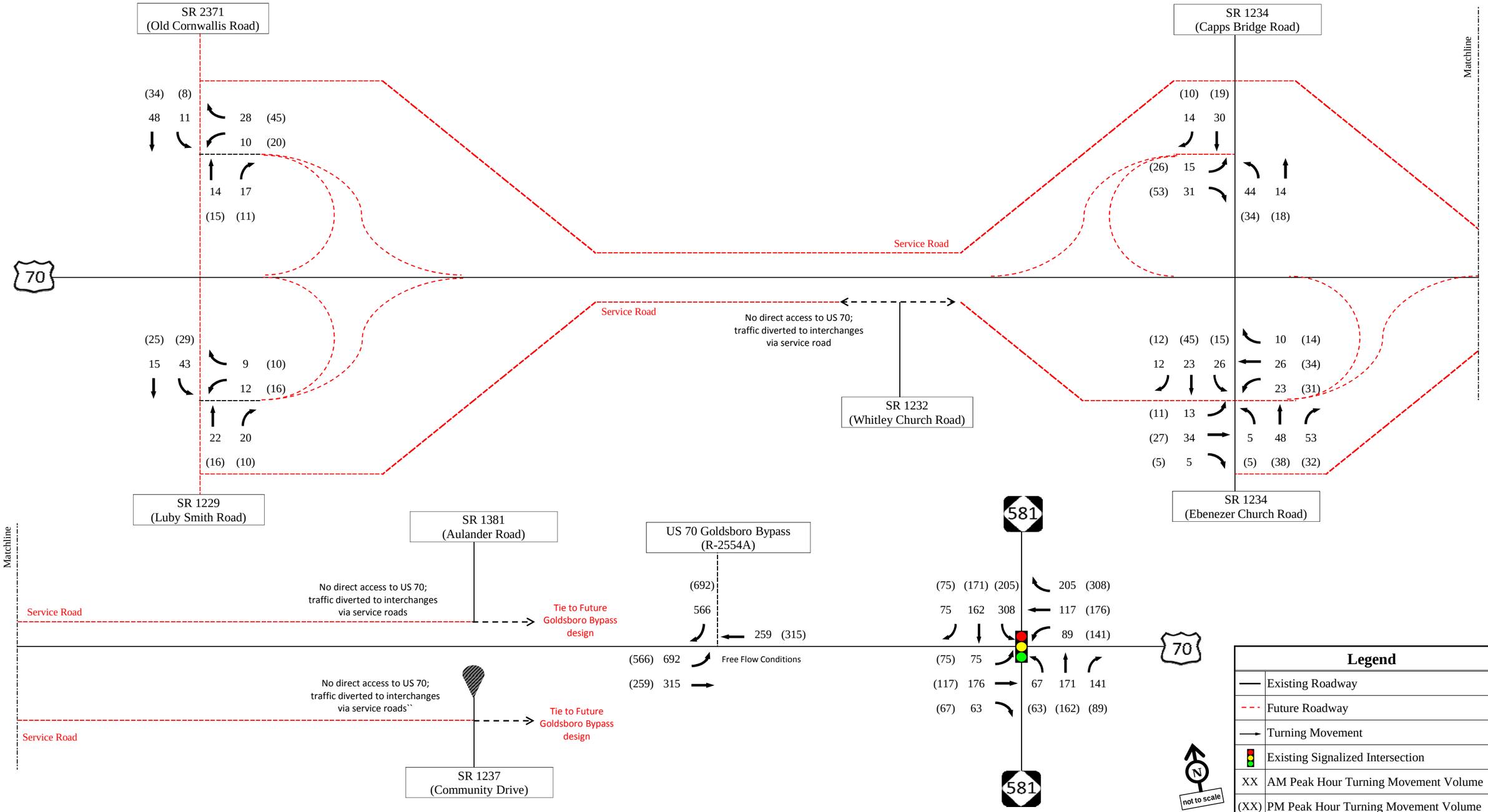
Figure 6-2
Future (2035) Build - Improve Existing, Recommended Lane Geometrics and Traffic Control

FS-1204A US 70 from
SR 2372 (Edwards Road) to the
US 70 Goldsboro Bypass

Table 6-2

Base Year (2013) Build – Improve Existing LOS Results

Intersection and Approach	Base Year (2013) Build Improve Existing	
	AM Peak	**PM Peak**
US 70 and SR 2371 (Old Cornwallis Road)	All intersections are transitioned to service roads and access US 70 via interchanges	
US 70 and SR 1229 (Luby Smith Road)		
US 70 and SR 1232 (Whitley Church Road)		
US 70 and SR 1234 (Capps Bridge Road/Ebenezer Church Road)		
US 70 and SR 1381 (Aulander Road)/SR 1237 (Community Drive)		
US 70 and NC 581	**C (30.6 sec)**	**C (29.9 sec)**
Eastbound	C	C
Westbound	C	C
Northbound	C	C
Southbound	C	C
Interchanges		
Old Cornwallis Road/Luby Smith Road	**N/A**	**N/A**
Westbound Ramps	A	A
Eastbound Ramps	A	A
Ebenezer Church Road/Capps Bridge Road	**N/A**	**N/A**
Westbound Ramps	A	A
Eastbound Ramps	B	B



Legend	
——	Existing Roadway
- - -	Future Roadway
⟶	Turning Movement
	Existing Signalized Intersection
XX	AM Peak Hour Turning Movement Volume
(XX)	PM Peak Hour Turning Movement Volume

VHB

Figure 6-3
Base Year (2013) Build - Improve Existing AM and PM Peak Hour Turning Movement Volumes

FS-1204A US 70 from
SR 2372 (Edwards Road) to the
US 70 Goldsboro Bypass

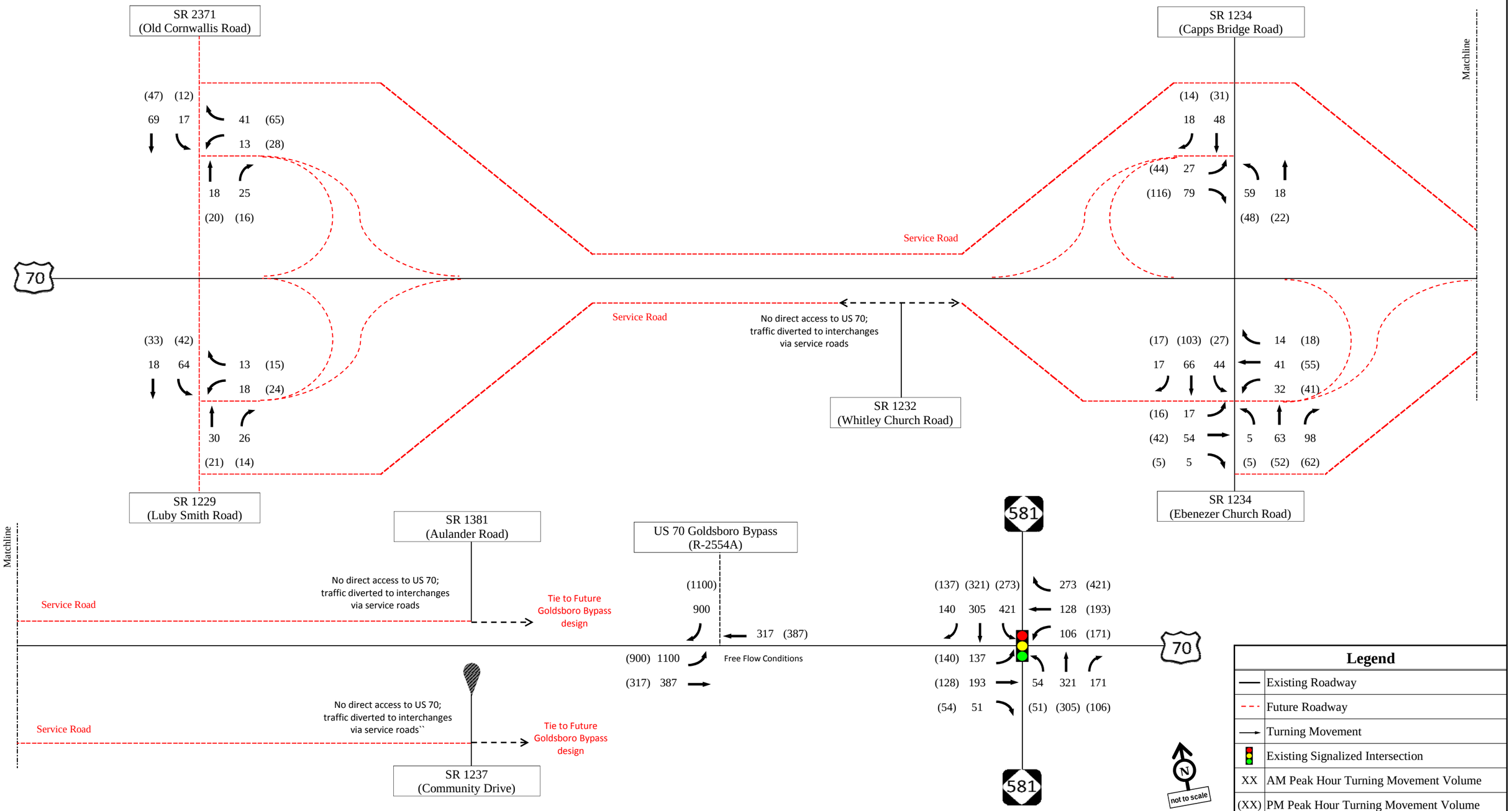
6.4.3 Design Year (2035) Build – Improve Existing Alternative Capacity Analysis

This scenario represents operations at the network intersections given the design year volumes and accounting for the construction of a freeway facility along the existing roadway. This scenario also accounts for the completion of R-2554A, the Goldsboro Bypass and the roadway improvements detailed in Section 6.4.1.

Traffic capacity analysis indicates that, the signalized intersection of US 70 at NC 581 and all unsignalized approaches at the interchange ramps operate acceptably under this scenario. Table 6-3 summarizes the LOS results and Figure 6-4 illustrates the volumes used in this scenario analysis.

Table 6-3
Design Year (2035) Build – Improve Existing LOS Results

Intersection and Approach	Design Year (2035) Build- Improve Existing Alternative	
	AM Peak	**PM Peak**
US 70 and SR 2371 (Old Cornwallis Road)	All intersections are transitioned to service roads and access US 70 via interchanges	
US 70 and SR 1229 (Luby Smith Road)		
US 70 and SR 1232 (Whitley Church Road)		
US 70 and SR 1234 (Capps Bridge Road/Ebenezer Church Road)		
US 70 and SR 1381 (Aulander Road)/SR 1237 (Community Drive)		
US 70 and NC 581	**D (41.4 sec)**	**D (40.3 sec)**
Eastbound	D	D
Westbound	C	C
Northbound	D	D
Southbound	D	D
Interchanges		
Old Cornwallis Road/Luby Smith Road	**N/A**	**N/A**
Westbound Ramps	A	A
Eastbound Ramps	B	A
Ebenezer Church Road/Capps Bridge Road	**N/A**	**N/A**
Westbound Ramps	A	A
Eastbound Ramps	B	B



VHB

Figure 6-4
Design Year (2035) Build - Improve Existing, AM and PM Peak Hour Turning Movement Volumes

FS-1204A US 70 from SR 2372 (Edwards Road) to the US 70 Goldsboro Bypass

6.5 NORTH ALTERNATIVE

The North Alternative proposes to construct a freeway facility on new location to the north of the existing US 70 facility. The North Alternative starts just west of SR 2372 (Edwards Road) and departs onto new location via a free flow interchange just west of SR 2371 (Old Cornwallis Road); traffic from both SR 2371 (Old Cornwallis Road) and SR 1229 (Luby Smith Road) would be routed to the west, accessing US 70 via SR 2372 (Edwards Road). This alternative proposes a partial clover interchange at SR 2372 (Edwards Road) and a diamond interchange at SR 1234 (Ebenezer Church Road). The North Alternative would rejoin US 70 Business via a free flow interchange just west of SR 1381/SR 1237 (Aulander Road/Community Drive). Because the proposed alternative would be fully controlled, this alternative includes service roads along much of the new location alignment to provide access to numerous parcels; additionally, a service road is proposed to connect SR 1234 (Ebenezer Church Road) to SR 1237 (Community Drive) on the south side of existing US 70.

6.5.1 Roadway Improvements

The roadway improvements associated with this alternative include constructing a highway on new location including interchange ramps and service roads. The intersection configurations along existing US 70 are adequate to handle the projected traffic volumes with the North Alternative in place; thus no improvements to these locations are recommended. The interchanges at the departures from the existing US 70 facility are proposed to be free flowing fly-over configurations. The interchange ramps along the new facility are all proposed to operate under stop control. Improvements and lane configurations associated with this alternative include:

US 70 at SR 2372 (Edwards Road) Interchange

To ensure that the proposed project could tie into the existing Princeton Bypass (US 70) west of the project, the scope of design was expanded to include an interchange at SR 2372 (Edwards Road). A conceptual interchange design was developed at this existing at-grade, signalized intersection; however, no additional traffic analysis was included for this location. The following lane configurations were assumed for the conceptual design effort, but should be evaluated further later in the project process.

- Construct a partial cloverleaf interchange with ramps and loops in the northwest and southwest quadrants; and
- Where a left-turn movement is present, construct an exclusive left-turn lane with at least 100 feet of storage and appropriate taper.

US 70 North Alternative at Existing US 70 (Western Departure)

- Construct a free-flow interchange to facilitate the departure of the North Alternative;
- Westbound Existing US 70 would be diverted slightly to the north on a fly-over across the new location alignment and brought back into Existing US 70 with a merge movement.

US 70 North Alternative at SR 2371 (Old Cornwallis Road)

- Due to the free flow interchange for the new location departure, cul-de-sac SR 2371 (Old Cornwallis Road) north of the proposed alignment; and
- Access to US 70 will be maintained for properties along this road via Edwards Road.

Existing US 70 at SR 1229 (Luby Smith Road)

- Construct a service road parallel to the existing US 70 facility to tie SR 1229 (Luby Smith Road) to SR 2556 (Dr. Donnie H Jones Boulevard) to the west in order to provide access to the proposed new location alternative; and
- Maintain the existing full movement access along existing US 70.

US 70 at SR 1234 (Capps Bridge Road) Interchange

- Construct a new diamond interchange.

<u>US 70 North Alternative Westbound at SR 1234 (Capps Bridge Road)</u>

- Shared through/right-turn lane on southbound approach;
- Exclusive left-turn lane with at least 100 feet of storage and appropriate taper on northbound approach; and
- Exclusive left-turn and right-turn lanes on Westbound Off-ramp approach, with at least 100 feet of storage and appropriate taper for the left-turn lane.

<u>US 70 North Alternative Eastbound at SR 1234 (Capps Bridge Road)</u>

- Shared through/right-turn lane on northbound approach;
- Exclusive left-turn lane with at least 100 feet of storage and appropriate taper on southbound approach; and
- Exclusive left-turn and right-turn lanes on Eastbound Off-ramp approach, with at least 100 feet of storage and appropriate taper.

US 70 North Alternative at Existing US 70 (Eastern Departure)

- Construct a free-flow interchange to facilitate the departure of the North Alternative;
- Westbound Existing US 70 would be diverted slightly to the north on a fly-over across the new location alignment and tied back into Existing US 70.

The conceptual sketch for this alternative, including these improvements, is illustrated in Figure 6-5.

6.5.2 Base Year (2013) Build – North Alternative Capacity Analysis

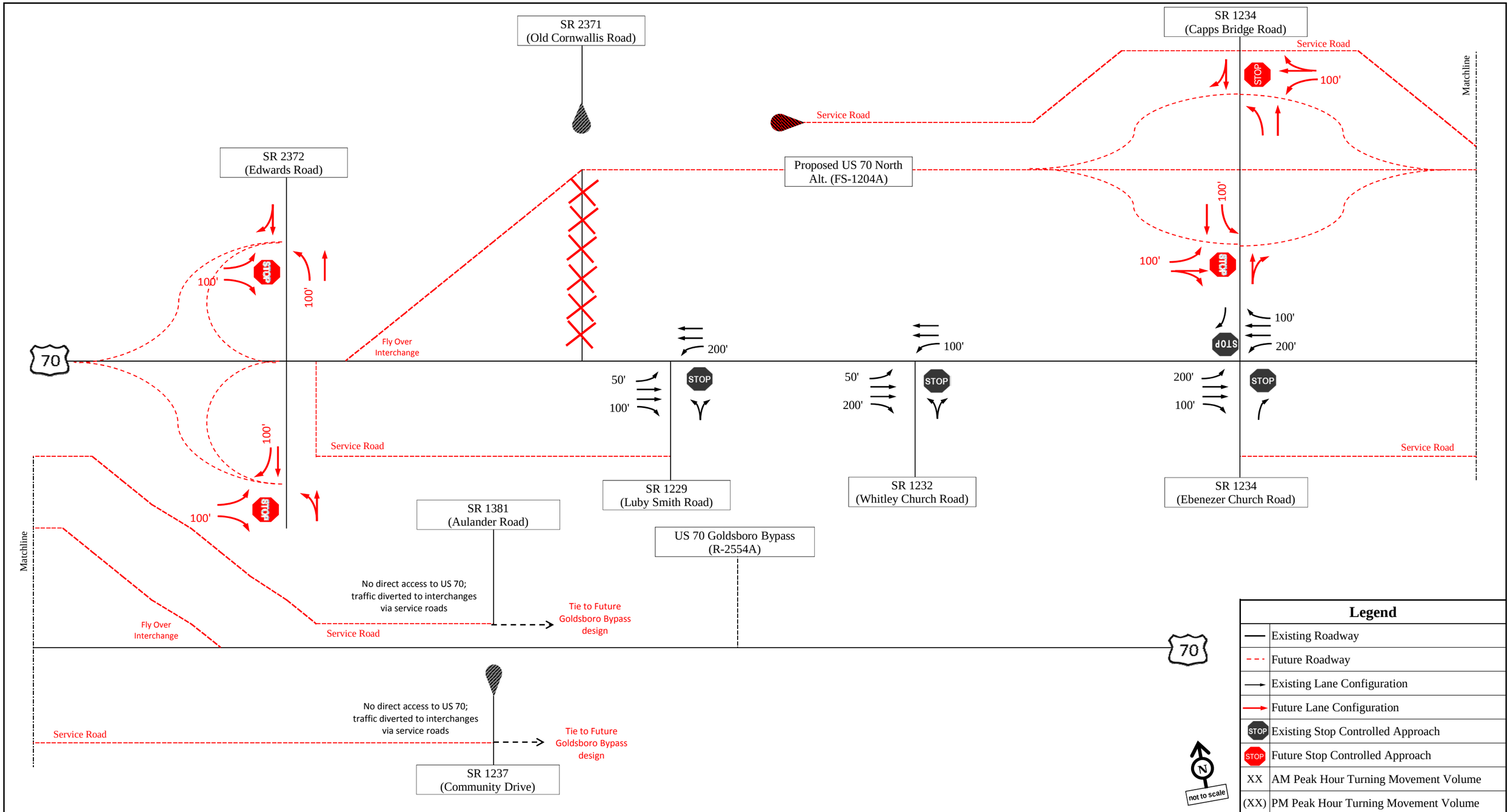
This scenario represents operations at the network intersections given the base year volumes and accounting for the construction of a new location facility north of existing US 70. To be consistent with the provided traffic forecasts, this scenario does account for the completion of R-2554A, the US 70 Goldsboro Bypass east of the project area. All other roadway improvements are consistent with those detailed in Section 6.5.1.

Traffic capacity analysis indicates that, the signalized intersection and all unsignalized approaches at the interchange ramps operate acceptably under this scenario. Table 6-4 summarizes the LOS results and Figure 6-6 illustrates the volumes used in this scenario analysis.

6.5.3 Design Year (2035) Build – North Alternative Capacity Analysis

This scenario represents operations at the network intersections given the design year volumes and accounting for the construction of a freeway facility on new location to the north of the existing US 70 facility. This scenario also accounts for the completion of R-2554A, the Goldsboro Bypass and the roadway improvements detailed in Section 6.5.1.

Traffic capacity analysis indicates that, the signalized intersection and all unsignalized approaches at the interchange ramps operate acceptably under this scenario. Table 6-5 summarizes the LOS results and Figure 6-7 illustrates the volumes used in this scenario analysis.



Legend	
——	Existing Roadway
- - -	Future Roadway
→	Existing Lane Configuration
→	Future Lane Configuration
STOP	Existing Stop Controlled Approach
STOP	Future Stop Controlled Approach
XX	AM Peak Hour Turning Movement Volume
(XX)	PM Peak Hour Turning Movement Volume

VHB

Figure 6-5
Future (2035) Build - North Alternative, Recommended Lane Configurations and Traffic Control

FS-1204A US 70 from
SR 2372 (Edwards Road) to the
US 70 Goldsboro Bypass

Table 6-4
Base Year (2013) Build – North Alternative LOS Results

Intersection and Approach	Base Year (2013) Build – North Alternative	
	AM Peak	**PM Peak**
US 70 and SR 2371 (Old Cornwallis Road)	**-**	**-**
Southbound	-	-
US 70 and SR 1229 (Luby Smith Road)	**N/A**	**N/A**
Northbound	A	A
US 70 and SR 1232 (Whitley Church Road)	**N/A**	**N/A**
Northbound	A	A
US 70 and SR 1234 (Capps Bridge Road/Ebenezer Church Road)	**N/A**	**N/A**
Eastbound Lefts	B	B
Westbound Lefts	B	B
US 70 and SR 1381 (Aulander Road)/SR 1237 (Community Drive)	**-**	**-**
Northbound	-	-
Southbound	-	-
US 70 and NC 581	**C (29.0 sec)**	**C (28.1 sec)**
Eastbound	C	C
Westbound	C	C
Northbound	C	C
Southbound	C	C
Interchanges		
Old Cornwallis Road/Luby Smith Road	**-**	**-**
Westbound Ramps	-	-
Eastbound Ramps	-	-
Ebenezer Church Road/Capps Bridge Road	**N/A**	**N/A**
Westbound Ramps	A	A
Eastbound Ramps	A	A

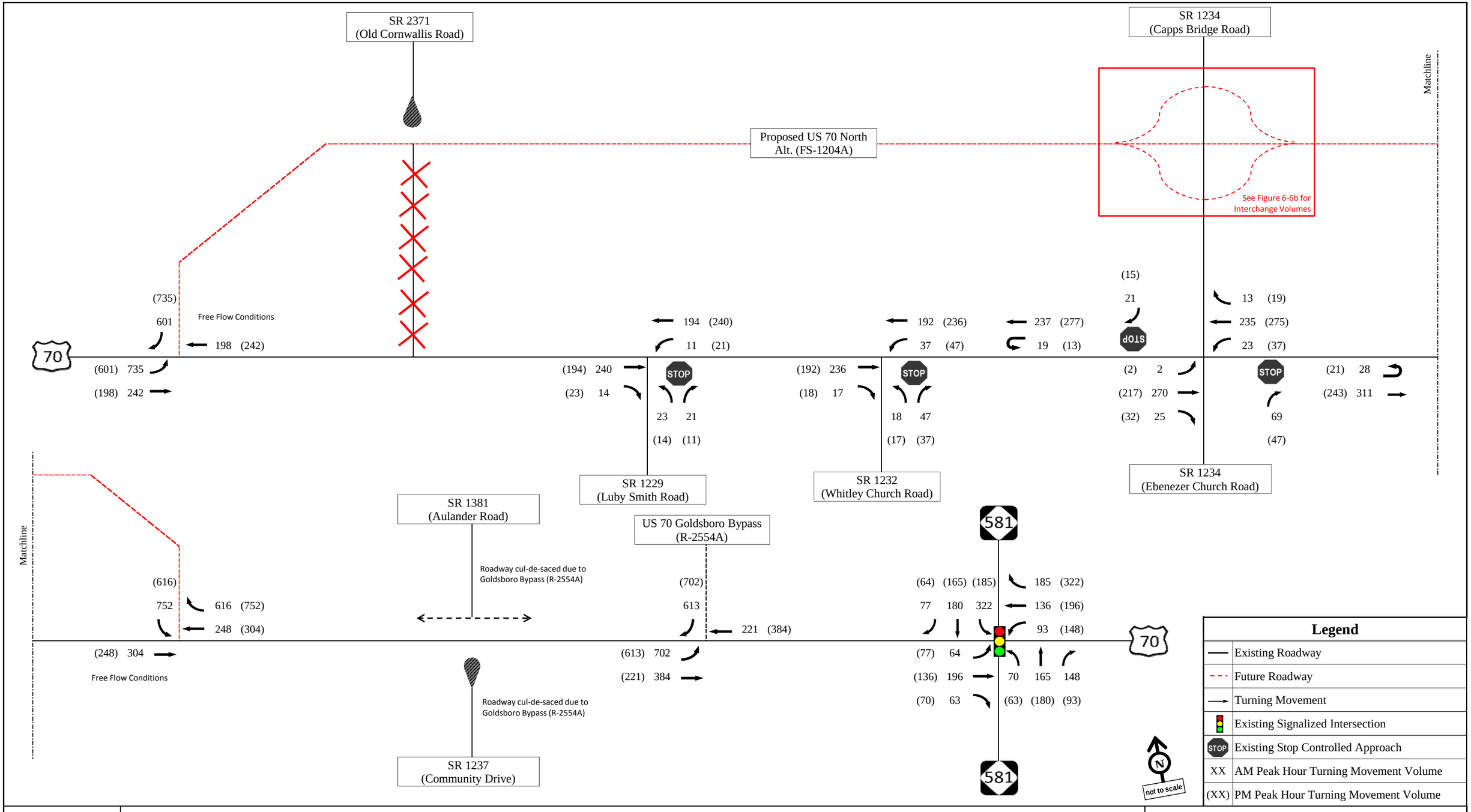
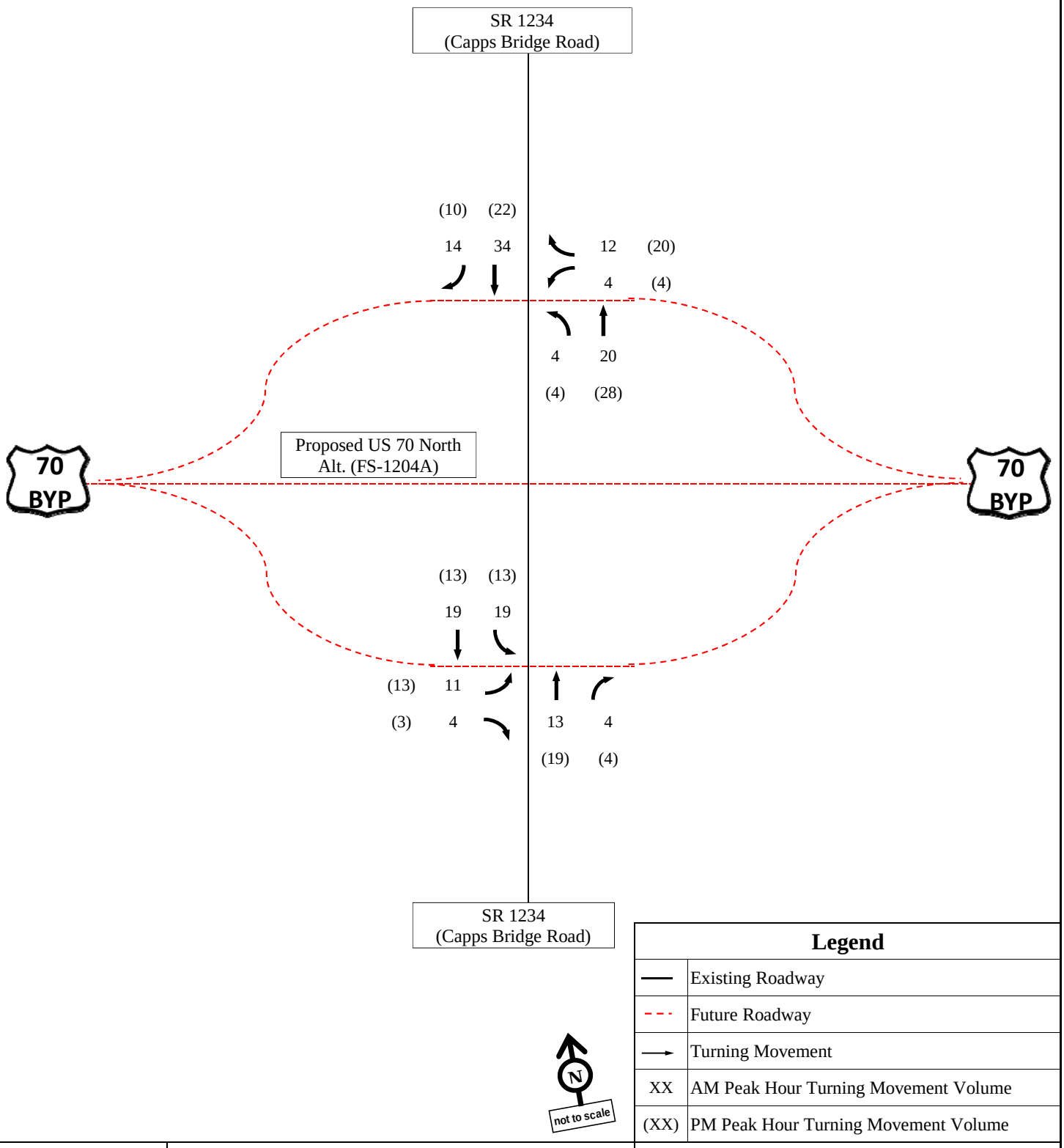


Figure 6-6a
Base Year (2013) Build - North AM and PM Peak Hour Turning Movement Volumes

FS-1204A US 70 from
SR 2372 (Edwards Road) to the
US 70 Goldsboro Bypass



Legend	
——	Existing Roadway
- - -	Future Roadway
⟶	Turning Movement
XX	AM Peak Hour Turning Movement Volume
(XX)	PM Peak Hour Turning Movement Volume

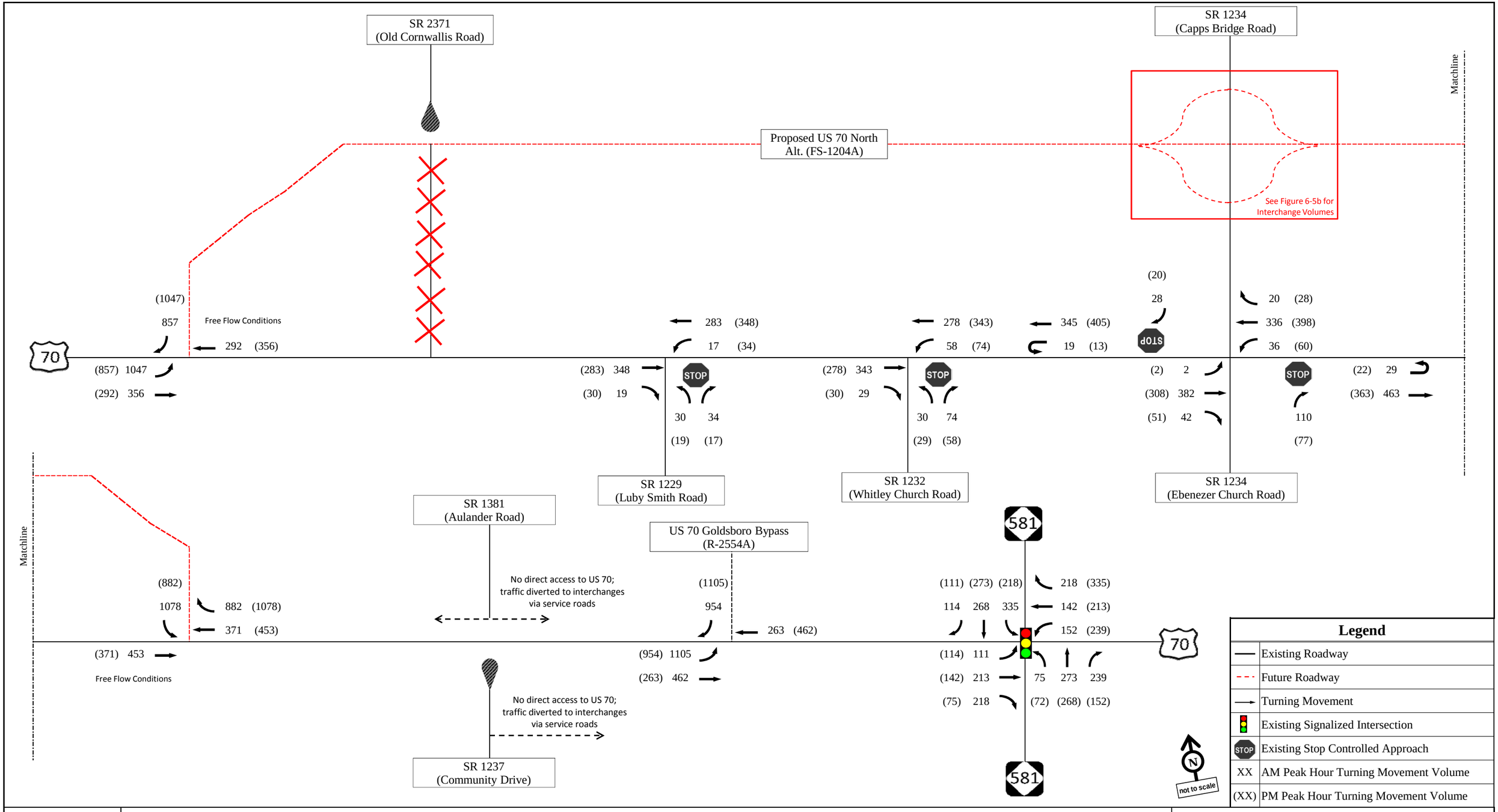
VHB

Figure 6-6b
Base Year (2013) Build - North AM and PM Peak Hour Turning Movement Volumes

FS-1204A US 70 from SR 2372 (Edwards Road) to the US 70 Goldsboro Bypass

Table 6-5
Design Year (2035) Build – North Alternative LOS Results

Intersection and Approach	Design Year (2035) Build - North Alternative	
	AM Peak	**PM Peak**
US 70 and SR 2371 (Old Cornwallis Road)	**-**	**-**
Southbound	-	-
US 70 and SR 1229 (Luby Smith Road)	**N/A**	**N/A**
Northbound	B	B
US 70 and SR 1232 (Whitley Church Road)	**N/A**	**N/A**
Northbound	B	B
US 70 and SR 1234 (Capps Bridge Road/Ebenezer Church Road)	**N/A**	**N/A**
Eastbound Lefts	B	B
Westbound Lefts	B	B
US 70 and SR 1381 (Aulander Road)/SR 1237 (Community Drive)	**-**	**-**
Northbound	-	-
Southbound	-	-
US 70 and NC 581	**D (35.4 sec)**	**D (36.6 sec)**
Eastbound	D	D
Westbound	C	C
Northbound	C	D
Southbound	D	D
Interchanges		
Old Cornwallis Road/Luby Smith Road	**-**	**-**
Westbound Ramps	-	-
Eastbound Ramps	-	-
Ebenezer Church Road/Capps Bridge Road	**N/A**	**N/A**
Westbound Ramps	A	A
Eastbound Ramps	A	A

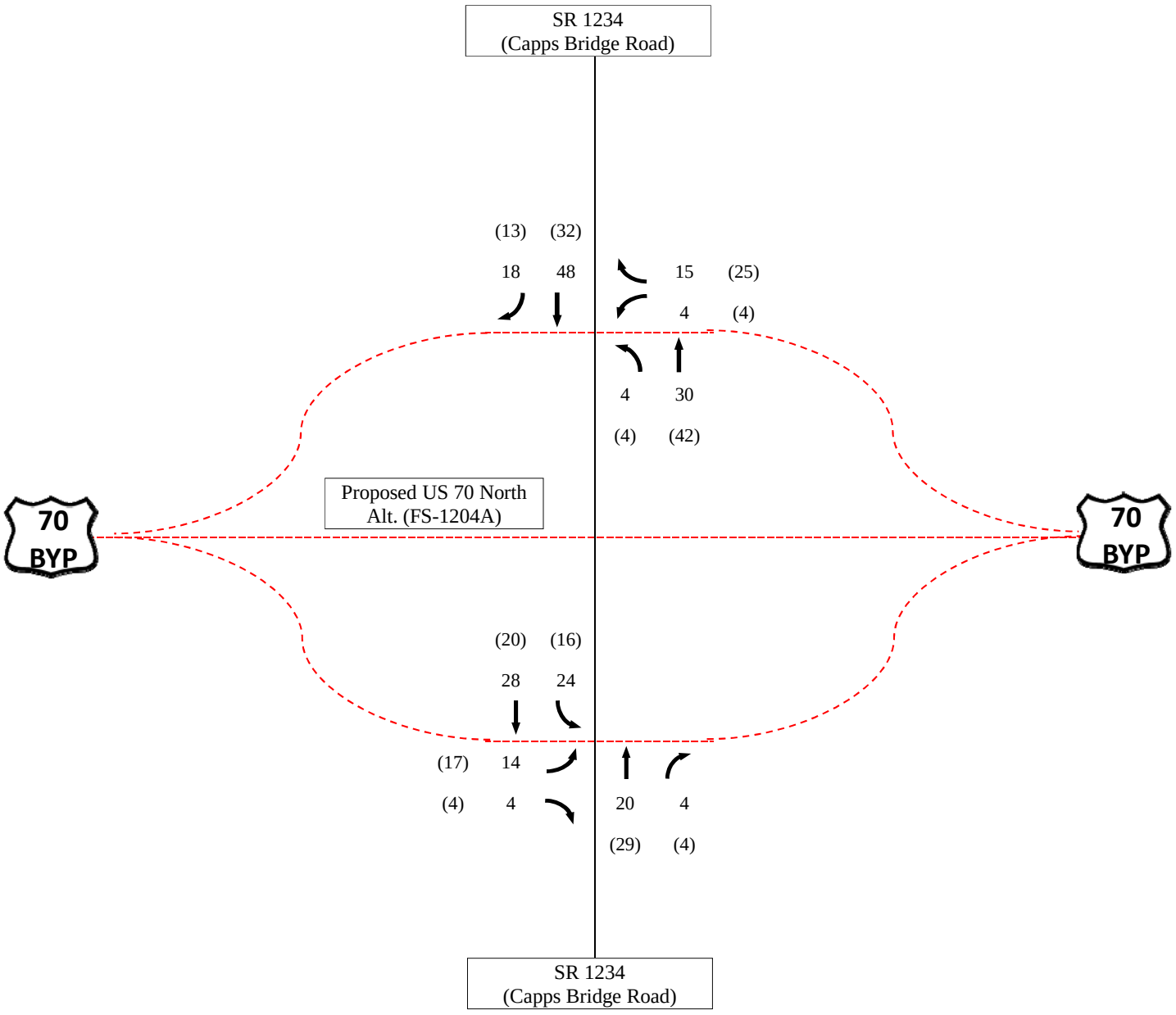


Legend	
——	Existing Roadway
- - -	Future Roadway
——→	Turning Movement
	Existing Signalized Intersection
STOP	Existing Stop Controlled Approach
XX	AM Peak Hour Turning Movement Volume
(XX)	PM Peak Hour Turning Movement Volume

VHB

Figure 6-7a
Design Year (2035) Build - North AM and PM Peak Hour Turning Movement Volumes

FS-1204A US 70 from
SR 2372 (Edwards Road) to the
US 70 Goldsboro Bypass



Legend	
——	Existing Roadway
- - -	Future Roadway
⟶	Turning Movement
XX	AM Peak Hour Turning Movement Volume
(XX)	PM Peak Hour Turning Movement Volume

N

not to scale

VHB

Figure 6-7b
Design Year (2035) Build - North AM and PM Peak Hour Turning Movement Volumes

FS-1204A US 70 from SR 2372 (Edwards Road) to the US 70 Goldsboro Bypass

6.6 SOUTH ALTERNATIVE

The South Alternative proposes to construct a freeway facility on new location to the south of the existing US 70 facility. The South Alternative starts just west of SR 2372 (Edwards Road) and departs onto new location via a free flow interchange just east of SR 1229 (Luby Smith Road); traffic from both SR 2371 (Old Cornwallis Road) and SR 1229 (Luby Smith Road) would be routed to the west, accessing US 70 via SR 2372 (Edwards Road). This alternative proposes a partial clover interchange at SR 2372 (Edwards Road) and a diamond interchange at SR 1234 (Ebenezer Church Road). The South Alternative would rejoin US 70 Business via a free flow interchange just west of SR 1381/SR 1237 (Aulander Road/Community Drive). Because the proposed alternative would be fully controlled, it includes service roads along much of the new location alignment to provide access to numerous parcels; additionally, a service road is proposed to connect SR 1234 (Ebenezer Church Road) to SR 1237 (Community Drive) on the south side of existing US 70.

6.6.1 Roadway Improvements

The roadway improvements associated with this alternative include constructing a highway on new location including interchange ramps and service roads. The intersection configurations along existing US 70 are adequate to handle the projected traffic volumes with the new roadway in place; thus no improvements to these locations are recommended. The interchanges at the departures from the existing US 70 facility are proposed to be free flowing fly-over configurations. The interchange ramps along the new facility are all proposed to operate under stop control. Improvements and lane configurations associated with this alternative include:

US 70 at SR 2372 (Edwards Road) Interchange

To ensure that the proposed project could tie into the existing Princeton Bypass, the scope of design was expanded to include an interchange at SR 2372 (Edwards Road). A conceptual interchange design was developed at this existing at grade, signalized intersection; however, no additional traffic analysis was included for this location. The following lane configurations were assumed for the conceptual design effort, but should be evaluated further later in the project process.

- Construct a partial cloverleaf interchange with ramps and loops in the northwest and southwest quadrants; and
- Where a left-turn movement is present, construct an exclusive left-turn lane with at least 100 feet of storage and appropriate taper.

Existing US 70 at SR 2371 (Old Cornwallis Road)

- Due to the control of access associated with the proposed alignment, cul-de-sac SR 2371 (Old Cornwallis Road) north of the existing US 70 facility; and
- Access to US 70 will be maintained for properties along this road via Edwards Road.

Existing US 70 at SR 1229 (Luby Smith Road)

- Construct a service road parallel to the existing US 70 facility to tie SR 1229 (Luby Smith Road) to SR 2556 (Dr. Donnie H Jones Boulevard) to the west in order to provide access to the proposed roadway; and
- Close access to the existing US 70 facility.

US 70 South Alternative at Existing US 70 (Western Departure)

- Construct a free-flow interchange to facilitate the departure of the South Alternative;
- Eastbound Existing US 70 would be diverted slightly to the south on a fly-over across the new location alignment and brought back into Existing US 70.

SR 1232 (Whitely Church Road)

- Cul-de-sac this roadway on either side of the proposed new location alternative as there is no feasible crossing of the new alignment and the railroad just south of the proposed alignment;
- Maintain full movement access at the existing US 70 facility.

US 70 South Alternative at SR 1234 (Ebenezer Church Road) Interchange

- Construct a new diamond interchange; and
- Construct a service road along the south side of the proposed roadway to connect SR 1234 (Ebenezer Church Road) to SR 1237 (Community Drive).

<u>US 70 South Alternative Westbound at SR 1234 (Ebenezer Church Road)</u>

- Shared through/right-turn lane on southbound approach;
- Exclusive left-turn lane with at least 100 feet of storage and appropriate taper on northbound approach; and
- Exclusive left-turn lane on Westbound Off-ramp approach, with at least 100 feet of storage and appropriate taper for the left-turn lane.

<u>US 70 South Alternative Eastbound at SR 1234 (Ebenezer Church Road)</u>

- Shared through/right-turn lane on northbound approach;
- Exclusive left-turn lane with at least 100 feet of storage and appropriate taper on southbound approach; and

- Exclusive left-turn lane on Eastbound Off-ramp approach, with at least 100 feet of storage and appropriate taper.

The conceptual sketch for this alternative, including these improvements, is illustrated in Figure 6-8.

6.6.2 Base Year (2013) Build – South Alternative Capacity Analysis

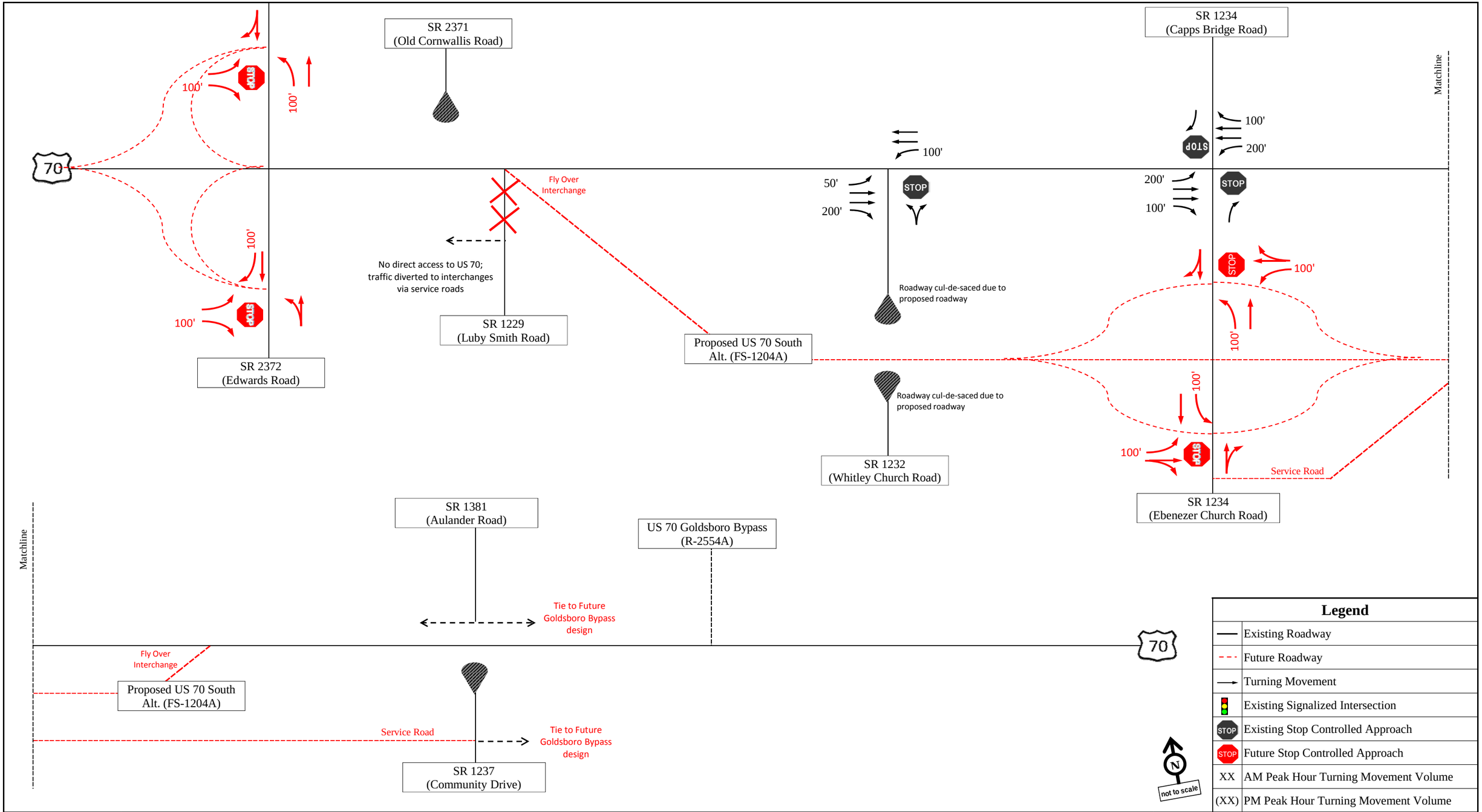
This scenario represents operations at the network intersections given the base year volumes and accounting for the construction of a new location facility south of existing US 70. To be consistent with the provided traffic forecasts, this scenario does account for the completion of R-2554A, the US 70 Goldsboro Bypass which includes the closure of SR 1381 (Aulander Road) and SR 1237 (Community Drive) at their intersection with US 70. All other roadway improvements are consistent with those detailed in Section 6.6.1.

Traffic capacity analysis indicates that, the signalized intersection and all unsignalized approaches at the interchange ramps operate acceptably under this scenario. Table 6-6 summarizes the LOS results and Figure 6-9 illustrates the volumes used in this scenario analysis.

6.6.3 Design Year (2035) Build – South Alternative Capacity Analysis

This scenario represents operations at the network intersections given the design year volumes and accounting for the construction of a freeway facility on new location to the south of the existing US 70 roadway. This scenario also accounts for the completion of R-2554A, the Goldsboro Bypass and the roadway improvements detailed in Section 6.6.1.

Traffic capacity analysis indicates that, the signalized intersection and all unsignalized approaches at the interchange ramps operate acceptably under this scenario. Table 6-7 summarizes the LOS results and Figure 6-10 illustrates the volumes used in this scenario analysis.



Legend	
	Existing Roadway
	Future Roadway
	Turning Movement
	Existing Signalized Intersection
STOP	Existing Stop Controlled Approach
STOP	Future Stop Controlled Approach
XX	AM Peak Hour Turning Movement Volume
(XX)	PM Peak Hour Turning Movement Volume

VHB

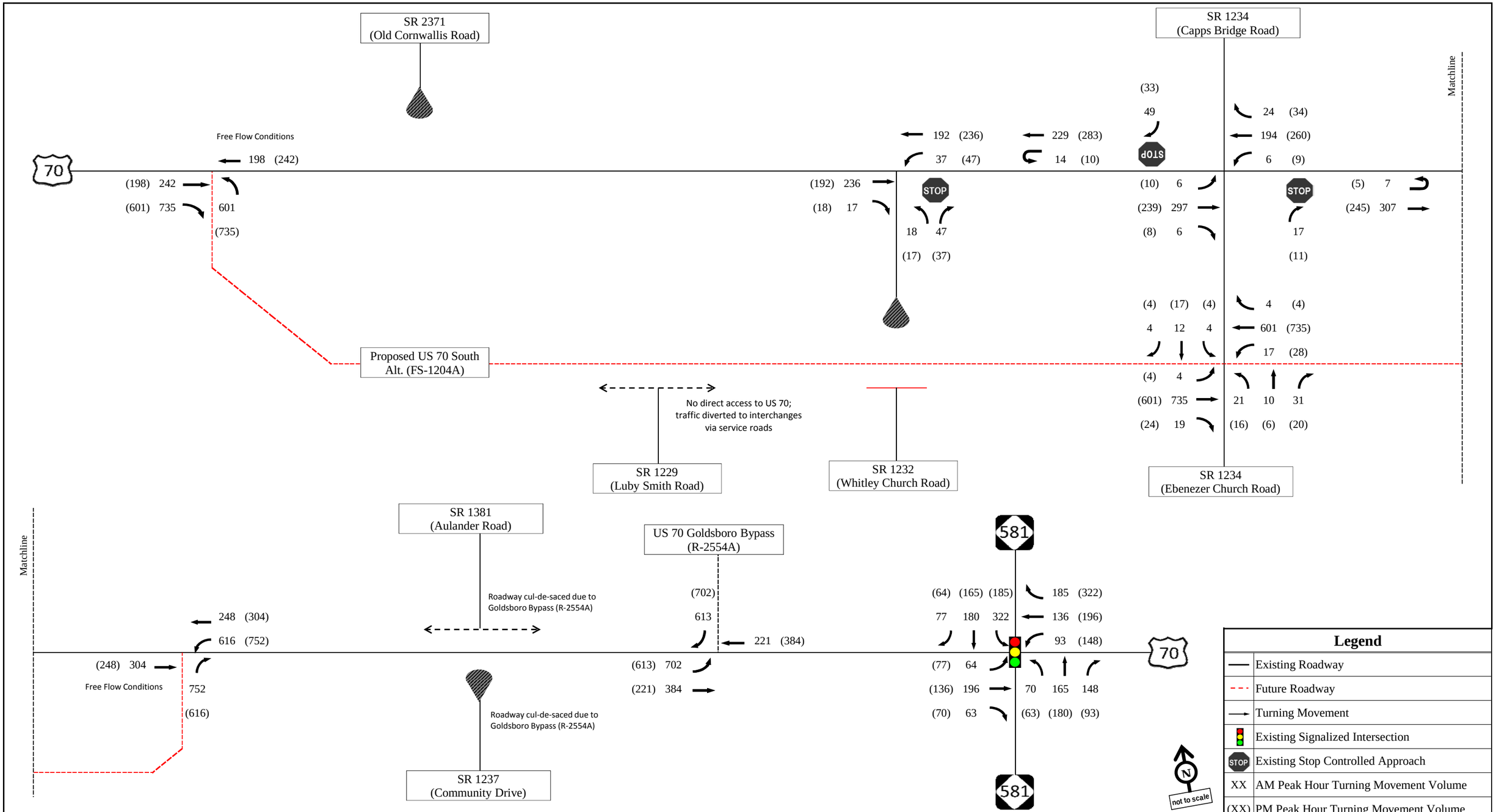
Figure 6-8
Future (2035) Build - South Alternative, Recommended Lane Configurations and Traffic Control

FS-1204A US 70 from
SR 2372 (Edwards Road) to the
US 70 Goldsboro Bypass

Table 6-6

Base Year (2013) Build – South Alternative LOS Results

Intersection and Approach	Base Year (2013) Build - South Alternative	
	AM Peak	**PM Peak**
US 70 and SR 2371 (Old Cornwallis Road)	**-**	**-**
Southbound	-	-
US 70 and SR 1229 (Luby Smith Road)	**-**	**-**
Northbound	-	-
US 70 and SR 1232 (Whitley Church Road)	**N/A**	**N/A**
Northbound	A	A
US 70 and SR 1234 (Capps Bridge Road/Ebenezer Church Road)	**N/A**	**N/A**
Eastbound Lefts	B	B
Westbound Lefts	B	B
US 70 and SR 1381 (Aulander Road)/SR 1237 (Community Drive)	**-**	**-**
Northbound	-	-
Southbound	-	-
US 70 and NC 581	**C (29.0 sec)**	**C (28.1 sec)**
Eastbound	C	C
Westbound	C	C
Northbound	C	C
Southbound	C	C
Interchanges		
Old Cornwallis Road/Luby Smith Road	**-**	**-**
Westbound Ramps	-	-
Eastbound Ramps	-	-
Ebenezer Church Road/Capps Bridge Road	**N/A**	**N/A**
Westbound Ramps	A	A
Eastbound Ramps	A	A

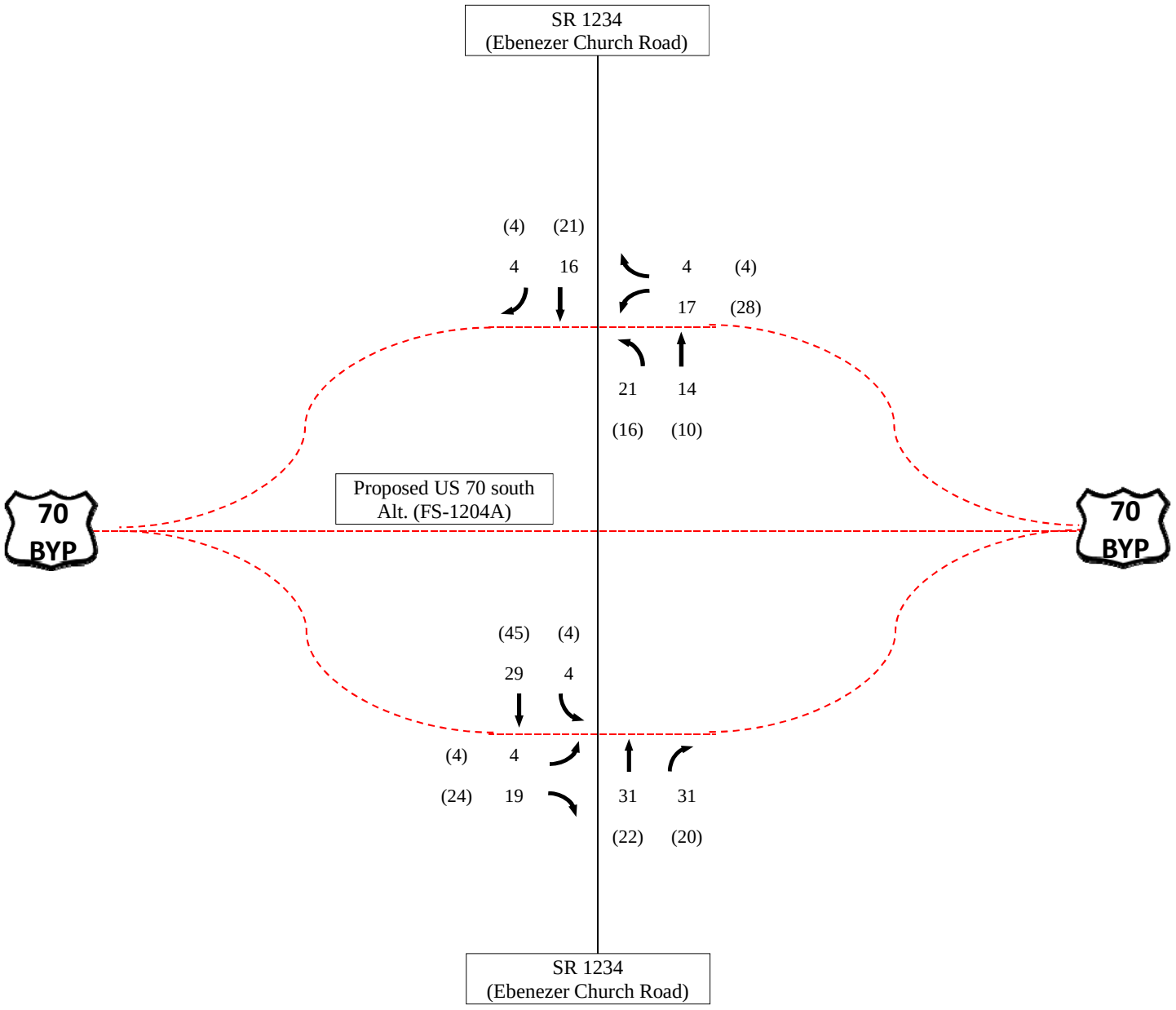


Legend	
—	Existing Roadway
- - -	Future Roadway
→	Turning Movement
	Existing Signalized Intersection
STOP	Existing Stop Controlled Approach
XX	AM Peak Hour Turning Movement Volume
(XX)	PM Peak Hour Turning Movement Volume

VHB

Figure 6-9a
Base Year (2013) Build - South AM and PM Peak Hour Turning Movement Volumes

FS-1204A US 70 from
SR 2372 (Edwards Road) to the
US 70 Goldsboro Bypass



Legend	
——	Existing Roadway
- - -	Future Roadway
⟶	Turning Movement
XX	AM Peak Hour Turning Movement Volume
(XX)	PM Peak Hour Turning Movement Volume

N

not to scale

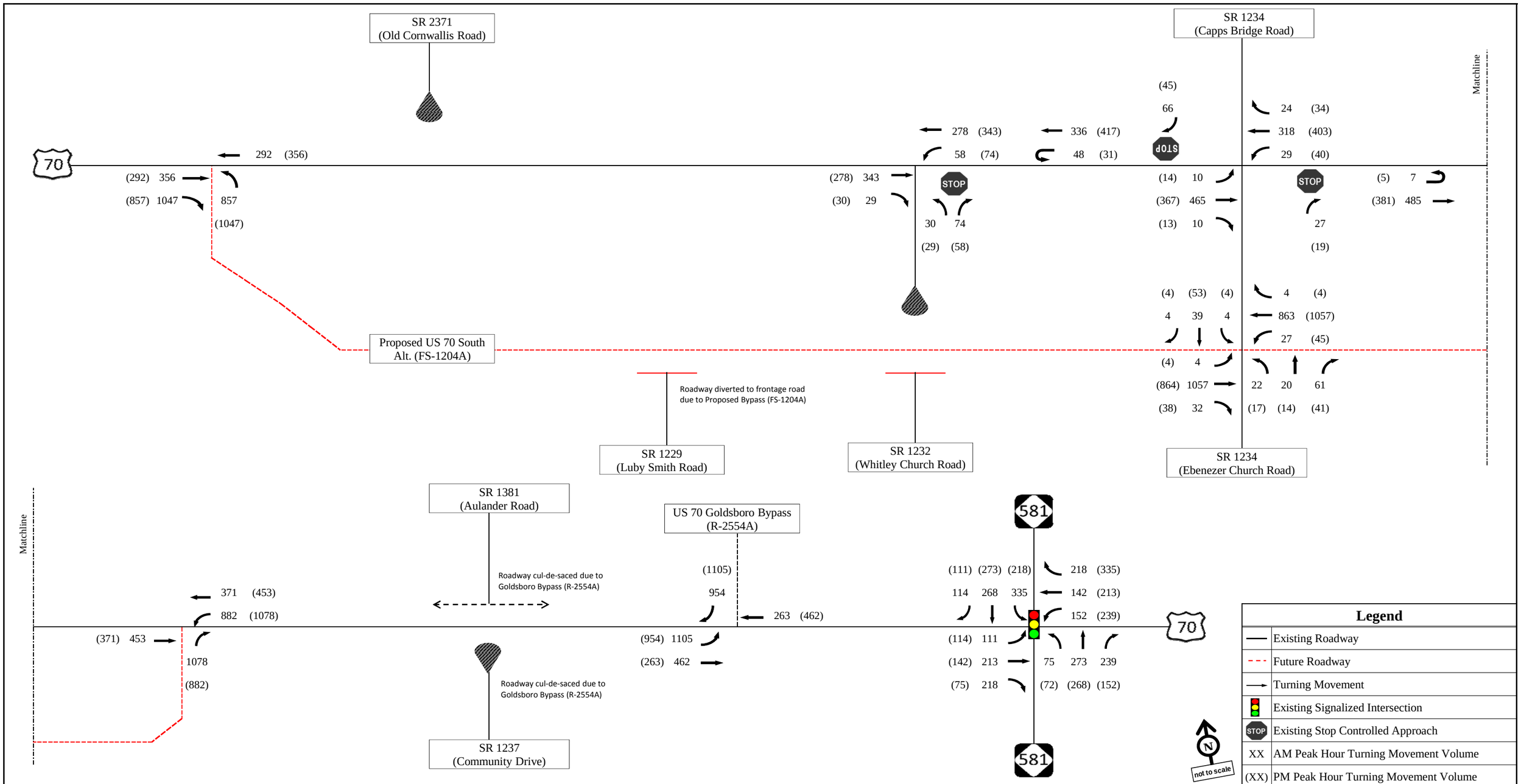
VHB

Figure 6-9b
Base Year (2013) Build - South AM and PM Peak Hour Turning Movement Volumes

FS-1204A US 70 from SR 2372 (Edwards Road) to the US 70 Goldsboro Bypass

Table 6-7
Design Year (2035) Build – South Alternative LOS Results

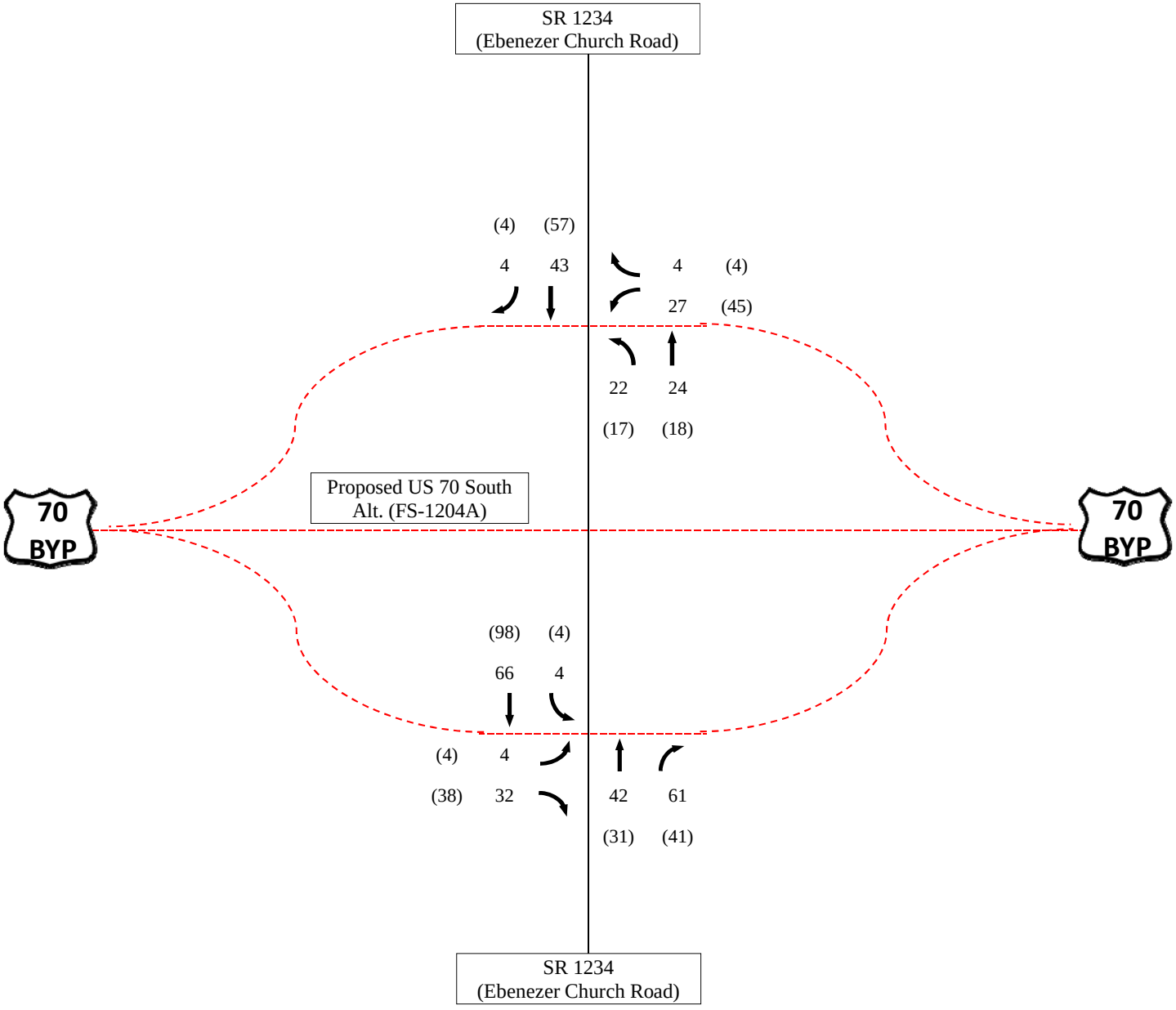
Intersection and Approach	Design Year (2035) Build - South Alternative	
	AM Peak	**PM Peak**
US 70 and SR 2371 (Old Cornwallis Road)	**-**	**-**
Southbound	-	-
US 70 and SR 1229 (Luby Smith Road)	**-**	**-**
Northbound	-	-
US 70 and SR 1232 (Whitley Church Road)	**N/A**	**N/A**
Northbound	B	B
US 70 and SR 1234 (Capps Bridge Road/Ebenezer Church Road)	**N/A**	**N/A**
Eastbound Lefts	B	B
Westbound Lefts	B	B
US 70 and SR 1381 (Aulander Road)/SR 1237 (Community Drive)	**-**	**-**
Northbound	-	-
Southbound	-	-
US 70 and NC 581	**D (35.4 sec)**	**D (36.6 sec)**
Eastbound	D	D
Westbound	C	C
Northbound	C	D
Southbound	D	D
Interchanges		
Old Cornwallis Road/Luby Smith Road	**-**	**-**
Westbound Ramps	-	-
Eastbound Ramps	-	-
Ebenezer Church Road/Capps Bridge Road	**N/A**	**N/A**
Westbound Ramps	A	A
Eastbound Ramps	A	A



VHB

Figure 6-10a
Design Year (2035) Build - South AM and PM Peak Hour Turning Movement Volumes

FS-1204A US 70 from
SR 2372 (Edwards Road) to the
US 70 Goldsboro Bypass



Legend	
——	Existing Roadway
- - -	Future Roadway
⟶	Turning Movement
XX	AM Peak Hour Turning Movement Volume
(XX)	PM Peak Hour Turning Movement Volume

N

not to scale

Figure 6-10b
Design Year (2035) Build - South AM and PM Peak Hour Turning Movement Volumes

FS-1204A US 70 from SR 2372 (Edwards Road) to the US 70 Goldsboro Bypass

6.7 STRUCTURES AND HYDROLOGY

According to the NCDOT Bridge Inventory and field verification, there are no existing bridge structures within the feasibility study area, nor are there any major hydraulic structures (bridge or culvert of at least 72 inches in diameter). However, there are two existing stream crossings that would need to be lengthened if the existing facility were upgraded to a freeway. In addition, as a result of their similarities to the existing US 70 stream crossings, it is anticipated that the new location alternatives would not require major hydraulic structures for the streams that would be crossed by the new facility.

6.7.1 Hydraulic Structures

The Improve Existing Alternative would require the lengthening of two existing culverts, both of which are pipes with less than a 72-inch diameter. The first is located approximately 800 feet west of Bridgers Road. The second is located approximately 300 feet east of Whitley Church Road; this stream crossing is connected to a ditch that runs along the south side of US 70 for some length. In order to accommodate the proposed widening and associated service roads, this ditch would likely need to be relocated and tied back into the existing streambed.

The North Alternative would have the most stream crossings, with a potential for five crossing locations. The streams that would be crossed are all tributaries of Little River to the north and it is anticipated that no major hydraulic structures would be required.

The South Alternative would have a potential for two stream crossing locations. The first stream crossing is of a tributary that flows north to Little River and is not expected to require a major hydraulic structure. The second impacted stream is a tributary that flows south to Beaverdam Creek. The impact to this stream is due to the proposed service road but it is anticipated to be minor, impacting only a short segment at the start of the tributary.

6.7.2 Bridge Structures

Each alternative would require a number of new bridge structures to support and facilitate the interchanges needed to access the proposed freeway facility.

The Improve Existing Alternative would require three roadway bridge structures:

- A 36'x275' span carrying Old Cornwallis Road over US 70;
- A 36'x235' span carrying realigned Old Cornwallis/Luby Smith Road over the railroad; and
- A 36'x240' span carrying Capps Bridge Road over US 70.

The North Alternative would require four roadway bridge structures:

- A 48'x260' span carrying Edwards Road over existing US 70;

- A 38'x290' span carrying Existing US 70 Westbound over the proposed new location alternative (west flyover);
- A 48'x240' span carrying Capps Bridge Road over the North Alternative; and
- A 38'x330' span carrying Existing US 70 Westbound over the proposed new location alternative (east flyover).

The South Alternative would require four roadway bridge structures:

- A 38'x260' span carrying Edwards Road over existing US 70;
- A 38'x245' span carrying Existing US 70 Eastbound over the proposed new location alternative (west flyover);
- A 48'x245' span carrying Ebenezer Church Road over the South Alternative; and
- A 38'x285' span carrying Existing US 70 Eastbound over the proposed new location alternative (east flyover).

7.0 OPINION OF PROBABLE COST

7.1 COST ESTIMATES

Cost estimates for construction, utility relocation, and right-of-way were completed for each build alternative. These estimates are based on the conceptual designs prepared for the improvements. Table 7-1 summarizes the cost estimates for each component of each alternative and provides a total of estimated cost per alternative.

Table 7-1
Estimated Costs for each Alternative

Description	Improve Existing	North Alternative	South Alternative
Right of Way	$ 18,925,000	$ 22,875,000	$ 22,725,000
Utility Relocation	$ 843,249	$ 624,899	$ 386,107
Construction	$ 44,200,000	$ 57,400,000	$ 52,200,000
Total	**$ 63,968,249**	**$ 80,899,899**	**$ 75,311,107**

7.2 BENEFIT-COST ANALYSIS

A benefit-cost analysis was completed using the NCDOT Redbook Wizard tool, which is based on the *User Benefit Analysis for Highways* publication (AASHTO, 2003). Inputs for the benefit analysis include base year and projected future year traffic volumes, average travel speeds, and crash statistics and result in three types of benefits: user value of time, user operating cost, and user crash reduction benefits. The sum of these benefits constitutes the overall project benefit. Project costs are taken directly from cost estimates for right-of-way, utility relocation, and construction. The benefit and the cost of implementation are then weighed against one another to determine the "benefit-cost ratio" for a specific alternative. This tool also allows the user to compare this ratio among alternatives under review, providing a benefit-cost ranking for the alternatives. An additional use for this ratio is to allow for comparison between potential projects within a given vicinity and to aid in prioritizing funding for multiple projects in the same area.

The *User Benefit Analysis for Highways* publication does not directly account for new location projects, but rather evaluates new highway projects as analogous to the addition of new lane capacity on an existing facility. The procedure for analyzing additional lane capacity is applied to corridors substantially affected by the new location project to determine the benefit of the new roadway. Thus, in the case of the proposed North or South Alternative, benefits associated with the project, such as crash reduction and increased average travel speed, were derived by

determining the benefit that the new road would provide to US 70, the existing road. The crashes anticipated due to past history along the existing corridor were also taken into account. The benefit-cost analysis assumes 2013 as the opening year and therefore the benefits are calculated for the years between Base Year (2013) and Design Year (2040).

The benefit-cost ratio for the Improve Existing Alternative was calculated to be the highest (1.76) due to the highest crash reduction benefits, user value of time benefits and user operating costs as well as the lowest cost. The benefits for Build North Alternative and South Alternative are similar however the benefits for the North Alternative are slightly higher due to a slightly shorter length. The benefit-cost ratio for the North Alternative is 0.61 and the benefit-cost ratio for the South Alternative is 0.57. The bypass options have reduced value of time and operating cost benefits due to the increase in segment lengths and travel time relative to using the existing alignment, which is more direct. Similarly, the overall crash reduction benefit is lower than the Improve Existing scenario due to the increased vehicle exposure and continued use of the existing alignment by a portion of the total traffic, which has a relatively high fatal crash rate relative to freeway conditions.

8.0 ALTERNATIVES EVALUATION AND RECOMMENDATIONS

This section details and evaluates the quantitative impacts of the presented alternatives such as stream impacts, relocations and cost estimates. It also includes a discussion comparing the alternatives, resulting in the recommendation of a preferred alternative.

8.1 IMPACTS OF ALTERNATIVES

Each of the presented alternatives is unique in its associated alignment and improvements. Table 8-1 provides a comparison of the quantitative impacts to each resource for each alternative.

It should be noted that this table indicates there is minimal impact to historic resources along the corridor based on the screening done for this study, meaning it is unlikely the Build Alternatives would directly impact the historic or potentially historic structures or their property. Ebenezer United Methodist Church, specifically, is on the State Historic Property Study List and is located adjacent to the existing US 70 corridor. An interchange is proposed just west of this church in the Improve Existing Alternative. That alternative would have a small impact to the church property to accommodate right-of-way for the alignment. While the proposed project alternatives would not directly impact this property, they could cause some indirect and potentially adverse impacts. These impacts will be evaluated in consultation with the North Carolina State Historic Preservation Office (NCSHPO) at the time when the project is being evaluated for environmental impacts under the National Environmental Policy Act (NEPA). A detailed evaluation of potentially eligible properties would be undertaken as well.

The impacted wetland acreage, floodplain acreage and linear feet of stream impact estimates are derived from data publicly available through NC Department of Environment and Natural Resources, Division of Coastal Management (NCDENR-DCM) and Wayne County and Johnston County GIS resources.

Parcel information was obtained through the Wayne and Johnston Counties' GIS resources and are not the product of project specific surveys.

Table 8-1
Alternatives Major Impact Comparison

Impact	Improve Existing Alternative	North Alternative	South Alternative
Relocations – Businesses	13	9	13
Relocations – Churches	0	0	0
Relocations – Residences	41	46	47
Wetlands Impacted (acres)	2.62	8.22	10.54
Stream Crossings (USGS Blue Line)	3	5	2
Stream Crossing (lf) – Perennial	38	2,520	-
Stream Crossing (lf) – Intermittent	532	264	346
Floodplain 100-Yr (acres)	-	41.6	-
Floodplain 500-Yr (acres)	-	6.7	-
Probable Underground Storage Tanks (UST)	-	1	1
National Register of Historic Places Sites	0	0	0
Potential Grave Site Impacts	~50	0	0
ROW (acres)	191	264	251
ROW Costs	$ 18,925,000	$ 22,875,000	$ 22,725,000
Construction Cost	$ 44,200,000	$ 57,400,000	$ 52,200,000
Utility Relocation Cost	$ 843,249	$ 624,899	$ 386,107
Total Cost	**$ 63,968,249**	**$ 80,899,899**	**$ 75,311,107**

8.2 CONCLUSIONS AND RECOMMENDATIONS

Based on the data presented in this study, it is recommended that the South Alternative should be considered for programming with a formal decision on the preferred alternative being deferred to later during the NEPA process. This alternative proposes to construct a freeway facility on new location to the south of the existing US 70 facility. The South Alternative starts just west of SR 2372 (Edwards Road) and departs onto new location via a free flow interchange just east of SR 1229 (Luby Smith Road); traffic from both SR 2371 (Old Cornwallis Road) and SR 1229 (Luby Smith Road) would be routed to the west, accessing US 70 via SR 2372 (Edwards Road). This alternative proposes a partial clover interchange at SR 2372 (Edwards Road) and a

diamond interchange at SR 1234 (Ebenezer Church Road). The South Alternative would rejoin US 70 Business via a free flow interchange just west of SR 1381/SR 1237 (Aulander Road/Community Drive). Because the proposed alternative would be fully controlled, it includes service roads along much of the new location alignment to provide access to numerous parcels; additionally, a service road is proposed to connect SR 1234 (Ebenezer Church Road) to SR 1237 (Community Drive) on the south side of existing US 70.

The recommendation of this alternative is based on several aspects of the project, including environmental impacts, community impacts and mid-range cost.

8.2.1 Environmental Impacts

The South Alternative would have the highest impact on wetland areas but the lowest impact stream crossings in the project area, impacting no perennial streams. The relocation and ROW impacts are comparable across all alternatives. While there is a potential UST impact with this alternative, it avoids any impact to gravesites.

8.2.2 Estimated Cost

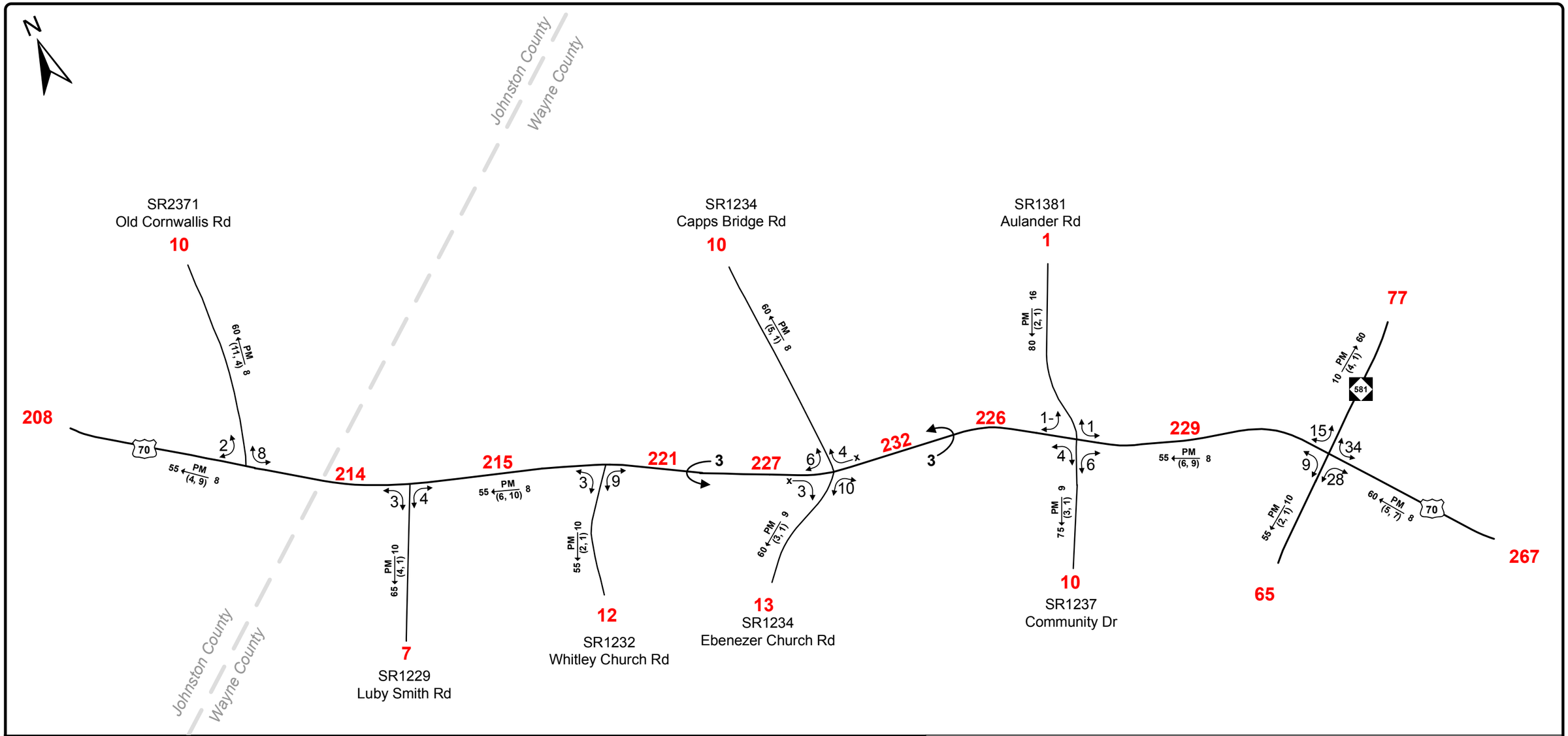
Based on the cost estimates, the South Alternative is expected to cost $ 75,311,107 including the ROW, utility relocation and construction costs, which is mid-range among the evaluated alternatives.

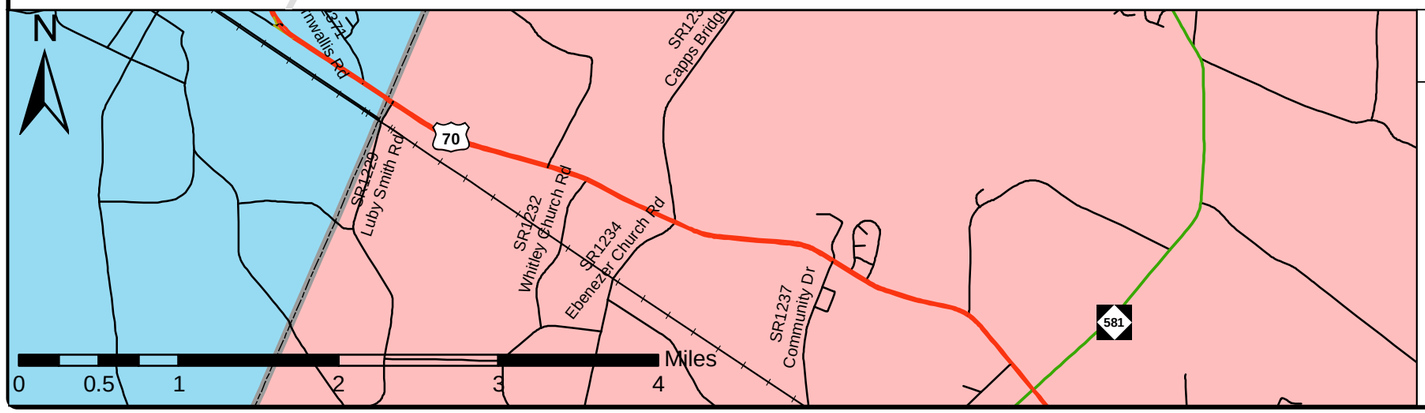
8.2.3 Benefit-Cost Analysis

The South Alternative has a lower benefit-cost ratio than the Improve Existing alternatives, but is similar to the North Alternative. There would be a long-term benefit in user value of time, user operating costs, and crash reduction benefits.

APPENDIX A

Traffic Forecast





2013 AVERAGE ANNUAL DAILY TRAFFIC

NO BUILD

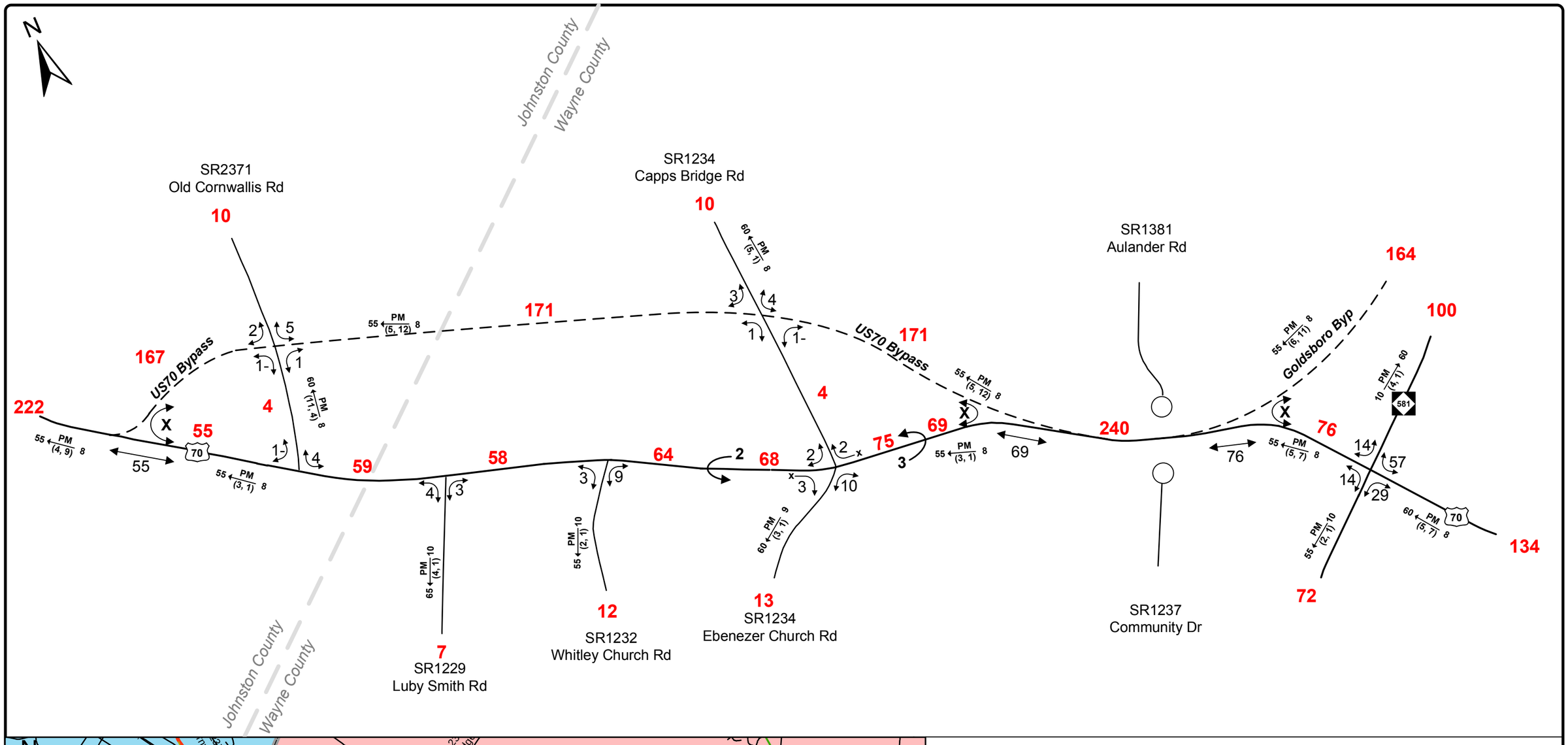
SHEET 1 OF 4

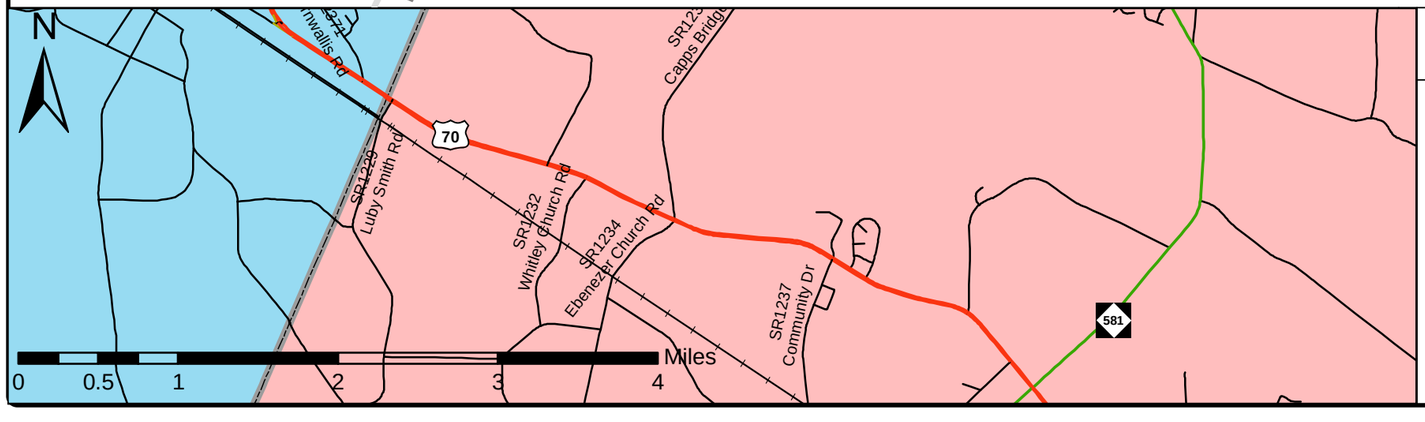
L E G E N D

K PM (d, t) D

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

TIP: FS-1204A	**WBS:** 34263.1.1
COUNTY: Wayne	**DIVISION:** 4
DATE: 11-12-13	
PREPARED BY: Jamie Moore	
LOCATION: US70 from Johnston County Line to Proposed US70 Goldsboro Bypass	
PROJECT: Access Control on US70	





2013 AVERAGE ANNUAL DAILY TRAFFIC

BUILD

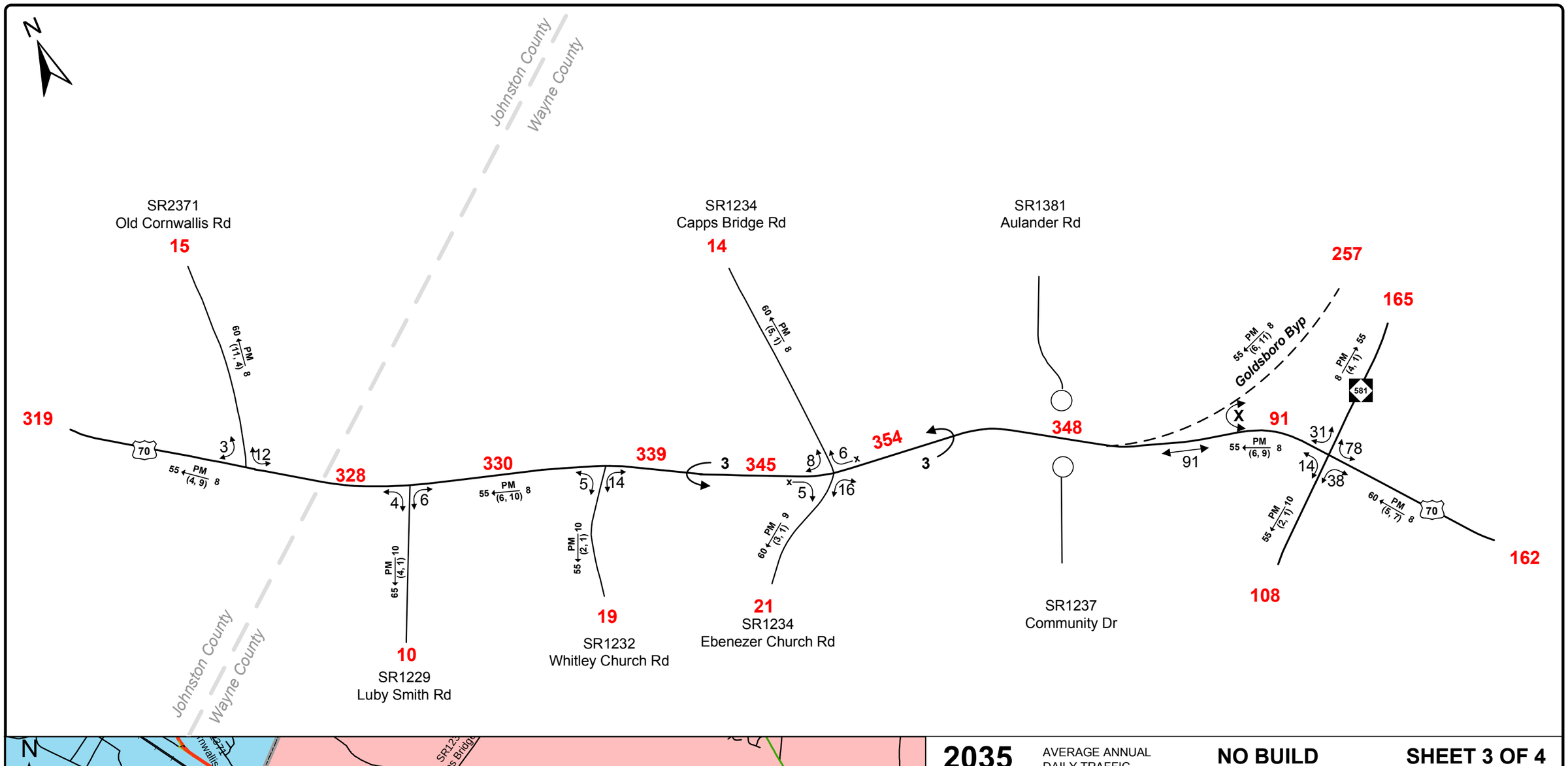
SHEET 2 OF 4

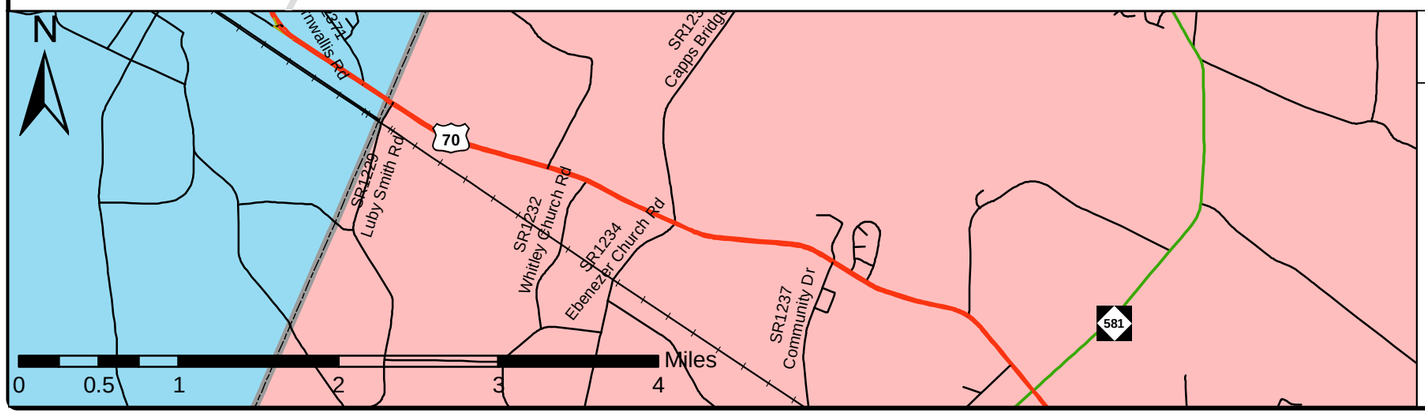
L E G E N D

K PM (d, t) D

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

TIP: FS-1204A	**WBS:** 34263.1.1
COUNTY: Wayne	**DIVISION:** 4
DATE: 11-12-13	
PREPARED BY: Jamie Moore	
LOCATION: US70 from Johnston County Line to Proposed US70 Goldsboro Bypass	
PROJECT: Access Control on US70	





2035 AVERAGE ANNUAL DAILY TRAFFIC

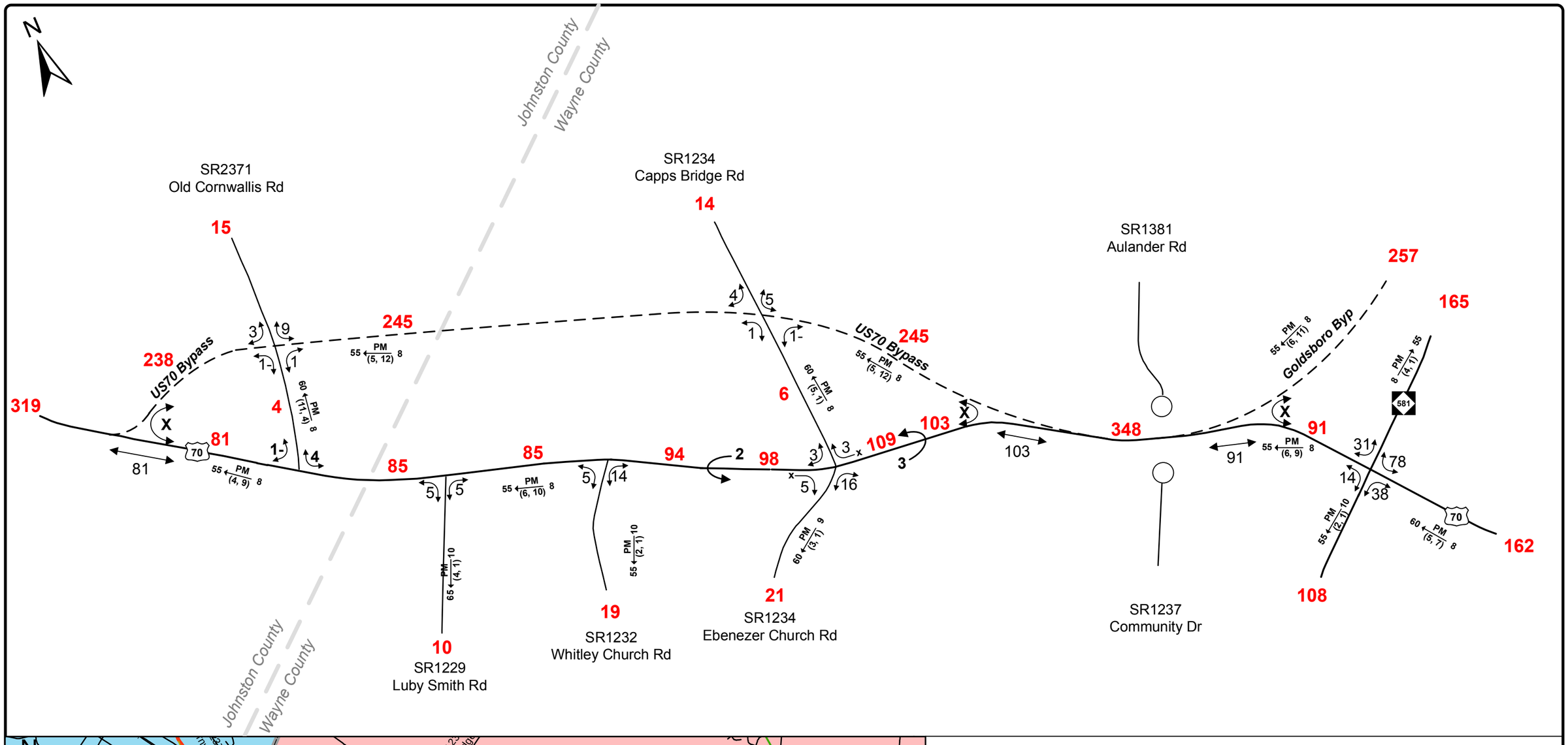
NO BUILD

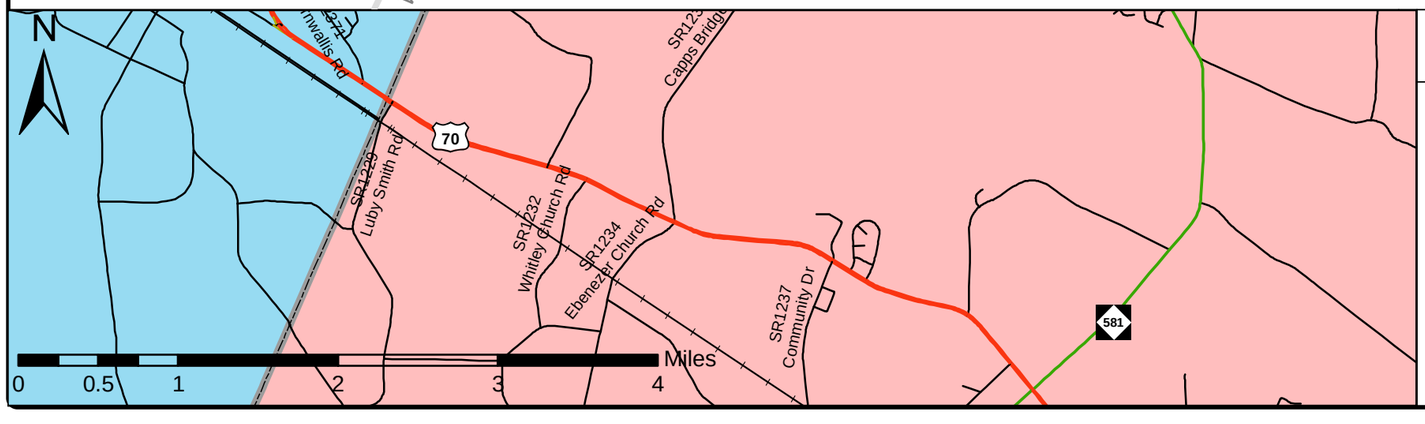
L E G E N D

K PM (d, t) D

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

TIP: FS-1204A	**WBS:** 34263.1.1
COUNTY: Wayne	**DIVISION:** 4
DATE: 11-12-13	
PREPARED BY: Jamie Moore	
LOCATION: US70 from Johnston County Line to Proposed US70 Goldsboro Bypass	
PROJECT: Access Control on US70	





2035 AVERAGE ANNUAL DAILY TRAFFIC

BUILD

SHEET 4 OF 4

L E G E N D

K PM (d, t) D

###	No. of Vehicles Per Day (VPD) in 100s	K	Design Hour Factor (%)
1-	Less than 50 VPD	PM	PM Peak Period
X	Movement Prohibited	D	Peak Hour Directional Split
.....	Proposed Roadway	→	Indicates Direction of D
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TIP: FS-1204A	**WBS:** 34263.1.1
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