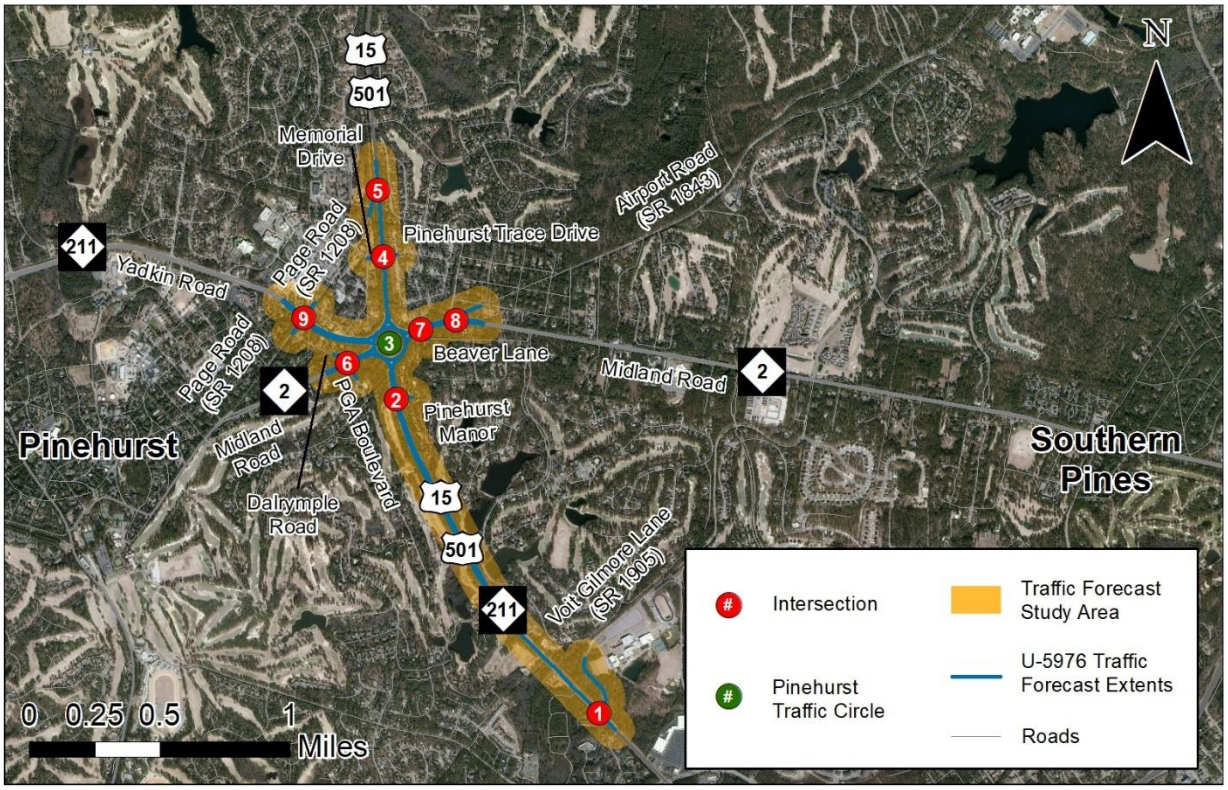
Project Level Traffic Forecast

FINAL

STIP Project U-5976

US 15-501 Traffic Circle and Other Intersection Improvements
From Voit Gilmore Lane (SR 1905) to Page Road (SR 1208)

Moore County



WBS # 45964.1.1

June 2, 2021
Prepared By: HNTB North Carolina, P.C.

NCDOT Transportation Planning Division

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June 2, 2021

MEMORANDUM TO: Alison Kluttz, PE
Division Project Development Engineer
NCDOT Division 8

FROM: John Burris, PTP
HNTB North Carolina, PC

SUBJECT: Traffic Forecast for STIP Project U-5976
US 15-501 Traffic Circle & Other Intersection Improvements
From Voit Gilmore Lane (SR 1905) to Page Road (SR 1208)
Moore County

The North Carolina Department of Transportation (NCDOT) Transportation Planning Division (TPD) approves this forecast for U-5976 as of June 1, 2021.

Please find attached the 2045 Project-Level Traffic Forecast for State Transportation Improvement Program (STIP) Project U-5976. STIP Project U-5976 is proposed to upgrade existing US 15-501 from Voit Gilmore Lane (SR 1905) to Page Road (SR 1208), in Pinehurst and Southern Pines, NC (Moore County). STIP Project U-5976 is approximately 2.3 miles long and includes improvements to the Pinehurst Traffic Circle at US 15-501, NC 2 (Midland Road), and NC 211 (Yadkin Road) and improvements to the US 15-501 and Page Road (SR 1208) intersection. The traffic forecast for this project was requested by Alison Kluttz of NCDOT Division 8 in March 2021 as part of the 2018 Traffic Forecasting Limited Services Agreement (LSA) to be performed by HNTB North Carolina, P.C.

STIP Project U-5976 is currently programmed for right-of-way (ROW) to begin in fiscal year 2024 and construction to begin in fiscal year 2026, per the 2020 – 2029 STIP. The 2020 – 2029 STIP was approved by the NCDOT Board of Transportation on September 5, 2019, was most recently revised on April 19, 2021, and received Federal Highway Administration (FHWA) approval in Spring 2020.

The traffic forecast study area for U-5976 includes a total of 9 existing intersections, which includes the five-leg Pinehurst Traffic Circle. The following scenarios are included in this forecast:

- **2021 Base Year (BY):** the 2021 existing road network is assumed only
- **2045 Future Year (FY):** includes all projects programmed for construction in the 2020 – 2029 STIP

This traffic forecast includes two scenarios: Base Year and Future Year. Since this is an intersection / traffic circle improvement project, there are no specific design improvements that would attract additional traffic volumes in the study area. Therefore, the traffic volumes are not expected to change between No-Build and Build scenarios. The Base Year and Future Year forecasts can be used for both No-Build and Build scenarios.

There are no recently completed project-level traffic forecasts that are nearby the U-5976 forecast study area.

Travel Demand Model

The Moore County Travel Demand Model (TDM), most recently updated and effective on June 30, 2014, was used in the development of this forecast. The Moore County TDM has a BY of 2010 and a FY of 2040. The model includes all fiscally-constrained projects contained in the STIP at the time of the model's effective date, as well as socioeconomic data (population, households, employment, etc.) projections. For the purposes of the U-5976 forecast, model runs were completed after ensuring all relevant transportation projects proposed in the latest 2020 – 2029 STIP were included and by modifying the highway network to include projects if they were not originally in the model.

The North Carolina Statewide Model (NCSTM) (Generation 2.3, provided February 14, 2018, TransCAD 5 Build 1880) was also used in the development of this traffic forecast to assess heavy truck vehicle percentages. The NCSTM has a Base Year of 2011 and a Future Year of 2040.

Interpolation

To determine any intermediate years, straight-line interpolation may be used. AADT volumes may be extrapolated for up to two years immediately following 2045.

Certain assumptions were made in the development of the forecast and include the following:

Fiscal Constraint

For projects located within a RPO area, forecasts are fiscally constrained to the STIP. This means that only projects programmed for construction in the 2020 – 2029 STIP are considered constructed and open to traffic in the future year.

Development Activity

All recent and planned developments were reviewed with local planners and engineers and are assumed to be included in the official Base Year and Future Year Moore County TDM socioeconomic data sets.

Forecast Methodology

The 2021 BY traffic estimate volumes and design factors were developed by considering recent historic AADT, the projection of historic AADT to 2021, project specific count data, previously collected traffic count data from 2018, and applying engineering judgement. The traffic count data was collected on a weekday while the Moore County public school system was having in-person instruction (this was confirmed in a site visit on April 15, 2021 during data collection).

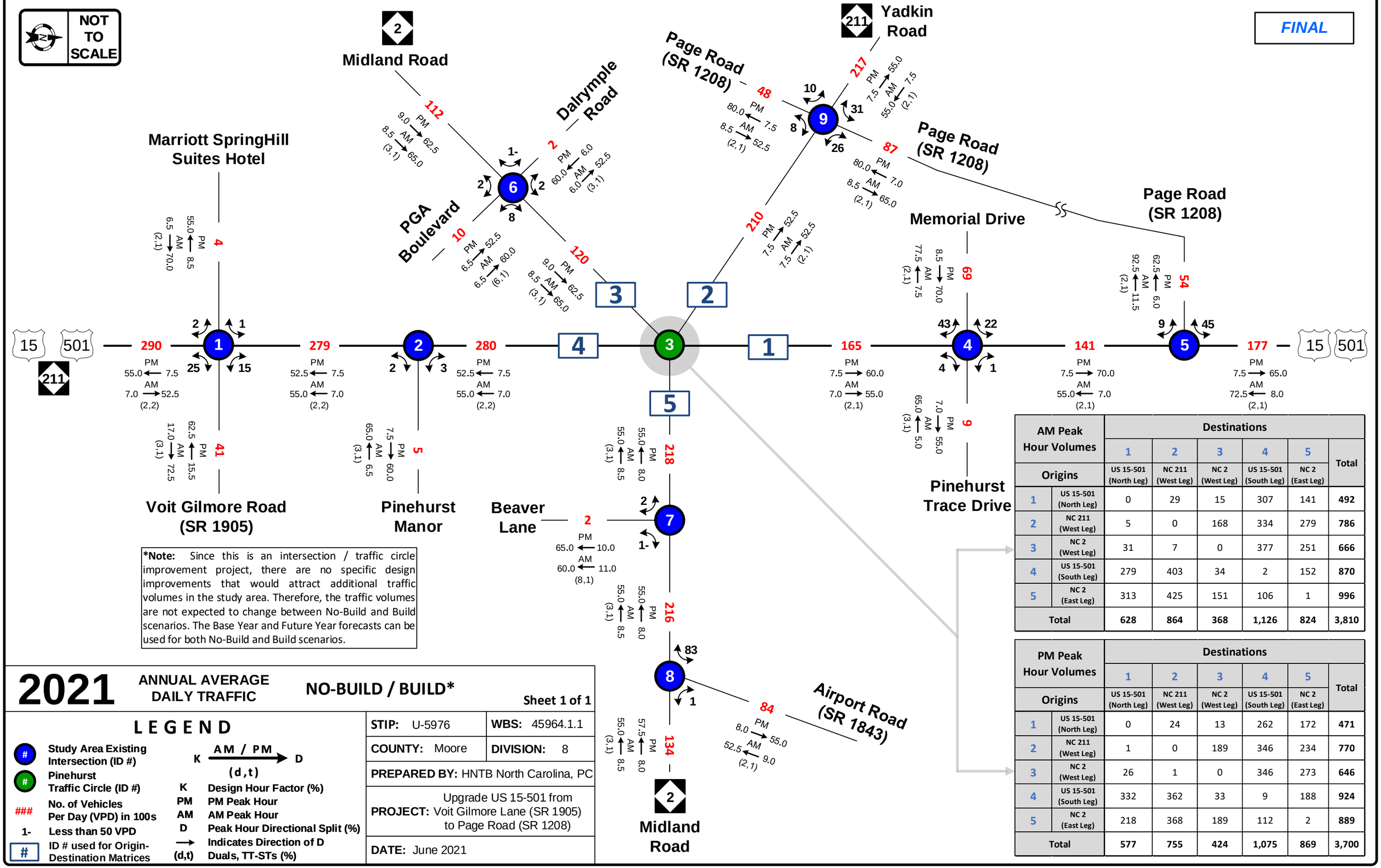
The 2045 FY traffic forecast volumes were developed using historic AADT growth rates, extrapolations of historical AADT volumes, and growth percentages calculated from the Moore County TDM.

If it is determined that any of these assumptions have become inconsistent with the project and surrounding area activity, please request updated projections. If you have any questions or I can be of further assistance, please do not hesitate to call me at (919) 424-0483 or e-mail me at jburris@hntb.com.

cc: Keith Dixon (trafficforecast@ncdot.gov), NCDOT Transportation Planning Division
NCDOT Traffic Forecasting GIS Support (trafficforecastinggissupport@ncdot.gov)

NOT TO SCALE

FINAL



***Note:** Since this is an intersection / traffic circle improvement project, there are no specific design improvements that would attract additional traffic volumes in the study area. Therefore, the traffic volumes are not expected to change between No-Build and Build scenarios. The Base Year and Future Year forecasts can be used for both No-Build and Build scenarios.

AM Peak Hour Volumes

Origins		Destinations 1 US 15-501 (North Leg)	2 NC 211 (West Leg)	3 NC 2 (West Leg)	4 US 15-501 (South Leg)	5 NC 2 (East Leg)	Total
1	US 15-501 (North Leg)	0	29	15	307	141	**492**
2	NC 211 (West Leg)	5	0	168	334	279	**786**
3	NC 2 (West Leg)	31	7	0	377	251	**666**
4	US 15-501 (South Leg)	279	403	34	2	152	**870**
5	NC 2 (East Leg)	313	425	151	106	1	**996**
Total		**628**	**864**	**368**	**1,126**	**824**	**3,810**

PM Peak Hour Volumes

Origins		Destinations 1 US 15-501 (North Leg)	2 NC 211 (West Leg)	3 NC 2 (West Leg)	4 US 15-501 (South Leg)	5 NC 2 (East Leg)	Total
1	US 15-501 (North Leg)	0	24	13	262	172	**471**
2	NC 211 (West Leg)	1	0	189	346	234	**770**
3	NC 2 (West Leg)	26	1	0	346	273	**646**
4	US 15-501 (South Leg)	332	362	33	9	188	**924**
5	NC 2 (East Leg)	218	368	189	112	2	**889**
Total		**577**	**755**	**424**	**1,075**	**869**	**3,700**

2021

ANNUAL AVERAGE DAILY TRAFFIC

NO-BUILD / BUILD*

Sheet 1 of 1

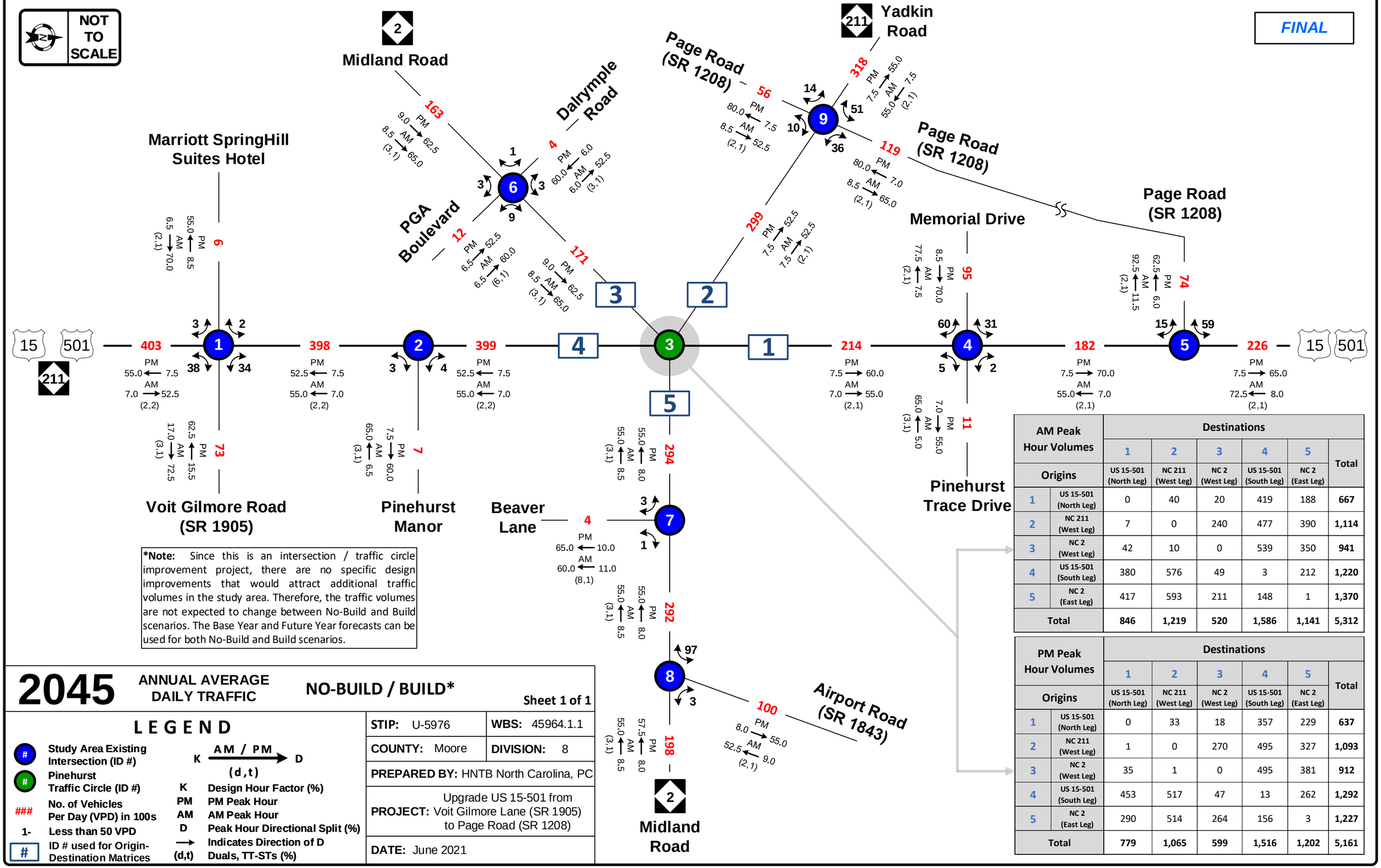
LEGEND

- (#) Study Area Existing Intersection (ID #)
- (#) Pinehurst Traffic Circle (ID #)
- ### No. of Vehicles Per Day (VPD) in 100s
- 1- Less than 50 VPD
- [#] ID # used for Origin-Destination Matrices
- K AM / PM D (d,t)
- K Design Hour Factor (%)
- PM PM Peak Hour
- AM AM Peak Hour
- D Peak Hour Directional Split (%)
- → Indicates Direction of D
- (d,t) Duals, TT-STs (%)

STIP: U-5976	**WBS:** 45964.1.1
COUNTY: Moore	**DIVISION:** 8
PREPARED BY: HNTB North Carolina, PC	
PROJECT: Upgrade US 15-501 from Voit Gilmore Lane (SR 1905) to Page Road (SR 1208)	
DATE: June 2021	

NOT TO SCALE

FINAL



***Note:** Since this is an intersection / traffic circle improvement project, there are no specific design improvements that would attract additional traffic volumes in the study area. Therefore, the traffic volumes are not expected to change between No-Build and Build scenarios. The Base Year and Future Year forecasts can be used for both No-Build and Build scenarios.

AM Peak Hour Volumes		Destinations					
		1	2	3	4	5	Total
Origins		US 15-501 (North Leg)	NC 211 (West Leg)	NC 2 (West Leg)	US 15-501 (South Leg)	NC 2 (East Leg)	
1	US 15-501 (North Leg)	0	40	20	419	188	**667**
2	NC 211 (West Leg)	7	0	240	477	390	**1,114**
3	NC 2 (West Leg)	42	10	0	539	350	**941**
4	US 15-501 (South Leg)	380	576	49	3	212	**1,220**
5	NC 2 (East Leg)	417	593	211	148	1	**1,370**
Total		**846**	**1,219**	**520**	**1,586**	**1,141**	**5,312**

PM Peak Hour Volumes		Destinations					
		1	2	3	4	5	Total
Origins		US 15-501 (North Leg)	NC 211 (West Leg)	NC 2 (West Leg)	US 15-501 (South Leg)	NC 2 (East Leg)	
1	US 15-501 (North Leg)	0	33	18	357	229	**637**
2	NC 211 (West Leg)	1	0	270	495	327	**1,093**
3	NC 2 (West Leg)	35	1	0	495	381	**912**
4	US 15-501 (South Leg)	453	517	47	13	262	**1,292**
5	NC 2 (East Leg)	290	514	264	156	3	**1,227**
Total		**779**	**1,065**	**599**	**1,516**	**1,202**	**5,161**

2045 ANNUAL AVERAGE DAILY TRAFFIC

NO-BUILD / BUILD*

Sheet 1 of 1

LEGEND

- # — Study Area Existing Intersection (ID #)
- # — Pinehurst Traffic Circle (ID #)
- ### — No. of Vehicles Per Day (VPD) in 100s
- 1- — Less than 50 VPD
- # — ID # used for Origin-Destination Matrices
- K AM / PM D (d,t)
- K — Design Hour Factor (%)
- PM — PM Peak Hour
- AM — AM Peak Hour
- D — Peak Hour Directional Split (%)
- → — Indicates Direction of D
- (d,t) — Duals, TT-STs (%)

STIP: U-5976	**WBS:** 45964.1.1
COUNTY: Moore	**DIVISION:** 8
PREPARED BY: HNTB North Carolina, PC	
PROJECT: Upgrade US 15-501 from Voit Gilmore Lane (SR 1905) to Page Road (SR 1208)	
DATE: June 2021	

1. PROJECT BACKGROUND

1.1. Forecast Request Information

The traffic forecast for this project was requested by Alison Kluttz of North Carolina Department of Transportation (NCDOT) Division 8 in March 2021 as part of the 2018 Traffic Forecasting Limited Services Agreement (LSA) to be performed by HNTB North Carolina, P.C.

1.2. Project Description

NCDOT State Transportation Improvement Program (STIP) Project U-5976 is proposed to upgrade existing US 15-501 from Voit Gilmore Lane (SR 1905) to Page Road (SR 1208), in Pinehurst and Southern Pines, NC (Moore County). STIP Project U-5976 is approximately 2.3 miles long and includes improvements to the Pinehurst Traffic Circle at US 15-501, NC 2 (Midland Road), and NC 211 (Yadkin Road) and improvements to the US 15-501 and Page Road (SR 1208) intersection. The traffic forecast study area for U-5976 includes a total of 9 existing intersections, which includes the five-leg Pinehurst Traffic Circle. **Figure 1** shows the project study area for this forecast.

STIP Project U-5976 is currently programmed for right-of-way (ROW) to begin in fiscal year 2024 and construction to begin in fiscal year 2026, per the 2020 – 2029 STIP. The 2020 – 2029 STIP was approved by the NCDOT Board of Transportation on September 5, 2019, was most recently revised on April 19, 2021, and received Federal Highway Administration (FHWA) approval in Spring 2020.

1.3. Traffic Forecast History

There are no recent, previously completed project-level traffic forecasts that are nearby the U-5976 traffic forecast study area. The two closest project-level traffic forecasts on forecast study area roadways include R-5726 and R-5929, which are approximately 7 miles and 10 miles away, respectively, from STIP Project U-5976. See **Section 2.1** for a summary of those two historic traffic forecasts.

N

15
501

Memorial Drive

5

Pinehurst Trace Drive

4

11

Airport Road (SR 1843)

211

Yadkin Road

Page Road (SR 1208)

9

7

8

3

Beaver Lane

Page Road (SR 1208)

6

2

Midland Road

Pinehurst Manor

2

Midland Road

PGA Boulevard

Pinehurst

15

501

Dalrymple Road

211

10

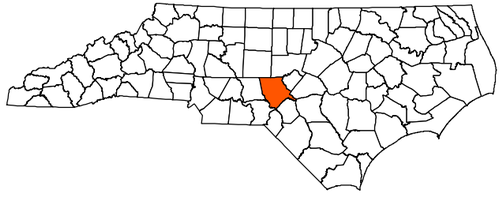
Voit Gilmore Lane (SR 1905)

1

Southern Pines

1

0 0.25 0.5 1 Miles



Legend

- Intersection (13-Hour TMC)
- Pinehurst Traffic Circle (Peak Period Origin-Destination Study)
- 24-Hour VSC Location
- U-5976 Traffic Forecast Extents
- US Highways
- NC Highways
- Roads
- Traffic Forecast Study Area

Traffic Forecast Extents & Count Location Map

PREPARED BY:

HNTB North Carolina, P.C.
343 E. Six Forks Rd, Suite 200
Raleigh, NC 27609

STIP: U-5976

COUNTY: Moore

PROJECT:
Upgrade US 15-501 from Voit Gilmore Lane (SR 1905) to Page Road (SR 1208)

DATE: June 2021

Figure 1

1.4. Traffic Forecast Description

This traffic forecast includes two scenarios that are listed below and summarized in **Table 1**. Since this is an intersection / traffic circle improvement project, there are no specific design improvements that would attract additional traffic volumes in the study area. Therefore, the traffic volumes are not expected to change between No-Build and Build scenarios. The Base Year and Future Year forecasts can be used for both No-Build and Build scenarios.

1. 2021 Base Year (BY)
2. 2045 Future Year (FY)

The 2021 BY traffic estimate volumes and design factors were developed by considering recent historic AADT, the projection of historic average annual daily traffic (AADT) to 2021, project specific count data, previously collected traffic count data from 2018, and applying engineering judgement. The traffic count data was collected on a weekday while the Moore County public school system was having in-person instruction (this was confirmed in a site visit on April 15, 2021 during data collection).

The 2045 FY traffic forecast volumes were developed using historic AADT growth rates, extrapolations of historical AADT volumes, and growth percentages calculated from the Moore County Travel Demand Model (TDM).

This technical memorandum provides traffic design data for design hourly volumes (K-factors), directional distribution percentages (D-factors), and heavy vehicle percentages (single-unit trucks, tractor-trailer-semi-trailers) as well as AADT estimates for the study corridor and describes the methodology and data inputs used in the traffic forecasting process.

Table 1 – Traffic Forecast Scenarios

Forecast Scenario	Year	Traffic Forecast Study Area Assumption
Base Year (No-Build / Build)	2021	Existing Road Network
Future Year (No-Build / Build)	2045	Includes: • Existing Road Network • All projects programmed for construction in the 2020 – 2029 STIP • Official Moore County TDM land uses at the TAZ level are incorporated

1.5. Local Population Data

The North Carolina Office of State Budget & Management (NCOSBM) population projections for Moore County and North Carolina are shown in **Table 2**. The compound annual growth rates of the NCOSBM population data are summarized in **Table 3**.

Table 2 – Historic & Projected Population Data

Geographic Area	Census Population			Population Estimates		Population Projections			
	1990	2000	2010	2015	2019	2025	2030	2040	2045
Moore County	59,000	74,768	88,247	94,136	101,219	111,395	120,258	137,848	146,574
North Carolina	6,632,448	8,046,813	9,535,483	10,029,904	10,487,088	11,108,479	11,677,603	12,821,708	13,394,273

Sources: NCOSBM LINC, accessed 4/21/2021, Census, https://linc.osbm.nc.gov/pages/population-housing/
NCOSBM County/State Population Projections, accessed 4/21/2021,
https://www.osbm.nc.gov/facts-figures/population-demographics/state-demographer/countystate-population-projections

Table 3 – Population Compound Annual Growth Rates

Geographic Area	2000-2010	2010-2019	2010-2040	2019-2030	2019-2045
Moore County	1.67%	1.54%	1.50%	1.58%	1.43%
North Carolina	1.71%	1.06%	0.99%	0.98%	0.95%

Socioeconomic data from the Moore County TDM (including population) was used as a criterion in determining study area growth between the Base Year and Future Year forecast years. **Table 4** displays a comparison between the NCOSBM and Moore County TDM population data for Moore County in the model base year (2010) and model future year (2040). The Moore County TDM matches the NCOSBM exactly in the year 2010, since both source values use the official US Census population for that year. In the year 2040, the Moore County TDM has a total population value that is approximately 9% higher than NCOSBM.

Table 4 – Moore County Population Comparison – NCOSBM to Model

Data Source	Population Estimates		Compound Annual Growth Rate
	2010	2040	2010 to 2040
NCOSBM	88,247	137,848	1.50%
Moore County TDM	88,247	150,168	1.80%
Difference (%)	0.0%	8.9%	0.30%

1.6. Local Land Use Data

Local land use plans, discussions with local planners and engineers, and a site field visit were used to study land use for the U-5976 traffic forecast study area. Current land uses within the study area are primarily medium density residential, open space golf courses, and institutional (FirstHealth Moore Regional Medical Center), with some commercial land uses on the periphery of the study area (e.g., shopping center at US 15-501 and Morganton Road). Land uses will remain, overall, similar in the Future Year. For information concerning relevant land use and transportation plans, see **Table 5**.

Table 5 – Existing Land Use & Transportation Plans

Entity	Plan	Date
Triangle Area Rural Planning Organization (TARPO)	*Moore County Comprehensive Transportation Plan (CTP)*	**TARPO Endorsement Date:** December 13, 2018 **NCDOT Board of Transportation Adoption:** January 10, 2019
	Midland Road Corridor Study	**Report Date:** July 2017
Moore County	*2013 Land Use Plan*	**Adoption Date:** November 19, 2013
	DRAFT 2020 Land Use Plan	**DRAFT Report Date:** Current as of 2020
Village of Pinehurst	*2019 Comprehensive Plan*	**Adoption Date:** October 2019
Town of Southern Pines	*Comprehensive Long-Range Plan*	**Adoption Date:** March 8, 2016

Listed below is information on known development in the forecast study area. This development information was provided by both the Village of Pinehurst and the Town of Southern Pines (refer to **Table 12** for notes from discussions with the local planners and engineers):

- **FirstHealth Moore Regional Medical Center Cancer Center:** A new 120,000 square foot cancer center is currently under construction on Page Road near the existing FirstHealth Moore Regional Medical Center.
- **Eagle Landing Apartments:** Three-story "luxury" apartments with a total of 288 units. The apartment complex is currently under construction and is located on the west side of US 15-501 just north of the Marriott Hotel and south of the Latter Day Saints Church. The following provided below is information from the approved site plan and provided by the Town of Southern Pines:

PARKING SUMMARY

UNIT TYPE	NUMBER OF UNITS	PARKING REQUIRED
1 BEDROOM	120	1 SPACES/UNIT
2 BEDROOM	144	2 SPACES/UNIT
3 BEDROOM	24	2 SPACES/UNIT

REQUIRED VISITOR PARKING = 1 SPACE PER 5 D.U = 58 SPACES

TOTAL REQUIRED = 120 + 288 + 48 + 58 = 514 SPACES

BICYCLE PARKING REQUIRED = 1 SPACE PER 10 DU = 29 BIKE SPACES

PARKING PROVIDED	515 SPACES
GARAGES	0 SPACES
TOTAL PARKING PROVIDED	515 SPACES

1.7. Route Information

The route information for traffic forecast study area routes is shown in **Table 6**.

Table 6 – Route Information

SR Number	Road Name	Functional Class	Traffic Forecast Study Area Cross-Sections (Existing)
-	US 15-501 / NC 211 (South of Inverrary Road)	Principal Arterial	5-lane undivided [1]
-	US 15-501 / NC 211 (Inverrary Road to Pinehurst Traffic Circle)		4-lane divided
-	US 15-501 (Pinehurst Traffic Circle to Memorial Drive / Pinehurst Trace Drive)		4-lane undivided
-	US 15-501 (North of Memorial Drive / Pinehurst Trace Drive)		2-lane undivided
-	NC 2 (Midland Road) (West of Pinehurst Traffic Circle)	Minor Arterial	4-lane divided
-	NC 2 (Midland Road) (East of Pinehurst Traffic Circle)	Principal Arterial	
-	NC 211 (Yadkin Road)	Principal Arterial	4-lane divided
-	Marriott SpringHill Suites Hotel	n/a	n/a
1905	Voit Gilmore Lane	Major Collector	2-lane undivided
-	Pinehurst Manor	n/a	n/a
-	Memorial Drive	Local	2-lane undivided
-	Pinehurst Trace Drive	Local	2-lane undivided
1208	Page Road	Major Collector	2-lane undivided
-	PGA Boulevard	Local	2-lane undivided
-	Dalrymple Road	Local	2-lane undivided
-	Beaver Lane	Local	2-lane undivided
1843	Airport Road	Minor Arterial	2-lane undivided

[1] The cross-section includes a two-way-left-turn-lane.

2. SOURCES OF INFORMATION AND DATA

2.1. Related Forecasts

The two closest project-level traffic forecasts on forecast study area roadways include R-5726 and R-5929, which are approximately 7 miles and 10 miles away, respectively, from STIP Project U-5976. **Table 7** provides details of these forecasts, which are not referenced elsewhere in this forecast report due to their lack of relevance for U-5976.

Table 7 – Historic Traffic Forecasts in the Study Area

Project STIP #	Year Forecast Completed	Project Description	Relevance to U-5976
R-5726	2016	Widen NC 211 to a multilane facility from NC 73 in West End to west of Holly Grove School Road (SR 1241).	**Low relevance:** • This project is approximately 7 miles west of U-5976 • This forecast is approximately 5 years old
R-5929	2019	Improve the intersection of US 15-501 and NC 24 / NC 27 in Carthage	**Low relevance:** • This project is approximately 10 miles north of U-5976

2.2. Travel Demand Model

The Moore County Travel Demand Model (TDM), most recently updated and effective on June 30, 2014, was used in the development of this forecast. The Moore County TDM has a Base Year of 2010 and a Future Year of 2040. The model includes all fiscally-constrained projects contained in the STIP at the time of the model's effective date, as well as socioeconomic data (population, households, employment, etc.) projections. For the purposes of the U-5976 forecast, model runs were completed after ensuring all relevant transportation projects proposed in the latest 2020 – 2029 STIP were included and by modifying the highway network to include projects if they were not originally in the model. See **Section 4.3** for more information.

The NCSTM (Generation 2.3, provided February 14, 2018, TransCAD 5 Build 1880) was also used in the development of this traffic forecast. The NCSTM has a Base Year of 2011 and a Future Year of 2040.

2.3. Historic AADT Data

HNTB reviewed all available NCDOT Traffic Survey Unit AADT data from 2000 to 2019 (most recent published information). A total of 13 historic AADT stations were referenced in this forecast. The historic AADT stations were referenced to help determine historic traffic growth rates on traffic forecast study area roadways. Linear growth trend line estimates were developed for roadway segments in the study area using the NCDOT AADT historical data. **Figure 2** shows the locations of the historical AADT data provided by the Traffic Survey Group and referenced in this forecast.

Table 8 displays available AADT from 2000 to 2019 for relevant roadway segments within the study area. **Table 9** displays available AADT from 2015 to 2019, 10-year and 20-year linear annual growth rates based on historic AADT linear regression lines, and 2021 AADT that is estimated based on the 10-year and 20-year historic linear annual growth rates. ***Appendix A*** shows detailed linear regression graphs used to determine 10-year and 20-year annual growth rates based on historical AADT data.

N

15
501

Memorial Drive

Airport Road (SR 1843)

211

Yadkin Road

Page Road (SR 1208)

Pinehurst Trace Drive

Page Road (SR 1208)

Beaver Lane

Midland Road

2

Pinehurst Manor

2

Midland Road

PGA Boulevard

Pinehurst

15
501

Dalrymple Road

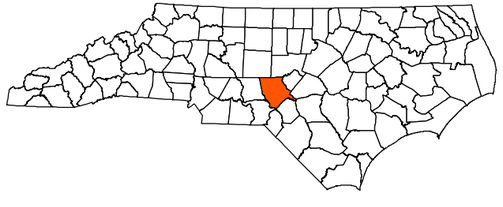
211

Voit Gilmore Lane (SR 1905)

Southern Pines

1

0 0.25 0.5 1 Miles



Legend

- Nearby Historic AADT Locations
- U-5976 Traffic Forecast Extents
- US Highways
- NC Highways
- Roads
- Traffic Forecast Study Area

Nearby Historic AADT Locations

PREPARED BY:

HNTB North Carolina, P.C.
343 E. Six Forks Rd, Suite 200
Raleigh, NC 27609

STIP: U-5976

COUNTY: Moore

PROJECT:
Upgrade US 15-501 from Voit Gilmore Lane (SR 1905) to Page Road (SR 1208)

DATE: June 2021

Figure 2

Table 8 – Historic AADT Traffic Volumes

Roadway	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001	2000
US 15-501 / NC 211 – North of Morganton Road (SR 1309) (just south of Voit Gilmore Lane (SR 1905)	27,000	28,500	28,000	-	27,000	-	25,000	-	-	-	28,000	-	-	-	-	-	-	-	-	-
US 15-501 / NC 211 – South of NC 2 (Midland Road) [1]	-	27,500	26,000	27,000	26,000	-	26,000	29,000	28,000	*21,000*	26,000	26,000	26,000	26,000	27,000	28,000	28,000	26,000	23,000	25,000
US 15-501 – North of NC 211 (Yadkin Road) [1]	-	16,000	*13,000*	15,000	16,000	-	16,000	*18,000*	16,000	15,000	16,000	14,000	*12,000*	16,000	15,000	16,000	15,000	14,000	13,000	14,000
US 15-501 – North of Page Road (SR 1208)	18,000	-	16,000	-	16,000	-	16,000	-	-	-	16,000	-	-	-	-	-	-	-	-	-
NC 2 (Midland Road) – West of US 15-501 [1]	-	9,600	-	*11,000*	7,100	7,600	8,700	8,500	8,400	7,500	7,500	-	7,700	8,000	8,600	8,100	6,800	6,500	5,800	5,400
NC 2 (Midland Road) – East of US 15-501 [1]	-	-	21,000	21,000	18,000	17,000	18,000	20,000	19,000	17,000	17,000	18,000	18,000	18,000	17,000	19,000	19,000	16,000	*9,400*	16,000
NC 2 (Midland Road) – East of Airport Road (SR 1843)	12,000	-	12,000	13,000	11,000	11,000	11,000	11,000	10,000	9,400	9,600	9,500	11,000	-	9,800	11,000	9,600	9,000	9,000	9,300
NC 211 (Yadkin Road) – West of Page Road (SR 1208) [1]	23,500	-	20,000	-	-	-	*12,000*	-	-	-	16,000	-	-	-	-	-	-	-	-	-
NC 211 (Yadkin Road) – East of Page Road (SR 1208)	-	23,500	20,000	19,000	18,000	19,000	-	18,000	17,000	15,000	16,000	17,000	15,000	15,000	17,000	16,000	17,000	15,000	14,000	16,000
Voit Gilmore Lane (SR 1905) – East of US 15-501 / NC 211	4,100	-	3,800	-	-	-	-	-	3,800	-	3,400	-	1,900	-	2,900	-	2,900	-	-	-
Page Road (SR 1208) – South of NC 211 (Yadkin Road)	-	4,800	-	4,400	-	4,500	-	4,700	-	4,500	-	-	-	4,600	-	4,900	-	3,800	3,700	-
Page Road (SR 1208) – North of NC 211 (Yadkin Road) [1]	7,800	-	8,200	-	6,100	-	-	-	5,900	-	7,200	-	*3,900*	-	5,000	-	7,100	-	6,200	-
Airport Road (SR 1843) – North of NC 2 (Midland Road)	-	7,800	-	5,900	-	-	-	7,800	-	5,700	-	6,900	-	7,800	-	8,000	-	5,700	5,600	-

Source of Historic AADT Traffic Volumes: NCDOT Traffic Survey Unit

[1] Blue and italicized historic AADT values are outliers that were removed for the purposes of calculating historic AADT linear regression lines in **Table 9**. Outliers were determined by first identifying statistical outliers (traffic volumes that are outside of two standard deviations of a historic AADT station's linear regression line) and then determining if the statistical outlier (or other unusual volumes identified) should be removed as a final outlier based on a qualitative review of AADT data collected for other years and an assessment of any recent developments that could have influenced traffic volumes.

Table 9 – Historic AADT Traffic Volumes and Growth Rates

Roadway	NCDOT Historic Traffic Count Data					Annual Growth Rate		2021 10-Year AADT Estimate [2]	2021 20-Year AADT Estimate [2]
	2015	2016	2017	2018	2019	10-Year [1]	20-Year [1]		
US 15-501 / NC 211 – North of Morganton Road (SR 1309) (just south of Voit Gilmore Lane (SR 1905)	27,000	-	28,000	28,500	27,000	1.58%	0.23%	29,000	27,600
US 15-501 / NC 211 – South of NC 2 (Midland Road) [3]	26,000	27,000	26,000	27,500	-	-0.73%	0.30%	25,800	27,500
US 15-501 – North of NC 211 (Yadkin Road) [3]	16,000	15,000	-	16,000	-	0.23%	0.69%	15,900	16,500
US 15-501 – North of Page Road (SR 1208)	16,000	-	16,000	-	18,000	1.84%	0.92%	18,000	17,400
NC 2 (Midland Road) – West of US 15-501 [3]	7,100	-	-	9,600	-	1.57%	1.86%	9,200	9,400
NC 2 (Midland Road) – East of US 15-501 [3]	18,000	21,000	21,000	-	-	1.98%	0.94%	21,600	20,200
NC 2 (Midland Road) – East of Airport Road (SR 1843)	11,000	13,000	12,000	-	12,000	2.79%	1.51%	13,300	12,300
NC 211 (Yadkin Road) – West of Page Road (SR 1208) [3] [4]	-	-	20,000	-	23,500	-	3.65%	-	23,900
NC 211 (Yadkin Road) – East of Page Road (SR 1208)	18,000	19,000	20,000	23,500	-	4.17%	1.89%	23,900	21,000
Voit Gilmore Lane (SR 1905) – East of US 15-501 / NC 211	-	-	3,800	-	4,100	0.75%	2.90%	4,100	4,300
Page Road (SR 1208) – South of NC 211 (Yadkin Road)	-	4,400	-	4,800	-	0.33%	0.85%	4,700	4,900
Page Road (SR 1208) – North of NC 211 (Yadkin Road) [3]	6,100	-	8,200	-	7,800	4.30%	1.27%	8,600	7,600
Airport Road (SR 1843) – North of NC 2 (Midland Road)	-	5,900	-	7,800	-	1.71%	0.66%	7,600	7,400

Historic AADT Source: NCDOT Traffic Survey Unit

[1] 10- and 20-year annual growth rates derived from linear regression projections of all available historic AADT from 2000 – 2019 and 2010 – 2019, respectively.

[2] AADT estimates are projected using historic AADT linear regression lines. Values are rounded to the nearest 100.

[3] Outliers displayed in **Table 8** are removed to calculate annual growth rates.

[4] Only two data points are available from 2010 to 2019.

2.4. Field Traffic Data Collection

The traffic count data for this forecast was collected by HNTB's subconsultant, Quality Counts LLC, in April 2021 when Moore County schools were having in-person instruction. 13-hour turning movement counts (TMCs) were completed for standard intersections and 24-hour volume, speed, class (VSC) counts were collected at two locations on US 15-501 adjacent to the traffic circle. AM and PM peak period origin-destination traffic data were collected for the Pinehurst Traffic Circle using drones.

Additionally, previously collected traffic count data from 2018 was downloaded from the *NCDOT Traffic Safety Data Files* website and used to check the reasonableness of the 2021 project-specific traffic count data, especially since the latest data was collected during the COVID-19 pandemic.

Table 10 provides a summary of the field traffic data collection completed for this forecast. **Figure 1** (previously referenced in **Section 1.2**) displays the locations of the traffic counts. Detailed reports of the traffic counts can be found in ***Appendix B***.

The partial weekday traffic count data was converted to a 24-hour daily traffic volume value by dividing the partial weekday traffic count by adjustment factors provided by the Traffic Survey Group on November 24, 2015 ("NCDOT Traffic Survey Partial Weekday Count Expansion Factors_11-24-15" spreadsheet). An adjustment factor ranging from 0.79 to 0.83 (depending on the route classification) was used for all 13-hour turning movement counts. The 24-hour daily traffic volume values were then converted to AADT by multiplying the 24-hour daily traffic volume by seasonal factors.

Seasonal factors for Automatic Traffic Recorder (ATR) Group 1 were considered appropriate for all U-5976 traffic forecast study area roadways. ATR Group 1 is the most dominant group in North Carolina. ATR Group 1 is used at a variety of different count locations that include nonurban primary routes and rural and urban secondary roads

To convert raw TMCs to AADT, the following equation was used:
AADT = (Raw Count) x (1 / (Adjustment Factor)) x (Seasonal Factor)

Table 10 – Field Traffic Data Collection

Location	Count Type	Date	Daily Factor [1]	ATR Group	Seasonal Factor
US 15-501 / NC 211 at Voit Gilmore Lane (SR 1905)	13-Hr TMC	April 15, 2021 (Thursday)	**	1	0.95
US 15-501 / NC 211 at Pinehurst Manor	13-Hr TMC	April 15, 2021 (Thursday)	**	1	0.95
US 15-501 at NC 2 (Midland Road) / NC 211 (Yadkin Road)	Origin-Destination counts collected via drones from 7 AM to 9 AM and 4 PM to 6 PM	April 15, 2021 (Thursday)	n/a	n/a	n/a
US 15-501 at Memorial Drive / Pinehurst Trace Drive	13-Hr TMC	April 15, 2021 (Thursday)	**	1	0.95
US 15-501 at Page Road (SR 1208)	13-Hr TMC	April 15, 2021 (Thursday)	**	1	0.95
NC 2 (Midland Road) at Dalrymple Road / PGA Boulevard	13-Hr TMC	April 15, 2021 (Thursday)	**	1	0.95
NC 2 (Midland Road) at Beaver Lane	13-Hr TMC	April 15, 2021 (Thursday)	**	1	0.95
NC 2 (Midland Road) at Airport Road (SR 1843)	13-Hr TMC	April 15, 2021 (Thursday)	**	1	0.95
NC 211 (Yadkin Road) at Page Road (SR 1208)	13-Hr TMC	April 15, 2021 (Thursday)	**	1	0.95
US 15-501 / NC 211 between Voit Gilmore Lane (SR 1905) and Pinehurst Manor	24-Hr VSC	April 15, 2021 (Thursday)	n/a	1	0.95
US 15-501 between NC 2 (Midland Road) / NC 211 (Yadkin Road) and Memorial Drive / Pinehurst Trace Drive	24-Hr VSC	April 15, 2021 (Thursday)	n/a	1	0.95
US 15-501 at Memorial Drive / Pinehurst Trace Drive	13-Hr TMC	January 10, 2018 (Wednesday)	**	1	1.10
US 15-501 at Page Road (SR 1208)	13-Hr TMC	January 10, 2018 (Wednesday)	**	1	1.10
US 15-501 / NC 211 at Pinehurst Manor	13-Hr TMC	October 24, 2018 (Wednesday)	**	1	0.96
US 15-501 at Memorial Drive / Pinehurst Trace Drive	13-Hr TMC	October 24, 2018 (Wednesday)	**	1	0.96
NC 2 (Midland Road) at Dalrymple Road / PGA Boulevard	13-Hr TMC	October 24, 2018 (Wednesday)	**	1	0.96
NC 2 (Midland Road) at Beaver Lane	13-Hr TMC	October 24, 2018 (Wednesday)	**	1	0.96
NC 2 (Midland Road) at Airport Road (SR 1843)	13-Hr TMC	October 24, 2018 (Wednesday)	**	1	0.96
NC 211 (Yadkin Road) at Page Road (SR 1208)	13-Hr TMC	October 24, 2018 (Wednesday)	**	1	0.96
NC 211 (Yadkin Road) at Aviemore Drive	13-Hr TMC	October 24, 2018 (Wednesday)	**	1	0.96

[1] 13-hour-to-24-hour partial weekday adjustment factor (default values provided by NCDOT Traffic Survey Group November 24, 2015)

** Combination of various 13-hour to 24-hour weekday adjustment factors were used:

0.8144 used for SR/Local Road movements (Traffic Survey Group default value)
0.8290 used for NC Route movements (Traffic Survey Group default value)
0.8259 used for US Route movements (Traffic Survey Group default value)
0.7886 used for Interstate Route movements (Traffic Survey Group default value)

2.5. Field Investigation

A field investigation of the project traffic forecast study area was conducted on Thursday, April 15, 2021, the same day the traffic count data was collected. Key observations made within the vicinity of the U-5976 traffic forecast study area included:

- The validation of existing land use patterns as determined based on local land use maps and discussions with local planners and engineers.
- The observance of in-person attendance at Pinecrest High School off Voit Gilmore Lane (SR 1905).
- Most businesses in the vicinity around the study appeared to be in business, which is noteworthy during the COVID-19 pandemic. At least one commercial space was available for lease in the Hickory Tavern shopping center (north of Voit Gilmore Lane).
- Traffic volumes in the forecast study area were observed and appeared to be normal relative to a site visit that HNTB took to the U-5976 study area in 2018 (before the pandemic). Various levels of queuing were observed at all Pinehurst Traffic Circle approaches in the AM peak period (between 7 AM and 9 AM), which included US 15-501 southbound traffic backing up to Page Road (approximately 2,800 feet).
- The "Eagle Landing" apartment complex is currently under construction on the west side of US 15-501/NC 211 and just north of Voit Gilmore Lane (SR 1905). The complex will include three-story luxury apartments with one- to three-bedroom units available. The apartment complex currently has an unsignalized connection to US 15-501/NC 211 and allows both right turns and left turns into and out of the complex (including both a left turn lane and a right turn lane to exit). A commercial site is currently available for purchase next to the apartments.

For more information on local land use and transportation planning documents, see **Table 5** in **Section 1.6**. After discussion with local planning staff, it was determined that all recent and planned developments are assumed to be included in the official Base Year and Future Year 2040 Moore County TDM socioeconomic (SE) data sets.

2.6. Other Sources

HNTB collected information on relevant roadway improvement projects within and around the traffic forecast study area. **Table 11** displays the relevant nearby projects that are included in the current 2020 – 2029 STIP and the status of their applicability to the U-5976 traffic forecast. Note that the projects summarized in this table are just a subset of all 2020 – 2029 STIP projects in Moore County.

Table 12 lists the engineers, planners, and local officials contacted for information and their responses.

Table 11 – Nearby 2020 – 2029 STIP Projects

STIP ID	Route	Project Description	From	To	Length (miles)	STIP Programmed Fiscal Years		Application to U-5976 Traffic Forecast
						ROW / Utilities	Construction	
U-5976	US 15-501	Upgrade Page Road (SR 1208) intersection and construct improvements to Pinehurst Traffic Circle and approaches	Voit Gilmore Lane (SR 1905)	Page Road (SR 1208)	2.3	2024	2026	**N/A:** Since this is an intersection / traffic circle improvement project, there are no specific design improvements that would attract additional traffic volumes in the study area.
R-5726	NC 211	Widen to a multi-lane facility	NC 73 in West End	West of Holly Grove School Road (SR 1241)	7.1	Currently in Progress	2025 through 2029	**Included**
R-5891	US 15-501 / NC 211	Convert at-grade intersection to an interchange	Morganton Road (SR 1309)		-	2029 through Unfunded Future Year	Unfunded Future Year	**Not Included:** Construction Year is entirely included in the "Unfunded Future Year" category
R-5892	NC 5 (Beulah Hill Road)	Add turn lanes, signal improvements, and other operational improvements along corridor as appropriate	Trotter Drive / Blake Boulevard	NC 211	2.8	2028	Unfunded Future Year	**N/A:** No specific design improvements to attract additional traffic volumes in the study area
R-5927	US 15-501	Widen to a multi-lane facility	NC 2 (Midland Road) / NC 211 (Yadkin Road)	NC 73	3.7	2026 through 2027	2029 through Unfunded Future Year	**Included**
U-5756	NC 5	Widen to a multi-lane facility	US 1	Trotter Drive / Blake Boulevard	4.35	2023	2025	**Included**
U-5814	US 15-501 / NC 211	Access management improvements	US 1	Brucewood Road	1.3	In Progress	2025 through 2026	**N/A:** No specific design improvements to attract additional traffic volumes in the study area

Note: The projects summarized in this table are just a subset of 2020 – 2029 STIP projects that are within the vicinity of the U-5976 traffic forecast study area. As summarized in **Table 1**, all 2020 – 2029 STIP projects are assumed complete in the future year traffic forecast scenarios.

Table 12 – Local Contacts

Name of Contact	Position	Organization	Date of Contact	Contact Info.	Topics Discussed
Xin Wang, PhD	Transportation Engineer III	NCDOT TPD	4/13/2021 (Email)	xwang2@ncdot.gov (919) 707-0957	Provided the Moore County TDM and model manual
Matt Day, AICP, CTP	Rural Mobility & Transportation Program Manager	Triangle Area Rural Planning Organization (TARPO)	4/22/2021 (Email)	mday@tjcog.org (919) 558-9397	**Excerpt of Email Response:** • There was a past development proposal on a property northwest of the US 15-501/Morganton intersection for a shopping center that would have had a primary access point on US 15-501 and a secondary driveway to Morganton Rd. However, this proposal was successfully blocked by nearby residents a few years ago. I'm not sure what will eventually happen with that property (between the Springhill Suites and the LDS church), but something will probably get built there eventually (maybe smaller scale than the previous proposal, though, or without the back access to Morganton). That's the only large non-developed parcel I'm aware of along this specific stretch of US 15-501. • Looking beyond the immediate project area, there are a few large projects that may have some impact on your study area: ○ Morganton Park (a large development on Morganton Road east of US 15-501) – partially built already (shopping center on south side, apartments and some medical buildings on north side); remaining parts I believe are more office-type uses on north side ○ New Southern Pines Elementary School (adjacent to Morganton Park) ○ There was discussion of possibly a shopping center at US 15-501 and Juniper Lake Rd (north of your study area), but I don't know if that ever moved beyond the discussion stage ○ First Health Moore Regional Hospital seems to always have some type of expansion going on (just west of US 15-501, with several access points) – I believe they are working on a cancer center expansion at this time • In terms of general future land use trends, I think you will see a small bit of infill happen in this immediate corridor, but it is largely built out right now. You will probably also see: ○ Residential growth in some of the large undeveloped/still developing parcels along the Airport Rd corridor and toward Whispering Pines ○ Growth spilling northward along the US 15-501 corridor into some currently-rural areas north of Pinehurst (commercial and residential) ○ Growth in Carthage (to the north along US 15-501) ○ Growth spilling westward along the NC 211 corridor west of Pinehurst ○ Some redevelopment of some of the older commercial areas south of your study area on US 15-501 FYI, there have been a number of NCDOT studies in recent years at the Pinehurst Traffic Circle (including at least one that I believe was done by HNTB) that you may also be able to get some information from. And there is a travel demand model for Moore County (housed at TPD) that was developed for the CTP – however that model's getting a little old by now. We're starting preparation for an update to that model's SE data, but it won't be available anytime soon.
Darryn Burich	Planning & Inspections Director	Village of Pinehurst	4/23/2021 & 5/3/2021 (Both Email)	dburich@vopnc.org (910) 295-8658	The biggest thing happening in the project area is the new 120,000 square foot cancer center that FirstHealth Moore Regional Medical Center will be constructing on Page Road (north). The building permit was just recently issued for the building.

Table 12 (Continued) – Local Contacts

Name of Contact	Position	Organization	Date of Contact	Contact Info.	Topics Discussed
BJ Grieve	Planning Director	Town of Southern Pines	4/27/2021 (Email)	bjgrieve@southernpines.net (910) 692-4003	Provided information about the Eagle Landing apartment complex from the approved site plan (see information below). The total number of units summarize to equal 288 apartment units. PARKING SUMMARY UNIT TYPE — NUMBER OF UNITS — PARKING REQUIRED 1 BEDROOM — 120 — 1 SPACES/UNIT 2 BEDROOM — 144 — 2 SPACES/UNIT 3 BEDROOM — 24 — 2 SPACES/UNIT REQUIRED VISITOR PARKING = 1 SPACE PER 5 D.U = 58 SPACES TOTAL REQUIRED = 120 + 288 + 48 + 58 = 514 SPACES BICYCLE PARKING REQUIRED = 1 SPACE PER 10 DU = 29 BIKE SPACES PARKING PROVIDED 515 SPACES GARAGES 0 SPACES TOTAL PARKING PROVIDED 515 SPACES
Scott Walston, PE, CPM	Eastern Piedmont Group Supervisor	NCDOT TPD	4/30/2021 (Email)	swalston@ncdot.gov (919) 707-0941	• The Pinehurst Traffic Circle has big backups on US 15-501 southbound to get in the circle at the peak hour. • There was a study about the traffic circle a few years ago, which NCDOT Division 8 would probably be aware of.
Bryan Kluchar, PE	Division Planning Engineer	NCDOT Highway Division 8	5/7/2021 (Email)	bdkluchar@ncdot.gov (910) 773-8021	**Note:** The comment provided by Bryan Kluchar is representative of him, Alison Klutz, and Matthew Kitchen in NCDOT Division 8. **Excerpt of Email Response:** Please take note of the traffic performing U-turn movements on NC 2 east of PGA Boulevard. With the No U Turn restriction at PGA Boulevard there is a heavy movement of vehicle on NC 211 east that use the slip lane to NC 2 and utilize the U-turn to free flow back to the circle to head onto 15-501 south. Results could skew the destination study for the circle if not accounted for. This occurs regular during peak hours.

3. 2021 BASE YEAR TRAFFIC ESTIMATE

The 2021 BY scenario is a traffic estimate for existing traffic study area conditions using actual field collected traffic counts from April 2021 and historical NCDOT AADT data. The 2021 BY estimate was used in the development of the 2045 FY traffic forecast scenario.

3.1. Assumptions

The 2021 count data collected for this forecast is assumed to represent a typical weekday. No special events, construction or other activities are known to have affected traffic in any unusual way during the data collection. Moore County schools were having in-person instruction on the day that traffic count data was collected.

During the process of 2021 BY AADT selection, it was determined that the April 2021 traffic count data was not substantially different than recent historic AADT and from traffic count data collected in 2018 (downloaded from the *NCDOT Traffic Safety Data Files* website). A site visit taken on the day of traffic data collection also confirmed the reasonableness of traffic patterns relative to pre-pandemic conditions. Therefore, this 2021 traffic count data, and 2021 BY Selected AADT based on it, are considered valid for the purposes of this traffic forecast (regardless if being compared to pandemic or pre-pandemic conditions).

3.2. Methodology

Field collected 2021 count data was primarily used to determine the 2021 BY estimate, followed by comparing count data with 2018 traffic count data, recent historical AADT, historical trend line estimates, extrapolating historical AADT volumes to 2021 using 10-year historic growth rates and 20-year historic growth rates, and applying engineering judgment. To determine intersection forecasts, AADT volumes, Directional Flow (D) percentages, and Design Hourly Volume (DHV) percentages were input into adjustable peak hour breakout spreadsheets provided by NCDOT. For the 2021 BY traffic estimate, existing count data at individual intersections and key roadway segments provided accurate mainline and bi-directional turn data. Bi-directional turning volumes were adjusted to calibrate as closely as possible with actual field conditions and balance with mainline traffic volumes.

The Pinehurst Traffic Circle turning movements were determined via a drone study that was conducted from 7 AM to 9 AM and 4 PM to 6 PM on the day of 2021 field data collection. This study was used to determine the origins and destinations of every vehicle that used the Pinehurst Traffic Circle. The AM and PM peak hour results of this traffic study are displayed as origin-destination matrices in the U-5976 traffic forecast diagrams.

3.3. Design Factors

Appropriate design characteristics (DHV, D, and heavy truck percentages) were determined for the traffic forecast study area by reviewing NCDOT historical AADT count station data and existing traffic count data. The 2021 BY design data information is shown in **Table 13** (AM peak hour and daily heavy truck percentages) and **Table 14** (PM peak hour).

Peak Hour Directional Split (D) factors for the BY traffic estimate were determined by comparing AM and PM peak hour approach/departure volumes to daily approach departure volumes for a roadway segment or corridor. The forecast attempted to provide consistent D factors along

corridor segments uninterrupted by major Y-line roadways. The D factors were rounded to the nearest 2.5% increment.

Design Peak Hour Factors (K) were determined by comparing approach and departure highest AM and PM peak hour traffic volumes for a segment to the estimated AADT to approximate K_{30}. The forecast attempted to provide consistent K-factors along corridor segments uninterrupted by major Y-line roadways.

3.4. BY Traffic Estimate Results

Table 15 provides the estimated AADT from the existing count data, projected 2021 AADT based on historical AADT, 2018 count data AADT estimates, and the 2021 selected BY Estimate volumes. NCDOT adjustable intersection analysis buddy (IAB) results for traffic forecast study area intersections are included in ***Appendix C***.

Table 13 – 2021 BY AM Peak Design Factors and Daily Heavy Truck Percentages

Roadway	D – Directional Distribution % (AM Peak) [1]				K – AM Peak Hour Factor % [1]				Daily Heavy Truck % (Dual, TTST) [1]				
	2018 Previous Count Data	Existing Count		Selected 2021 Value	2018 Previous Count Data	Existing Count		Selected 2021 Value	2018 Previous Count Data	2019 AADT Shape File [2]	Existing Count		Selected 2021 Value
		TMC	VSC			TMC	VSC				TMC	VSC	
US 15-501 / NC 211 – South of Voit Gilmore Lane (SR 1905)	-	51 NB	-	**52.5 NB**	-	6.9	-	**7.0**	-	2, 2	2, 1	-	**2, 2**
US 15-501 / NC 211 – Voit Gilmore Lane (SR 1905) to Pinehurst Manor	57 SB	57 SB	56 SB	**55 SB**	6.8	6.9	7.1	**7.0**	2, 1	2, 2	2, 1	4, 2	**2, 2**
US 15-501 / NC 211 – Pinehurst Manor to NC 2 (Midland Road) / NC 211 (Yadkin Road)	56 SB	56 SB	-	**55 SB**	6.8	7.0	-	**7.0**	2, 1	2, 2	2, 1	-	**2, 2**
US 15-501 – NC 2 (Midland Road) / NC 211 (Yadkin Road) to Memorial Drive / Pinehurst Trace Drive [3]	53 NB / 54 NB	56 NB	59 NB	**55 NB**	6.9 / 7.4	7.1	6.7	**7.0**	2, 1	2, 1	2, 0	7, 1	**2, 1**
US 15-501 – Memorial Drive / Pinehurst Trace Drive to Page Road (SR 1208)	57 SB / 59 SB	54 SB / 56 SB	-	**55 SB**	6.1 / 7.0	6.4	-	**7.0**	2, 1	2, 1	3, 0	-	**2, 1**
US 15-501 – North of Page Road (SR 1208)	76 SB	72 SB	-	**72.5 SB**	8.5	7.5	-	**8.0**	-	2, 1	2, 0	-	**2, 1**
NC 2 (Midland Road) – West of Dalrymple Road / PGA Boulevard	65 EB	64 EB	-	**65 EB**	8.9	8.3	-	**8.5**	2, 0	3, 1	3, 0	-	**3, 1**
NC 2 (Midland Road) – Dalrymple Road / PGA Boulevard to US 15-501 / NC 211	65 EB	64 EB	-	**65 EB**	8.7	8.2	-	**8.5**	2, 0	3, 1	3, 0	-	**3, 1**
NC 2 (Midland Road) – US 15-501 / NC 211 to Beaver Lane	52 WB	54 WB	-	**55 WB**	8.4	8.3	-	**8.5**	2, 0	3, 1	2, 1	-	**3, 1**
NC 2 (Midland Road) – Beaver Lane to Airport Road (SR 1843)	52 WB	54 WB	-	**55 WB**	8.5 / 8.6	8.3	-	**8.5**	2, 0	3, 1	2, 1	-	**3, 1**
NC 2 (Midland Road) – East of Airport Road (SR 1843)	54 WB	55 WB	-	**55 WB**	8.4	8.0	-	**8.5**	2, 1	3, 1	3, 1	-	**3, 1**
NC 211 (Yadkin Road) – West of Page Road (SR 1208)	57 EB	54 EB	-	**55 EB**	7.8	7.4	-	**7.5**	2, 1	2, 1	3, 1	-	**2, 1**
NC 211 (Yadkin Road) – Page Road (SR 1208) to US 15-501	50 / 52 WB	51 WB	-	**52.5 WB**	7.5 / 7.9	7.3	-	**7.5**	2, 1	2, 1	2, 1	-	**2, 1**
Marriott SpringHill Suites Hotel – West of US 15-501 / NC 211	-	71 EB	-	**70 EB**	-	6.3	-	**6.5**	-	-	0, 0	-	**2, 1**
Voit Gilmore Lane (SR 1905) – East of US 15-501 / NC 211	-	73 EB	-	**72.5 EB**	-	16.9	-	**17.0**	-	-	3, 0	-	**3, 1**
Pinehurst Manor – East of US 15-501 / NC 211	64 WB	65 WB	-	**65 WB**	7.4	5.8	-	**6.5**	2, 0	-	3, 0	-	**3, 1**
Memorial Drive – West of US 15-501	73 WB	78 WB	-	**77.5 WB**	6.9 / 7.1	7.5	-	**7.5**	1, 0	-	1, 0	-	**2, 1**
Pinehurst Trace Drive – East of US 15-501	56 WB / 63 WB	67 WB	-	**65 WB**	2.9 / 4.8	4.6	-	**5.0**	3, 0	-	3, 0	-	**3, 1**
Page Road (SR 1208) – West of US 15-501	94 WB	93 WB	-	**92.5 WB**	12.8	11.4	-	**11.5**	-	-	2, 0	-	**2, 1**
PGA Boulevard – South of NC 2 (Midland Road)	55 NB	63 NB	-	**60 NB**	6.7	6.6	-	**6.5**	3, 0	-	6, 0	-	**6, 1**
Dalrymple Road – North of NC 2 (Midland Road)	53 SB	57 NB	-	**52.5 NB**	9.0	5.3	-	**6.0**	9, 0	-	3, 0	-	**3, 1**
Beaver Lane – South of NC 2 (Midland Road)	58 SB	60 SB	-	**60 SB**	6.2	10.8	-	**11.0**	7, 1	-	8, 0	-	**8, 1**
Airport Road (SR 1843) – North of NC 2 (Midland Road)	51 NB	53 SB	-	**52.5 SB**	8.7	8.8	-	**9.0**	2, 0	-	2, 0	-	**2, 1**
Page Road (SR 1208) – South of NC 211 (Yadkin Road)	52 NB	51 NB	-	**52.5 NB**	8.3	8.1	-	**8.5**	2, 0	-	2, 0	-	**2, 1**
Page Road (SR 1208) – North of NC 211 (Yadkin Road)	65 NB	63 NB	-	**65 NB**	8.5	8.0	-	**8.5**	2, 0	-	2, 0	-	**2, 1**

[1] Multiple design factors displayed with a slash for a roadway segment are the result of neighboring intersection turning movement counts that provide two different design factor values.

[2] 2019 Traffic Data Segment Shapefile provided by the NCDOT Traffic Survey Group

[3] Excessive queuing at the Pinehurst Traffic Circle led to vehicles queuing over top the US 15-501 tube counts north of the traffic circle. Therefore, the VSC heavy truck percentages may be over-estimated relative to other data sources.

Table 14 – 2021 BY PM Peak Design Factors

Roadway	D – Directional Distribution % (PM Peak) [1]				K – PM Peak Hour Factor % [1]			
	2018 Previous Count Data	Existing Count		Selected 2021 Value	2018 Previous Count Data	Existing Count		Selected 2021 Value
		TMC	VSC			TMC	VSC	
US 15-501 / NC 211 – South of Voit Gilmore Lane (SR 1905)	-	54 SB	-	**55 SB**	-	7.7	-	**7.5**
US 15-501 / NC 211 – Voit Gilmore Lane (SR 1905) to Pinehurst Manor	57 SB	50 / 51 NB	50	**52.5 SB**	7.5	7.4	7.6	**7.5**
US 15-501 / NC 211 – Pinehurst Manor to NC 2 (Midland Road) / NC 211 (Yadkin Road)	57 SB	50	-	**52.5 SB**	7.4	7.3	-	**7.5**
US 15-501 – NC 2 (Midland Road) / NC 211 (Yadkin Road) to Memorial Drive / Pinehurst Trace Drive	57 NB / 58 NB	60 NB	67 NB	**60 NB**	7.0 / 7.3	7.4	7.3	**7.5**
US 15-501 – Memorial Drive / Pinehurst Trace Drive to Page Road (SR 1208)	69 NB / 71 NB / 74 NB	69 NB / 70 NB	-	**70 NB**	7.7 / 8.4 / 8.9	7.7 / 7.8	-	**7.5**
US 15-501 – North of Page Road (SR 1208)	68 NB	63 NB	-	**65 NB**	8.3	7.3	-	**7.5**
NC 2 (Midland Road) – West of Dalrymple Road / PGA Boulevard	67 EB	61 EB	-	**62.5 EB**	9.4	9.1	-	**9.0**
NC 2 (Midland Road) – Dalrymple Road / PGA Boulevard to US 15-501 / NC 211	66 EB	61 EB	-	**62.5 EB**	9.2	8.9	-	**9.0**
NC 2 (Midland Road) – US 15-501 / NC 211 to Beaver Lane	50	54 WB	-	**55 WB**	8.4	8.0	-	**8.0**
NC 2 (Midland Road) – Beaver Lane to Airport Road (SR 1843)	50 / 51 WB	54 WB / 55 WB	-	**55 WB**	8.0 / 8.3	8.0	-	**8.0**
NC 2 (Midland Road) – East of Airport Road (SR 1843)	57 WB	57 WB	-	**57.5 WB**	8.2	7.8	-	**8.0**
NC 211 (Yadkin Road) – West of Page Road (SR 1208)	55 WB	54 WB	-	**55 WB**	7.8	7.4	-	**7.5**
NC 211 (Yadkin Road) – Page Road (SR 1208) to US 15-501	51 WB / 51 EB	51 WB	-	**52.5 WB**	7.8 / 8.1	7.4	-	**7.5**
Marriott SpringHill Suites Hotel – West of US 15-501 / NC 211	-	55 WB	-	**55 WB**	-	8.6	-	**8.5**
Voit Gilmore Lane (SR 1905) – East of US 15-501 / NC 211	-	63 WB	-	**62.5 WB**	-	15.3	-	**15.5**
Pinehurst Manor – East of US 15-501 / NC 211	61 EB	61 EB	-	**60 EB**	8.6	6.7	-	**7.5**
Memorial Drive – West of US 15-501	74 EB	67 EB	-	**70 EB**	8.1 / 8.3	8.3	-	**8.5**
Pinehurst Trace Drive – East of US 15-501	56 EB / 57 EB	52 EB	-	**55 EB**	6.6 / 7.5	6.7	-	**7.0**
Page Road (SR 1208) – West of US 15-501	59 WB	64 WB	-	**62.5 WB**	5.3	6.1	-	**6.0**
PGA Boulevard – South of NC 2 (Midland Road)	60 SB	58 NB	-	**52.5 NB**	6.8	6.4	-	**6.5**
Dalrymple Road – North of NC 2 (Midland Road)	56 SB	63 SB	-	**60 SB**	5.4	6.0	-	**6.0**
Beaver Lane – South of NC 2 (Midland Road)	88 SB	63 SB	-	**65 SB**	8.2	10.2	-	**10.0**
Airport Road (SR 1843) – North of NC 2 (Midland Road)	59 NB	50	-	**55 NB**	7.6	8.1	-	**8.0**
Page Road (SR 1208) – South of NC 211 (Yadkin Road)	85 SB	81 SB	-	**80 SB**	7.2	7.8	-	**7.5**
Page Road (SR 1208) – North of NC 211 (Yadkin Road)	82 SB	78 SB	-	**80 SB**	6.6	6.8	-	**7.0**

[1] Multiple design factors displayed with a slash for a roadway segment are the result of neighboring intersection turning movement counts that provide two different design factor values.

Table 15 – 2021 BY Selected AADT

Roadway	NCDOT Historic AADT					2021 10-Year (2010 – 2019) AADT Estimate [1]	2021 20-Year (2000 – 2019) AADT Estimate [1]	2018 Previously Collected Count Data AADT Estimate [2]		2021 Project Specific Count Data AADT Estimate [2]		2021 BY Selected AADT
	2015	2016	2017	2018	2019			TMC – 1/10/18	TMC – 10/24/18	TMC	VSC	
US 15-501 / NC 211 – South of Voit Gilmore Lane (SR 1905)	27,000	-	28,000	28,500	27,000	29,000	27,600	-	-	29,300	-	**29,000**
US 15-501 / NC 211 – Voit Gilmore Lane (SR 1905) to Pinehurst Manor	-	-	-	-	-	-	-	-	27,900	27,400 / 28,200	25,400	**27,900**
US 15-501 / NC 211 – Pinehurst Manor to NC 2 (Midland Road) / NC 211 (Yadkin Road)	26,000	27,000	26,000	27,500	-	25,800	27,500	-	28,000	27,500	-	**28,000**
US 15-501 – NC 2 (Midland Road) / NC 211 (Yadkin Road) to Memorial Drive / Pinehurst Trace Drive [3]	16,000	15,000	-	16,000	-	15,900	16,500	17,500	16,400	15,900	14,300	**16,500**
US 15-501 – Memorial Drive / Pinehurst Trace Drive to Page Road (SR 1208)	-	-	-	-	-	-	-	14,600	13,900	13,600	-	**14,100**
US 15-501 – North of Page Road (SR 1208)	16,000	-	16,000	-	18,000	18,000	17,400	18,600	-	16,800	-	**17,700**
NC 2 (Midland Road) – West of Dalrymple Road / PGA Boulevard	-	-	-	-	-	-	-	-	12,000	11,100	-	**11,200**
NC 2 (Midland Road) – Dalrymple Road / PGA Boulevard to US 15-501 / NC 211	7,100	-	-	9,600	-	9,200	9,400	-	12,500	12,000	-	**12,000**
NC 2 (Midland Road) – US 15-501 / NC 211 to Beaver Lane	-	-	-	-	-	-	-	-	23,400	21,800	-	**21,800**
NC 2 (Midland Road) – Beaver Lane to Airport Road (SR 1843)	18,000	21,000	21,000	-	-	21,600	20,200	-	22,600 / 23,100	21,400 / 21,600	-	**21,600**
NC 2 (Midland Road) – East of Airport Road (SR 1843)	11,000	13,000	12,000	-	12,000	13,300	12,300	-	14,200	13,400	-	**13,400**
NC 211 (Yadkin Road) – West of Page Road (SR 1208)	-	-	20,000	-	23,500	-	23,900	-	21,200	21,700	-	**21,700**
NC 211 (Yadkin Road) – Page Road (SR 1208) to US 15-501	18,000	19,000	20,000	23,500	-	23,900	21,000	-	20,800 / 21,000	20,900	-	**21,000**
Marriott SpringHill Suites Hotel – West of US 15-501 / NC 211	-	-	-	-	-	-	-	-	-	400	-	**400**
Voit Gilmore Lane (SR 1905) – East of US 15-501 / NC 211	-	-	3,800	-	4,100	4,100	4,300	-	-	4,000	-	**4,100**
Pinehurst Manor – East of US 15-501 / NC 211	-	-	-	-	-	-	-	-	600	500	-	**500**
Memorial Drive – West of US 15-501	-	-	-	-	-	-	-	7,900	6,900	5,900	-	**6,900**
Pinehurst Trace Drive – East of US 15-501	-	-	-	-	-	-	-	1,000	900	900	-	**900**
Page Road (SR 1208) – West of US 15-501	-	-	-	-	-	-	-	5,800	-	4,900	-	**5,400**
PGA Boulevard – South of NC 2 (Midland Road)	-	-	-	-	-	-	-	-	1,100	900	-	**1,000**
Dalrymple Road – North of NC 2 (Midland Road)	-	-	-	-	-	-	-	-	200	100	-	**200**
Beaver Lane – South of NC 2 (Midland Road)	-	-	-	-	-	-	-	-	200	200	-	**200**
Airport Road (SR 1843) – North of NC 2 (Midland Road)	-	5,900	-	7,800	-	7,600	7,400	-	8,600	8,200	-	**8,400**
Page Road (SR 1208) – South of NC 211 (Yadkin Road)	-	4,400	-	4,800	-	4,700	4,900	-	5,900	4,800	-	**4,800**
Page Road (SR 1208) – North of NC 211 (Yadkin Road)	6,100	-	8,200	-	7,800	8,600	7,600	-	10,000	8,700	-	**8,700**

[1] AADT estimates are projected using historic AADT linear regression lines (volumes rounded to the nearest 100).

[2] Multiple TMC AADT estimate values for a roadway segment are the result of neighboring intersection turning movement counts that provide two different traffic volume values for a given road segment (all AADT estimate volumes rounded to the nearest 100).

[3] Excessive queuing at the Pinehurst Traffic Circle led to vehicles queuing over top the US 15-501 tube counts north of the traffic circle. Therefore, the VSC AADT estimate at this location may be lower than other data sources.

4. GENERAL MODEL DATA

4.1. Travel Demand Model

As mentioned in **Section 2.2**, the Moore County TDM, most recently updated and effective on June 30, 2014, was used in the development of this forecast. The Moore County TDM has a BY of 2010 and a FY of 2040. The model includes all fiscally-constrained projects contained in the STIP at the time of the model's effective date, as well as socioeconomic data (population, households, employment, etc.) projections. For the purposes of the U-5976 forecast, model runs were completed after ensuring all relevant transportation projects proposed in the latest 2020 – 2029 STIP were included and by modifying the highway network to include projects if they were not originally in the model. See **Section 4.3** for more information.

The NCSTM (Generation 2.3, provided February 14, 2018, TransCAD 5 Build 1880) was also used in the development of this traffic forecast. The NCSTM has a Base Year of 2011 and a Future Year of 2040.

4.2. Model Socioeconomic Data

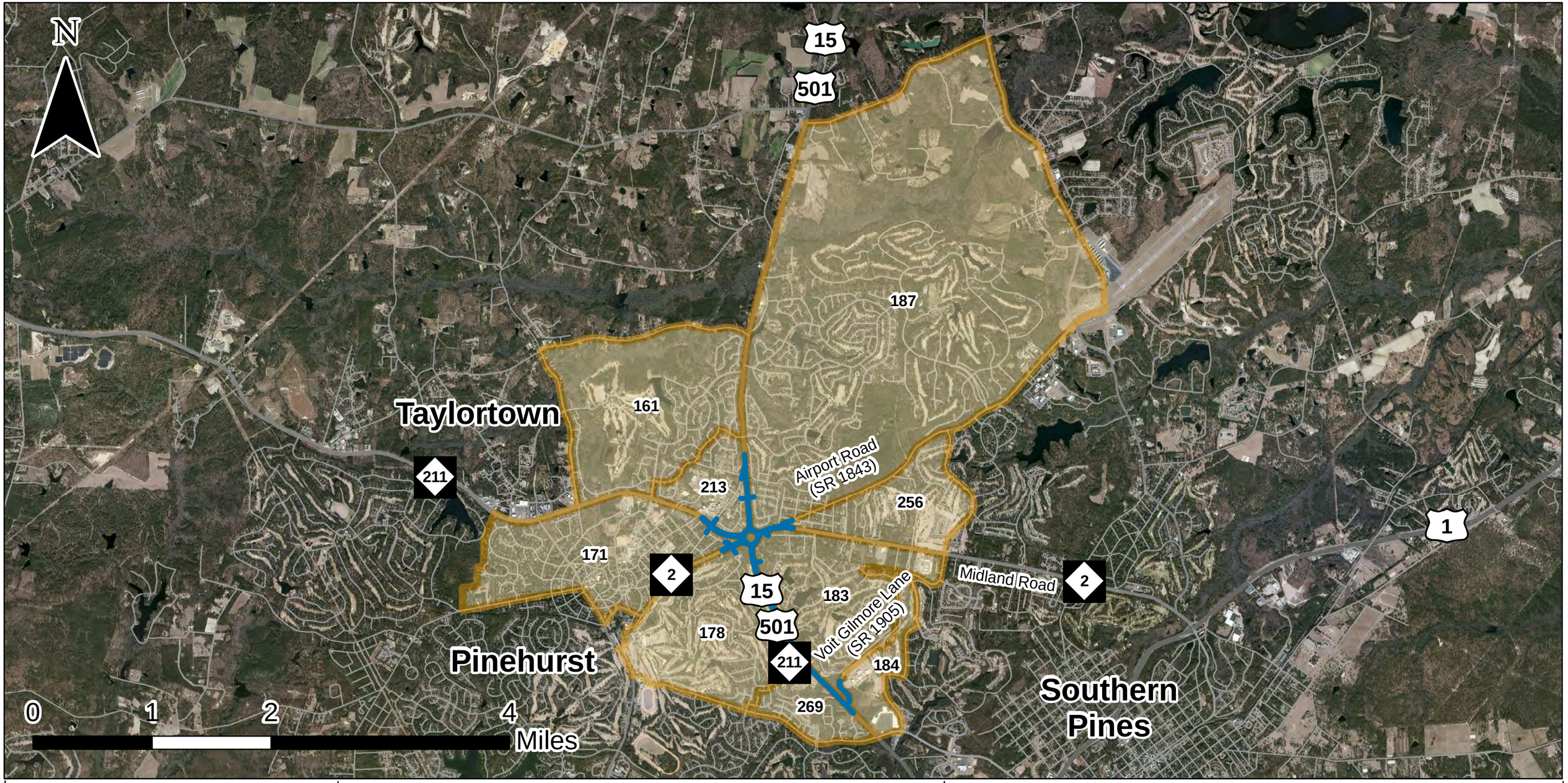
Land use data from the Moore County TDM was used as a criterion in determining study area growth between the Base Year and Future Year forecast years. The Moore County TDM uses specifically delineated Traffic Analysis Zones (TAZs) as areas where trips are generated or attracted based on population, households, and employment data. **Figure 3** shows locations of TAZs from the Moore County TDM adjacent to the study area. As shown in **Table 16** and **Table 17**, population in both the Adjacent TAZs and overall Moore County are projected to increase by approximately 70% from 2010 to 2040, which is comparable to the increase of households. The overall employment for the adjacent TAZs is anticipated to increase by 26%, as contrasted to an overall 60% increase in employment for Moore County.

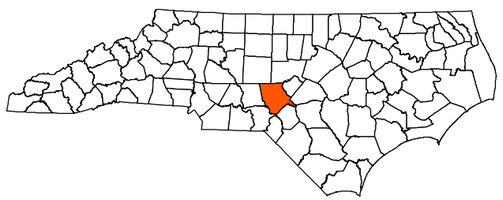
Table 16 – Base Year and Future Year Model TAZ Values

TAZ Statistic	Moore County TDM			
	2010		2040	
	Adjacent TAZs	All Model TAZs (Moore County)	Adjacent TAZs	All Model TAZs (Moore County)
Population	8,524	88,247	14,567	150,168
Households	3,911	37,540	6,243	64,371
Employment	6,808	31,868	8,550	50,887

Table 17 – Base Year and Future Year Model TAZ Data Growth Rates

TAZ Statistic	Moore County TDM			
	Total Percentage Change from 2010 to 2040		Compound Average Annual Growth Rate (2010 to 2040)	
	Adjacent TAZs	All Model TAZs (Moore County)	Adjacent TAZs	All Model TAZs (Moore County)
Population	71%	70%	1.8%	1.8%
Households	60%	71%	1.6%	1.8%
Employment	26%	60%	0.8%	1.6%





Legend

#### TAZ ID Number	US Highways
Adjacent TAZs	NC Highways
U-5976 Traffic Forecast Extents	Roads

Adjacent Traffic Analysis Zones

PREPARED BY:

HNTB North Carolina, P.C.
343 E. Six Forks Rd, Suite 200
Raleigh, NC 27609

STIP: U-5976 **COUNTY:** Moore

PROJECT:
Upgrade US 15-501 from Voit Gilmore Lane (SR 1905) to Page Road (SR 1208)

DATE: June 2021 **Figure 3**

4.3. Model Network Review

Output from the latest version of the Moore County TDM, effective June 30, 2014, was used as a tool in the development of this traffic forecast. The model was provided by the NCDOT Transportation Planning Division (TPD), which maintains the model for the TARPO.

The model includes all fiscally-constrained projects contained in the STIP at the time of the model's effective date, which required a thorough review due to the age of the model. The model network was thoroughly reviewed for accurate laneage, speed limits, facility types, and capacities for all model network roadways in the general vicinity of the forecast study area that would impact model traffic volume assignment. After review, it was determined that the following network modifications were needed to maintain accurate traffic flow conditions:

- Reduced the Pinehurst Traffic Circle from an all-around two-lane roundabout to a hybrid design that includes one-lane sections in between entrance/exit locations. This matches what the actual roundabout design is currently. **Applied to both the BY and FY.**
- Revised the 2010 BY model to include NC 211 (Yadkin Road) as a 4-lane divided facility from the Pinehurst traffic circle to NC 73 in West End. This facility was a 2-lane undivided facility in the year 2010 in both the model and in actuality, before being widened in 2014. In order to avoid an overly aggressive growth rate on NC 211 (Yadkin Road) from BY to FY in the model, the 2010 BY network was coded to include NC 211 (Yadkin Road) as a 4-lane divided facility for the limits of this project. **Coding applied to the BY Only (already coded in FY).**
- Changed the NC 211 (Yadkin Road) median type from "None" to "Divided." **Applied to both the BY and FY.**
- NC 211 (Yadkin Road) Segment ID # 3250 was revised from a 2-lane undivided to a 4-lane divided facility so that it appropriately matched the rest of NC 211 (Yadkin Road). **Applied to both the BY and FY.**
- US 15-501 from NC 2 (Midland Road) / NC 211 (Yadkin Road) to NC 73 – Revised the cross-section from a two-lane to four-lane divided cross-section to match STIP Project R-5927. **Applied to the FY scenario ONLY.**
- NC 5 from US 1 to Trotter Drive / Lake Boulevard – Revised the cross-section from a two-lane to four-lane cross-section to match STIP Project U-5756. **Applied to the FY scenario ONLY.**
- NC 211 from NC 73 in West End to west of Holly Grove School Road (SR 1241) – Revised the cross-section from a two-lane to four-lane divided cross-section to match STIP Project R-5726. **Applied to the FY scenario ONLY.**

4.4. NCSTM Model Heavy Truck Data

Table 18 was used to validate selected truck values for the Base Year and Future Year forecast scenarios. The table indicates minor changes at most (-2% to 0% increases) in Dual and TTST truck percentages from the NCSTM 2011 Base Year model run to the 2040 Future Year model run along model network roads in the traffic forecast study area. Therefore, Dual and TTST truck percentages are estimated to remain the same for both the 2021 and 2045 traffic forecast scenario years.

Table 18 – NCSTM Dual & TTST Output

Roadway [1]	Year	Total Flow	Dual Flow [2]	TTST Flow [3]	% Dual Flow	% TTST Flow
US 15-501 / NC 211 – South of Voit Gilmore Lane (SR 1905) to NC 2 (Midland Road) / NC 211 (Yadkin Road)	2011	11,722	515	428	4%	4%
	2040	25,721	838	587	3%	2%
US 15-501 – NC 2 (Midland Road) / NC 211 (Yadkin Road) to North of Page Road (SR 1208)	2011	11,824	353	246	3%	2%
	2040	20,304	486	272	2%	1%
NC 2 (Midland Road) – West of Dalrymple Road / PGA Boulevard to US 15-501 / NC 211	2011	3,248	105	65	3%	2%
	2040	4,409	140	75	3%	2%
NC 2 (Midland Road) – US 15-501 / NC 211 to East of Airport Road (SR 1843)	2011	6,878	261	217	4%	3%
	2040	13,600	387	283	3%	2%
NC 211 (Yadkin Road) – West of Page Road (SR 1208) to US 15-501	2011	12,877	623	515	5%	4%
	2040	32,184	1,058	739	3%	2%

[1] Forecast roadway segments are consolidated since the NCSTM includes only major statewide / regional roads
[2] Tot_Flow_tot_sut attribute in NCSTM loaded network (total flow of all single-unit trucks)
[3] Tot_Flow_tot_mut attribute in NCSTM loaded network (total flow of all multi-unit trucks)

4.5. Model Validation

Table 19 provides traffic forecast study area road network segments that are included in the Moore County TDM and comparable recent AADT information that provide validation for the use of the Moore County TDM in project traffic forecasting methodologies used in this report.

Table 19 – Model Validation

Roadway	Model Calibration		Forecast Traffic Volume	Future Year Traffic Volumes		
	Model (2010) [1]	AADT (Year)	2021 BY	Extrapolated (2045) [2]	Model (2040)	Forecast (2045)
US 15-501 / NC 211 – South of Voit Gilmore Lane (SR 1905)	26,090	28,000 (2009)	**29,000**	29,100	41,492	**40,300**
US 15-501 / NC 211 – Voit Gilmore Lane (SR 1905) to Pinehurst Manor	24,989	-	**27,900**	-	41,224	**39,800**
US 15-501 / NC 211 – Pinehurst Manor to NC 2 (Midland Road) / NC 211 (Yadkin Road)	24,989	26,000 (2009)	**28,000**	29,400	41,224	**39,900**
US 15-501 – NC 2 (Midland Road) / NC 211 (Yadkin Road) to Memorial Drive / Pinehurst Trace Drive	17,943	15,000 (2010)	**16,500**	19,000	22,329	**21,400**
US 15-501 – Memorial Drive / Pinehurst Trace Drive to Page Road (SR 1208)	17,943	-	**14,100**	-	22,329	**18,200**
US 15-501 – North of Page Road (SR 1208)	15,349	16,000 (2009)	**17,700**	20,900	19,119	**22,600**
NC 2 (Midland Road) – West of Dalrymple Road / PGA Boulevard	8,477	-	**11,200**	-	10,051	**16,300**
NC 2 (Midland Road) – Dalrymple Road / PGA Boulevard to US 15-501 / NC 211	8,477	7,500 (2010)	**12,000**	12,800	10,051	**17,100**
NC 2 (Midland Road) – US 15-501 / NC 211 to Beaver Lane	20,737	-	**21,800**	-	31,500	**29,400**
NC 2 (Midland Road) – Beaver Lane to Airport Road (SR 1843)	20,737	17,000 (2010)	**21,600**	24,300	31,500	**29,200**
NC 2 (Midland Road) – East of Airport Road (SR 1843)	12,707	9,400 (2010)	**13,400**	16,100	23,053	**19,800**
NC 211 (Yadkin Road) – West of Page Road (SR 1208)	11,184	16,000 (2009)	**21,700**	40,200	29,027	**31,800**
NC 211 (Yadkin Road) – Page Road (SR 1208) to US 15-501	18,824	15,000 (2010)	**21,000**	28,600	40,259	**29,900**
Marriott SpringHill Suites Hotel – West of US 15-501 / NC 211	-	-	**400**	-	-	**600**
Voit Gilmore Lane (SR 1905) – East of US 15-501 / NC 211	1,102	3,400 (2009)	**4,100**	6,500	4,327	**7,300**
Pinehurst Manor – East of US 15-501 / NC 211	-	-	**500**	-	-	**700**
Memorial Drive – West of US 15-501	-	-	**6,900**	-	-	**9,500**
Pinehurst Trace Drive – East of US 15-501	-	-	**900**	-	-	**1,100**
Page Road (SR 1208) – West of US 15-501	-	-	**5,400**	-	-	**7,400**
PGA Boulevard – South of NC 2 (Midland Road)	-	-	**1,000**	-	-	**1,200**
Dalrymple Road – North of NC 2 (Midland Road)	-	-	**200**	-	-	**400**
Beaver Lane – South of NC 2 (Midland Road)	-	-	**200**	-	-	**400**
Airport Road (SR 1843) – North of NC 2 (Midland Road)	10,646	5,700 (2010)	**8,400**	8,400	13,624	**10,000**
Page Road (SR 1208) – South of NC 211 (Yadkin Road)	-	4,500 (2010)	**4,800**	5,800	-	**5,600**
Page Road (SR 1208) – North of NC 211 (Yadkin Road)	-	7,200 (2009)	**8,700**	9,600	-	**11,900**

[1] The 2010 model volumes displayed in this table are based on a model run that has NC 211 (Yadkin Road) as a two-lane facility in 2010 (before it was widened to a 4-lane divided facility in 2014). This differs from the 2010 model run used in 2045 FY growth rate calculations, which codes NC 211 (Yadkin Road) as a 4-lane divided facility from the Pinehurst traffic circle to NC 73 in West End (its current 2021 configuration). In the instance of developing growth rates, keeping the laneage assumptions consistent on NC 211 (Yadkin Road) helps avoid the selection of an overly aggressive and unrealistic annual growth rate.

[2] 20-year annual growth rates derived from linear regression projections of all available historic AADT from 2000 – 2019 were used to extrapolate 2045 AADT volumes. 2045 Extrapolated AADT volumes are rounded to the nearest 100.

5. 2045 FUTURE YEAR TRAFFIC FORECAST

5.1. Assumptions

The 2045 FY forecast is the projection of the most likely future traffic volumes in the year 2045 with all fiscally-constrained projects in 2020 – 2029 STIP assumed to be complete. All 2020 – 2029 STIP projects that are relevant to this forecast are included in **Table 11** in **Section 2.6**.

Official Moore County TDM land uses at the TAZ level are incorporated, which includes all anticipated background developments.

5.2. Methodology

The 2045 FY forecast is based on a review and comparison of BY to FY model daily volumes and growth rates, followed by historical trend line estimates, model TAZ data, regional population and employment projections, knowledge of future land use, and engineering judgment. The general development of the 2045 FY traffic forecast included the following steps:

1) Growth rates were calculated based on the 10-year and 20-year historic AADT data and 2010 BY and 2040 FY Moore County TDM results. Applied growth rates were developed and refined based on these calculated growth rates as well as knowledge of future land use and the future road network, model TAZ data, regional population and employment projections, and engineering judgment.
2) The selected growth rates were applied to the 2021 BY Selected AADT volumes to develop unbalanced 2045 FY AADT estimates for each roadway segment.
3) The unbalanced 2045 FY AADT estimates were then balanced using the NCDOT TPD IAB tool. See ***Appendix C*** for the IAB tool results.
4) During the balancing process, AADT estimates were refined based on knowledge of future land use and the future road network, and engineering judgment, to provide consistent daily traffic flow patterns along the forecast study area corridors. At existing intersections, bi-directional turning movements were forecasted to calibrate, as closely as possible, with existing 2021 daily turning movement volumes while accounting for roadway network changes and traffic flow pattern shifts.

5.3. Design Factors

Traffic forecast design characteristics (D, DHV, heavy truck percentages) were determined to remain unchanged from the BY traffic estimate for all study area roadways based on a review of the FY roadway network, the Moore County TDM, anticipated future land use, and engineering judgment.

5.4. FY Traffic Forecast Results

Table 20 shows the historic growth rates, model growth rates, applied growth rates, and the 2045 FY Selected AADT volumes.

Table 20 – 2045 FY Selected AADT

Roadway	Reference Growth Rate		Model Daily Traffic Volumes & Growth Rate [2]			Applied Growth Rate	2021 BY Selected AADT	2045 FY Selected AADT
	10-Year Historic [1]	20-Year Historic [1]	2010 BY	2040 FY	Model CAGR			
US 15-501 / NC 211 – South of Voit Gilmore Lane (SR 1905)	1.58%	0.23%	27,534	41,492	1.38%	**1.4%**	29,000	**40,300**
US 15-501 / NC 211 – Voit Gilmore Lane (SR 1905) to Pinehurst Manor	-	-	26,429	41,224	1.49%	**1.5%**	27,900	**39,800**
US 15-501 / NC 211 – Pinehurst Manor to NC 2 (Midland Road) / NC 211 (Yadkin Road)	-0.73%	0.30%	26,429	41,224	1.49%	**1.5%**	28,000	**39,900**
US 15-501 – NC 2 (Midland Road) / NC 211 (Yadkin Road) to Memorial Drive / Pinehurst Trace Drive	0.23%	0.69%	16,262	22,329	1.06%	**1.1%**	16,500	**21,400**
US 15-501 – Memorial Drive / Pinehurst Trace Drive to Page Road (SR 1208)	-	-	16,262	22,329	1.06%	**1.1%**	14,100	**18,200**
US 15-501 – North of Page Road (SR 1208)	1.84%	0.92%	14,058	19,119	1.03%	**1.0%**	17,700	**22,600**
NC 2 (Midland Road) – West of Dalrymple Road / PGA Boulevard [3]	-	-	4,973	10,051	2.37%	**1.6%**	11,200	**16,300**
NC 2 (Midland Road) – Dalrymple Road / PGA Boulevard to US 15-501 / NC 211 [3]	1.57%	1.86%	4,973	10,051	2.37%	**1.5%**	12,000	**17,100**
NC 2 (Midland Road) – US 15-501 / NC 211 to Beaver Lane	-	-	21,657	31,500	1.26%	**1.3%**	21,800	**29,400**
NC 2 (Midland Road) – Beaver Lane to Airport Road (SR 1843)	1.98%	0.94%	21,657	31,500	1.26%	**1.3%**	21,600	**29,200**
NC 2 (Midland Road) – East of Airport Road (SR 1843) [4]	2.79%	1.51%	13,329	23,053	1.84%	**1.6%**	13,400	**19,800**
NC 211 (Yadkin Road) – West of Page Road (SR 1208)	-	3.65%	18,031	29,027	1.60%	**1.6%**	21,700	**31,800**
NC 211 (Yadkin Road) – Page Road (SR 1208) to US 15-501	4.17%	1.89%	25,896	40,259	1.48%	**1.5%**	21,000	**29,900**
Marriott SpringHill Suites Hotel – West of US 15-501 / NC 211	-	-	-	-	-	**1.7%**	400	**600**
Voit Gilmore Lane (SR 1905) – East of US 15-501 / NC 211 [3]	0.75%	2.90%	1,108	4,327	4.65%	**2.4%**	4,100	**7,300**
Pinehurst Manor – East of US 15-501 / NC 211	-	-	-	-	-	**1.4%**	500	**700**
Memorial Drive – West of US 15-501 [2]	-	-	29,961	44,591	1.33%	**1.3%**	6,900	**9,500**
Pinehurst Trace Drive – East of US 15-501	-	-	-	-	-	**0.8%**	900	**1,100**
Page Road (SR 1208) – West of US 15-501 [2]	-	-	29,961	44,591	1.33%	**1.3%**	5,400	**7,400**
PGA Boulevard – South of NC 2 (Midland Road)	-	-	-	-	-	**0.8%**	1,000	**1,200**
Dalrymple Road – North of NC 2 (Midland Road)	-	-	-	-	-	**2.9%**	200	**400**
Beaver Lane – South of NC 2 (Midland Road)	-	-	-	-	-	**2.9%**	200	**400**
Airport Road (SR 1843) – North of NC 2 (Midland Road)	1.71%	0.66%	11,045	13,624	0.70%	**0.7%**	8,400	**10,000**
Page Road (SR 1208) – South of NC 211 (Yadkin Road) [2]	0.33%	0.85%	25,317	30,556	0.63%	**0.6%**	4,800	**5,600**
Page Road (SR 1208) – North of NC 211 (Yadkin Road) [2]	4.30%	1.27%	29,961	44,591	1.33%	**1.3%**	8,700	**11,900**

[1] 10- and 20-year annual growth rates derived from linear regression projections of all available historic AADT from 2010 to 2019 and 2000 to 2019, respectively. See **Table 9**.

[2] Light orange cells with red text are locations where roadways are not coded in the model and centroid connector volumes were used to determine growth rates. The red text values are the sum of all model centroid connector daily traffic volumes for a given model traffic analysis zone (TAZ) that encompasses the location of the roadway. This provides a high-level idea of how model socioeconomic data growth for that location is influencing traffic volume growth.

[3] The approximate model traffic volume difference was used to determine the Selected 2045 FY AADT.

[4] The 2045 FY Selected AADT value was selected by considering model growth rates and adjacent intersection balancing and to fit in with overall corridor volume growth.