Kanuga Road (SR 1127)

Little River Road (SR 1123) to South Church Street (US 25 Business)

Henderson County

STIP Project No. R-5748

WBS No. 50203.1.D1

Traffic Forecast Report

Prepared For:

North Carolina Department of Transportation

Prepared By:

Patriot Transportation Engineering, PLLC

July 2017

TRAFFIC FORECAST COVER LETTER

July 6, 2017

MEMORANDUM TO:	Stephen Williams NCDOT Division 14
FROM:	Peter Trencansky, PE, PTOE, AICP Patriot Transportation Engineering, PLLC
SUBJECT:	Traffic Forecast for R-5748 Henderson County Kanuga Road (SR 1127) from Little River Road (SR 1123) to South Church Street (US 25 Business)

Please find attached the 2016/2040 traffic forecast for STIP Project Number R-5748 in Henderson County. The proposed project will make improvements along the Kanuga Road (SR 1127) corridor in Henderson County, from Little River Road (SR 1123)/White Squirrel Lane to South Church Street (US 25 Business). This forecast was requested for use in the project development activities associated with the project, including the NEPA documentation and Preliminary Roadway Design.

This is the first forecast for this project. The project is located within the boundaries of the French Broad River Metropolitan Planning Organization. The following three scenarios are provided in this forecast:

- 2016 Base Year No-Build
- 2040 Future Year No-Build
- 2040 Future Year Build

Brian Burch (NCDOT Division 14 Project Development Engineer), Wanda Austin (NCDOT Division 14 Project Manager), Steve Buchanan (NCDOT Division 14 Traffic Engineer), Steve Cannon (Division 14, District 1 District Engineer), Daniel Sellers (NCDOT Transportation Planning Branch), Brian Wert (NCDOT Transportation Planning Branch), Lyuba Zuyeva (French Broad River MPO), Susan Frady (City of Hendersonville Development Assistance Department), and Matt Champion (Henderson County Transportation Planner) were consulted during the development of this forecast.

Fiscal Constraint

The project is located within the boundaries of the French Broad River Metropolitan Planning Organization; therefore, the travel demand model and traffic forecast is fiscally constrained to match the assumptions of the corresponding Metropolitan Transportation Plan (MTP).

The French Broad River Metropolitan Planning Organization Metropolitan Transportation Plan 2015-2040 includes the proposed project in the Time Horizon 3: 2026-2030 (Unfunded TIP) group of projects and describes it as follows:

- HEND28-H, R-5748 – Kanuga Rd (SR 1127) from US 25 Business (Church St) to Little River Rd (SR 1123) – Add turn lanes, widen and improve geometrics as appropriate

Additionally, the following projects that may affect the proposed project are included in the 2015-2040 MTP and are assumed to be constructed prior to 2040:

Patriot Transportation Engineering, PLLC
3008 Anderson Drive, Suite 120
Raleigh, North Carolina 27609
Phone: 919.977.9125

- TIP Project U-5783 – US 64, from Blythe Street to Daniel Drive – Widening and improvements
- TIP Projects R-2588A and R-2588B – NC 191, from US 25 to NC 280 – Widen to a four-lane, median-divided facility
- TIP Project R-5744 – Balfour Parkway, from NC 191 to US 64 north of Nix Road – Construct a new four-lane expressway
- TIP Project U-5886 – White Street, from SR 1171 (Willow Rd) to US 176 (Spartanburg Highway) – Construct 3-lane connector, re-alignment and extension

Travel Demand Model

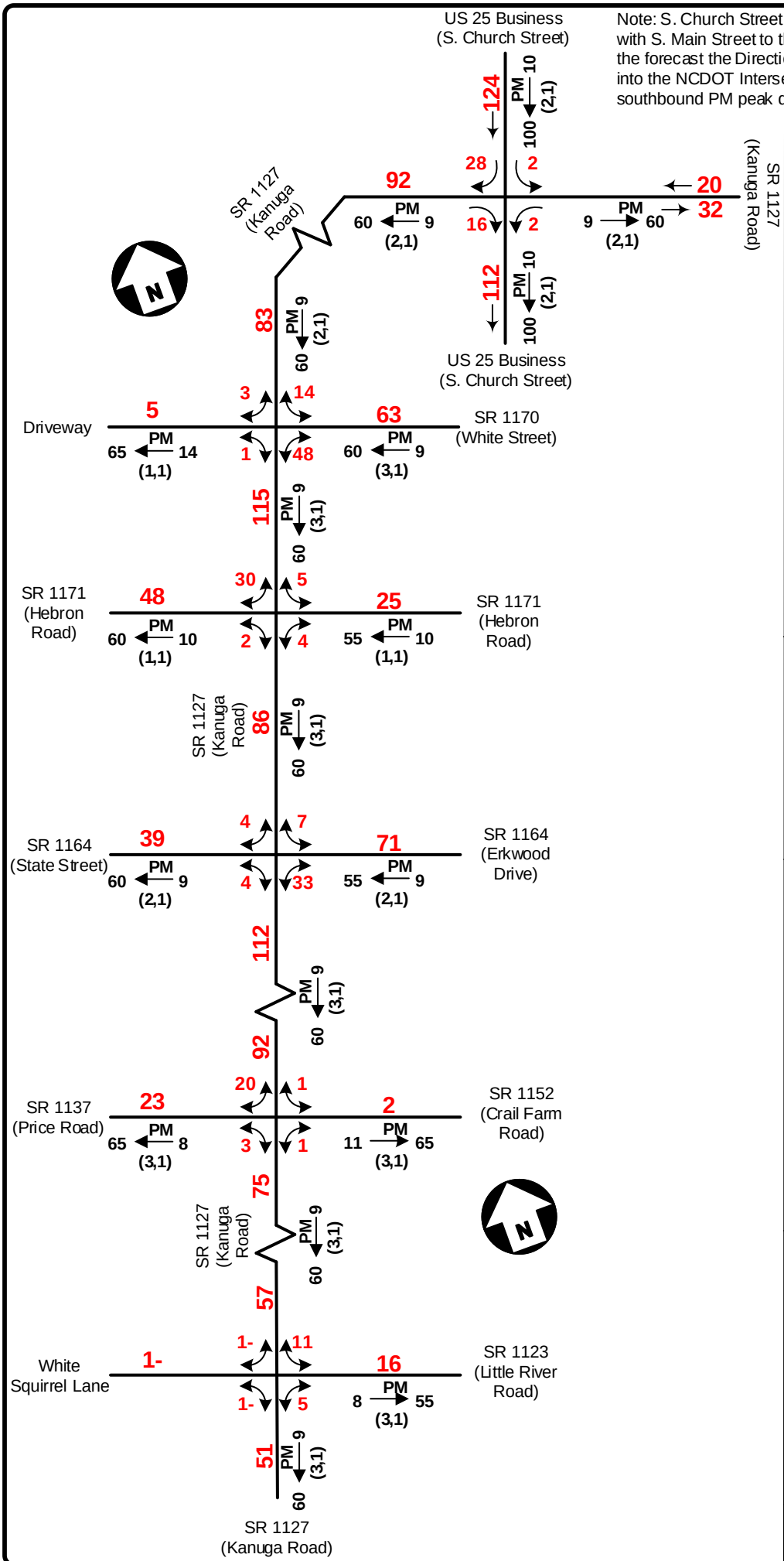
The French Broad River MPO Travel Demand Model was utilized as a tool in the development of the forecast.

Forecast Methodology

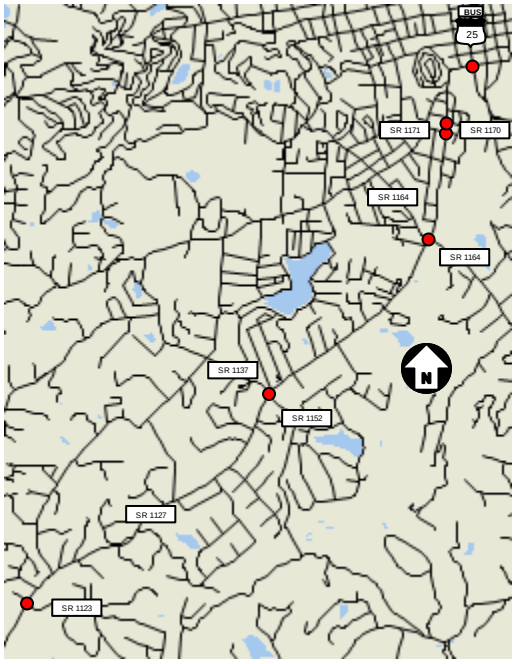
The 2016 base year no-build traffic volumes and design factors were developed based upon current counts and historic AADT trend projections. The 2040 future year no-build traffic volumes generally included the development of compound annual growth rates between two model years, while the 2040 future year build volumes generally included the development of diversion rates between like model years with different scenarios. The compound annual growth rates or diversion rates were then applied to the AADT volumes from another scenario to develop initial volumes for each scenario. Engineering judgment adjustments were applied as needed in finalizing the volumes in order to develop a balanced forecast.

Interpolation/Extrapolation

To estimate AADT volumes between 2016 and 2040, straight line interpolation between the 2016 Base Year No-Build and the 2040 scenarios is acceptable. The 2016 Base Year No-Build volumes may be used as a surrogate for the 2016 Base Year Build volumes for interpolation and extrapolation purposes. AADT volumes may be extrapolated for up to two years immediately following 2040. If it is determined that any of these assumptions have become inconsistent with the project and surrounding area activity, please request updated projections at this location.



Note: S. Church Street is a one-way street that forms a one-way pair, along with S. Main Street to the east. Because only S. Church Street is included in the forecast the Directional Distribution is shown as 100 percent. For input into the NCDOT Intersection Analysis Utility a D value of 55% with a southbound PM peak direction should be utilized.



2016 AVERAGE ANNUAL DAILY TRAFFIC

NO BUILD SCENARIO

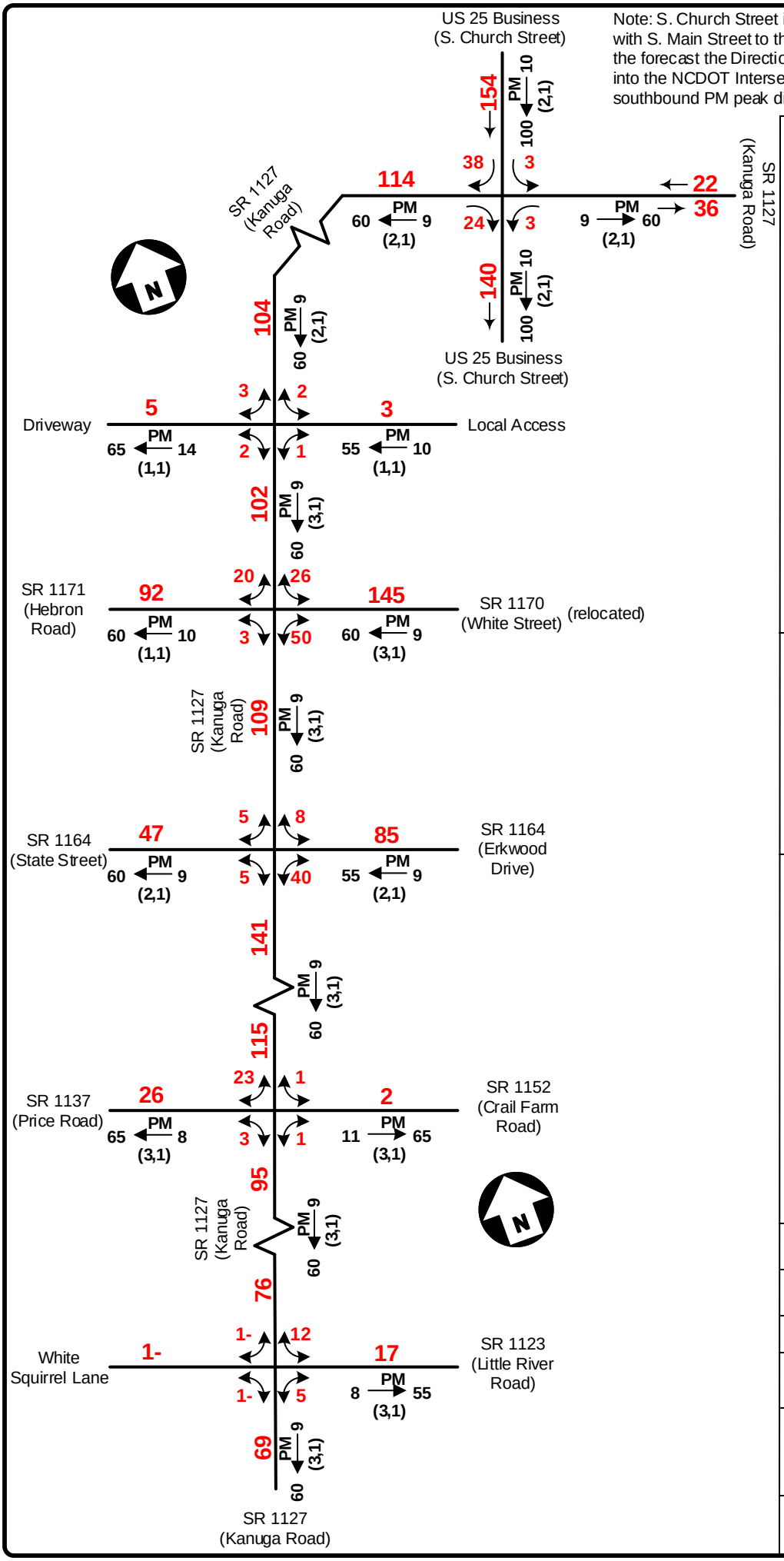
SHEET 1 OF 1

L E G E N D

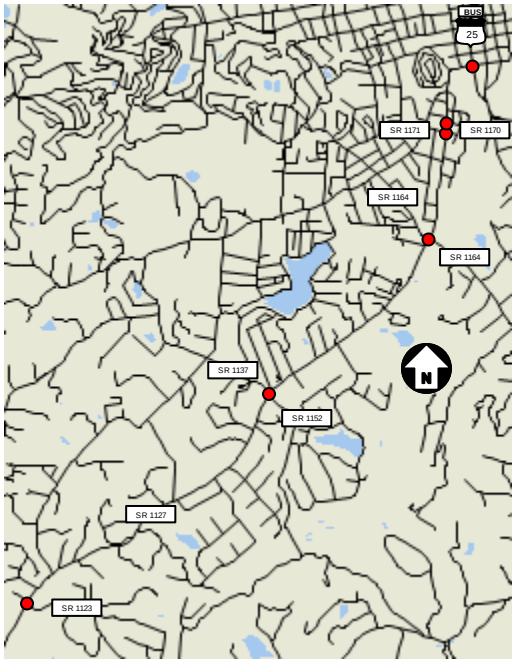
K PM (d, t) D

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

TIP: R-5748	**WBS:** 50203.1.D1
COUNTY: Henderson	**DIVISION: 14**
DATE: 07-06-2017	
PREPARED BY: Patriot Transportation Engineering, PLLC	
LOCATION: SR 1127 (Kanuga Rd) US 25 Business (S. Church Street) to SR 1123 (Little River Road)	
PROJECT: SR 1127 (Kanuga Road) Improvements	



Note: S. Church Street is a one-way street that forms a one-way pair, along with S. Main Street to the east. Because only S. Church Street is included in the forecast the Directional Distribution is shown as 100 percent. For input into the NCDOT Intersection Analysis Utility a D value of 55% with a southbound PM peak direction should be utilized.



2040 AVERAGE ANNUAL DAILY TRAFFIC

NO BUILD SCENARIO

SHEET 1 OF 1

L E G E N D

K PM (d, t) D

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

TIP: R-5748 | **WBS:** 50203.1.D1

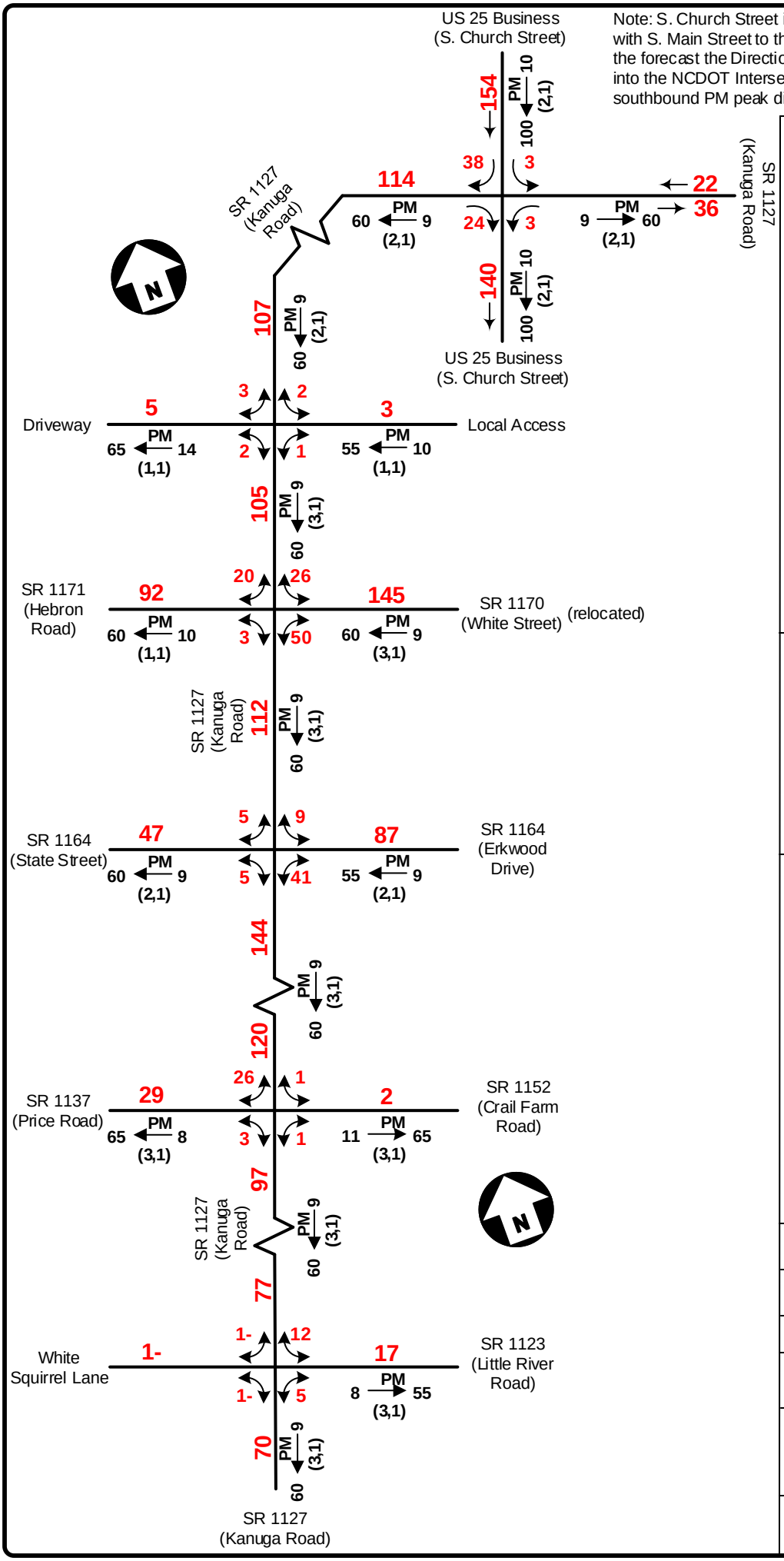
COUNTY: Henderson | **DIVISION: 14**

DATE: 07-06-2017

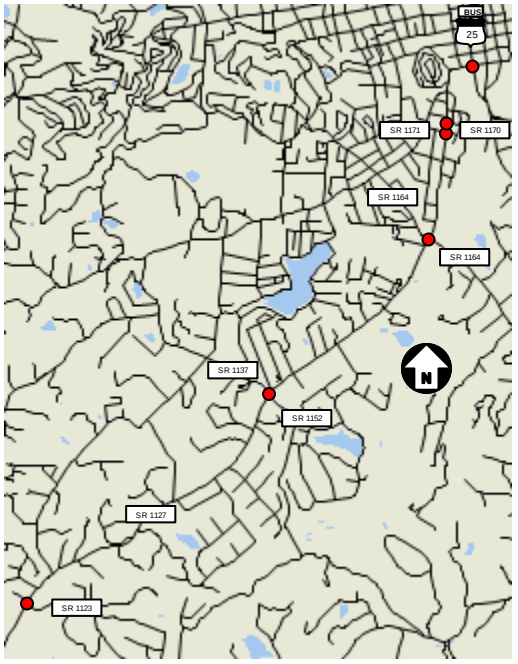
PREPARED BY: Patriot Transportation Engineering, PLLC

LOCATION: SR 1127 (Kanuga Rd) US 25 Business (S. Church Street) to SR 1123 (Little River Road)

PROJECT: SR 1127 (Kanuga Road) Improvements



Note: S. Church Street is a one-way street that forms a one-way pair, along with S. Main Street to the east. Because only S. Church Street is included in the forecast the Directional Distribution is shown as 100 percent. For input into the NCDOT Intersection Analysis Utility a D value of 55% with a southbound PM peak direction should be utilized.



2040 AVERAGE ANNUAL DAILY TRAFFIC

BUILD SCENARIO
SHEET 1 OF 1

L E G E N D

K PM (d, t) D

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

TIP: R-5748	**WBS:** 50203.1.D1
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1. PROJECT BACKGROUND

Patriot Transportation Engineering, PLLC (Patriot) has been contracted by the North Carolina Department of Transportation (NCDOT) and HDR to develop base and future year traffic forecasts for NCDOT State Transportation Improvement Program (STIP) Project Number R-5748; upgrade Kanuga Road (SR 1127) in Henderson County.

1.1 PROJECT REQUEST INFORMATION

The traffic forecast request for this project was requested by NCDOT Division 14 in support of National Environmental Policy Act (NEPA) documentation for the project. The scope of work for the traffic forecast was finalized in November 2016.

For the purposes of the environmental document, it was decided through project scoping with NCDOT that Base Year scenarios would use 2016 and Future Year scenarios would use 2040. The 2016 Base Year traffic forecast includes only the No-Build scenario. The 2040 Future Year traffic forecast includes Build and No-Build scenarios for a single alternative.

1.2 FORECAST HISTORY

This is the first request for a traffic forecast at this location.

1.3 PROJECT DESCRIPTION

NCDOT proposes to make improvements along the Kanuga Road (SR 1127) corridor in Henderson County, from Little River Road (SR 1123)/White Squirrel Lane to South Church Street (US 25 Business), a length of approximately four miles.

1.4 AREA INFORMATION

Henderson County has an estimated population of 113,300 citizens based on 2010 census data and a 2015 population of 112,500 according to the North Carolina Office of State Budget and Management. The county covers approximately 375 square miles and consists of several cities and towns including: Hendersonville, Saluda, Fletcher, Laurel Park, and Mills River. Hendersonville is the county seat of Henderson County.

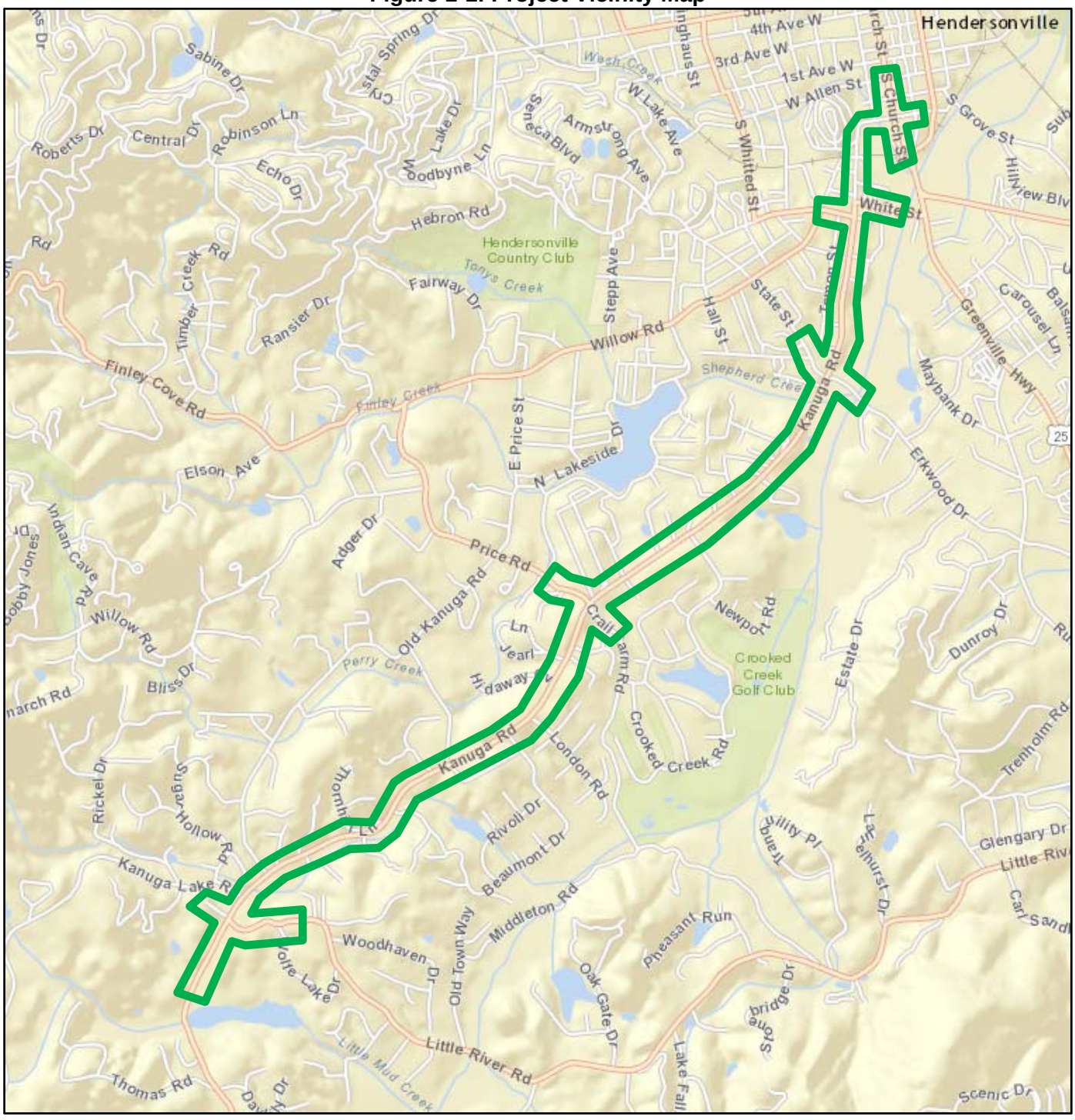
The project location map for the U-5748 forecast is shown on Figure 1-1: Project Vicinity Map.

1.5 ROUTE INFORMATION

The following roadways are classified by the Federal Highway Administration (FHWA), as designated in the 2015-2040 Metropolitan Transportation Plan:

The **Kanuga Road (SR 1127)** corridor is classified as a Minor Arterial within the forecast study area, although the classification changes to Major Collector from Little River Road (SR 1123) south. The corridor connects Transylvania County and western Henderson County with downtown Hendersonville. The land use along the project study corridor is primarily residential with some undeveloped parcels in the southern end of the study corridor. Toward the northern end of the study corridor the residential density increases until the area transitions to commercial and downtown Hendersonville. The speed limit along Kanuga Road is 35 miles per hour from South Church Street (US 25 Business) to State Street (SR 1164)/Erkwood Drive (SR 1164), 40 miles per hour from State Street (SR 1164)/Erkwood Drive (SR 1164) to Kanuga Pines Drive (SR 1245), and 45 miles per hour south of Kanuga Pines Drive.

Figure 1-1: Project Vicinity Map



Little River Road (SR 1123) is a Local Street with a speed limit of 35 miles per hour providing access to residential areas.

Price Road (SR 1137) is a Local Street with a speed limit of 35 miles per hour providing access to residential areas.

Crail Farm Road (SR 1152) is an unpaved Local Street providing access to residential areas.

State Street (SR 1164) is classified as a Major Collector from Kanuga Road (SR 1127) to 5th Avenue to the north. The speed limit along State Street is 35 miles per hour.

Erkwood Drive (SR 1164) is classified as a Major Collector from Kanuga Road (SR 1127) to Greenville Highway (NC 225) to the east. The speed limit along Erkwood Drive is 40 miles per hour.

Hebron Road (SR 1171) is a Local Street with a speed limit of 25 miles per hour.

White Street (SR 1170) is a Local Street with an unposted speed limit providing access to a mix of residential and commercial properties.

South Church Street (US 25 Business) is classified as a Minor Arterial through downtown Hendersonville where it connects to Kanuga Road (SR 1127). It is a southbound, one-way street with a speed limit of 20 miles per hour.

1.6 FUTURE AREA ROADWAY IMPROVEMENTS – FISCAL CONSTRAINT

The project is located within the boundaries of the French Broad River Metropolitan Planning Organization (FBRMPO); therefore, the travel demand model and traffic forecasts are fiscally constrained to match the assumptions of the corresponding Metropolitan Transportation Plan (MTP).

The *French Broad River Metropolitan Planning Organization Metropolitan Transportation Plan 2015-2040* includes the proposed project in the Time Horizon 3: 2026-2030 (Unfunded TIP) group of projects and describes it as follows:

- HEND28-H, R-5748 – Kanuga Rd (SR 1127) from US 25 Business (Church St) to Little River Rd (SR 1123) – Add turn lanes, widen and improve geometrics as appropriate

Additionally, the following projects that may affect the proposed project are included in the 2015-2040 MTP and are assumed to be constructed prior to 2040:

- TIP Project U-5783 – US 64, from Blythe Street to Daniel Drive – Widening and improvements
- TIP Projects R-2588A and R-2588B – NC 191, from US 25 to NC 280 – Widen to a four-lane, median-divided facility
- TIP Project R-5744 – Balfour Parkway, from NC 191 to US 64 north of Nix Road – Construct a new four-lane expressway
- TIP Project U-5886 – White Street, from SR 1171 (Willow Rd) to US 176 (Spartanburg Highway) – Construct 3-lane connector, re-alignment and extension

2. SOURCES OF INFORMATION AND DATA

The following sections describe the various information and data sources used in the development of the traffic forecast.

2.1 RELATED FORECASTS

Past traffic forecasts in the vicinity of the proposed project can potentially be utilized as a tool when preparing the traffic forecast. However, no past forecasts in the vicinity of the project were identified.

2.2 HISTORIC AADT

Existing traffic count data for study area roadways from 1994 to 2014 was provided by the NCDOT Traffic Survey Group (TSG). Data sources included:

- NCDOT TSG Average Annual Daily Traffic (AADT) history from 1994 to 2014

The locations of the historic traffic data counts are shown in Figure 2-1 . The complete 20-year AADT history for each location is found in Appendix A.

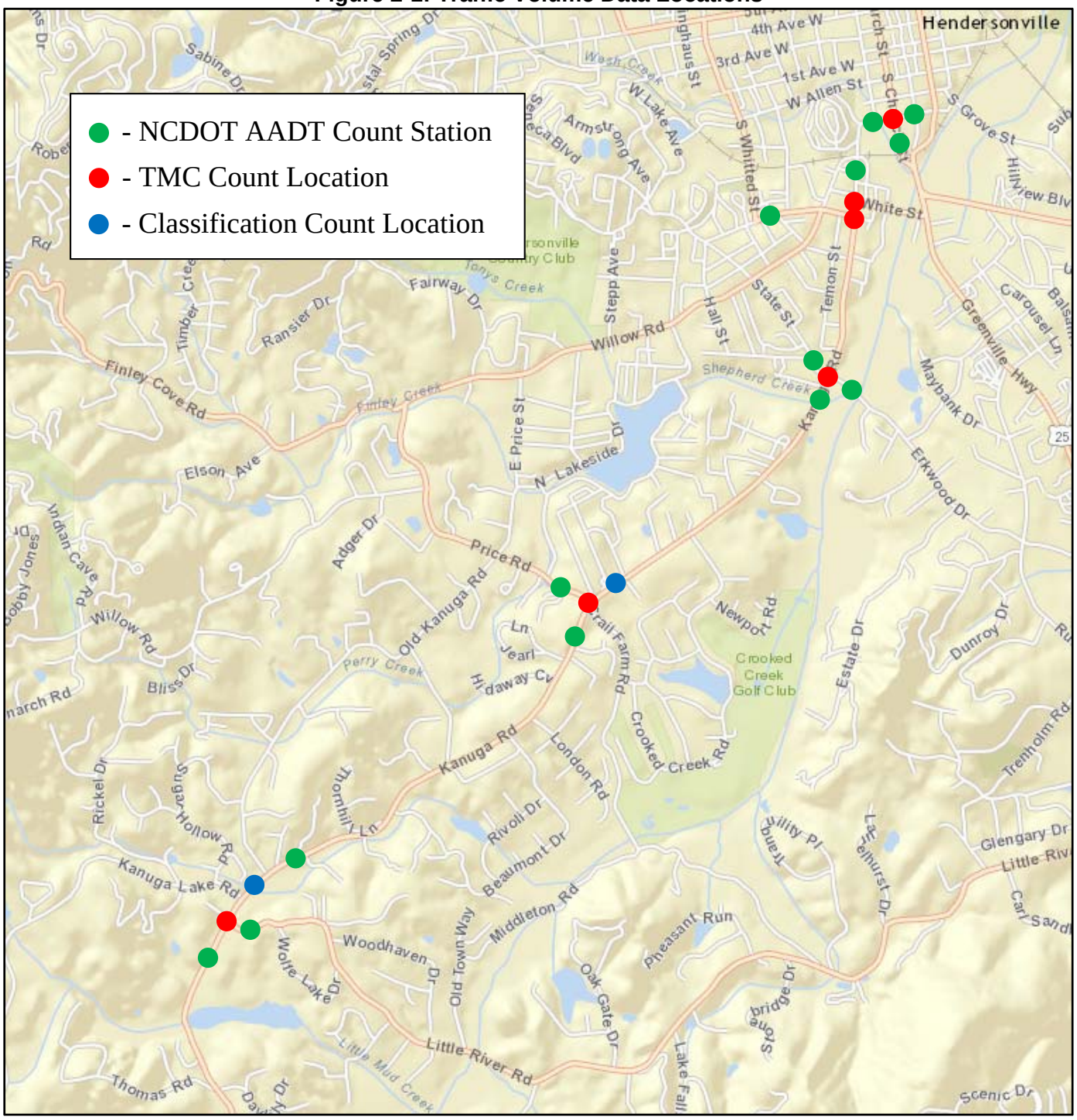
2.3 FIELD DATA COLLECTION

New project-specific counts were taken in March 2016 through the NCDOT TSG on-call contract and included one 13-hour turning movement count and two 48-hour classification counts. In addition, six 4-hour turning movement counts collected in October 2015 as part of the initial feasibility planning for the project were utilized for the forecast. The 13-hour turning movement count and vehicle classification counts were used to develop the AADT, the design data (see Section 3.2), and conversion rates for the turning movement counts with durations less than 13 hours. The traffic count locations are listed in Table 2-1 and are displayed in Figure 2-1.

The traffic count locations fall under one TSG ATR classification, as follows:

- ATR Group 1 (The most dominant group in the State. Mostly rural in nature and is predominantly used for count locations on nonurban primary routes and all rural and most urban secondary roads.). This ATR Group was used for all of the roadways included in the forecast.

Figure 2-1: Traffic Volume Data Locations



The classification counts were converted to 24-Hour volumes by dividing the 48-Hour counts by two and then applying the correct seasonal adjustment factors. The turning movement counts (TMCs) were converted to 24-Hour volumes by utilizing the NCDOT Traffic Survey Partial Weekday Count Expansion Factors (November 2015). The count expansion factors were also compared to the count data from the 48-hour volume, speed, classification count and determined to be adequate.

Table 2-1: Collected Traffic Count Locations

Location	Count Type	Date(s)	County	ATR Group	Seasonal Adjustment Factor
Kanuga Rd (SR 1127) at Little River Rd (SR 1123)/White Squirrel Ln	4-hour TMC	10/21/15	Henderson	1	0.96
Kanuga Rd (SR 1127) at Price Rd (SR 1137)/Crail Farm Rd (SR 1152)	4-hour TMC	10/21/15	Henderson	1	0.96
Kanuga Rd (SR 1127) at State St (SR 1164)/Erkwood Dr (SR 1164)	4-hour TMC	10/21/15	Henderson	1	0.96
Kanuga Rd (SR 1127) at Hebron Rd (SR 1171)	4-hour TMC	10/21/15	Henderson	1	0.96
Kanuga Rd (SR 1127) at White St (SR 1170)	4-hour TMC	10/21/15	Henderson	1	0.96
Kanuga Rd (SR 1127) at S Church St (US 25 Business)	4-hour TMC	10/21/15	Henderson	1	0.96
Kanuga Rd (SR 1127) at Price Rd (SR 1137)/Crail Farm Rd (SR 1152)	13-hour TMC	09/15/16	Henderson	1	0.94
Kanuga Rd (SR 1127) north of Little River Rd (SR 1123)	48-hour VSC	09/14/16	Henderson	1	0.99/0.94
Kanuga Rd (SR 1127) north of Price Rd (SR 1137)/Crail Farm Rd (SR 1152)	48-hour VSC	09/14/16	Henderson	1	0.99/0.94

Note: TMC = turning movement count; VSC = volumes, speed, classification count

2.4 FIELD INVESTIGATION

An orientation field trip was taken as part of the traffic forecast initiation process. The field trip was taken on February 8-9, 2017. The following observations were noted:

- No ongoing or recently completed large scale development was observed along the corridor.
- There wasn't a large amount of easily developable land along the corridor, except perhaps at the Kanuga Road (SR 1127)/State Street (SR 1164)/Erkwood Drive (SR 1164) intersection.
- The direction of travel on Kanuga Road was observed to be primarily northbound in the AM peak period and southbound in the PM peak period.
- Most of the observed traffic on Kanuga Road proceeded through at the intersections to stay on Kanuga Road. Turning traffic was not significant except at S Church Street.
- At the Kanuga Road/S Church Street intersection, approximately equal numbers of vehicles proceeded south and turned west (made a right turn).
- A significant amount of the side street traffic at the Kanuga Road/State Street/Erkwood Drive proceeds as through movements, without turning.
- A substantial amount of traffic was observed in the AM peak period making a left turn from Hebron Road (to northbound Kanuga Road) and then turning right onto White Street (SR 1170).

2.5 INFORMATION FROM LOCAL PLANNERS

Questionnaires were sent to, completed by or discussed with the following individuals to assist in understanding the project and traffic forecast study area:

- *Brian Burch, NCDOT Division 14 Project Development Engineer

- *Wanda Austin, NCDOT Division 14 Project Manager
- *Steve Buchanan, NCDOT Division 14 Traffic Engineer
- *Steve Cannon, Division 14, District 1 District Engineer
- *Daniel Sellers, NCDOT Transportation Planning Branch
- *Brian Wert, NCDOT Transportation Planning Branch
- *Lyuba Zuyeva, French Broad River MPO
- *Susan Frady, City of Hendersonville, Development Assistance Department
- Matt Champion, Henderson County Transportation Planner

Individuals who provided a response are denoted with an *. Detailed information from the questionnaires is included in Appendix B.

2.6 OTHER SOURCES

Data sources used that are not listed in Sections 2.1 through 2.5 include:

North Carolina Department of Transportation. *State Transportation Improvement Program.* August 2016. Available: https://connect.ncdot.gov/projects/planning/STIPDocuments1/LIVE_STIP.pdf

French Broad River Metropolitan Planning Organization. *French Broad River Metropolitan Planning Organization Metropolitan Transportation Plan 2015-2040.* Adopted September 24, 2015. Available: http://www.fbrmpo.org/metropolitan-transportation-plan-mtp/

NCDOT Functional Classification Maps. Available: http://ncdot.maps.arcgis.com/home/webmap/viewer.html?layers=029a9a9fe26e43d687d30cd3c08b1792

3. BASE YEAR 2016 NO-BUILD TRAFFIC FORECAST

3.1 METHODOLOGY

A review of previous traffic forecasts, field-collected traffic counts, area AADT history, and engineering judgment serve as the basis for the 2016 Base Year No-Build traffic forecast. After careful review for reasonableness checks, the 48-Hour classification counts, 13-Hour TMCs, and 4-hour TMCs were first converted to AADT volumes by using the appropriate NCDOT TSG seasonal adjustment factors based on the month and day of the week the counts were collected.

A variation of the NCDOT Traffic Forecast Utility (TFU) spreadsheet was also a major tool used in the determination of the traffic forecast volumes. The NCDOT TFU spreadsheet includes the calculation of a validation score that considers the approach volumes and design factors for each intersection. The score is utilized as a tool in selecting the appropriate volumes and factors with a score that is less than 2.0 being considered to be valid. All of the intersections included in the forecast had a score less than 1.1. Ultimately, the approach volumes and factors will be selected based on engineering judgment such that the AADTs and turning movements can be converted to peak hour volumes.

The data from the field-collected traffic counts were incorporated into the spreadsheet in order to replicate volumes as closely as possible for each intersection in the traffic forecast. The traffic forecast volumes in the 2016 Base-Year traffic forecast mimic the observed patterns as closely as possible. Once the traffic forecast volumes were determined, they were compared to historic AADT trends and interpolated model volumes for reasonableness. Table C1 found in Appendix C provides a comparison of historic AADT trends, field collected data, interpolated model volumes, and the selected traffic forecast volumes for all locations within the study area. In most cases, the chosen traffic forecast value also happened to be in line with the historic AADT trends extrapolated to 2016.

3.2 DESIGN FACTORS

Design factors are a very important aspect of traffic forecasting. The truck percentages, peak hour factor (or K-Factor), and directional distribution are all used along with forecasted traffic volumes when designing a roadway. The methodology and chosen values for each of the aforementioned factors are described below.

3.2.1 TRUCK PERCENTAGES

Truck Percentages were determined using the 48-Hour mainline classification count data, and the 4-Hour and 13-Hour TMC data. Overall truck percentages were then separated into the two NCDOT standard classifications: Duals (single-unit trucks with at least one dual- tire axle) and TTSTs (multi-unit trucks with single or twin trailers). Attempts were made to maintain consistent truck percentages along a roadway facility unless circumstances warranted a change. Data used to determine the truck percentages and the chosen values are found in Table C2 in Appendix C. A discussion of the truck percentages for the project is also included as follows:

- Kanuga Rd (SR 1127) Corridor – The data collection showed that the truck percentages gradually decreased from the south end (approximately three percent trucks) to the north end (approximately one percent trucks). The total truck percentages collected from turning movement counts showed from one to three percent total trucks, while the tube counts showed ten percent trucks. It was determined that the truck percentage would likely be between the values shown in the TMCs and classification counts, with the TMC data receiving a slightly higher degree of consideration. Therefore, the truck percentages chosen were: three percent duals and one percent TTSTs south of White Street (SR 1170); and two percent duals and one percent TTSTs north of White Street (SR 1170).

- Y-lines along Kanuga Rd (SR 1127) – the truck traffic for Y-lines along the Kanuga Rd corridor ranged from zero to three percent and the selected percentages were largely in line with the turning movement count percentages.

3.2.2 DIRECTIONAL DISTRIBUTION

The directional distribution (D) provides information on the direction of traffic flow in the peak period and is a percentage (rounded to the nearest 5 percent) based on the percent of traffic traveling in each direction along the roadway. In addition to the directional distribution percentage, the direction of the peak travel during the PM peak period is selected and included on the forecast figures. For the forecast study area, generally D was in the 53% to 66% range. D values typically fell within the range of 55% to 62% with the exception of South Church St (US 25 Business), which is a one-way street. Table C3 in Appendix C provides the D value information used for this traffic forecast. A discussion of the D values for the project is also included as follows:

- Kanuga Rd (SR 1127) Corridor – the directional distribution along Kanuga Rd were not particularly directional and ranged from 56 to 62 percent with a predominant PM peak period direction in the southbound direction. The average distribution was approximately 59.5 percent along the entire corridor and based on a review of the data it was determined that a single value would be used for the entire length of the Kanuga Rd corridor. The directional distribution was determined to be 60 percent along the entire corridor with a PM peak in the southbound direction. The only exception to the primary PM peak direction for Kanuga Rd was on the eastern leg of the Kanuga Rd/S Church St intersection.
- S Church St (US 25 Business) – S Church Street is a one-way street that forms a one-way pair, along with S Main Street to the east. Because only S Church Street is included in the forecast, the directional distribution is shown as 100 percent. For input into the NCDOT Intersection Analysis Utility a D value of 55% with a southbound PM peak direction should be utilized.
- Y-lines along Kanuga Rd (SR 1127) – the directional distributions for Y-lines along Kanuga Rd generally ranged from 53 to 66 percent and the selected directional distributions were largely in line with the turning movement count percentages. South Church St is a one-way roadway, however, so the measured and selected directional distribution was 100 percent.

3.2.3 PEAK HOUR FACTOR

The peak hour factor (K) is the percentage of AADT that occurs during the peak time period of the day. The K-factor is meant to approximate what percentage of daily traffic would be present during the 30th highest peak hour of a given year, which is commonly referred to as K30. To determine the K-value for the classification counts the highest hourly volume was divided by the daily average of the 48-Hour counts. For turning movement counts the K-factor was developed by dividing the peak hour of the count by the daily volume. The K-factors in this traffic forecast range from 8% to 15%. The K-factor information used for this forecast is found in Table C4 in Appendix C. A discussion of the K values for the project is also included as follows:

- Kanuga Rd (SR 1127) Corridor – the peak hour factor along SR 1127 ranged from eight to nine percent and had relatively consistent percentages along the corridor. The peak hour factor for the corridor was determined to be nine percent, which is consistently maintained along the corridor.
- Y-lines along Kanuga Rd (SR 1127) – the peak hour factors for Y-lines along SR 1127 generally ranged from eight to eleven percent and the selected peak hour factors were largely in line with the turning movement count percentages. The only location that showed a peak hour factor outside of the general range was for a commercial driveway, which was measured at fifteen percent.

3.3 TRAFFIC FORECAST VOLUMES

Based on the methodology described in Section 3.1, traffic forecasts for the 2016 Base Year No-Build Scenario were calculated. Adjusted counts were compared to trend line analyses and the extrapolation of data to 2016 during the process. Utilizing the variation of the NCDOT Traffic Forecast Utility spreadsheet, bidirectional turning movements were also forecasted at intersections to replicate observed daily turning movement volumes as closely as possible. Comparisons of trend line analyses, volume extrapolation, observed counts, and selected forecast volumes are shown in Table C1 in Appendix C.

4. MODEL DATA

The study area for the forecast is included the French Broad River Travel Demand Model. The study area is located in the southern area of the model and has relatively good connectivity, with the model including Kanuga Rd (SR 1127), Little River Rd (SR 1123), Price Rd (SR 1137), State St (SR 1164), Erkwood Dr (SR 1164), Hebron Rd (SR 1171), White St (SR 1170), and Church St (US 25 Business). The French Broad River Travel Demand Model (provided by NCDOT on 03/31/2016) was utilized as a tool in the development of the forecast to determine the Future year scenario traffic volumes.

The French Broad River model was developed in TransCAD (version 5 Build 2110) and was calibrated based on a base year of 2010, and has models for a future year of 2040.

Table C5 can be found in Appendix C and displays model performance for the 2010 model against 2010 NCDOT AADTs, the 2040 model volumes and an extrapolated volume for 2016 based on the 2010 and 2040 model output. A discussion of the model performance for the project study area corridors is included as follows:

- Kanuga Rd (SR 1127) – the 2010 model volumes were generally higher than the corresponding AADT counts by 700 to 3,000 vehicles per day (vpd), though there are a couple of locations where the model volumes are lower than the AADT counts. The 2016 interpolated model volumes varied from the extrapolated AADT counts in a similar way.
- Little River Rd (SR 1123) – the 2010 model volume for Little River Road is slightly higher than the 2010 AADT by about 250 vpd. The 2016 interpolated model volumes and the extrapolated AADT volumes were the same.
- Price Rd (SR 1137) – the 2010 model volume for Price Road is higher than the 2010 AADT by about 900 vpd. The 2016 interpolated model volumes and the extrapolated AADT showed a similar discrepancy.
- Erkwood Dr (SR 1164) – the 2010 model volume for Erkwood Drive is higher than the 2010 AADT by about 600 vpd and by about 400 vpd using the 2016 interpolated model data and extrapolated AADT volumes.
- Hebron Rd (SR 1171) – the 2010 model volume for Hebron Road is lower than the 2010 AADT by about 200 vpd, but the 2016 interpolated model data is higher than the extrapolated AADT volumes by about 400 vpd.
- Church St (US 25 Business) – the 2010 model volume for Church Street is higher than the 2010 AADT by about 3,000 vpd. The discrepancy between the model volume and the AADT volume looks even greater when using 2016 interpolated model volume and extrapolated AADT volume. Historic NCDOT data show the volumes at this location decreasing over time.

5. BASE YEAR 2016 BUILD TRAFFIC FORECAST

During the scoping process for this forecast, it was determined that a base year 2016 build traffic forecast would not be prepared. The current roadways included in this forecast are operating below capacity; therefore, the 2016 base year no-build volumes can be used as a surrogate for the 2016 base year build forecast. Additionally, the 2016 base year build can be used to interpolate interim year or extrapolate beyond 2040, if needed.

6. FUTURE YEAR 2040 NO-BUILD TRAFFIC FORECAST

6.1 ASSUMPTIONS

A Future Year of 2040 was chosen for the R-5748 traffic volume examination as it is the latest year available in the French Broad River Travel Demand Model. All 2040 fiscally-constrained projects, with the exception of R-5748, listed in the French Broad River MPO 2040 Metropolitan Transportation Plan were included in the 2040 No-Build alternative model run.

The modeling aspects for the 2040 No-Build scenario include utilizing the French Broad River Travel Demand Model fiscally constrained model. The first step was to review the model and determine if the changes included in the fiscally constrained MTP have been properly included in the model. Based on this review, it was determined that one change to the future year network would be made:

- TIP Project U-5886 was not included in the future network. This project would widen White Street to 3 lanes from SR 1171 (Willow Rd) to US 176 (Spartanburg Highway). The project would also re-align White Street to intersect with Kanuga Road (SR 1127) directly opposite Hebron Road (SR 1171). The existing alignment of White Street east of Kanuga Road would have a cul-de-sac instead of connecting to other roadways. The model network was revised to reflect these changes. No other roadway links were changed. The existing centroid connection to White Street was unchanged.

The review of the future year model scenario included a comparison to the 2010 Base Year model. After the review it was determined that no changes to the future year network needed to be made.

6.2 METHODOLOGY

The French Broad River Travel Demand Model was utilized as a tool in the development of the 2040 Future Year No-Build traffic volumes.

2010 Base Year and a 2040 Future Year No-Build model runs were completed without the proposed project in place. The Compound Annual Growth Rate (CAGR) for each traffic volume location was calculated using the following equation:

((2040 Model Value/2010 Model Value) ^ (1/30)) -1

The CAGR rates were reviewed and adjusted during this phase using engineering judgment where needed. The selected CAGR rates were then applied to the 2016 No-Build traffic volumes and extrapolated to determine the 2040 traffic volumes.

6.3 DESIGN FACTORS

The 2040 model network was reviewed to see if the corridor experienced changes in the percent of traffic occurring in the peak hour, direction of peak travel, or directional split. The modeled volumes showed no substantive changes in the percentage of traffic along the study corridor during the peak periods on the roadways or the peak travel direction. However, two changes were made to side streets in response to the anticipated realignment of White Street (TIP U-5886, see above in Section 6.1):

1. In the future, the east leg of the Kanuga Rd/Hebron Rd intersection will be made by White Street, a roadway connecting to US 176 instead of Hebron Road, which provides access only to those properties in its direct

vicinity. Because the current location of White Street is only a short distance from the proposed location, and because the character of the re-aligned White Street would be more analogous to the current White Street than to the current Hebron Road, the design factors for the existing White Street east of Kanuga Road would be utilized for the realigned White Street east of Kanuga Road. So, instead of a K-factor of 10 with a D of 55%, a K-factor of 9 with D of 60% was utilized. The truck percentages currently seen on the current location of White Street (3% Duals and 1% TTSTs) were also maintained for the re-aligned location of White Street. The PM peak direction of travel remained the same.

2. The current roadway that is White Street east of Kanuga Road will be changed in the future to provide access only to properties in its direct vicinity instead of connecting to US 176. In the future this roadway will be alike in character to the existing Hebron Road and serve similar land uses. Therefore, the design factors and truck percentages for the existing Hebron Road (east of Kanuga Road) were ported to this redesigned location: a K-factor of 10, D of 55%, with 1% Duals and 1% TTSTs. The PM peak direction of travel remained the same.

6.4 TRAFFIC FORECAST VOLUMES

Based on the methodology described in Section 6.2, traffic volumes for the 2040 Future Year No-Build Scenario were calculated. Table C6 in Appendix C shows the comparisons of historic growth rates, model output, CAGRs, and selected volumes. The model growth rate and raw model volume increases were both considered when making the No-Build forecast. Some of the volumes were modified slightly to allow for the development of a balanced network.

A brief summary of the key observations and considerations from the development of the 2040 No-Build volumes are as follows:

- The 2040 model volumes along Kanuga Road (SR 1127) average a CAGR of 1.07% per year south of S Church Street (US 25 Business), with the southern end of the corridor showing more growth than the northern end. Around S Church Street (in downtown Hendersonville) the 2040 model volumes on Kanuga Road average a CAGR of 0.37%. The growth rates chosen for Kanuga Road largely resemble the model growth rates, but at each study intersection the growth rates were held constant across both sides the intersection. The section of Kanuga Road between Hebron Road and White Street shows a decrease in traffic growth due to the realignment of White Street – a substantial volume of traffic traveling along Kanuga Road between Hebron Road and White Street will have a direct connection in the future. The negative growth rate on this section was chosen so that in 2040 the drop in traffic across the Hebron Road/White Street intersection was similar to the drop in traffic in 2016 from the south side of Hebron Road to the north side of White Street.

- Model growth rates could not be applied directly to the existing volumes of Hebron Road and White Street on the east side of Kanuga Rd (SR 1127) due to the realignment of White Street and because Hebron Road east of Kanuga Road is not included in the Base Year model network. In the existing roadway network, Hebron Road and White Street are close enough to each other to share some travel characteristics, so the majority of their volumes are likely traveling between Kanuga Road and NC 225 and US 176. Re-aligning White Street to intersect with Kanuga Road at Hebron Road, therefore, would combine the volumes presently seen on White Street and Hebron Road. Therefore, the model growth rate for White Street (a CAGR of 2.17%) was used as a reference, and a similar CAGR was applied to the combined volumes of White Street and Hebron Road east of Kanuga Road (with a small reduction to factor in local traffic that would still use the cul-de-sac at the former White Street location) to forecast the future volumes of White Street. The CAGR chosen for Hebron Road on the west side of Kanuga Road were largely in line with the rates calculated from the model output.

- The remaining side streets along Kanuga Road show CAGR rates of less than 1%. The CAGR chosen for the side streets were largely in line with the rates calculated from the model output. Some roadways with very small volumes did not have a large enough base of traffic volumes to show any appreciable growth when rounding to the nearest 100 vehicles – these roadways show a growth rate of 0%.

7. FUTURE YEAR 2040 BUILD TRAFFIC FORECAST

7.1 ASSUMPTIONS

The 2040 Build traffic forecast contains all of the assumptions found in the 2040 No-Build traffic volume network discussed in Section 6.1. The R-5748 project includes intersection improvements along the corridor. Because the model does not account for intersection geometry, the increased capacity from the project was coded into the model by changing the median code along Kanuga Rd (SR 1127) to reflect the presence of a two-way left-turn lane. The model contains look-up tables to adjust the roadway capacity accordingly.

7.2 METHODOLOGY

The French Broad River Travel Demand Model and engineering judgment was heavily relied upon in the calculation of the 2040 Future Year Build traffic volumes. Once the travel demand model was run to include R-5748, model volumes were extracted for each location included in the evaluation. Model volumes from the 2040 No-Build and Build Model runs were compared in order to calculate a diversion percentage between the two scenarios. These diversion percentages were then applied to the 2040 No-Build traffic volumes in order to develop 2040 Build Traffic volumes.

7.3 DESIGN FACTORS

The 2040 model network was reviewed to see if the corridor experienced changes in the percent of traffic occurring in the peak hour, direction of peak travel, or directional split. The selection of design factors for the 2040 Build scenario was similar to the evaluations discussed for the 2040 No-Build scenario, with the selected values being the same as those selected for the 2040 No-Build scenario as discussed in Section 6.3.

7.4 TRAFFIC FORECAST VOLUMES

Based on the methodology described in Section 7.2, traffic volumes for the 2040 Future Year Build Forecast Scenario were calculated. Table C7 in Appendix C shows the comparisons of model output, diversion percentages, and selected volumes.

A brief summary of the key observations and considerations from the development of the 2040 Build volumes are as follows:

- The 2040 Build Model volumes along Kanuga Road (SR 1127) show several, geographically delimited clusters of similar diversion rates. South of Price Road (SR 1137)/Crail Farm Road (SR 1152) the average diversion rate on Kanuga Road is 1.61%. From Price Road (SR 1137)/Crail Farm Road (SR 1152) to State Street/Erkwood Drive, the average diversion rate is 3.56%. From State Street/Erkwood Drive to north of White Street, the average diversion rate is 2.64%. And the average diversion rate on Kanuga Road on either side of S Church Street (US 25 Business) is 0.61%. The varying diversion rates are possible because of the relatively long distances between some of the locations and because some of the side streets also exhibit diversion of traffic. The diversion of traffic is primarily a result of the increased capacity for the proposed project. The diversion rates from the model were utilized in the development in the development of the 2040 Build AADT volumes. An effort was made to maintain relatively consistent diversion rates where it made sense to do so.
- The various side streets display varied diversion rates, with some showing a decrease in traffic volume while others show an increase. An increase in traffic is likely the result of vehicles diverting toward Kanuga Road to take advantage of the increased capacity. A decrease in traffic on the side streets could indicate that vehicles are bypassing the side street to stay on Kanuga Road longer, or it could indicate that vehicles are diverting toward Kanuga Road earlier in their trips, so that the side streets in question were bypassed. For the most part, all locations with a negative diversion rate (i.e., a decrease in traffic) showed a decrease in actual traffic volumes of less than 100 vehicles. Therefore, no negative diversion rates were used for the 2040 Build

forecast. For the locations of positive diversion, forecast diversion rates were chosen so that the amount of diverted traffic in the forecast was similar to the value estimated by the model.

APPENDIX A:

HISTORIC AADT COUNT DATA

Table A1: NCDOT Historic AADT

Location	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004
SR 1127 (Kanuga Road) - south of SR 1123 (Little River Road)/ White Squirrel Lane	3,900		*3,300*		3,800		4,200		4,100		4,200
SR 1127 (Kanuga Road) - south of SR 1137 (Price Road)/ SR 1152 (Crail Farm Road)	6,700		6,700		6,400		6,500		6,800		6,800
SR 1127 (Kanuga Road) - south of SR 1164 (State Street)/(Erkwood Drive)	11,000		11,000		10,000		10,000		11,000		*12,000*
SR 1127 (Kanuga Road) - north of SR 1170 (White Street)	8,200		8,500		8,400		8,400		9,800		*13,000*
SR 1127 (Kanuga Road) - west of US 25 Business (S. Church Street)	9,700		9,600		9,200		9,600		10,000		10,000
SR 1127 (Kanuga Road) - east of US 25 Business (S. Church Street)	5,500		4,700			4,800					
SR 1123 (Little River Road) - east of SR 1127 (Kanuga Road)				1,400		1,300		1,400		1,800	
SR 1137 (Price Road) - west of SR 1127 (Kanuga Road)	2,000		2,100		2,100		2,200		2,400		2,200
SR 1164 (State Street) - west of SR 1127 (Kanuga Road)	3,600		2,900			5,100					
SR 1164 (Erkwood Drive) - east of SR 1127 (Kanuga Road)	6,200		6,400		6,400		6,400		6,500		6,700
SR 1172 (Hebron Road) -west of SR 1127 (Kanuga Road)	4,000		3,800		3,800		*5,600*		4,000		4,200
US 25 Business (S. Church Street) - south of SR 1127 (Kanuga Road)	9,300		10,000			12,000					

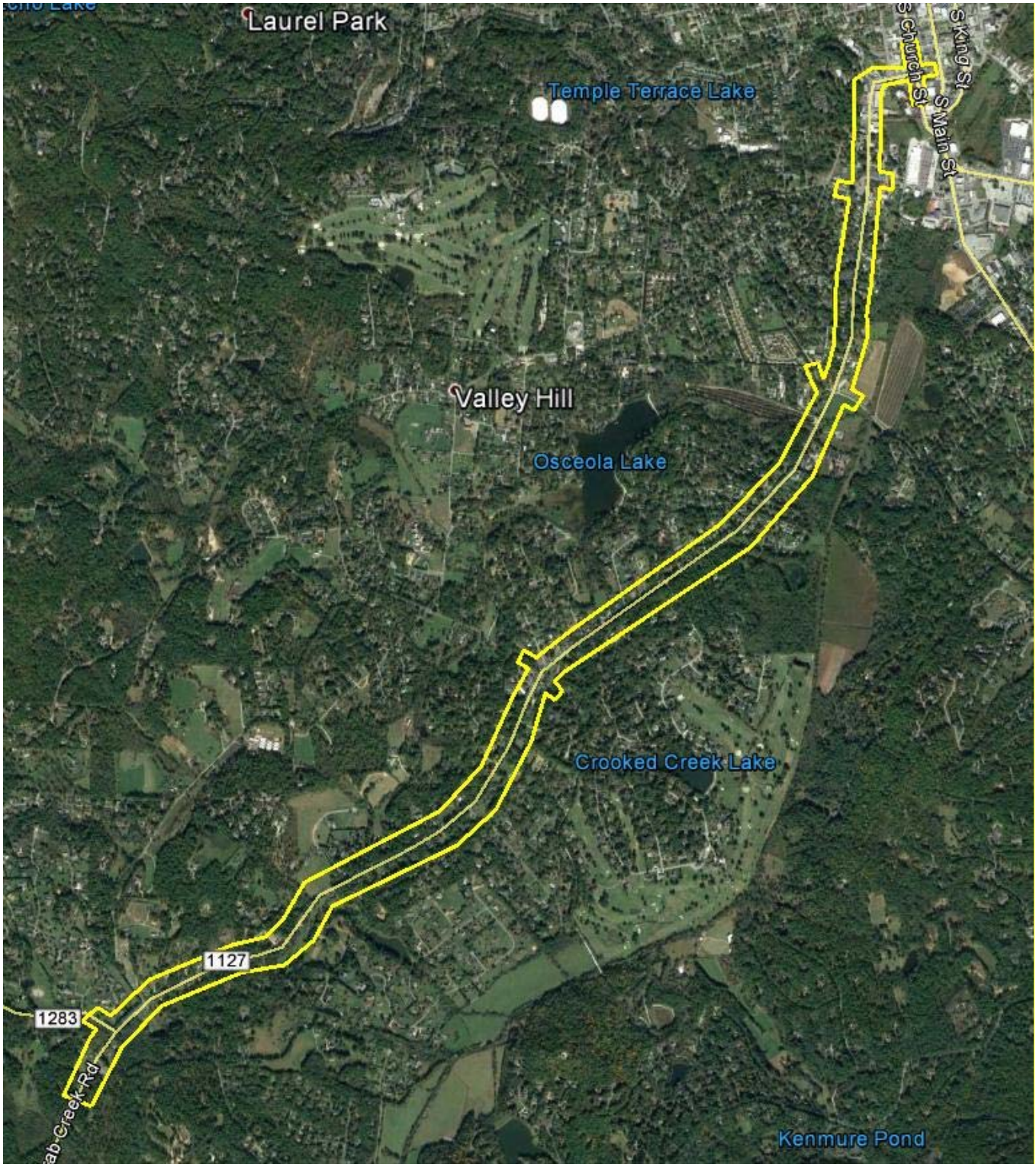
Location	2003	2002	2001	2000	1999	1998	1997	1996	1995	1994
SR 1127 (Kanuga Road) - south of SR 1123 (Little River Road)/White Squirrel Lane		4,100	4,200		4,200		3,800		3,600	
SR 1127 (Kanuga Road) - south of SR 1137 (Price Road)/ SR 1152 (Crail Farm Road)	6,600		6,300		6,400		5,900		*4,900*	
SR 1127 (Kanuga Road) - south of SR 1164 (State Street)/(Erkwood Drive)		10,000	10,000		10,000		9,200		8,300	
SR 1127 (Kanuga Road) - north of SR 1170 (White Street)			8,000		8,700		7,800		7,500	
SR 1127 (Kanuga Road) - west of US 25 Business (S. Church Street)	10,000		9,900		*11,000*		9,200		9,300	
SR 1127 (Kanuga Road) - east of US 25 Business (S. Church Street)										
SR 1123 (Little River Road) - east of SR 1127 (Kanuga Road)	1,700		1,700		1,700		1,700		1,500	
SR 1137 (Price Road) - west of SR 1127 (Kanuga Road)		2,000	2,200		2,300		2,000		1,900	
SR 1164 (State Street) - west of SR 1127 (Kanuga Road)										
SR 1164 (Erkwood Drive) - east of SR 1127 (Kanuga Road)	6,400		6,000		5,900		4,700		4,000	
SR 1172 (Hebron Road) -west of SR 1127 (Kanuga Road)	4,000		4,100		3,700		3,200		3,300	
US 25 Business (S. Church Street) - south of SR 1127 (Kanuga Road)										

Note: *Red Italics* denote numbers removed from data set due to being greater than two standard deviations away from the trend line data.

APPENDIX B:

LOCAL REPRESENTATIVE QUESTIONNAIRES

Patriot Transportation Engineering is currently in the process of developing a traffic forecast for NCDOT STIP Project No. R-5748, which would make intersection improvements and add bicycle and pedestrian accommodations along SR 1127 (Kanuga Rd) from US 25 Business (South Church St) to SR 1123 (Little River Rd) in Henderson County. The forecast includes base year (2016) and design year (2040) forecasts. The forecast study area is shown in the following figure:



We have reviewed the FBRMPO 2040 Metropolitan Transportation Plan (September, 2015) and are seeking input from local planners and engineers who are familiar with the area. We have identified you as a local representative. I have listed a few questions below that will help us in the development in the traffic forecast. We would greatly appreciate your time in answering these questions. You may answer the questions in text format below and return them to me at: lee@pt-engineering.net.

If you would rather discuss the questions over the phone, I will be following up with a phone call later next week. Thank you in advance for your time and please let me know if you have any questions.

1) Current and historical traffic trends indicate that in the last 10 years the growth in the study area has been low with rates less than 1.0% per year. The traffic along SR 1127 (Kanuga Rd) rose steadily through 2007 and then dropped through 2010 before steadily increasing again through the present time. The 20-year growth rates are relatively even across the study area, with most rates at or below 1.0% per year. The only count station in the study area that varies from the general observations is on Kanuga Rd east of US 25 Business (South Church St), which shows a growth rate of 2.6% per year, although this represents a data set limited to counts from 2009 onward (a 5-year period).
    a. Do you agree with this statement?

    b. What growth patterns have you noticed?

    c. Would you expect the growth rate experienced prior to the recession to return or do you think the growth rate will be lower or higher?

    d. Would you expect the growth rate to change substantially in the next 20 years?

2) Aside from school being in session, are there any noticeable seasonal differences in traffic?

3) According to the North Carolina Office of State Budget and Management (OSBM) the current population of Henderson County is approximately 113,000 and is projected to grow by 0.9% per year to slightly more than 133,000 in 2035. The population projections for Henderson County that are contained within the MTP are different, showing a projected population of 160,000 in the year 2040 (approximately a 1.3% per year growth rate).
    a. Do you think that the 0.9 to1.3% population growth rate is reasonable for this area?

    b. Do you know of any other population projections for this area that may be helpful as we review the growth in the area?

4) The Metropolitan Transportation Plan (MTP) includes the following projects in the vicinity of the forecast that have the potential to affect the traffic volumes in the traffic forecast study area:
        i. US 64 from Blythe Street to Daniel Drive – Widening and improvements (U-5783)
        ii. NC 191 from US 25 to NC 280 – Widen to a 4-lane, median-divided facility (R-2588A and R-2588B)
        iii. Balfour Pkwy – Construct new 4-lane expressway from NC 191 to US 64 north of Nix Rd (R-5744)
        iv. White Street from SR 1171 (Willow Rd) to US 176 (Spartanburg Hwy) – Construct 3-lane connector (U-5886)
    a. How do you think each of these projects will affect traffic volumes in the study area?

    b. Do you know of any reasonably foreseeable transportation projects that are not identified above that may affect traffic volumes in the traffic forecast study area?

5) Are you aware of any previous traffic forecasts that were performed in or near the study area?

6) Do you know of developments in the vicinity of the traffic forecast area that may affect our traffic forecast?

7) Do you have any additional comments that would be helpful in our development of the traffic forecast?

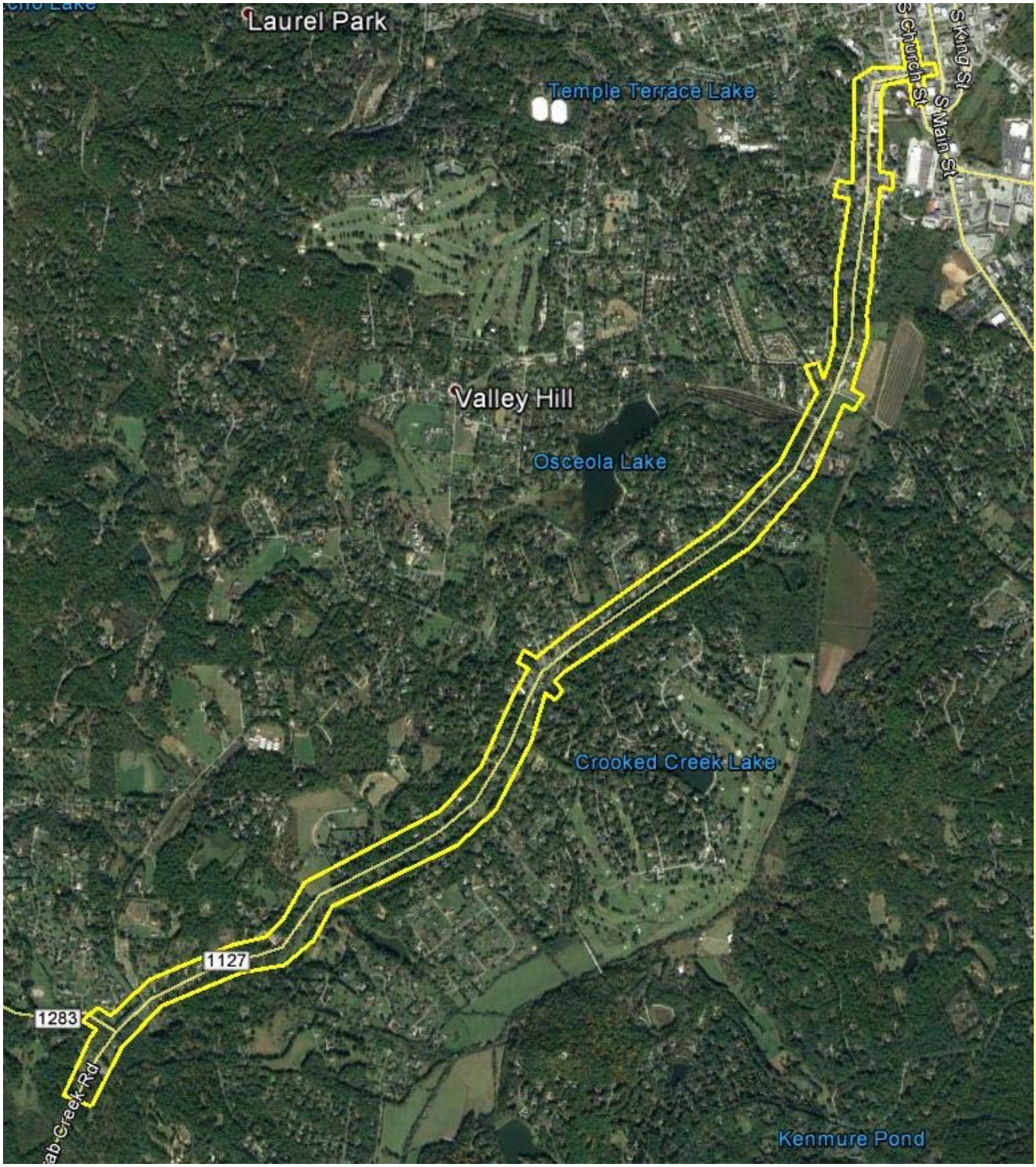
8) This questionnaire is being sent to the following individuals:

   i. Brian Burch, Division 14 Division Project Development Engineer
   ii. Wanda Austin, Division 14 Division Project Manager
   iii. Steve Buchanan, Division 14 Division Traffic Engineer
   iv. Steve Cannon, Division 14, District 1 District Engineer
   v. Daniel Sellers, NCDOT Transportation Planning Branch
   vi. Brian Wert, NCDOT Transportation Planning Branch
   vii. Lyuba Zuyeva, French Broad River MPO
   viii. Susan Frady, City of Hendersonville Development Assistance Department
   ix. Matt Champion, Henderson County Transportation Planner

   a. Are there any other individuals whom you think we should contact to discuss this forecast?

Comments completed by Steve Buchanan via email – 02/07/2017

Patriot Transportation Engineering is currently in the process of developing a traffic forecast for NCDOT STIP Project No. R-5748, which would make intersection improvements and add bicycle and pedestrian accommodations along SR 1127 (Kanuga Rd) from US 25 Business (South Church St) to SR 1123 (Little River Rd) in Henderson County. The forecast includes base year (2016) and design year (2040) forecasts. The forecast study area is shown in the following figure:



Comments completed by Steve Buchanan via email – 02/07/2017

We have reviewed the FBRMPO 2040 Metropolitan Transportation Plan (September, 2015) and are seeking input from local planners and engineers who are familiar with the area. We have identified you as a local representative. I have listed a few questions below that will help us in the development in the traffic forecast. We would greatly appreciate your time in answering these questions. You may answer the questions in text format below and return them to me at: lee@pt-engineering.net.

If you would rather discuss the questions over the phone, I will be following up with a phone call later next week. Thank you in advance for your time and please let me know if you have any questions.

1) Current and historical traffic trends indicate that in the last 10 years the growth in the study area has been low with rates less than 1.0% per year. The traffic along SR 1127 (Kanuga Rd) rose steadily through 2007 and then dropped through 2010 before steadily increasing again through the present time. The 20-year growth rates are relatively even across the study area, with most rates at or below 1.0% per year. The only count station in the study area that varies from the general observations is on Kanuga Rd east of US 25 Business (South Church St), which shows a growth rate of 2.6% per year, although this represents a data set limited to counts from 2009 onward (a 5-year period).
    a. Do you agree with this statement? Yes

    b. What growth patterns have you noticed? Not enough local knowledge.

    c. Would you expect the growth rate experienced prior to the recession to return or do you think the growth rate will be lower or higher? Expect growth rate to stay at 1%.

    d. Would you expect the growth rate to change substantially in the next 20 years? No.

2) Aside from school being in session, are there any noticeable seasonal differences in traffic? I would expect only slight bumps during the leaf season and a drop off during the winter due to summer residents.

3) According to the North Carolina Office of State Budget and Management (OSBM) the current population of Henderson County is approximately 113,000 and is projected to grow by 0.9% per year to slightly more than 133,000 in 2035. The population projections for Henderson County that are contained within the MTP are different, showing a projected population of 160,000 in the year 2040 (approximately a 1.3% per year growth rate).
    a. Do you think that the 0.9 to1.3% population growth rate is reasonable for this area? Yes

    b. Do you know of any other population projections for this area that may be helpful as we review the growth in the area? No

4) The Metropolitan Transportation Plan (MTP) includes the following projects in the vicinity of the forecast that have the potential to affect the traffic volumes in the traffic forecast study area:
        i. US 64 from Blythe Street to Daniel Drive – Widening and improvements (U-5783)
        ii. NC 191 from US 25 to NC 280 – Widen to a 4-lane, median-divided facility (R-2588A and R-2588B)
        iii. Balfour Pkwy – Construct new 4-lane expressway from NC 191 to US 64 north of Nix Rd (R-5744)
        iv. White Street from SR 1171 (Willow Rd) to US 176 (Spartanburg Hwy) – Construct 3-lane connector (U-5886)
    a. How do you think each of these projects will affect traffic volumes in the study area?
        i. Not significantly.

Comments completed by Steve Buchanan via email – 02/07/2017

ii. Not significantly.
iii. Not significantly.
iv. Slight increase.

b. Do you know of any reasonably foreseeable transportation projects that are not identified above that may affect traffic volumes in the traffic forecast study area? Not at this time.

5) Are you aware of any previous traffic forecasts that were performed in or near the study area? No

6) Do you know of developments in the vicinity of the traffic forecast area that may affect our traffic forecast? We are currently studying Kanuga due to a fatal that occurred in December. Any improvements will most likely not change the amount of traffic, but may slightly alter the scope of the project.

7) Do you have any additional comments that would be helpful in our development of the traffic forecast?

8) This questionnaire is being sent to the following individuals:

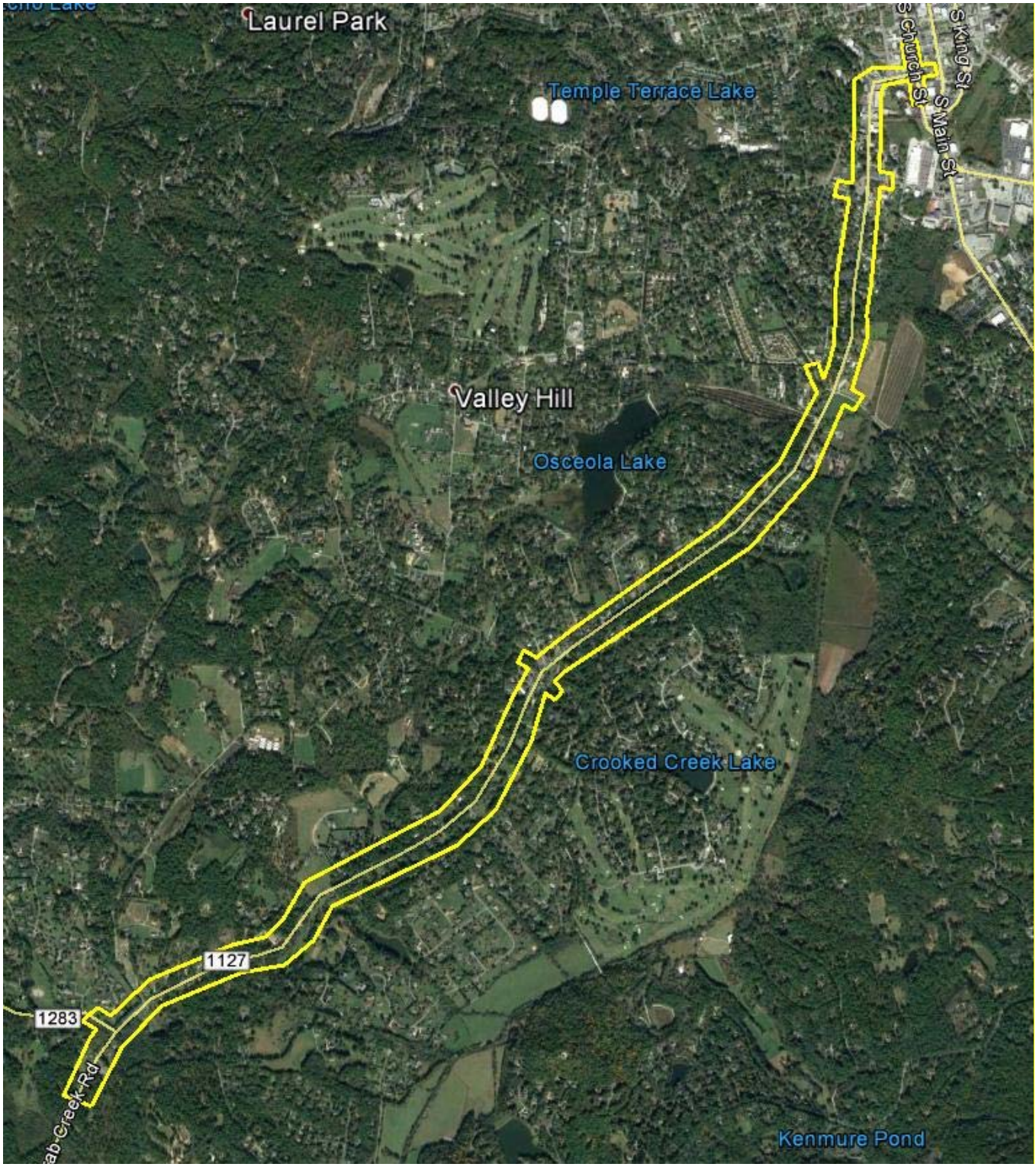
i. Brian Burch, Division 14 Division Project Development Engineer
ii. Wanda Austin, Division 14 Division Project Manager
iii. Steve Buchanan, Division 14 Division Traffic Engineer
iv. Steve Cannon, Division 14, District 1 District Engineer
v. Daniel Sellers, NCDOT Transportation Planning Branch
vi. Brian Wert, NCDOT Transportation Planning Branch
vii. Lyuba Zuyeva, French Broad River MPO
viii. Susan Frady, City of Hendersonville Development Assistance Department
ix. Matt Champion, Henderson County Transportation Planner

a. Are there any other individuals whom you think we should contact to discuss this forecast?

Roger Ayers, Division 14, Henderson County Maintenance Engineer
rayers@ncdot.gov

Comments completed by Steve Cannon via email – 02/15/2017

Patriot Transportation Engineering is currently in the process of developing a traffic forecast for NCDOT STIP Project No. R-5748, which would make intersection improvements and add bicycle and pedestrian accommodations along SR 1127 (Kanuga Rd) from US 25 Business (South Church St) to SR 1123 (Little River Rd) in Henderson County. The forecast includes base year (2016) and design year (2040) forecasts. The forecast study area is shown in the following figure:



Comments completed by Steve Cannon via email – 02/15/2017

We have reviewed the FBRMPO 2040 Metropolitan Transportation Plan (September, 2015) and are seeking input from local planners and engineers who are familiar with the area. We have identified you as a local representative. I have listed a few questions below that will help us in the development in the traffic forecast. We would greatly appreciate your time in answering these questions. You may answer the questions in text format below and return them to me at: lee@pt-engineering.net.

If you would rather discuss the questions over the phone, I will be following up with a phone call later next week. Thank you in advance for your time and please let me know if you have any questions.

1) Current and historical traffic trends indicate that in the last 10 years the growth in the study area has been low with rates less than 1.0% per year. The traffic along SR 1127 (Kanuga Rd) rose steadily through 2007 and then dropped through 2010 before steadily increasing again through the present time. The 20-year growth rates are relatively even across the study area, with most rates at or below 1.0% per year. The only count station in the study area that varies from the general observations is on Kanuga Rd east of US 25 Business (South Church St), which shows a growth rate of 2.6% per year, although this represents a data set limited to counts from 2009 onward (a 5-year period).
    a. Do you agree with this statement? Yes

    b. What growth patterns have you noticed? Stable, limited residential growth. Limited commercial growth. Minor increase in traffic patterns for traffic accessing Dupont State Forest.

    c. Would you expect the growth rate experienced prior to the recession to return or do you think the growth rate will be lower or higher? I would expect the growth rate to be at or lower than that experienced prior to the recession.

    d. Would you expect the growth rate to change substantially in the next 20 years? No

2) Aside from school being in session, are there any noticeable seasonal differences in traffic? No

3) According to the North Carolina Office of State Budget and Management (OSBM) the current population of Henderson County is approximately 113,000 and is projected to grow by 0.9% per year to slightly more than 133,000 in 2035. The population projections for Henderson County that are contained within the MTP are different, showing a projected population of 160,000 in the year 2040 (approximately a 1.3% per year growth rate).
    a. Do you think that the 0.9 to1.3% population growth rate is reasonable for this area? Yes

    b. Do you know of any other population projections for this area that may be helpful as we review the growth in the area? I am not aware of any other population projections. There are still some tracts of land undeveloped and available for residential growth, but no current known plans.

4) The Metropolitan Transportation Plan (MTP) includes the following projects in the vicinity of the forecast that have the potential to affect the traffic volumes in the traffic forecast study area:
        i. US 64 from Blythe Street to Daniel Drive – Widening and improvements (U-5783) No impact
        ii. NC 191 from US 25 to NC 280 – Widen to a 4-lane, median-divided facility (R-2588A and R-2588B) No impact
        iii. Balfour Pkwy – Construct new 4-lane expressway from NC 191 to US 64 north of Nix Rd (R-5744) No impact

Comments completed by Steve Cannon via email – 02/15/2017

iv. White Street from SR 1171 (Willow Rd) to US 176 (Spartanburg Hwy) – Construct 3-lane connector (U-5886) May increase traffic on northern end of project that may currently be using other routes to access Hwy 176

a. How do you think each of these projects will affect traffic volumes in the study area? Comments above.

b. Do you know of any reasonably foreseeable transportation projects that are not identified above that may affect traffic volumes in the traffic forecast study area? U-5105

5) Are you aware of any previous traffic forecasts that were performed in or near the study area? No

6) Do you know of developments in the vicinity of the traffic forecast area that may affect our traffic forecast? No

7) Do you have any additional comments that would be helpful in our development of the traffic forecast? No

8) This questionnaire is being sent to the following individuals:

i. Brian Burch, Division 14 Division Project Development Engineer
ii. Wanda Austin, Division 14 Division Project Manager
iii. Steve Buchanan, Division 14 Division Traffic Engineer
iv. Steve Cannon, Division 14, District 1 District Engineer
v. Daniel Sellers, NCDOT Transportation Planning Branch
vi. Brian Wert, NCDOT Transportation Planning Branch
vii. Lyuba Zuyeva, French Broad River MPO
viii. Susan Frady, City of Hendersonville Development Assistance Department
ix. Matt Champion, Henderson County Transportation Planner

a. Are there any other individuals whom you think we should contact to discuss this forecast? No

NOTES OF CONVERSATION WITH BRIAN BURCH, 02/10/2017

Deferred questions to District Engineer.

NOTES OF CONVERSATION WITH BRIAN WERT, 02/07/2017

Suggested that Daniel Sellers would be the best person to contact.

NOTES OF CONVERSATION WITH LYUBA LUYEVA, 02/07/2017

Could not think of any new developments going in in that area. She talked to Tristan as well, and he also did not know of any new developments in the area.

Suggested that the growth in that area is sort of "business as usual." There is some growth, but nothing unusual.

NOTES OF CONVERSATION WITH SUSAN FRADY, 02/13/2017

The city's jurisdiction goes about ¾ of a mile south of Erkwood Dr, and does not expect significant growth in the city portion of the study area.

A new fruit stand was pit in at the Erkwood Dr intersection, but it had an agricultural exemption for its approval because that area is in the flood plain. Further growth in that area is unlikely because of the flood plain.

Does not expect a lot of population growth in the city.

The Kanuga Rd corridor is one of the lowest areas for development they have in the city.

Traffic at Erkwood Dr can back up at the signal – northbound in the AM peak hour and southbound in the PM peak hour.

Lee Klieman

From: Sellers, Daniel C <dcsellers1@ncdot.gov>
Sent: Friday, February 10, 2017 5:23 PM
To: Lee Klieman
Subject: RE: NCDOT STIP R-5748 Traffic Forecast Questionnaire

Thank You for contacting me about this project. Unfortunately I am new to this assignment, and after reviewing your questions and the LRTP, I will defer to Lyuba and her staff to provide comments.

Daniel Cooper Sellers, PE

French Broad River MPO and
Land of Sky RPO Coordinator
Transportation Planning Branch
North Carolina Department of Transportation

919 707 0978 Office
dcsellers1@ncdot.gov

1554 Mail Service Center
Raleigh, NC 27699-1554

Lee Klieman

From: Austin, Wanda H <whaustin@ncdot.gov>
Sent: Wednesday, February 01, 2017 4:02 PM
To: Lee Klieman
Subject: RE: NCDOT STIP R-5748 Traffic Forecast Questionnaire

Good afternoon. I am not a good resource for these questions. I trust the other NCDOT employees listed on the email will have more knowledge of the roadway.

Wanda H. Austin, PE CPM
Project Team Lead
Division of Highways-Division 14
North Carolina Department of Transportation

828 586 2141 office
828 342 5079 mobile

APPENDIX C:

TRAFFIC FORECAST TABLES

Table C1: 2016 Base Year No-Build Traffic Volumes

Forecast Location	NCDOT Historic Count Data							AADT Exptrapolated to 2016[1]	Project Specific Count Data[3]		2016 No-Build Traffic Forecast
	2008	2009	2010	2011	2012	2013	2014		TMC	Mainline	
SR 1127 (Kanuga Road) - south of SR 1123 (Little Rive Road)/White Squirrel Lane	4,200		3,800		*3,300*		3,900	4,100 [1]	5,100 (4)		**5,100**
SR 1127 (Kanuga Road) - north of SR 1123 (Little Rive Road)/White Squirrel Lane									5,600 (4)	5,300 (6)	**5,700**
SR 1127 (Kanuga Road) - south of SR 1137 (Price Road)/ SR 1152 (Crail Farm Road)	6,500		6,400		6,700		6,700	6,800 [1]	7,500 (5)		**7,500**
SR 1127 (Kanuga Road) - north of SR 1137 (Price Road)/ SR 1152 (Crail Farm Road)									9,200 (5)	8,400 (6)	**9,200**
SR 1127 (Kanuga Road) - south of SR 1164 (State Street/Erkwood Drive)	10,000		10,000		11,000		11,000	11,300 [1]	11,200 (4)		**11,200**
SR 1127 (Kanuga Road) - SR 1164 (State Street/Erkwood Drive) to SR 1171 (Hebron Road)									8,600 (4) 8,400 (4)		**8,600**
SR 1127 (Kanuga Road) - SR 1171 (Hebron Road) to SR 1170 (White Street)									11,400 (4) 11,400 (4)		**11,500**
SR 1127 (Kanuga Road) - north of SR 1170 (White Street)	8,400		8,400		8,500		8,200	8,800 [1]	8,000 (4)		**8,300**
SR 1127 (Kanuga Road) - west of US 25 Business (S. Church Street)	9,600		9,200		9,600		9,700	9,700 [1]	8,400 (4)		**9,200**
SR 1127 (Kanuga Road) - east of US 25 Business (S. Church Street)		4,800			4,700		*5,500*	5,500 [2]	4,900 (4)		**5,200 [7]**
White Squirrel Lane - west of SR 1127 (Kanuga Road)									0 (4)		**0**
SR 1123 (Little River Road) - east of SR 1127 (Kanuga Road)		1,300		1,400				1,400 [1]	1,600 (4)		**1,600**
SR 1137 (Price Road) - west of SR 1127 (Kanuga Road)	2,200		2,100		2,100		2,000	2,200 [1]	2,300 (5)		**2,300**
SR 1152 (Crail Farm Road) - east of SR 1127 (Kanuga Road)									200 (5)		**200**
SR 1164 (State Street) - west of SR 1127 (Kanuga Road)		5,100			2,900		3,600	2,700 [2]	3,900 (4)		**3,900**
SR 1164 (Erkwood Drive)- east of SR 1127 (Kanuga Road)	6,400		6,400		6,400		6,200	7,100 [1]	7,100 (4)		**7,100**
SR 1171 (Hebron Road) - west of SR 1127 (Kanuga Road)	5,600		3,800		3,800		4,000	4,100 [1]	5,000 (4)		**4,800**
SR 1171 (Hebron Road) - east of SR 1127 (Kanuga Road)									2,400 (4)		**2,500**

Table C1: 2016 Base Year No-Build Traffic Volumes

Forecast Location	NCDOT Historic Count Data							AADT Exptrapolated to 2016[1]	Project Specific Count Data[3]		2016 No-Build Traffic Forecast
	2008	2009	2010	2011	2012	2013	2014		TMC	Mainline	
Commercial Driveway - west of SR 1127 (Kanuga Road)									500 (4)		**500**
SR 1170 (White Street) - east of SR 1127 (Kanuga Road)									6,300 (4)		**6,300**
US 25 Business (S. Church Street)- north of SR 1127 (Kanuga Road)									13,500 (4)		**12,400** [8]
US 25 Business (S. Church Street)- south of SR 1127 (Kanuga Road)		12,000			10,000		9,300	8,300 [2]	11,000 (4)		**11,200** [8]

Notes:

Red italics denote numbers removed from data set due to outlier status

(1) Data extrapolated to 2016 based on linear regression of 1994-2014 data

(2) Data extrapolated to 2016 based on linear regression of 2009-2014 data

(3) All Project Specific Counts were converted to AADT based on the NCDOT Traffic Survey Unit ATR Seasonal Factors as described in Section 2.3

(4) 2015 4-hour Turning Movement Count - factored to 24-hour volumes, factored to 2016 and adjusted to AADT

(5) 2016 13-hour Turning Movement Count - factored to 24-hour volumes, adjusted to AADT

(6) 2016 Project Specific Mainline Count - Adjusted to AADT

(7) Directional AADT Volume - Individual volumes shown on forecast diagrams

(8) One-way Volume - AADT shown is for SB Direction of one-way pair

Table C2: 2016 Base Year No-Build Design Data – Truck Percentages

Forecast Location	Project Specific Count Data		Selected 2016 BY NB Value
	TMC	Mainline	
SR 1127 (Kanuga Road) - south of SR 1123 (Little Rive Road)/White Squirrel Lane	3 , 0 (1)		**3 , 1**
SR 1127 (Kanuga Road) - north of SR 1123 (Little Rive Road)/White Squirrel Lane	3 , 0 (1)	10 , 0 (3)	**3 , 1**
SR 1127 (Kanuga Road) - south of SR 1137 (Price Road)/ SR 1152 (Crail Farm Road)	2 , 0 (2)		**3 , 1**
SR 1127 (Kanuga Road) - north of SR 1137 (Price Road)/ SR 1152 (Crail Farm Road)	2 , 0 (2)	10 , 0 (3)	**3 , 1**
SR 1127 (Kanuga Road) - south of SR 1164 (State Street/Erkwood Drive)	1 , 0 (1)		**3 , 1**
SR 1127 (Kanuga Road) - SR 1164 (State Street/Erkwood Drive) to SR 1171 (Hebron Road)	2 , 0 (1) 2 , 0 (1)		**3 , 1**
SR 1127 (Kanuga Road) - SR 1171 (Hebron Road) to SR 1170 (White Street)	2 , 0 (1) 1 , 0 (1)		**3 , 1**
SR 1127 (Kanuga Road) - north of SR 1170 (White Street)	1 , 0 (1)		**2 , 1**
SR 1127 (Kanuga Road) - west of US 25 Business (S. Church Street)	1 , 0 (1)		**2 , 1**
SR 1127 (Kanuga Road) - east of US 25 Business (S. Church Street)	1 , 0 (1)		**2 , 1**
SR 1123 (Little River Road) - east of SR 1127 (Kanuga Road)	3 , 0 (1)		**3 , 1**
SR 1137 (Price Road) - west of SR 1127 (Kanuga Road)	3 , 0 (2)		**3 , 1**
SR 1152 (Crail Farm Road) - east of SR 1127 (Kanuga Road)	3 , 0 (2)		**3 , 1**
SR 1164 (State Street) - west of SR 1127 (Kanuga Road)	2 , 0 (1)		**2 , 1**
SR 1164 (Erkwood Drive)- east of SR 1127 (Kanuga Road)	2 , 0 (1)		**2 , 1**
SR 1171 (Hebron Road) - west of SR 1127 (Kanuga Road)	1 , 0 (1)		**1 , 1**
SR 1171 (Hebron Road) - east of SR 1127 (Kanuga Road)	1 , 0 (1)		**1 , 1**
Commercial Driveway - west of SR 1127 (Kanuga Road)	0 , 0 (1)		**1 , 1**
SR 1170 (White Street) - east of SR 1127 (Kanuga Road)	2 , 0 (1)		**3 , 1**
US 25 Business (S. Church Street)- north of SR 1127 (Kanuga Road)	2 , 0 (1)		**2 , 1**
US 25 Business (S. Church Street)- south of SR 1127 (Kanuga Road)	2 , 0 (1)		**2 , 1**

Notes:

(1) 2015 4-hour Turning Movement Count

(2) 2016 13-hour Turning Movement Count

(3) 2016 Volume, Speed, Class Mainline Count

Table C3: 2016 Base Year No-Build Design Data – Directional Distribution

Forecast Location	Project Specific Count Data		Selected 2016 BY NB Value
	TMC	Mainline	
SR 1127 (Kanuga Road) - south of SR 1123 (Little Rive Road)/White Squirrel Lane	56 (1)		**60**
SR 1127 (Kanuga Road) - north of SR 1123 (Little Rive Road)/White Squirrel Lane	57 (1)	59 (3)	**60**
SR 1127 (Kanuga Road) - south of SR 1137 (Price Road)/ SR 1152 (Crail Farm Road)	59 (2)		**60**
SR 1127 (Kanuga Road) - north of SR 1137 (Price Road)/ SR 1152 (Crail Farm Road)	61 (2)	57 (3)	**60**
SR 1127 (Kanuga Road) - south of SR 1164 (State Street/Erkwood Drive)	59 (1)		**60**
SR 1127 (Kanuga Road) - SR 1164 (State Street/Erkwood Drive) to SR 1171 (Hebron Road)	61 (1) 62 (1)		**60**
SR 1127 (Kanuga Road) - SR 1171 (Hebron Road) to SR 1170 (White Street)	62 (1) 62 (1)		**60**
SR 1127 (Kanuga Road) - north of SR 1170 (White Street)	58 (1)		**60**
SR 1127 (Kanuga Road) - west of US 25 Business (S. Church Street)	62 (1)		**60**
SR 1127 (Kanuga Road) - east of US 25 Business (S. Church Street)	58 (1)		**60**
SR 1123 (Little River Road) - east of SR 1127 (Kanuga Road)	55 (2)		**55**
SR 1137 (Price Road) - west of SR 1127 (Kanuga Road)	63 (1)		**65**
SR 1152 (Crail Farm Road) - east of SR 1127 (Kanuga Road)	64 (1)		**65**
SR 1164 (State Street) - west of SR 1127 (Kanuga Road)	60 (1)		**60**
SR 1164 (Erkwood Drive)- east of SR 1127 (Kanuga Road)	57 (1)		**55**
SR 1171 (Hebron Road) - west of SR 1127 (Kanuga Road)	58 (1)		**60**
SR 1171 (Hebron Road) - east of SR 1127 (Kanuga Road)	53 (1)		**55**
Commercial Driveway - west of SR 1127 (Kanuga Road)	66 (1)		**65**
SR 1170 (White Street) - east of SR 1127 (Kanuga Road)	61 (1)		**60**
US 25 Business (S. Church Street)- north of SR 1127 (Kanuga Road)	100 (1)		**100**
US 25 Business (S. Church Street)- south of SR 1127 (Kanuga Road)	100 (1)		**100**

Notes:

(1) 2015 4-hour Turning Movement Count

(2) 2016 13-hour Turning Movement Count

(3) 2016 Volume, Speed, Class Mainline Count

Table C4: 2016 Base Year No-Build Design Data – Peak Hour Factor

Forecast Location	Project Specific Count Data[3]		Selected 2016 BY NB Value
	TMC	Mainline	
SR 1127 (Kanuga Road) - south of SR 1123 (Little Rive Road)/White Squirrel Lane	9 (1)		**9**
SR 1127 (Kanuga Road) - north of SR 1123 (Little Rive Road)/White Squirrel Lane	8 (1)	8 (3)	**9**
SR 1127 (Kanuga Road) - south of SR 1137 (Price Road)/ SR 1152 (Crail Farm Road)	9 (2)		**9**
SR 1127 (Kanuga Road) - north of SR 1137 (Price Road)/ SR 1152 (Crail Farm Road)	8 (2)	9 (3)	**9**
SR 1127 (Kanuga Road) - south of SR 1164 (State Street/Erkwood Drive)	9 (1)		**9**
SR 1127 (Kanuga Road) - SR 1164 (State Street/Erkwood Drive) to SR 1171 (Hebron Road)	9 (1) 9 (1)		**9**
SR 1127 (Kanuga Road) - SR 1171 (Hebron Road) to SR 1170 (White Street)	9 (1) 9 (1)		**9**
SR 1127 (Kanuga Road) - north of SR 1170 (White Street)	9 (1)		**9**
SR 1127 (Kanuga Road) - west of US 25 Business (S. Church Street)	9 (1)		**9**
SR 1127 (Kanuga Road) - east of US 25 Business (S. Church Street)	9 (1)		**9**
SR 1123 (Little River Road) - east of SR 1127 (Kanuga Road)	8 (2)		**8**
SR 1137 (Price Road) - west of SR 1127 (Kanuga Road)	8 (1)		**8**
SR 1152 (Crail Farm Road) - east of SR 1127 (Kanuga Road)	11 (1)		**11**
SR 1164 (State Street) - west of SR 1127 (Kanuga Road)	9 (1)		**9**
SR 1164 (Erkwood Drive)- east of SR 1127 (Kanuga Road)	9 (1)		**9**
SR 1171 (Hebron Road) - west of SR 1127 (Kanuga Road)	10 (1)		**10**
SR 1171 (Hebron Road) - east of SR 1127 (Kanuga Road)	11 (1)		**10**
Commercial Driveway - west of SR 1127 (Kanuga Road)	15 (1)		**14**
SR 1170 (White Street) - east of SR 1127 (Kanuga Road)	9 (1)		**9**
US 25 Business (S. Church Street)- north of SR 1127 (Kanuga Road)	10 (1)		**10**
US 25 Business (S. Church Street)- south of SR 1127 (Kanuga Road)	10 (1)		**10**

Notes:

(1) 2015 4-hour Turning Movement Count

(2) 2016 13-hour Turning Movement Count

(3) 2016 Volume, Speed, Class Mainline Count

Table C5: Model Validation

Forecast Location	Model Calibration 2010		Interpolated Model [3]	Forecast Volume	FY NB Volumes	
	Model	AADT [1]	2016	2016 NB	2040 Model	2040 Forecast
SR 1127 (Kanuga Road) - south of SR 1123 (Little Rive Road)/White Squirrel Lane	6,013	3,800	6,500	5,100	8,232	6,900
SR 1127 (Kanuga Road) - north of SR 1123 (Little Rive Road)/White Squirrel Lane	5,744	5,035 [2]	6,400	5,700	8,949	7,600
SR 1127 (Kanuga Road) - south of SR 1137 (Price Road)/ SR 1152 (Crail Farm Road)	8,877	6,400	9,600	7,500	12,393	9,500
SR 1127 (Kanuga Road) - north of SR 1137 (Price Road)/ SR 1152 (Crail Farm Road)	11,143		11,800	9,200	14,587	11,500
SR 1127 (Kanuga Road) - south of SR 1164 (State Street/Erkwood Drive)	13,424	10,000	14,300	11,200	17,834	14,100
SR 1127 (Kanuga Road) - SR 1164 (State Street/Erkwood Drive) to SR 1171 (Hebron Road)	9,044	9,424 [2]	9,600	8,600	11,995	10,900
SR 1127 (Kanuga Road) - SR 1171 (Hebron Road) to SR 1170 (White Street)	12,664		11,700	11,500	7,975	10,200
SR 1127 (Kanuga Road) - north of SR 1170 (White Street)	5,872	8,400	6,300	8,300	7,975	10,400
SR 1127 (Kanuga Road) - west of US 25 Business (S. Church Street)	11,615	9,200	12,100	9,200	13,840	11,400
SR 1127 (Kanuga Road) - east of US 25 Business (S. Church Street)	4,837	4,260 [2]	4,900	5,200	5,053	5,800
SR 1123 (Little River Road) - east of SR 1127 (Kanuga Road)	1,404	1,156 [2]	1,400	1,600	1,555	1,700
SR 1137 (Price Road) - west of SR 1127 (Kanuga Road)	2,976	2,100	3,000	2,300	3,243	2,600
SR 1164 (State Street) - west of SR 1127 (Kanuga Road)	3,369		3,500	3,900	4,156	4,700
SR 1164 (Erkwood Drive)- east of SR 1127 (Kanuga Road)	7,014	6,400	7,500	7,100	9,216	8,500
SR 1171 (Hebron Road) - west of SR 1127 (Kanuga Road)	3,620	3,800	4,500	4,800	8,210	9,200
SR 1170 (White Street) - east of SR 1127 (Kanuga Road)	7,248		5,800	6,300	0	300
US 25 Business (S. Church Street)- north of SR 1127 (Kanuga Road)	19,429		20,500	12,400	24,919	15,400
US 25 Business (S. Church Street)- south of SR 1127 (Kanuga Road)	13,963	10,869 [2]	14,900	11,200	18,416	14,000

Notes:

(1) NCDOT Historic Count Data unless otherwise noted

(2) Average weekday traffic from FBRMPO Model

(3) Interpolated volume between 2010 and 2040 model data

Table C6: 2040 No-Build Traffic Volumes

Forecast Location	Forecast 2016 Base Year NB	Historic Growth Rate		Model Growth Rate (1)	Chosen Growth Rate (1)	Future Year No-Build Volumes		
	AADT	2004-2014	1994-2014	2010-2040	2016-2040	2040 Model	2040 Forecast	
SR 1127 (Kanuga Road) - south of SR 1123 (Little Rive Road)/White Squirrel Lane	5,100	-0.87%	0.16%	1.05%	1.27%	8,232	**6,900**	
SR 1127 (Kanuga Road) - north of SR 1123 (Little Rive Road)/White Squirrel Lane	5,700			1.49%	1.21%	8,949	**7,600**	
SR 1127 (Kanuga Road) - south of SR 1137 (Price Road)/ SR 1152 (Crail Farm Road)	7,500	-0.19%	0.47%	1.12%	0.99%	12,393	**9,500**	
SR 1127 (Kanuga Road) - north of SR 1137 (Price Road)/ SR 1152 (Crail Farm Road)	9,200			0.90%	0.93%	14,587	**11,500**	
SR 1127 (Kanuga Road) - south of SR 1164 (State Street/Erkwood Drive)	11,200	0.47%	1.06%	0.95%	0.96%	17,834	**14,100**	
SR 1127 (Kanuga Road) - SR 1164 (State Street/Erkwood Drive) to SR 1171 (Hebron Road)	8,600			0.95%	0.99%	11,995	**10,900**	
SR 1127 (Kanuga Road) - SR 1171 (Hebron Road) to SR 1170 (White Street)	11,500			-1.53%	-0.50%	7,975	**10,200**	
SR 1127 (Kanuga Road) - north of SR 1170 (White Street)	8,300	-1.78%	0.44%	1.03%	0.94%	7,975	**10,400**	
SR 1127 (Kanuga Road) - west of US 25 Business (S. Church Street)	9,200	-0.46%	0.09%	0.59%	0.90%	13,840	**11,400**	
SR 1127 (Kanuga Road) - east of US 25 Business (S. Church Street)	5,200	2.57% (2)	n/a (2)	0.15%	0.46%	5,053	**5,800**	(3)
SR 1123 (Little River Road) - east of SR 1127 (Kanuga Road)	1,600	-4.34%	-1.11%	0.34%	0.25%	1,555	**1,700**	
SR 1137 (Price Road) - west of SR 1127 (Kanuga Road)	2,300	-1.31%	0.16%	0.29%	0.51%	3,243	**2,600**	
SR 1152 (Crail Farm Road) - east of SR 1127 (Kanuga Road)	200			n/a	0.00%	--	**200**	
SR 1164 (State Street) - west of SR 1127 (Kanuga Road)	3,900	-8.29% (2)	n/a (2)	0.70%	0.78%	4,156	**4,700**	
SR 1164 (Erkwood Drive)- east of SR 1127 (Kanuga Road)	7,100	-0.62%	1.67%	0.91%	0.75%	9,216	**8,500**	
SR 1171 (Hebron Road) - west of SR 1127 (Kanuga Road)	4,800	-0.64%	0.75%	2.77%	2.75%	8,210	**9,200**	
SR 1171 (Hebron Road) - east of SR 1127 (Kanuga Road)	2,500			n/a	7.60%	13,813	**14,500**	
Commercial Driveway - west of SR 1127 (Kanuga Road)	500			n/a	0.00%	--	**500**	
SR 1170 (White Street) - east of SR 1127 (Kanuga Road)	6,300			n/a	-11.91%	--	**300**	
US 25 Business (S. Church Street)- north of SR 1127 (Kanuga Road)	12,400			0.83%	0.91%	24,919	**15,400**	(4)
US 25 Business (S. Church Street)- south of SR 1127 (Kanuga Road)	11,200	-5.12% (2)	n/a (2)	0.93%	0.93%	18,416	**14,000**	(4)

Notes:

(1) Growth rate shown is the Compound Annual Growth Rate (CAGR).

(2) Only data from 2009-2014 available for these locations.

(3) Directional AADT Volume - Individual volumes shown on forecast diagrams

(4) One-way Volume - AADT shown is for SB Direction of one-way pair

Table C7: 2040 Build Traffic Volumes

Forecast Location	2040 Model Volumes, Daily		Model Diversion Percent	Chosen Diversion Percent	2040 Forecast Volumes		
	No-Build	Build			No-Build	Build	
SR 1127 (Kanuga Road) - south of SR 1123 (Little Rive Road)/White Squirrel Lane	8,232	8,390	1.92%	1.45%	6,900	**7,000**	
SR 1127 (Kanuga Road) - north of SR 1123 (Little Rive Road)/White Squirrel Lane	8,949	9,043	1.05%	1.32%	7,600	**7,700**	
SR 1127 (Kanuga Road) - south of SR 1137 (Price Road)/ SR 1152 (Crail Farm Road)	12,393	12,625	1.87%	2.11%	9,500	**9,700**	
SR 1127 (Kanuga Road) - north of SR 1137 (Price Road)/ SR 1152 (Crail Farm Road)	14,587	15,145	3.83%	4.35%	11,500	**12,000**	
SR 1127 (Kanuga Road) - south of SR 1164 (State Street/Erkwood Drive)	17,834	18,421	3.29%	2.13%	14,100	**14,400**	
SR 1127 (Kanuga Road) - SR 1164 (State Street/Erkwood Drive) to SR 1171 (Hebron Road)	11,995	12,321	2.72%	2.75%	10,900	**11,200**	
SR 1127 (Kanuga Road) - SR 1171 (Hebron Road) to SR 1170 (White Street)	7,975	8,180	2.57%	2.94%	10,200	**10,500**	
SR 1127 (Kanuga Road) - north of SR 1170 (White Street)	7,975	8,180	2.57%	2.88%	10,400	**10,700**	
SR 1127 (Kanuga Road) - west of US 25 Business (S. Church Street)	13,840	13,935	0.69%	0.00%	11,400	**11,400**	
SR 1127 (Kanuga Road) - east of US 25 Business (S. Church Street)	5,053	5,080	0.53%	0.00%	5,800	**5,800**	(1)
SR 1123 (Little River Road) - east of SR 1127 (Kanuga Road)	1,555	1,550	-0.32%	0.00%	1,700	**1,700**	
SR 1137 (Price Road) - west of SR 1127 (Kanuga Road)	3,243	3,547	9.37%	11.54%	2,600	**2,900**	
SR 1152 (Crail Farm Road) - east of SR 1127 (Kanuga Road)	--	--	n/a	0.00%	200	**200**	
SR 1164 (State Street) - west of SR 1127 (Kanuga Road)	4,156	4,123	-0.79%	0.00%	4,700	**4,700**	
SR 1164 (Erkwood Drive)- east of SR 1127 (Kanuga Road)	9,216	9,413	2.14%	2.35%	8,500	**8,700**	
SR 1171 (Hebron Road) - west of SR 1127 (Kanuga Road)	8,210	8,111	-1.21%	0.00%	9,200	**9,200**	
SR 1171 (Hebron Road) - east of SR 1127 (Kanuga Road)	13,813	13,818	0.04%	0.00%	14,500	**14,500**	
Commercial Driveway - west of SR 1127 (Kanuga Road)	--	--	n/a	0.00%	500	**500**	
SR 1170 (White Street) - east of SR 1127 (Kanuga Road)	--	--	n/a	0.00%	300	**300**	
US 25 Business (S. Church Street)- north of SR 1127 (Kanuga Road)	24,919	24,949	0.12%	0.00%	15,400	**15,400**	(2)
US 25 Business (S. Church Street)- south of SR 1127 (Kanuga Road)	18,416	18,379	-0.20%	0.00%	14,000	**14,000**	(2)

Notes:

(1) Directional AADT Volume - Individual volumes shown on forecast diagrams

(2) One-way Volume - AADT shown is for SB Direction of one-way pair

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