



US 1/US 1A/FALLS OF NEUSE ROAD INTERSECTION ANALYSIS

EXISTING CONDITIONS & TRENDS





Technical Memo 1: Existing Conditions and Trends Table of Contents

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1.0 INTRODUCTION

1.1 Study Purpose

The purpose of this “hot spot” analysis is to build upon the Capital Area Metropolitan Planning Organization’s (CAMPO) US 1 North Corridor Phase I Study to consider interim and future improvements for the intersection of Capital Boulevard (US 1)/ US 1A/Falls of Neuse Road located in Wake Forest. The study team will identify three potential future interchanges at the Falls of Neuse/South Main Street (US1A) intersection. The adopted Metropolitan Transportation Plan (MTP) calls for the US 1 Corridor to be upgraded to a freeway facility by 2030. As part of this conversion, the intersection at US 1/US 1A/Falls of Neuse will be converted from an at-grade intersection to a grade separation interchange. The study team will also analyze and recommend interim safety and operational improvement recommendations to improve the efficiency and extend the life of the existing intersection.

This technical memorandum will document the existing and future development baseline conditions in the vicinity of the US 1/US 1A/Falls of Neuse Road intersection and will take into consideration current and future development trends in this densely populated urban setting. Drawing traffic volumes from the Triangle Regional Demand Model, the baseline future year is 2040, with construction of the future interchange occurring in 2030.

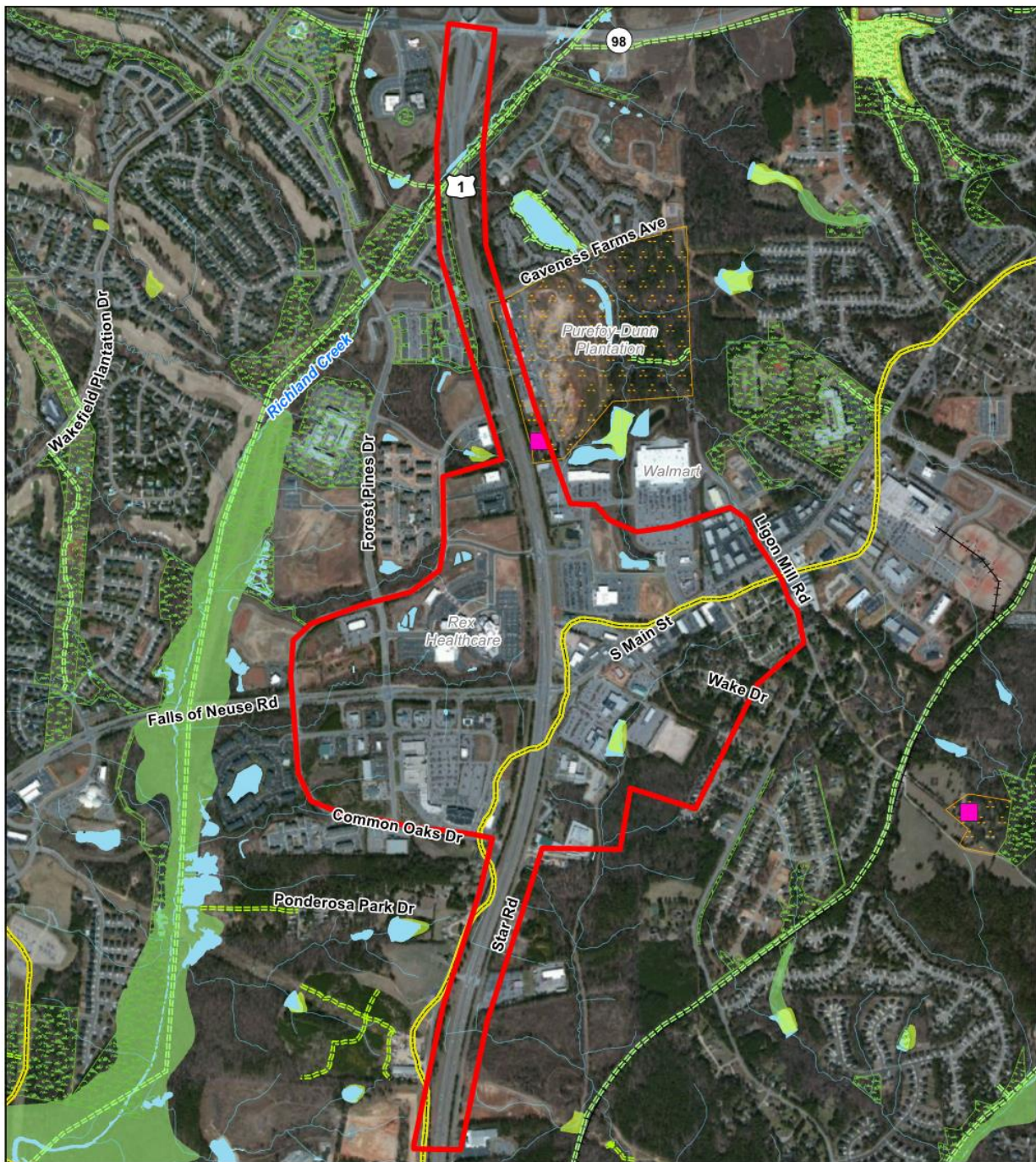
1.2 Study Area and Environmental Constraints

The project study area was defined to be a 500 foot corridor centered on the US 1 and Falls of Neuse/South Main Street corridors and includes the following intersections (Figure 1):

- US 1/US 1A/ Falls of Neuse Road
- US 1 and Directional Crossover (approximately 1,500 feet north of US 1A/South Main Street/Falls of Neuse Road)
- Falls of Neuse Road and Directional Crossover (approximately 870 feet west of US1)
- US 1A (South Main Street) and Star Road
- US 1A (South Main Street) and Wake Drive
- US 1A (South Main Street) and Walmart Entrance

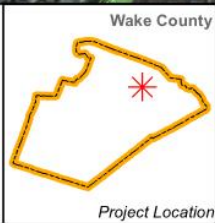
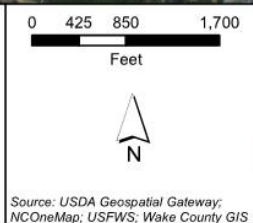
According to a GIS database search, the Purefoy-Dunn House is located adjacent to the US 1 corridor north of the US 1/ US 1A/ Falls of Neuse intersection and is registered as a historic site on the National Register. GIS database information indicates that the parcel as well as the house has historic significance, however portions of the identified parcel have been developed or have development plans underway by private developers. An effort to avoid or minimize impacts to this historic property is anticipated if State and Federal funding will be expended for future interchange or corridor improvements.

The US 1/US 1A/Falls of Neuse intersection falls in both the Richland Creek and Smith Creek Watersheds and may cause impacts to several tributaries within the vicinity of the interchange. Both the Richland Creek sub-watershed (HUC 030202010702) to the west and the Smith Creek sub-watershed (HUC 030202010702) to the east drain to the Neuse River and are subject to Neuse buffer regulations. Richland Creek (WS-IV; NSW) and Smith Creek (C;NSW) both drain to the Neuse River and are subject to Neuse buffer regulations. Smith Creek is listed on the 2014 303(d) draft list of impaired waters.



Study Area Limits	Watershed Boundary
Rail	Honeycutt Creek-Neuse River
Wetlands	Horse Creek
Freshwater Emergent Wetland	Perry Creek-Neuse River
Freshwater Forested/Shrub Wetland	Richland Creek
Freshwater Pond	Smith Creek
Lake	Trails
RIVERINE	Open Space
Stream	Historic Properties
Water Body	Historic Points
Conservation Easement	

Figure 1
Study Area
US-1 / US-1A /
Falls of Neuse Blvd.
Feasibility Study
 June 2014



Source: USDA Geospatial Gateway; NCOneMap; USFWS; Wake County GIS

2.0 EXISTING CONDITIONS

2.1 Existing Plans and Studies

The following relevant studies and plans were reviewed:

- US 1 Study Phase I & II Mapping Consolidation (underway)
- US 1 Corridor Study Phase II (2012)
- US 1 Corridor Study Phase I (2006)
- CAMPO Metropolitan Transportation Improvement Program
- CAMPO Congestion Management Process (CMP)
- NCDOT 2040 Plan
- Wake Forest Transportation Plan Update (2010)
- Wake Forest Land Development Plan
- Town of Wake Forest US 1 Corridor Plan (1999)

2.2 Existing Roadway and Traffic Conditions

US 1

US 1 is a regionally significant Principal Arterial which NCDOT has designated as a Strategic Highway Corridor in the areas of Wake, Franklin, and Vance County. It serves as connection between the City of Raleigh to the Towns of Wake Forest, Youngsville, and Franklinton. In the immediate study area US 1 is a four-lane divided facility with paved and turf shoulders. The Right-of-Way is approximately 270 feet north of the intersection, but varies throughout the interchange area and southward. US 1 is a partially controlled access facility. The posted speed limit is 55 MPH. South of the intersection with US 1A/ Falls of Neuse the 2011 AADT is 47,000 vehicles per day (vpd), and north of the intersection the AADT is 41,000 vpd. The primary land use along US 1 in the study area is industrial with some high density residential. There are no bicycle or pedestrian facilities along the US 1 corridor in the study area, however recommendations from the Phase I corridor study indicated that bicyclist and pedestrian accommodations will be accommodated on future frontage and backage roads, adjacent to development.

There are two primary transit services that operate in the area although neither offers a fixed route along US 1. Capital Area Transit (CAT) has a Wake Forest Loop which services retail locations along US 1 A and Falls of Neuse to include the Rex Healthcare Campus as well as Downtown Wake Forest and Park and Rides. Triangle Transit (TTA) offers an Express Route which is operated by CAT and services Park and Ride locations from North Raleigh to Downtown Wake Forest.

Falls of Neuse Road/South Main Street

Falls of Neuse Road is a Minor Arterial and serves as a major thoroughfare that extends from downtown Raleigh, interchanges with I-540, and connects with US 1 in the location of the former New Falls of Neuse Road. This connection was completed in 2012 and now serves as an alternate route to US 1 for points south to include Downtown Raleigh. Within the study area, Right-of-Way along Falls of Neuse is 150 feet, and there is no control of access along Falls of Neuse. Inside the study area, Falls of Neuse is a divided facility with a raised median and curb and gutter. It is posted at 45 MPH. There is no historical AADT available for this section since it was completed in 2012. There are sidewalks on both sides of Falls of Neuse that provide a

pedestrian link between high density residential areas and commercial areas such as the retail and restaurants at Wakefield Commons on the south side and the Rex Healthcare Campus and retail/restaurants on the north side of Falls of Neuse.

US 1A (South Main Street)

US 1A is a major collector and serves as a major thoroughfare connecting US 1 to Downtown Wake Forest. In the study area South Main Street is a 5-lane Undivided Facility with a 2-way left turn lane. Right-of-Way along US 1A varies, but is primarily 100 feet wide and there is no control of access. The posted speed limit is 35 MPH. AADT along US 1A is 24,000 vpd (2011). Through most of the study area South Main Street has curb and gutter and sidewalks, however at the connection with US 1, South Main Street is a shoulder section with no pedestrian facilities. Land use along South Main Street is primarily commercial and boasts big box retail, restaurants, and several outparcel retail locations. There is some residential adjacent to the study area. There are several closely spaced driveways and access points along US 1A.

2.3 Capacity Analysis

Baseline analyses for the existing year, 2014, and a future build year of 2040 were modeled in accordance with the Transportation Research Board's 2010 Highway Capacity Manual (HCM). The HCM utilizes a term "level of service" to measure how traffic operates in intersections and on roadway segments. There are currently six levels of service (LOS). The LOS is an important measure of roadway congestion. The LOS is determined by calculating the delay for the intersection and converting it to a letter grade. The LOS ranges from A (no congestion) to F (severe congestion).

Turning movement counts were collected on 4/23/2014 and 5/7/2014 for the morning (7-9 AM) and afternoon (4-6 PM) peak hours at each of the intersections within the study area. These traffic volumes were input into the Synchro model along with the speed limits, lane geometry and signal timing/phasing. The lane geometry was measured through field visits and the signal timing plans were obtained from NCDOT and the City of Raleigh.

Synchro/SimTraffic 8.0 was used to analyze the intersections in the study area for the existing conditions analyses. The Synchro results give a LOS and delay per vehicle for the unsignalized and signalized intersections. SimTraffic was used to simulate the traffic during each peak hour and calculate the queuing throughout the network. Five, sixty minute simulation runs of SimTraffic were averaged using a seed time of fifteen minutes on each. The NCDOT Congestion Management guidelines were adhered to in every aspect.

The results of the 2014 Existing Conditions Level of Service analysis indicate that four of the six intersections operate at an acceptable LOS D or better during both of the peak hours. The key study intersection, US 1 (Capital Boulevard) and US 1A (Falls of Neuse Road/South Main Street), operates at a LOS E during both the morning and afternoon peak hours, with all four of the approaches operating deficiently during the afternoon commute. Additionally, the directional crossover located to the north on Capital Boulevard at Popes Creek Drive/Wake Pointe operates at a LOS F during the afternoon peak hour. The southbound and westbound approaches are the contributing factors to the failing LOS at this intersection.

Table 1 below presents the 2014 Existing Conditions Level of Service and Delay for each of the intersections.

Table 1: 2014 Existing Conditions LOS

Intersection	Type	Level of Service																			
		Intersection				Northbound				Southbound				Eastbound				Westbound			
		AM		PM		AM		PM		AM		PM		AM		PM		AM		PM	
		LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY
1. Falls of Neuse Road and Wakefield Commons	Directional Crossover	B	12.7	C	16.4	B	12.7	C	16.4	-	-	-	-	A	0.0	A	0.0	B	10.8	B	13.3
2. Capital Boulevard & Falls of Neuse Road/South Main Street	Signalized	E	58.2	E	67.2	D	44.4	E	59.3	D	48.4	E	56.4	E	77.2	E	78.9	F	89.8	F	90.1
3. South Main Street and Star Road	Unsignalized	A	9.8	B	10.4	A	9.8	B	10.4	-	-	-	-	A	0.0	A	0.0	A	0.0	A	0.0
4. South Main Street and Wake Drive	Unsignalized	C	15.9	D	30.4	C	15.9	D	30.4	A	9.7	C	16.8	A	9.6	A	9.8	A	9.6	B	12.4
5. South Main Street and WalMart Driveway	Signalized	B	14.3	C	30.9	D	52.3	D	47.8	D	51.3	E	56.7	A	9.3	C	22.6	B	10.2	C	31.3
6. Capital Boulevard and Popes Creek Drive/Wake Pointe	Directional Crossover	D	29.1	F	117.4	D	28.2	C	19.0	C	15.5	E	43.0	D	29.1	C	21.5	C	17.1	F	117.4

2.4 Crash History

According to the Wake Forest Transportation Plan Update (2010), this intersection was identified as one of five high priority crash locations. The NCDOT provided Traffic Engineering Accident Analysis System (TEAAS) reports for a five year period from April 1, 2009 through March 31, 2014. The data included the following two segments and four intersections:

Segments

- US 1 (Capital Boulevard) from 1000 feet south of US 1A (South Main Street)/ Falls of Neuse Road/to 500 feet north of Popes Creek Drive/Wake Pointe
- US 1A (South Main Street)/Falls of Neuse Road from Forest Pines Drive to Carter Street

Intersections

- Falls of Neuse Road and Wakefield Commons Drive (Directional Crossover)
- US 1 (Capital Boulevard) and US 1A (South Main Street)/Falls of Neuse Road (signalized)
- US 1A (South Main Street) and Wake Drive (Full Movement Stop Control)
- US 1A (South Main Street) and Wal-Mart Driveway (Signalized)

The data provided for the five-year period included the total amount of vehicle crashes with a breakdown of fatalities, lighting and road surface conditions and crash type. The 2012 NCDOT Crash Report was also obtained from the Traffic Safety Unit which details the statewide crash rates for the years 2009-2011.

The roadway segment analysis was performed on US 1 (Capital Boulevard) and US 1A (South Main Street)/Falls of Neuse Road. **Table 3A and 3B** below lists the total number of crashes in each of the segments along with the statewide crash rates.

**Table 3A: US 1 (Capital Boulevard)
Total Crash Data**

Rate	Crashes	Crashes per 100 MVM	Statewide Rate ¹
Total	161	371.47	172.49
Fatal	0	0	0.86
Non-Fatal	47	108.44	52.31
Night	41	94.6	38.77
Wet	34	78.45	31.3

¹ 2009 - 2011 statewide crash rate for Urban US Route 4+ lane divided with partial control access

**Table 3B: US 1A (South Main Street)/Falls of Neuse Road
Total Crash Data**

Rate	Crashes	Crashes per 100 MVM	Statewide Rate ¹
Total	282	695.66	302.26
Fatal	0	0	1.14
Non-Fatal	81	199.82	99.31
Night	55	135.68	55.83
Wet	37	91.27	49.17

¹ 2009 - 2011 statewide crash rate for rural 4+ lane with continuous left turn lane Urban Primary Route

The intersections reports vehicle types and movements, contributing causes for crashes, and the number of injuries at specific locations within the corridor. **Table 3C** lists the number of crashes that occurred at each of the intersections.

Table 3C: Intersection Crash Data

Intersection	Rear End	Turning	Sideswipe	Angle	Head on	Involved Pedestrian/ Cyclist	Fatality	Total
1. Falls of Neuse Road and Wakefield Commons (Westbound Directional Crossover)	0	0	0	1	0	0	0	1
2. Capital Boulevard and Falls of Neuse Road/South Main Street (Signalized)	105	4	9	22	1	1	0	140
3. South Main Street and Star Road**	-	-	-	-	-	-	-	-
4. South Main Street and Wake Drive (Full movement Stop Control)	9	13	2	39	1	0	0	63
5. South Main Street and Wal-Mart Driveway (Signalized)	2	3	1	1	0	0	0	7
6. Capital Boulevard and Popes Creek Drive/Wake Pointe (North/Southbound Directional Crossover)**	-	-	-	-	-	-	-	-
TOTAL	116	20	12	63	2	1	0	211

Source: NCDOT Traffic Engineering Accident Analysis System reports from April 1, 2009 - March 31, 2014

** Intersection accident data not available.

Of the total of 116 crashes reported, the following highlight major findings of the crash analysis:

- The majority of the crashes (66 percent) occur at the intersection of US 1 (Capital Boulevard) and US 1A (South Main Street)/Falls of Neuse Road, with rear-end crashes being the predominant accident type
- 30 percent of the crashes occur at the intersection of US 1A (South Main Street) and Wake Drive with angled crashes happening most frequently
- 55 percent of the crashes are rear-end collisions
- 30 percent of the crashes involved are angled collisions
- 0 fatalities have occurred in this corridor over a five-year period
- 1 pedestrians was involved in reported a crash over a five-year period

As the majority of the crashes were rear-end type collisions, some could be eliminated when a grade separated interchange is built.

3.0 FUTURE TRENDS

Proposed/Potential Development

In analyzing Census data for the area surrounding the study area, population increased nearly 300% between 2000 and 2010. As there are several large undeveloped tracts of land along the study area, this northern section of Wake County is anticipated to continue to grow.

Wakefield Commons, a 160,000 square foot shopping center anchored by Marquee Cinemas, lies in the southwest quadrant of the intersection. The current uses include retail, financial, medical, restaurants, services, entertainment, and educational. This existing development has vacancies, including the former Kroger shopping center, and several outparcels that could be developed in the future.

In the northwest quadrant there is mixed-use existing development which includes a Harris Teeter grocery store, other retail, restaurants, and the Rex Healthcare of Wakefield. The current Rex Healthcare location is approximately 125,000 square feet and is anticipated to be at 100% capacity by 2015. In the past Rex Healthcare has applied for a 40-bed hospital which was denied during the Certificate of Need process. Once future bed allocations occur in Wake County, Rex Healthcare will again consider the Wakefield Campus for potential beds based on population and community health needs. Other future development plans of the campus include development of two retail “pads” which are approximately 10,000 square feet each. Currently these retail pads are owned by Rex Healthcare, but could be sold to private developers. Rex also anticipates the addition of another 30,000 square foot medical office building by 2030.

The northeast quadrant of the intersection is fully developed with commercial land uses which include a car dealer, gas station, a Walmart, grocery store, restaurants, and retail outparcels. A car dealer occupies the southeast quadrant.

The Shoppes at Caveness Farms is a proposed development northeast of the intersection which will be anchored by a 140,000 square foot Sam’s Club, a 50,000 square foot retail space,



US 1/US 1A/Falls of Neuse Road Intersection Transportation Feasibility and Impact Analysis

and two smaller 24,000 square feet retail spaces. There are four existing outparcels with retail and restaurants and an additional two outparcels available for future development. The Sam's Club site plan is anticipated to be approved by the Town of Wake Forest.