Chapter 3 – Existing Conditions

Chapter 1 mentions the significant growth that the study area is undergoing and identifies goals for the *Southwest Durham County and Southeast Chapel Hill Collector Street Plan* (CSP). Even though the community is changing, it is important to identify the current conditions in order to better understand the recommendations presented in this plan. A field investigation was completed at the onset of this project. **Figure 3.1** depicts the resulting data collected. Some of the influential factors that have helped shape this report include plans that have already been developed, the traffic and safety conditions, existing development, demographics, and environmental features.

Existing Plans

- Comprehensive Plan (2005) – The *Durham Comprehensive Plan* contains guidance for land use, housing, economic development, conservation, transportation, water/wastewater, solid waste, parks and recreation, schools, public safety, libraries, and capital improvements.

- Land Use Plan (2005) – The current land use plan was adopted as part of the *Durham Comprehensive Plan*. The plan proposes a flexible approach to the interaction of land uses, while limiting intensities and densities depending on the location.

- Unified Development Ordinance (2005) – This ordinance represents the first major overhaul of the development regulations in Durham in nearly 30 years. This ordinance, along with the *Comprehensive Plan*, provides Durham's development regulations.

- Thoroughfare Plan (1991) – Since its completion, the Durham County population has increased 23% (increasing from 181,835 to 223,314), and it contains some roads that are no longer in the 2025 Long Range Transportation Plan (LRTP).

- 2030 Long Range Transportation Plan (LRTP) (2005) – This contains highway, transit, fixed-guide way, bicycle, and other types of transportation projects that are planned through 2030.

- 2006-2012 Transportation Improvement Program (TIP) (2005) – This plan contains funded projects in the feasibility, scoping,

environmental analysis, design, right-of-way acquisition, and construction phases.

A challenge to the process for developing a collector street plan is the existence of collector street, corridor, and fixed-guideway plans that cover areas within or adjacent to the study area. The contents of these plans will need to be incorporated and considered in a DCHC MPO collector street plan. The existing plans include:

Collector Street Plans

- Town of Chapel Hill Design Manual (2005) – The Chapel Hill Design Manual provides guidance for the design and construction of collector streets as well as street standards for collector street classification.

- CORE Collector Street Plan – The Triangle J Council of Governments (TJCOG) is developing a collector street plan in the Center of the Region Enterprise (CORE) area. Upon completion of the plan, the City and County of Durham shall evaluate the plan and consider amending the *Durham Comprehensive Plan* to incorporate the collector street plan.

- City of Durham NC 54/I-40 Corridor Study (2005) – This identifies the general location for some connector streets. Connector streets are similar to collector streets, as they provide a connection between local streets.

- In addition, the City of Durham "Public Works Reference Guide" provides design standards and guidelines for infrastructure construction, including street design standards.

Corridor Plans

- US 15-501 Corridor Master Plan (1994) – This evaluated several potential transit technologies and alignments.

- A group of citizens participated in a charrette to produce a transit oriented development (TOD) in the southwest area of Durham County to plan for the 15-501 fixed-guideway alignment.

- The DCHC MPO is implementing the "next steps" in the 15-501 fixed-guideway study that includes local decisions on alignment and proposed station changes, corridor protection and

development characteristics, and the use of impact studies for proposed corridor changes.

Fixed-Guideway Plans

- The US 15-501 Fixed-Guideway Feasibility Study
- Triangle Transit Authority (TTA) Regional Rail Plan

Southwest Durham - Southeast Chapel Hill Collector Street Plan

Figure 3.1 - Existing Conditions

Kimley-Horn and Associates, Inc.

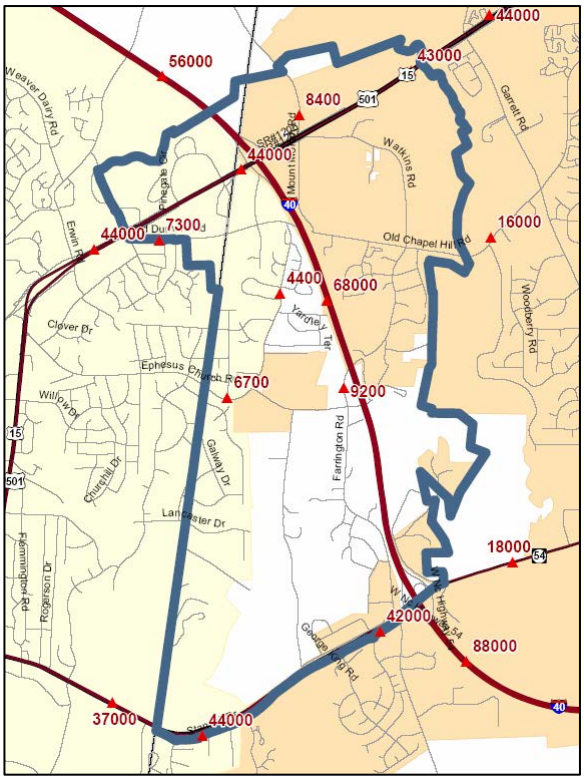
SW Durham County and SE Chapel Hill COLLECTOR STREET PLAN

Study Area
Lakes, Rivers, Streams and Creeks
Corps of Engineers Land
County Boundary
Chapel Hill Town Limits
Durham City Limits
Destination Points
Schools
Stub Out
Highways
2 Lanes
2 Lanes (with left turn lane)
4 Lanes Divided (Concrete Median)
4 Lanes (with left turn lane)
4 Lanes Divided (Grass Median)
6 Lanes Divided (Grass Median)
Dirt Roads
Sidewalk One Side
Sidewalk Both Sides

0 0.125 0.25 0.5 Miles

Traffic

The *Southwest Durham County and Southeast Chapel Hill Collector Street Plan* (CSP) study area has many higher classified facilities (such as major thoroughfares, minor thoroughfares, and interstates) that are heavily traveled. Although it was not the intent of this plan to suggest any improvements to facilities other than collector streets, it is important to study the entire roadway network to understand the existing traffic patterns and areas of concern. Non-collector street facilities of key concern that exist in the study area include I-40, US15-501, NC 54, the proposed transit fixed-guideway corridor, and the proposed Southwest Durham Drive.



2004 Average Daily Traffic Volumes

Interstate 40 is currently a six-lane interstate that runs north/south, bisecting the study area. It is divided with a grass median and the speed limit is 65 mph. This facility carries daily commuters and regional traffic. I-40 currently carries an average daily traffic (ADT) volume of 68,000 vehicles.

Highway 54

NC 54 has three distinct cross sections along its routing through the southern portion of the study area. West of I-40, NC 54 is a four-lane divided thoroughfare with a grass median. As the facility crosses I-40, the median narrows to a four foot concrete island. East of Leigh Farm Road, NC 54 narrows to two lanes. Between Leigh Farm Road and Farrington Road, the signal spacing is approximately 1,000 feet between signals at Farrington Road and the I-40 ramps. Between Leigh Farm Road and the I-40 ramps, the signal spacing is reduced to approximately 500 feet. During the peak periods, heavy congestion occurs at these signals, backing up onto the I-40 ramps and even onto I-40 itself. The congestion is due to commuter traffic to and from UNC at Chapel Hill and people who live or work in RTP, Chapel Hill, and Durham. NC 54 serves as the southern boundary of the study area and carries an ADT volume of approximately 44,000 vehicles.

US 15-501 is a four-lane, grass median divided boulevard within the study area. US 15-501 has a distinct commercial character, surrounded by retail areas and various businesses. This facility is also heavily traveled and is often congested during peak hours. This facility carries an ADT volume of 44,000 vehicles.

Farrington Road is currently a two-lane undivided arterial. This facility is typically congested during peak hours, especially at the intersection of NC 54. This facility currently carries 9,200 vehicles per day.

Old Durham/Chapel Hill Road is a two-lane undivided arterial. This facility runs east/west through the study area and is often congested near signalized intersections. This facility carries an ADT volume of 16,000 vehicles.

Mt. Mariah Road is currently a three-lane road with a two-way left-turn lane. This facility serves the newly developed retail areas in the northern section of the study area. Mt. Mariah Road typically serves 8,400 vehicles per day.

Ephesus Church Road is a two-lane undivided arterial that is centrally located within the study area. New development has recently occurred in the vicinity of this facility and is expected to continue. Ephesus Church Road currently has an ADT volume of 6,700 vehicles.

Safety

Six corridors within the study area were analyzed using crash data obtained from the North Carolina Department of Transportation over a three-year period (March 30, 2002 to March 30, 2005). **Table 3.1** shows the corridor crash rates, corridor length, severity index, majority causational factor, and the statewide average crash rate for each type of facility. A crash "rate" is defined as the number of crashes per 100 million vehicle miles traveled. It should be noted that the NCDOT splits the statistics at the county line and therefore the table reports the rates by county.

Table 3.1 - Crash Statistics

Corridor (County)	Crash Rate (per 100 MVMT*)	Corridor Length (miles)	Severity Index**	Majority Crash Type	Statewide Average Crash Rate***
Watkins Rd	1130	1.16	6.55	Rear-end	347.58
Old Durham Rd (Orange)	71	0.64	5.93	Rear-end	178.42
Old Durham Rd (Durham)	1007	2.46	3.72****	Rear-end	178.42
NC 54 (Orange)	168	0.63	3.47	Rear-end	150.3
NC 54 (Durham)	250	1.98	2.96****	Rear-end	150.3
Farrington Rd	229	2.51	6.52	Rear-end	178.42
Ephesus Church Rd (Orange)	831	0.14	2.23	Rear-end	178.42
Ephesus Church Rd (Durham)	61	0.32	1	Left-turn	178.42
US 15/US 501 (Orange)	460	0.77	3.6	Rear-end	236.68
US 15/US 501 (Durham)	529	1.63	2.66	Rear-end	236.68

Source: North Carolina Department of Transportation

* MVMT = million vehicle miles traveled

** Severity Index = (76.8*(F+A) + 8.4*(B+C) + PDO)/TOTAL CRASHES

*** State averages for comparable roadway types (based on lanegae and route type)

**** Fatal crash occurred

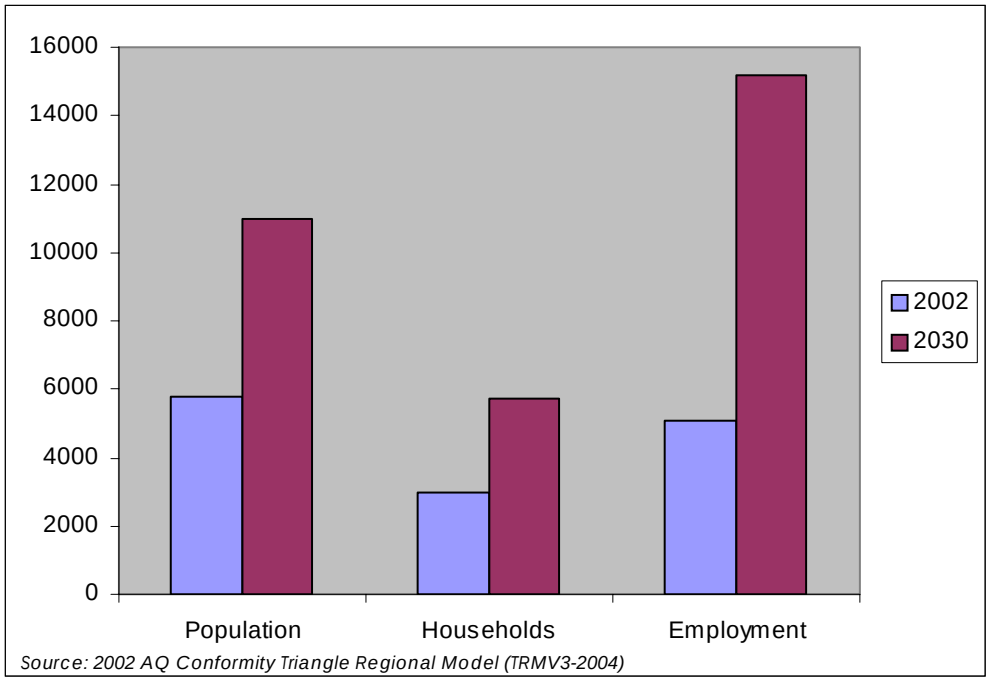
This analysis was used to help identify existing safety issues as a consideration in placing proposed collector street intersections with these facilities. As would be expected, the most heavily traveled facilities are experiencing the greatest number of crashes and the majority of those crashes are caused by rear-end collisions. The input from public workshops reinforced the safety problems identified by NCDOT data.

The adoption of a collector street plan in southwest Durham and southeast Chapel Hill may be an effective countermeasure for theses crash patterns. The collector streets may reduce the volume of traffic on the major arterial routes, thereby reducing the total number of

crashes occurring on these facilities. In addition, the low speed of the collector streets themselves should create a safer driving environment.

Existing Development

As mentioned previously, development has been taking place in the study area and is expected to increase in the near future. The chart below indicates the expected growth in population, households, and employment. One factor in this growth is the regional rail corridor that is projected to be built. It will provide citizens with convenient travel options and thus has the potential to attract more citizens to the area.



2002 vs. 2030 Study Area Statistics

The northern portion of the study area has experienced significant growth over the past couple of years with the development of shopping centers (including stores such as Wal-Mart, Home Depot, Kohl's, and Kroger) along US 15-501 and Mt. Mariah Road. Undeveloped land in the central portion of the study area is currently being developed as residential communities. This is illustrated in **Figure 3.2**.

It is expected that parcels throughout this study area will continue to be developed and redeveloped. Therefore, it is imperative that the *Durham County and Southeast Chapel Hill Collector Street Plan* be completed and adopted so that the future development will be supported by an appropriate infrastructure.

Southwest Durham - Southeast Chapel Hill Collector Street Plan

Figure 3.2 - Approved & Proposed Developments

Kimley-Horn and Associates, Inc.

SW Durham County and SE Chapel Hill COLLECTOR STREET PLAN

Study Area
County Boundary
Lakes, Rivers, Streams and Creeks
Corps of Engineers Land
Chapel Hill Town Limits
Durham City Limits
Schools
Destination Points
Stub Out
Highways
Proposed Transit Alignment
Proposed Transit Stations
Approved Internal Neighborhood Street
Proposed Internal Neighborhood Street
Proposed Development
Approved Development
Approved SW Durham Drive
Approved SW Durham Drive on Existing Alignment
Overpass

0 0.125 0.25 0.5 Miles

Environmental Resources

Because the land within the study area will continue to develop, awareness regarding the impacts to the surrounding environment have become heightened. It is imperative to manage and minimize these impacts to continue to serve this area with clean air and water and unpolluted land.

Figure 3.3 illustrates important environmental resources within the study area. Wetlands and U.S. Army Corps of Engineers land in the southern and eastern portions of the study area have forced street planning activities to the edges of these environmental resource areas.

The collector street network was developed in a way to minimize impacts to the wetlands. Potential wetlands crossings should be recommended at the smallest geographic locations. It was extremely important to be sensitive to the natural environment while developing this plan so that the potential impacts would be minimal while making sure that the plan would be reasonable and feasible.

Southwest Durham - Southeast Chapel Hill Collector Street Plan

Figure 3.3 - Environmental Features

Kimley-Horn and Associates, Inc.

SW Durham County and SE Chapel Hill COLLECTOR STREET PLAN

- Study Area
- County Boundary
- Wetlands
- Gamelands
- Corps of Engineers Land
- Chapel Hill Town Limits
- Durham City Limits
- Lakes, Rivers, Streams and Creeks
- Vascular Plant
- Invertabrate Animal
- Natural Community
- Approved SW Durham Drive on Existing Alignment
- Approved SW Durham Drive
- 10-Foot Elevation Contours
- Water Treatment Facility

0 0.125 0.25 0.5 Miles