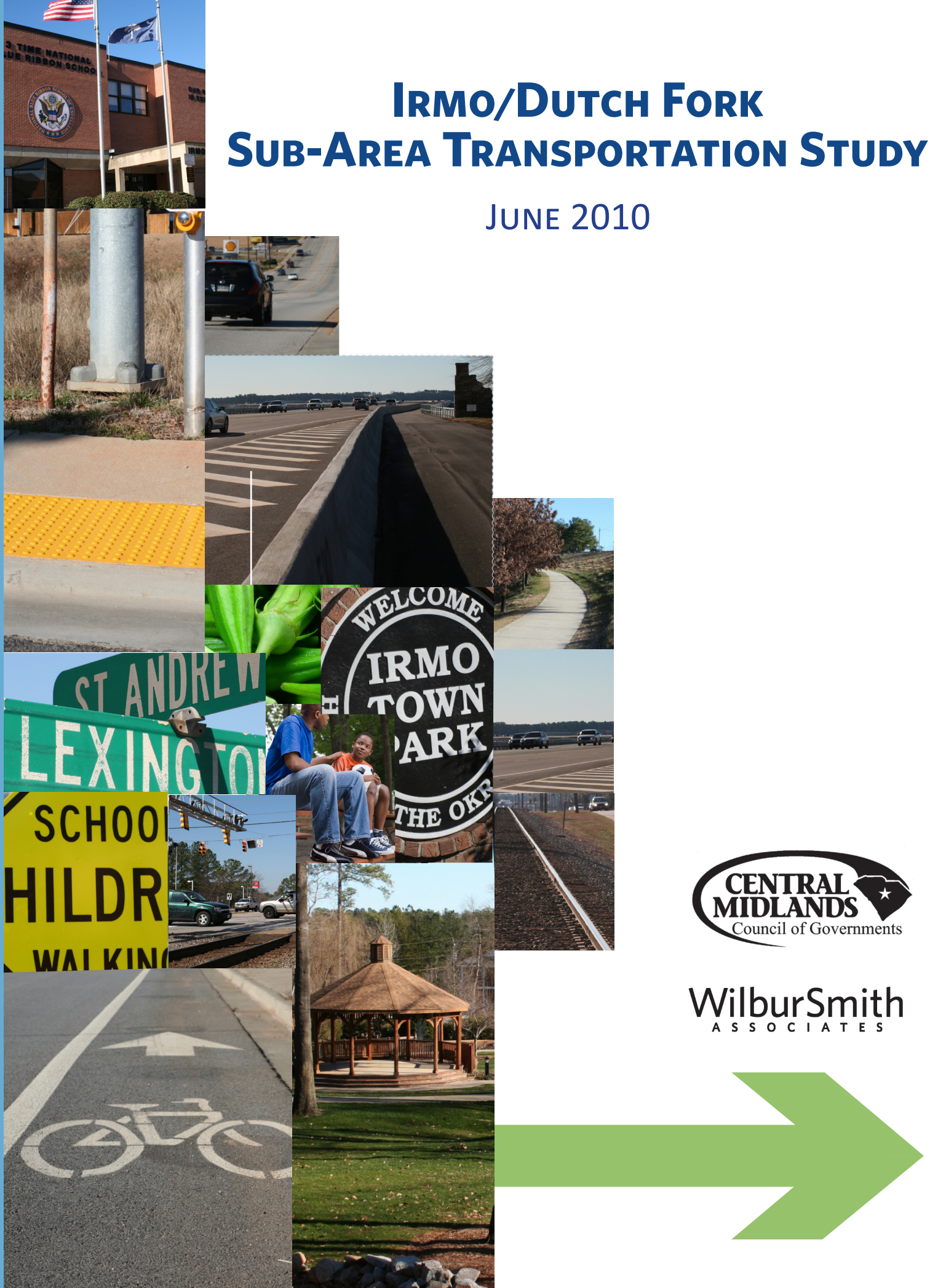
Irmo/Dutch Fork Sub-Area Transportation Study

June 2010



Central Midlands Council of Governments

WilburSmith Associates

IRMO/DUTCH FORK SUB-AREA PLAN

FINAL REPORT

April 2010

Prepared for:

Central Midlands Council of Governments

Columbia Area Transportation Study
Metropolitan Planning Organization

Prepared by:

Wilbur Smith Associates

In association with:

Kublins Transportation Group, Inc.
And
Maxim Communications Group

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1. Project Summary

The Central Midlands Council of Governments (CMCOG), the Metropolitan Planning Organization (MPO) for Columbia Area Transportation Study (COATS), contracted with Wilbur Smith Associates (WSA), Maxim Communications, and Kubilins Inc. in consulting services to develop the Irmo/Dutch Fork Sub-Area Plan. The mission is to develop a community vision that will identify a future plan that collaboratively addresses land use and multimodal transportation improvements. The Irmo/Dutch Fork Sub-Area Plan was developed in coordination with CMCOG, Richland and Lexington County, South Carolina Department of Transportation (SCDOT), Town of Irmo, local stakeholders, and citizens to ensure the community vision is established early in the process to develop feasible multimodal transportation improvements that support existing and future land use plans. The multimodal improvements identified in this plan will be considered for incorporation in the CMCOG during their continuous planning process.

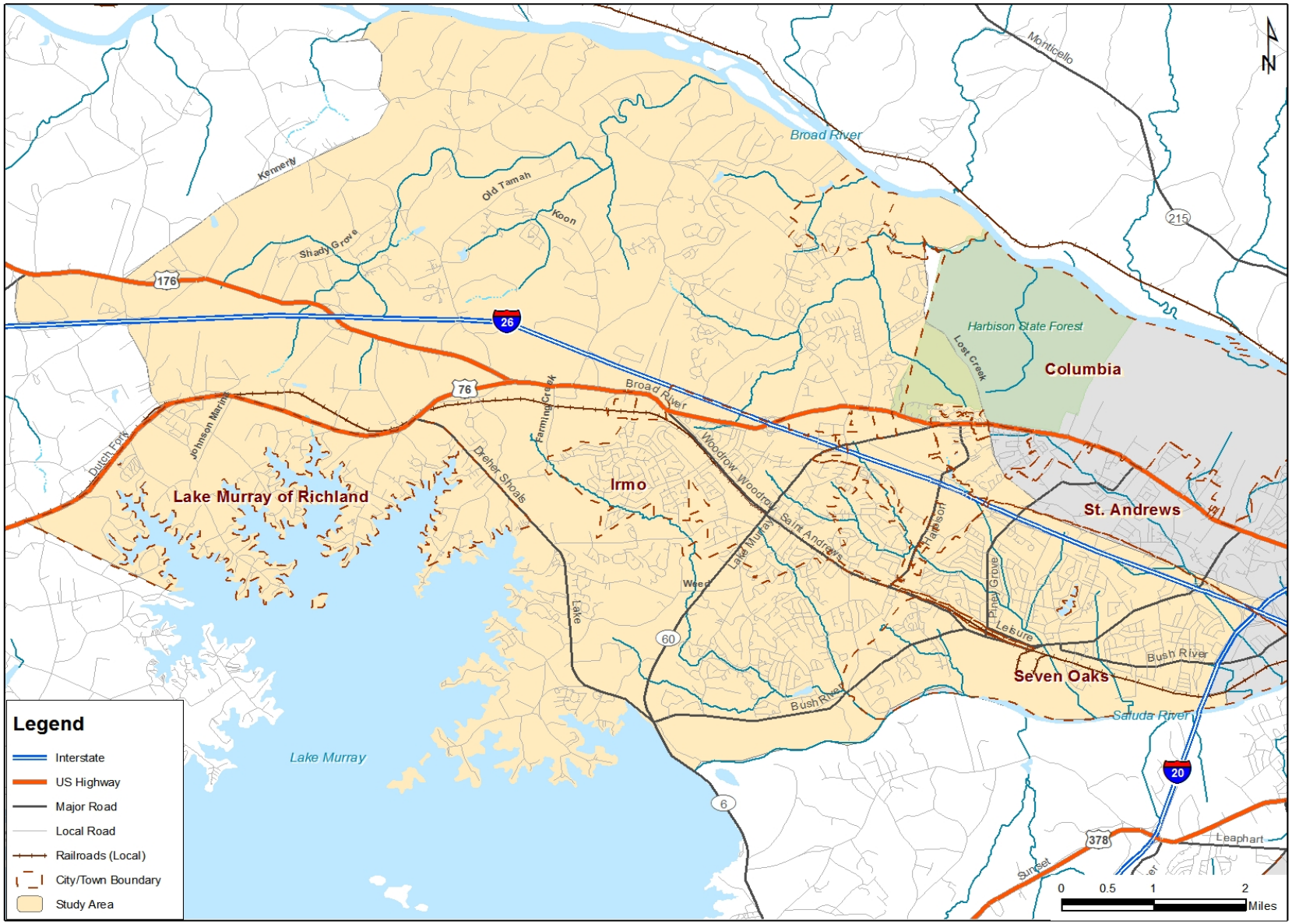
2. Existing Study Area Characteristics

The study area includes portions of Lexington and Richland counties and contains the town of Irmo and the communities of Ballentine and White Rock, as well as portions of the city of Columbia. This region is called Dutch Fork because it lies between the Saluda River and the Broad River where they merge together forming the Congaree River. The name is derived from the original German settlers in this area. The study area boundaries are shown in **Figure 1**.

In the 1970s, Irmo had a population of 500, but with the growth in the 70s and 80s the population today is over 12,000. It is approximately 10 miles outside of downtown Columbia and is part of the Columbia Metropolitan Area. Irmo was chartered in 1890 in response to the opening of the Columbia, Newberry and Laurens Railroad. The name of Irmo was the result of combining the names of Captain C.J. Iredell and Henry Moseley, two important figures in the founding of the town.

Today, the study area is still one of the fastest growing sections of the Greater Columbia area. The study area is comprised of 160 square miles in total. As previously stated, the area is split between Lexington County which makes up 84.4 square miles, and Richland County, providing 75.6 square miles. The population is also evenly split across the two counties with Lexington's 2008 estimated total and 48,022 and Richland County at 40,807. This gives the study area at 2008 population estimate of 88,829. This continued growth from previous years will be discussed further in **Section 2.3**.

Figure 1: Study Map



Source: ESRI

Despite the town's growth, Irmo does not have an actual downtown area but rather includes several clusters of suburban neighborhoods. The CSX rail line that passes through Irmo is one of the busiest lines in the Columbia Metropolitan Area as it carries approximately 24 trains per day, which does cause some minor issues with traffic operation during the time trains traverse through the study area.

The study area is the "Gateway to Lake Murray." Lake Murray covers 78 square miles with 649 miles of shoreline. The original earthen dam was completed between 1927 and 1930. Since the completion of the new Dam, SCDOT widened portions of SC 6 and SC 60 (Lake Murray Boulevard) to four lanes and constructed a 1.5 mile, eight foot wide walkway across the Dam, as well as a bike lane that is on the right shoulder of the roadway. The multi-use walkway and bike lane is been very popular with local residents as it is used extensively throughout the day.

Other important natural recreational centers in the study area include Harbison State Forest and Saluda Shoals Park. In 1951 the South Carolina Forestry Commission purchased 2,200 acres of land on the Broad River, which was called Harbison State Forest. In 1981, the Forestry Commission approved a master plan for the long-term development of the forest. The goal was to provide a public greenspace to serve as an educational environment promoting the value of the state's forests and encouraging the stewardship of South Carolina's natural resources. Saluda Shoals Park is a popular riverfront park located along the banks of the Saluda River, which is accessible by Old Bush River Road in the study area. Both of these environmentally sensitive natural areas are popular attractions for local residents because of the bicycle and pedestrian networks, as well as the other recreational activities.

The study area is served by School District Five of Lexington and Richland counties. Within the study area, there are 11 elementary schools, three middle schools and two high schools.

Portions of the study area are established commercial retail centers, while other portions are emerging or are still rural in character. Harbison Boulevard between I-26 and St. Andrews Road contains millions of commercial retail square feet. Columbiana Centre is the anchor and numerous other strip retail centers are located along this corridor. Emerging areas include the new Wal-Mart that is being constructed along Broad River Road where US 176 (Broad River Road) and US 76 (Dutch Fork Road) split near Ballentine. In the

70s and 80s, housing developments were concentrated in the Irmo area. However, today's housing developments are scattered throughout the study area and growth around Lake Murray has been significant. While portions of the study area are built out, there are opportunities to improve multimodal transportation connections and land use patterns to ensure this area remains one of the most livable areas in South Carolina.

2.1 Data Sources

Multiple data sources were collected, reviewed, and utilized during the data collection task. The majority of the geographic shapefiles were provided by the CMCOG data library. This data include municipal boundaries, school locations, parks and roadway networks, as well as more specialized files, such as the COATS model network derived from their travel demand model. In all, CMCOG provided 10 shapefiles and 4 previous reports for use during this study.

Other general information was collected from public sources such as the U.S. Census Bureau, South Carolina Department of Transportation (SCDOT), and the Central Midlands Regional Transit Authority (CMRTA).

2.2 Land Use

Stretching from the I-20/I-26 interchange to the western Richland County line, the study area includes suburban and rural land use patterns.

Suburban Development: Encompassing the area from I-20 to the Town of Irmo, suburban development includes a mix of medium and high density residential retail and service commercial establishment in strip centers and a small amount of industrial uses.

Rural Development: Encompassing the area north and west of the Town of Irmo to the study boundary, rural development includes agricultural activity, low density residential, some as scattered lots but most in subdivisions, and a small amount of commercial establishments.

Some of the major developments are listed below:

- **Residential developments:** Harbison (mix of single-family and multi-family development), Friarsgate, Whitehall
- **Schools:** There are 16 public schools and one private school in the study area. Additionally Midlands Technical College Harbison campus is also within the study area.

Public Schools

Ballentine Elementary	Dutch Fork Elementary	Irmo Elementary
Lake Murray Elementary	Leaphart Elementary	Harbison West Elementary
H. E. Corley Elementary	Nursery Road Elementary	Oak Point Elementary
River Springs Elementary	Seven Oaks Elementary	
Cross Roads Middle	Dutch Fork Middle	Irmo Middle
Dutch Fork High	Irmo High	

Private School

Ben Lippen Elementary

- **Shopping developments:** Columbiana Center, Columbiana Grande, Harbison Blvd (with several big-box retail.), new Wal-Mart shopping center on Broad River Road
- **Hospitals:** Palmetto Health Parkridge, Lexington Medical Center Irmo
- **Parks:** Seven Oaks Park, Saluda Shoals Park, Irmo Town Park, Dutch Fork Tennis Center, Friarsgate Park, Ballentine Community Center, Harbison State Forest
- **Libraries:** Irmo branch of the Lexington County Public Library, Ballentine branch of the Richland County Public Library
- **Religious centers:** There are over 25 religious centers within the study area.

2.3 Population Growth

The 2000 Census population for the study area was 77,403. A majority of the population, 78.1 percent, identified themselves as white, while 18.2 percent were African-American. The remaining population consisted of 2 percent Asian, 1.5 percent Hispanic, 0.2 percent American Indian or Alaska Native and 0.5 percent some other race.

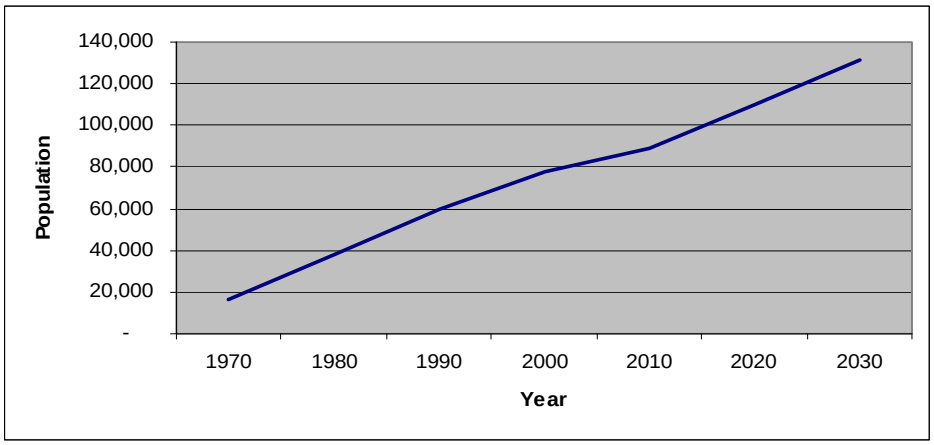
From 1990 to 2000, the study area experienced a growth rate of nearly 30 percent increasing from 59,597 to 77,403. During the same period, Richland County experienced an 8 percent population growth and Lexington County had a 29 percent population growth. The study area is one of six regional "hot-spots" identified in **A Mid-Census Review of Population Change and Development Activity in the Central Midlands Region 2000-2004** developed by Central Midlands Council of Governments. **Table 1** and **Figure 2** illustrates the growth over the past few decades and projects it into the future.

Table 1: Population growth

Year	Population	Growth
1970	16,126	n/a
1990	59,597	270%
2000	77,403	30%
2008 (1)	88,829	15%
2025 (2)	117,079	32%

Note: [1] Population Estimate
[2] Projected Population

Figure 2: Irmo/Dutch Fork Study Area Population Growth



Source: U.S. Census, ICRC Strategic Planning Task Force Report - April 2009

The age distribution of the population indicates continued growth in the study area. In 2000, 30 percent of the population were 19 or under, with another 62 percent of the population from the age of 20 and 64. The median age in 2000 was 35.5, just up slightly from 32.2 in 1990. It is estimated to be 38.8 in 2008.

3. Existing Roadway Conditions

This section of the report examines the existing roadway conditions in the study area. Roadway traffic volumes, level of service, vehicle miles travel and mileage by functional classification were evaluated using the COATS 2035 travel demand model. Major intersections and commuter travel behavior were evaluated based on field review, local expertise from the advisory committee and Census Journey-to-Work data for the years 2005 and 2035.

3.1 Roadway Classification

Roadway classification is a necessary step toward assessing and evaluating the effectiveness of the roadway network. Individual roads depend on surrounding and intersecting roads to create a functioning network. Currently there are 525 miles of roadway within the study area encompassing all road types. The Federal Functional Classification System is used by SCDOT to classify roads in the study area by categorizing a road section based on attributes common to its role and function in the network.

- Interstates – Defined as significant highways featuring limited access and continuous, high-speed movements for a wide variety of traffic types. Interstates and expressways account for 16 miles as I-26 and I-20 run through the study area. Since I-26 bisects the study area, it is easily accessible, providing high-speed connectivity for this area to other locations in and beyond the county. The Annual Average Daily Traffic (AADT) on this roadway is 85,500 vehicles per day (VPD). The volume increases the closer you get to downtown. The count locations further out have an AADT of 46,100, while the count locations closest to Columbia has an AADT of 133,300. I-20 serves as the east boundary of the study area and has an AADT of 71,572 vehicles per day (VPD).
- Arterials – Classified as a major or minor, these roads connect activity centers and carry large volumes of traffic at moderate speeds. The arterial system in the study area totals approximately

45 miles. St. Andrews Road between Jamil Road and Woodland Hills had the highest AADT with 29,220 vpd. St. Andrews Connector between St. Andrews Road and Woodrow Street had the lowest AADT with 1,220 VPD.

- Collectors – Collectors typically allow access to activity centers from residential areas. Collectors can also be categorized as major and minor, depending on the urbanized or rural setting. Their purpose is to collect traffic from streets in residential and commercial areas and distribute it to the arterial system. The collector system in the study area consists of 55 total miles. The AADT on collector roadways averages 4,721 vpd. Kennerly Road between State Highway S-40-1689 and Broad River Road (US 176) had the highest AADT with 15,900 vpd. A portion of Brookshire Road had the lowest AADT with 750 VPD.
- Local Streets – Local streets feed the collector system from low volume residential and commercial areas. Local streets are usually found in subdivisions and rural areas. Local streets account for 410 miles within the study area. There are no AADT counts available for the local streets.

3.2 Roadway Statistics

Roadway statistics evaluated in this study include year 2005 and year 2035 traffic volumes, level of service (LOS), vehicles miles of travel (VMT), and vehicle hours of travel (VHT).

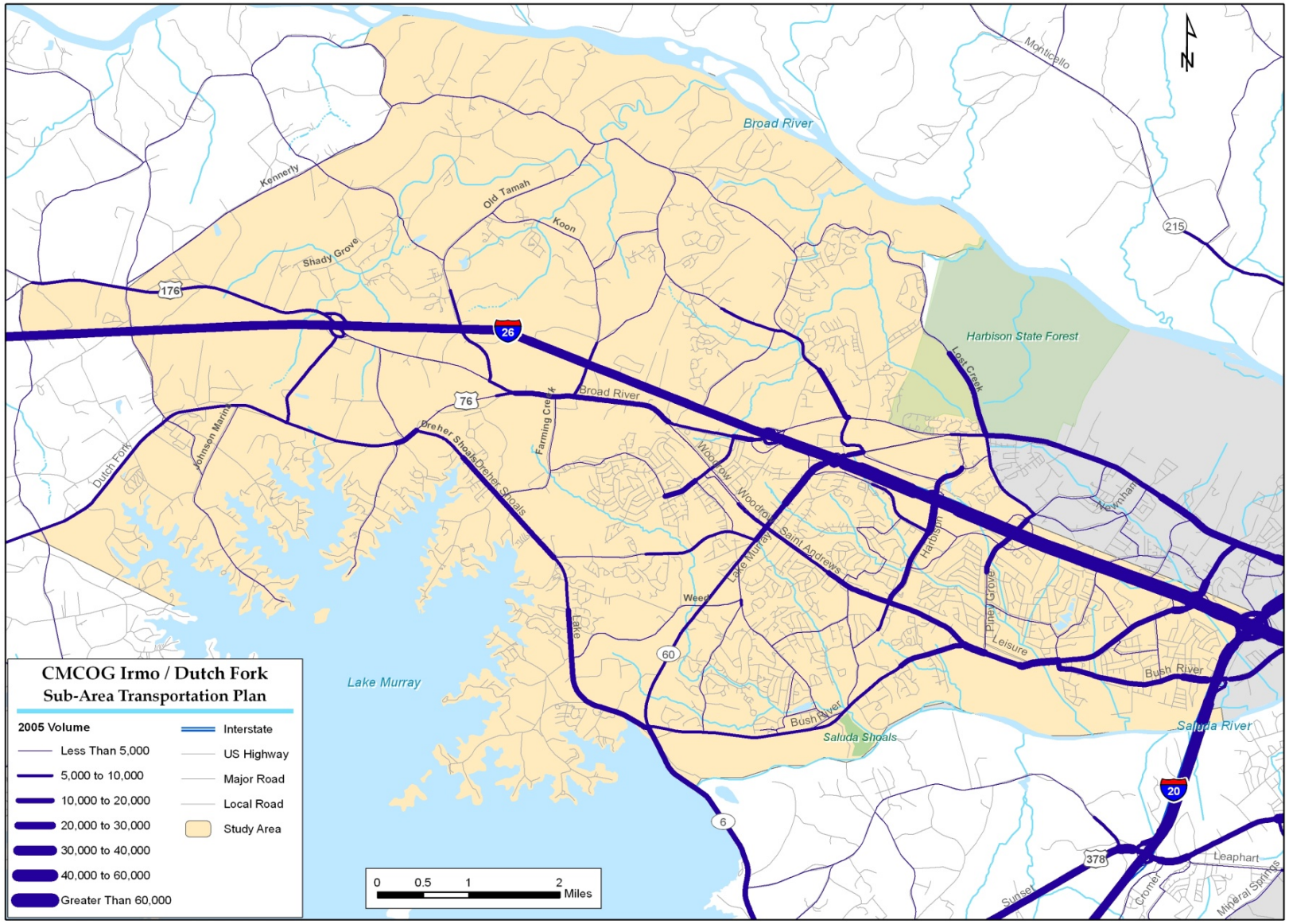
3.2.1 Traffic Volumes

Traffic volume flow maps show projected growth over the 30-year horizon used in the COATS travel demand model. **Figure 3** shows the 2005 model year volumes within the study area while **Figure 4** shows the 2035 model horizon year volumes.

When analyzing the results, I-26 between St. Andrews Road and I-20 has the highest daily traffic volumes in the study area in both 2005 and 2035. The traffic patterns in 2005 and 2035 are similar to each other. Basically, I-26 and I-20 carry the highest daily traffic volumes. Major arterials such as Broad River Road, Dutch Fork Road, Bush River Road, State Highway 6, and St. Andrews Road provide connection between northwest and southeast. Harbison Boulevard and Lake Murray Boulevard and a portion of St. Andrews Road are major connectors perpendicular to I-26. These roads intersect I-26 at major interchanges and serve as the primary routes to access the interstate. The general trend is that the closer to downtown Columbia, the higher the traffic volumes.

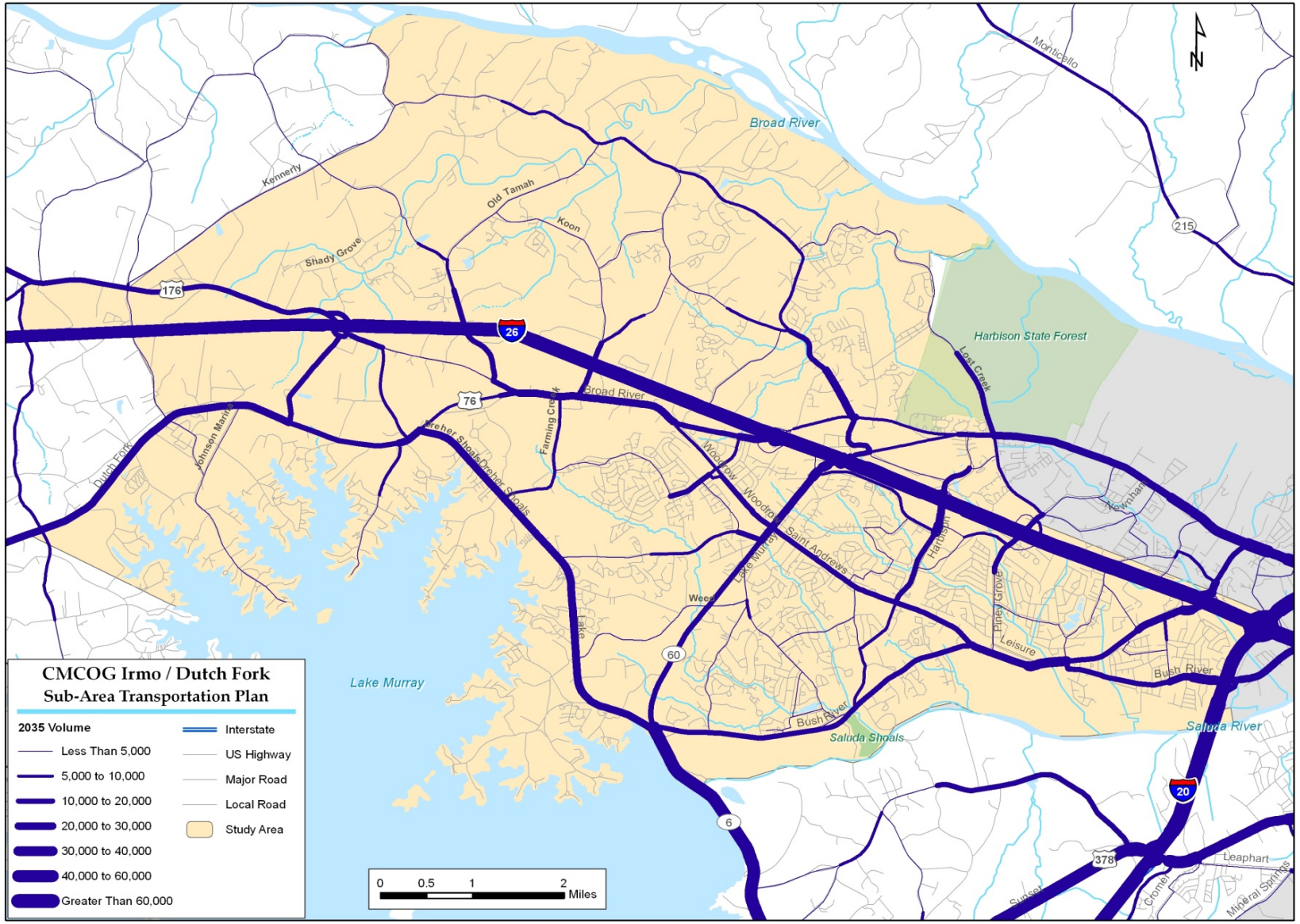
As discussed previously, the 2005 model volumes are highest along I-26 and traffic volumes show the accumulation of vehicles as routes approach the interstate. The horizon year, 2035, also exhibit similar traffic patterns. Volumes along the interstate are still highest among all roadway classes. The model shows an increase on SC 6 (Lake Murray Boulevard) as it crosses the dam. This is due in part to the increased capacity from widening SC 6 (Lake Murray Boulevard) from 2-lane to 4-lane. The traffic dissipates at the intersection, on the north side of the dam, but as a result Lake Murray Boulevard, Bush River Road, and North Lake Drive experience increased volume projections for 2035. Other changes to note are the growth projected for Broad River Road, Kennerly Road as it approaches Broad River Road intersection and the increase along US 176 (Broad River Road) at the Peak Exit off I-26. This area will be experiencing dramatic growth in the future that will be discussed further in **Section 6 - Development Trends**. The model estimates an increase in volume of around 65 percent across the 30 years, or about 1.7 percent average annual growth.

Figure 3: 2005 Traffic Volumes



Source: COATS Travel Demand Model

Figure 4: Projected 2035 Traffic Volumes



Source: COATS Travel Demand Model

Table 2 shows the 2000 and 2005 AADT counts and the projected 2035 AADT volumes and percent changes on selected roadway segments. The historic AADT values are from the SCDOT traffic count table and the 2035 traffic volumes are derived from the COATS travel demand model.

Table 2: Major Roadway Traffic Volumes

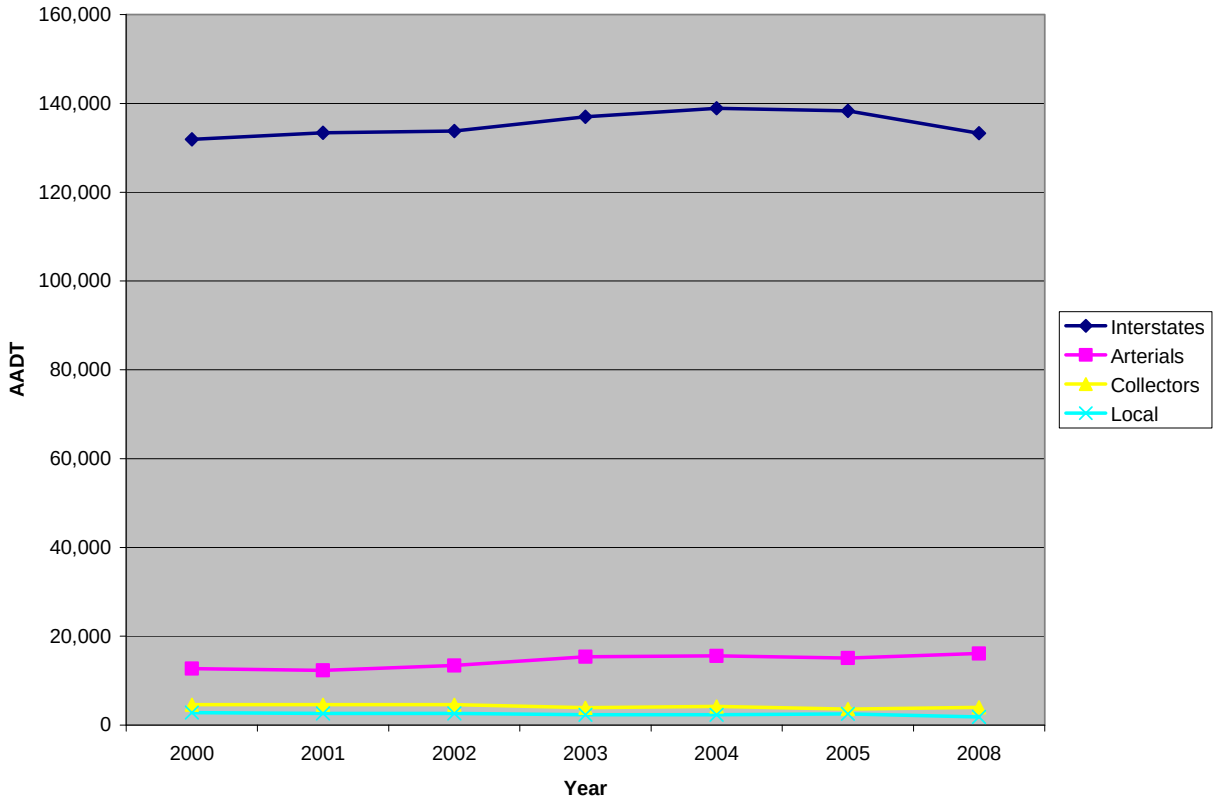
Roadway Segment	AADT			Avg. Annual Percent Change		
	2000 [1]	2005 [1]	2035 [2]	2000 to 2005	2005 to 2035	2000 to 2035
I-26 between I-20 and St. Andrews Road	131,900	138,300	201,400	1.0%	1.3%	1.2%
I-20 between I-26 and Bush River Road	62,000	69,400	121,100	2.3%	1.9%	1.9%
St. Andrews Road between I-26 and Sidney Road	23,400	21,900	23,800	-1.3%	0.3%	0.0%
Lake Murray Boulevard between I-26 and St. Andrews Road	22,100	25,200	30,400	2.7%	0.6%	0.9%
State Highway 6 between Broad River Road (US 76) and Farming Creek Road	7,400	9,100	23,400	4.2%	3.2%	3.3%
Broad River Road between Koon Road and Woodrow Road	12,700	15,100	24,400	3.5%	1.6%	1.9%

Source Notes: [1] SCDOT Traffic Counts (2009 file)
[2] 2035 COATS Travel Demand Model projections

The traffic growth rates on I-26 and I-20 are relatively close. For example, the growth rates from 2005 to 2035 are 1.3 percent and 1.9 percent on selected I-26 and I-20 roadway segments respectively. Other major roadway segments on St. Andrews Road and Lake Murray Boulevard show growth rates of less than 1 percent when AADTs are projected to the year of 2035, while SC 6 between US 75 and Farming Creek Road has the highest traffic growth rates.

Figure 5 shows the historical (2000 - 2008) traffic counts on roadway segments grouped by functional classification. Interstates showed a traffic volume decrease from 2005 to 2008, which is a reflection of the current economic downturn. Traffic volumes on arterials and collectors were relatively stable. It is worth pointing out that, due to the limited availability of AADT data from SCDOT permanent traffic count stations, the curve in **Figure 5** is based on sample data on selected roadway segments.

Figure 5: Historical Traffic Volumes between 2000 and 2008



Source: SCDOT

Within the study area, I-26 is the main corridor as it carries commuters into Columbia on a daily basis. It has a volume of almost 140,000 cars daily as I-26 approaches the interchange with I-20, according to the 2005 model year. It is well established that the interstate facilities are the primary corridors, but the supporting network also reveals internal routes of interest within the study area. **Table 3** shows the 10 highest non-interstate roads within the study area. The AADT shown is the average along the corridor.

Table 3: Ten Highest Non-interstate Roadway Traffic Volumes for 2005 Model Year

Street Name	AADT
Saint Andrews Road	28,200
Harbison Boulevard	24,900
SC 60 / Lake Murray Boulevard	24,800
Bush River Road	21,100
SC 6 / Dreher Shoals Road	19,400
Piney Grove Road	15,900
US 76 / Broad River Road	15,400
US 176 / Broad River Road	14,200
Kennerly Road	13,300
Lost Creek Road	12,100

Source: SCDOT

Arterials that connect to the Interstate also carry a heavy amount of vehicles. These roads include Lake Murray Boulevard, Harbison Boulevard, St. Andrews Road, Bush River Road (which connects to I-20), and Piney Grove Road. St. Andrews Road combines traffic from I-26 and Bush River Road to create a heavy volume area in the proximity of the Shaw manufacturing plant. North Lake Drive (SC 6) is the only other route besides I-20 that connects the study area to the rest of Lexington across the Saluda River.

In 2035, traffic volumes are projected to increase significantly across the study area as residential and commercial developments continue to expand into the undeveloped and under developed areas of northwest Richland County. **Table 4** shows the roads with the heaviest non-interstate volumes projected for the horizon year.

Table 4: Ten Highest Non-interstate Roadway Traffic Volumes for 2035 Model Year

Street Name	AADT
SC 6 / Dreher Shoals Road	44,700
Saint Andrews Road	36,200
SC 60 / Lake Murray Boulevard	33,800
Bush River Road	32,400
Harbison Boulevard	30,900
US 76 / Broad River Road	29,500
US 176 / Broad River Road	23,300
I-26 / I-20 Ramp	23,000
Kennerly Road	20,400
Piney Grove Road	19,900
Lost Creek Road	14,900

Source: COATS Travel Demand Model

A majority of the roads on the list remain the same. In 2035, the interstates will still be the primary corridors for trips into and out of the study area. Broad River Road (US 76), Harbison Boulevard, St. Andrews Road, Bush River Road, and Piney Grove Road all remain prominent commuting corridors in the area. Eleven records appear in the table to allow the "I-26/I-20 Ramp" record to be shown. The Ramps coming from I-20 westbound going to I-26 westbound is a specialized roadway but the volume of traffic along the ramp is substantial.

North Lake Drive (SC 6) shows a significant increase in traffic across the dam. The 2035 model reflects the expansion of this road from a 2-lane facility in 2007 to a 4-lane facility, which increased the capacity of the road to accommodate more vehicles. Similarly, Lake Murray Boulevard (SC 60) is also widened to a 4-lane facility in the future year. Lake Murray Boulevard intersects with SC 6 and I-26, so the expanded facility is a viable link from the interstate to the dam/lake recreation area. Another route that shows a large increase in future AADT is Kennerly Road. Kennerly Road had a 2005 AADT of 13,284. The 2035 volume is projected to be 20,374 AADT, which is a 53.4 percent increase in traffic on the 2-lane road across the 30-years. Kennerly Road is the main route used by residents in the rural portions of the study area to connect to I-26. The increased growth projected for this area will have a significant impact on some of the roads in this portion of the study area.

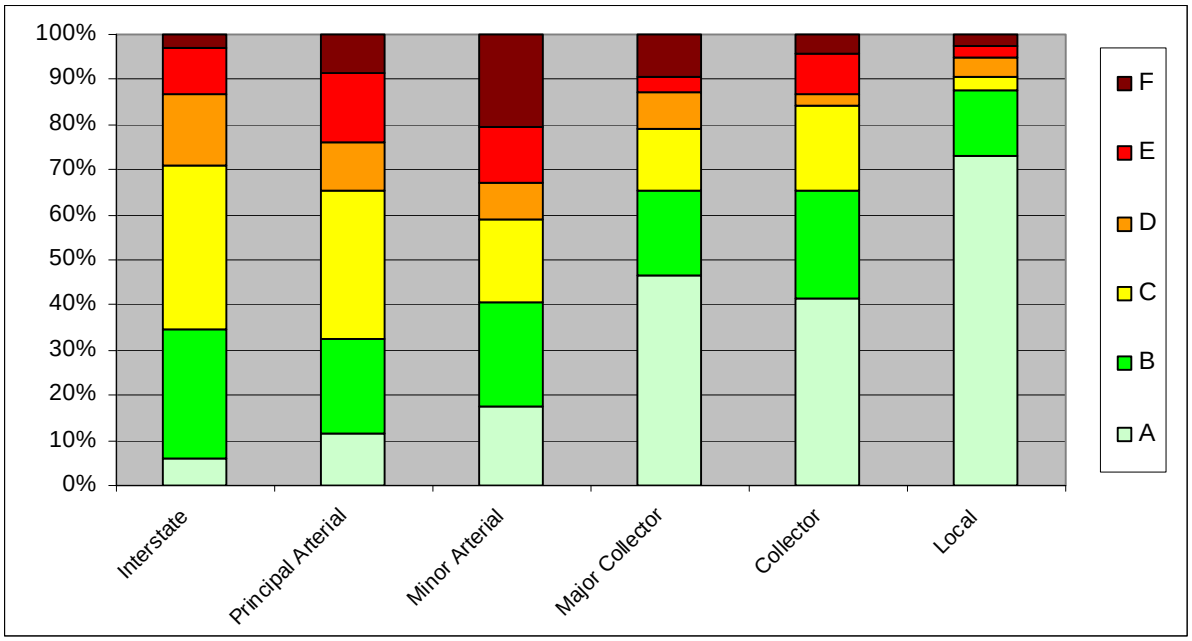
3.2.2 Level of Service (LOS)

Level of service (LOS) is a qualitative measurement from **A** to **F** for describing operational conditions for a given road. On this grading scale, **A** is the best and **F** is the worst for the highway segment. Below is a general description of each LOS category:

- **A** – Free flow; conditions where traffic flows at or above the posted speed limit and all motorists have complete mobility between lanes
- **B** – Reasonable flow; slightly more congestion with reduced maneuverability
- **C** – Stable flow; Ability to pass or change lanes is not assured. Most experienced drivers are comfortable, and posted speed is maintained, but roads are close to capacity.
- **D** – Typical of an urban highway during commuting hours. Speeds are somewhat reduced, motorists are hemmed in by other cars and trucks.
- **E** – Unstable flow; flow becomes irregular and speed varies rapidly, but rarely reaches the posted limit. On highways, this is consistent with a road over its designed capacity.
- **F** – Flow is forced; every vehicle moves in lockstep with the vehicle in front of it, with frequent drops in speed to nearly zero mph. High vehicle delay.

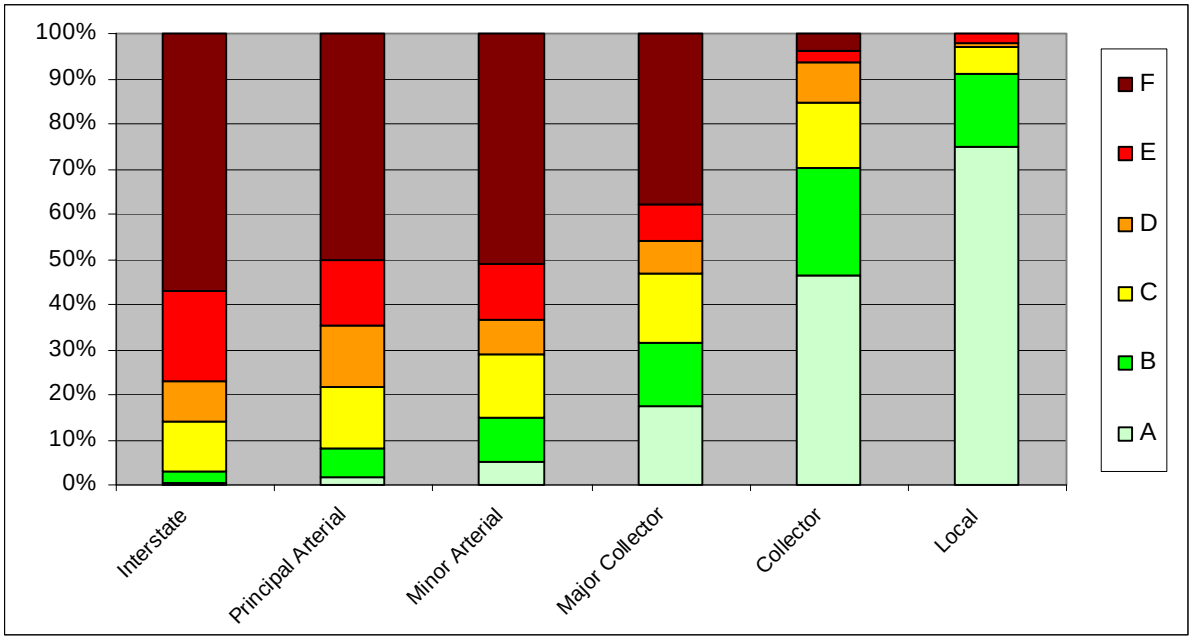
The COATS travel demand model was used to evaluate the LOS for years 2005 and 2035. The COATS model is a 24-hour model. Therefore the LOS is a 24-hour LOS, and not a peak-hour LOS. **Figure 6** and **Figure 7** illustrate the vehicle-miles of travel (VMT) within the study area by LOS group and roadway functional class for 2005 and 2035 respectively.

Figure 6: Percent of 2005 VMT per Level of Service by Functional Class



Source: COATS Travel Demand Model

Figure 7: Percent of 2035 VMT per Level of Service by Functional Class



Source: COATS Travel Demand Model

SCDOT uses a LOS of **C** for planning efforts to ensure an acceptable operating service for users. Since LOS is determined by the relationship of roadway volume (traffic on the road) to the roadway's capacity (what the road was designed to handle), each LOS category can be assigned a volume-to-capacity ratio range. At level **C**, this means the roadway volume is equal to the roadway capacity (Volume-to-Capacity Ratio equals 1.0). Below LOS **C** means the roadway volume is under capacity and above LOS **C** the roadway volume is over capacity. The range of Volume-to-Capacity ratios by LOS is shown in **Table 5**.

Table 5: SCDOT Volume-to-Capacity Ratios by Level of Service

LOS	V/C Ratio Range
A	0.00 – 0.49
B	0.50 – 0.74
C	0.75 – 1.00
D	1.01 – 1.15
E	1.16 – 1.34
F	1.35 - ∞

Source: SCDOT

In 2005, only a few roads within and entering the study area were at unacceptable LOS of **"E"** and **"F."** The majority of these roads are along the I-26 corridor. **Figure 6** shows the interstates within the study area are equally spread among the LOS categories with the unacceptable LOS levels occurring as I-26 and I-20 intersect on the eastern bounds of the Irmo/Dutch Fork area. For discussion purposes, ramps were included in the interstate total. Minor arterials are the functional class with the highest percentage of VMT in a LOF of F (20%). This is because most arterials directly connect to the interstate and incur

large traffic volumes as vehicle exit the high capacity interstate onto the low capacity arterials, such as St. Andrews Road, Piney Grove Road, Harbison Boulevard, and Broad River Road.

Other roads of concern are collectors which carry large amounts of traffic and comprise a lot of the study area roadway miles. These collectors include roadways such as SC 6 (Lake Murray Boulevard) as it crosses the dam, Bush River Road near I-20, and intersections at Dreher Shoals and Dutch Fork Road, Lake Murray Boulevard and Columbiana Drive, and North Lake Drive and Weed Road. North Lake Drive (SC 6) is a 2-lane road in the 2005 model as the construction of the 4-lane widening project was not complete until 2007. Additionally, the high growth around Kennerly Road and Lost Creek Road add to the high percentage of VMT on collectors in unacceptable LOS categories.

In 2035, the roadway service levels change dramatically. In **Figure 7**, there are larger percentages of VMT shown as level **E** and **F**. The roads experience continual growth to the extent where a large number of road sections have volumes that are greater than the road capacity. I-26 throughout the study area is projected to be at level **E** or **F** and the primary routes at the interstate exits will experience increased congestion. Additionally, arterials and collectors such as St. Andrews Road, Bush River Road, Broad River Road, Dutch Fork Road, and Dreher Shoals Road will likely experience a deteriorating level of service as they carry vehicles to/from the interstate.

The Long Range Transportation Plan improvement on Kennerly Road, described in **Section 3.2.5**, improves the road service by widening from two to four-lanes. Similarly, the widening across the dam on North Lake Drive (SC 6) helps the area with traffic flow and accessibility, but will also increase in usage since this is the main connection between Irmo and Lexington. The increased traffic will decrease the level of service as growth occurs. This reflects the growth in trips the model expects for the Irmo/Dutch Fork area in the next 30 years.

3.2.3 Vehicle-Miles and Vehicle-Hours of Travel

The COATS travel demand model was used to estimate the vehicle-miles of travel (VMT) and vehicle-hours of travel (VHT) by roadway type (functional classification). The model calculates VMT by multiplying the length of the roadway links by the assigned volume. The model calculates VHT by multiplying the time [Time= (Length/Speed)*60] of the roadway links by the assigned volume. **Table 6** shows the VMT, VHT, and congested speed (mph) by roadway type within the study area.

Table 6: 2005 Vehicle-Miles and Vehicle-Hours of Travel

Roadway Type	VMT	VHT	Congested Speed (mph)
Interstate	1,015,000	954,900	64
Principle Arterial	11,200	13,800	49
Minor Arterial	366,700	493,700	44
Major Collector	37,900	45,200	50
Collector	114,000	184,300	37
Local	60,200	99,900	36

Source: COATS Travel Demand Model

The study area is dependent on a reliable road network to function both in and around the study area. As **Table 6** reveals, that network is largely made up of interstates, minor arterials, and collectors. The high VMT and VHT values for interstates reinforce the importance of I-26 in this area for commuters and businesses. Interstates comprise 3 percent of the centerline road miles in the study area, but 63 percent of

the total VMT for all the roadway types. There are only a few principal arterials and major collectors in the area, hence the lower VMT and VHT totals for those classes. Minor Arterials, like Lake Murray Boulevard and Harbison Boulevard, see regular traffic as residential and commercial developments rely on these roads to connect and move the people and goods within the Irmo/Dutch Fork area. Similarly, collectors like Dreher Shoals Road and Kennerly Road are the major routes for many citizens to connect to the arterial facilities.

3.2.4 Journey-to-Work Census Data

Part 3 of the U.S. Census Transportation Planning Package (CTPP) was used to evaluate commuter flows in the study area. Commuter's place of residence (home location) and place of work (employment location) were evaluated at the Census Tract level in the study area for the year 2000. **Table 7 s**hows the split of commuters who live and work in a tract within the study area.

Table 7: Workers Leaving, Entering, and Living within each US Census Tract

US Census Tract	Workers who live within Tract	Workers live/work in Census Tract	Workers live in/travel out	External workers	Total workers in Census Tract
450630205.10	2,435	1,175	1,260	4,005	5,180
450630205.11	1,966	489	1,477	919	1,408
450630211.04	3,428	1,255	2,173	2,354	3,609
450630211.05	2,956	2,775	181	5,635	8,410
450630211.06	1,573	495	1,078	1,058	1,553
450630211.07	3,196	599	2,597	581	1,180
450630211.08	2,767	290	2,477	188	478
450790103.03	5,342	855	4,487	1,602	2,457
450790103.04	3,025	679	2,346	1,727	2,406
450790103.05	3,495	625	2,870	707	1,332
450790103.06	2,010	935	1,075	1,096	2,031
450790103.07	2,561	339	2,222	263	602
Total Study Area	34,754	10,511	24,243	20,135	30,646

Source: U.S. Census Transportation Planning Package

This information reveals that almost 70 percent of workers who live within the study area commute to work centers outside of the study area. Of the total 34,754 workers who live in the study area, 10,511 individuals work within the study area too. An additional 20,135 workers have jobs within the study area and regularly commute from neighboring areas. **Table 8** shows the originating location of the external workers of the 20,135 workers; over half come from some part of Lexington County. This could be from Chapin or across the river and/or dam.

Table 8: Workers from outside the Study Area (External Workers)

County	Workers
Kershaw	290
Lexington	10,607
Richland	9,238
TOTAL	20,135

Source: U.S. Census Transportation Planning Package

3.2.5 COATS 2035 LRTP Improvements

According to the COATS 2035 Long Range Transportation Plan (LRTP), there are roadway improvements identified and prioritized within a financially constrained plan. The widening project for Kennerly Road from Hollingshed Road to Broad River Road is the highest ranked project in the study area. This 2.2-mile project ranks ninth within the complete list for the COATS LRTP. Additionally, US 76 (Broad River Road) from the intersection at Dutch Fork Road to Woodrow Street ranks 15th on the list. This 1.74 mile segment widens Broad River Road from 2-lane to a 5-lane roadway.

The final project on the prioritized MPO list is Broad River Road from Woodrow Street to the I-26 interchange. This project ranks 18th and is adjacent to the previous improvement. Similarly, it also improves Broad River Road from 1.93 miles in length and would complete a continuous stretch of 4 travel lanes from the interstate to a growing commercial area at the US 76/US 176. Other projects were identified as needs within the Irmo/Dutch-Fork study area, but were unable to score a high enough ranking to be programmed into the LRTP.

Another road within the study area has recently been added to the Congestion Management Plan (CMP). North Lake Drive and Dutch Fork Shoals Road (both SC 6) between Lake Murray Boulevard (SC 60) and Dutch Fork Road (US 76) is being assessed for widening from two-lanes to five-lanes. This four mile section is in need of improvements as residential growth continues along the roadway.

There is also a major construction project shown in the Vision Plan. A project identified as the "Northwest Connector" has a long history as a proposal in earlier plans. This project would provide connectivity between suburban areas in the northeast and northwest portions of the MPO. It is currently beyond the anticipated financial capabilities of the COATS program, would require environmental studies, and may be difficult to implement due to encroachments of new development on their potential routes.

The interstate is the lifeline of the area. Improvements for I-26 have been identified, but the financial constraints of implementing all projects necessary across the area have pushed the timeline for these projects back. I-20 and 1-26 and I-126 (exits 107 and 108 along I-26) area scheduled to enter preliminary design phase to improve the interchange between the three. The I-20 and I-26 interchange is at the border of the study area. Because the COATS interstate system is moving from a primarily 4-lane system to a system with substantial mileage devoted to 6 to 8 lane freeways, COATS and SCDOT should begin investigating high occupancy vehicle (HOV), high occupancy toll (HOT), and contra-flow (reversible) lanes as techniques to add further capacity to the improved interstates.

4. Existing Transit Service

Fixed-route transit service in the Irmo/Dutch Fork study area is provided by the CMRTA. The not-for-profit Harbison Wheels provides limited service in the area and the Newberry County Council on Aging operates the SMARTRIDE commuter bus service that passes through the study area between the City of Newberry and the City of Columbia.

4.1 Central Midlands Regional Transit Authority

CMRTA transit services include fixed routes and paratransit service, Dial-A-Ride (DART), that provide access to jobs, schools, businesses, hospitals, shopping and entertainment throughout the Columbia Metropolitan area. CMRTA has a fleet size of 43 buses and 22 DART buses for paratransit. CMRTA has two routes that service the study area with a fixed one-way fare of $1.50. Special needs one-way fares are

$0.75 and fares are free for children under the age of five-years old. The DART paratransit service has a $3.00 one-way fare.

4.1.1 Existing Routes

As noted above, CMRTA has two fixed routes in the study area. Route 34 is the St. Andrews fixed route that travels along a loop path and uses St. Andrews Road and Bush River Road in the study area. Crosstown fixed route, 36a/b, runs a linear path with 36a being the inbound to the study area while passengers on 36b take the bus from the Harbison Boulevard area back into Columbia. The fixed routes focus on weekday travel and Saturday shopping trips to local retail centers in the study area, but no Sunday service is available for this route. The routes operate differently depending on the day. **Table 9** list the routes by day of week and **Figure 8** shows the CMRTA fixed routes in the study area.

Table 9: CMRTA Routes by Day of Week

Route Desc.	Route #	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
St. Andrews	34	X	X	X	X	X	X	
Crosstown	36a	X	X	X	X	X	X	
Crosstown	36b	X	X	X	X	X	X	

Source: CMRTA

In addition to the local service, SMARTRIDE offers a commuter service from Newberry to Columbia during the weekday; however, there are no stops within the study area. The closest stop is in the Town of Chapin at exit 91 (Columbia Avenue) on I-26.

4.1.2 Route Travel Times and Frequency

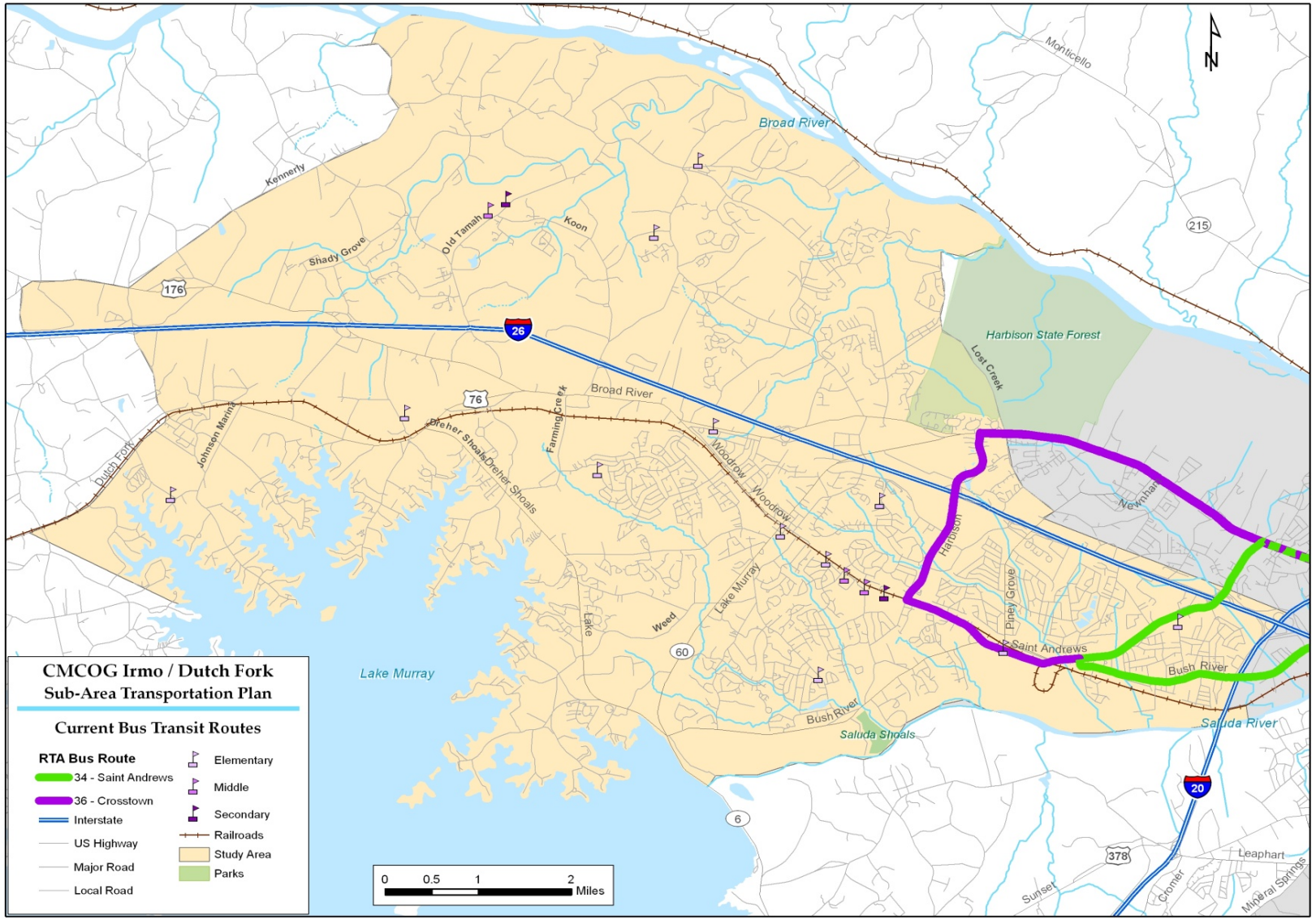
The two CMRTA routes that serve the study area start service between 5:49 and 7:35 a.m. and end service between 7:09 and 8:40 p.m. Route 34 has a frequency of 72 minutes, route 36A has a frequency of 68 minutes each way and route 36b has a frequency of 59 minutes, and **Table 10** shows the route travel times and frequency for the two routes within the study area. Times are the same for both weekday and Saturday service.

Table 10: Route Travel Times and Frequency within Study Area

Route	Route Start Time	Route End Time	Frequency (minutes)	Runs per Day
34	5:51AM	7:31PM	72	14
36a	7:35AM	6:28PM	68	11
36b	8:20 AM	7:09 PM	59	11

Source: CMRTA

Figure 8: CMRTA Fixed Routes in the Study Area



Source: CMRTA

4.1.3 Socio-economic Data

The 2006 CMRTA system-wide survey (All CMRTA riders) reports that 59 percent of riders are female, 84 percent are African-American, and 80 percent have less than or equal to $25,000 average annual income.

Additionally, the CMRTA survey shows that 86 percent of all CMRTA riders are commuters to work and 88 percent of the riders do not own a car. CMRTA has installed bicycle racks on all buses to hold up to two bikes per bus; however, there is no information available, to date, on bicycle rack use.

To get a better understanding of the CMRTA transit routes in the study area, socio-economic data were examined within a quarter mile buffer of the two CMRTA routes. **Table 11** shows the socio-economic data of population, race, age, gender, and median income for each CMRTA route segment within the study area based on the 2000 U.S. Census.

Table 11: Socio-economic Data for each CMRTA Route Segment

	Population	White	Black	Other	Male	Female
Route 36	3,844	2,788	912	144	1,746	2,098
Route 34	4,810	3,362	1,105	343	2,252	2,558

	Population	Age < 18	Age 19 - 49	50 < Age	Households	Avg Income
Route 36	3,844	853	1,848	1,143	1,717	$ 66,699
Route 34	4,810	1,021	2,407	1,382	2,208	$ 62,001

Source: U.S. Census

Based on the analysis of the routes within the study area boundary, the quarter mile service area for route 36 encompasses 3,844 residents, while route 34 service area contains 4,810 residents. There is little overlay between the two routes, meaning some residents are within a quarter mile of both routes. Thus, the CMRTA fixed routes service only 13 percent of the total study area population.

The majority of potential riders serviced by the fixed routes are white, according to the 2000 U.S. Census. As shown in **Table 11**, the two routes are both servicing residential areas occupied by upper-income families. The average income for both routes within the study area is above $60,000 per year. The housing densities show approximately 2.2 people occupy a single household (2.24 and 2.18 persons per house for routes 36 and 34 respectively).

DART paratransit service covers more potential riders, but is still based on the fixed routes through the study area. DART provides a curb-to-curb reservation based service on a needs basis for those riders with disabilities according to the Americans with Disabilities Act (ADA). The analysis of demographics within the study area was done on a three-quarter mile area around any current fixed route. The results shown in **Table 12** are for all persons within the buffer area, not just those certified to use DART. No ridership data was available for the DART service through the CMRTA.

Table 12: Socio-Economic Data for DART Service

Total Population	19,843
Caucasian	14,343
African American	4,482
Other	1,018
Male	9,289
Female	10,554
Younger than 18	4,635
Age 18 to 64	13,005
65 and Older	2,203
Households	8,530
Average Income	$67,848

Source: U.S. Census

The automobile ownership in the service area is high also. Observing the data with the Traffic Analysis Zones (TAZ) within the travel demand model, the majority of households (61%) serviced by the fixed routes has two or more vehicles. Only 8 percent of the households have no automobile available to them, thus would likely be dependent on some form of transit service to access shopping and local amenities. **Table 13** shows the percentage of households within transit service buffer for the Irmo/Dutch Fork study area that have automobiles.

Table 13: Automobile Ownership of Potential Transit Passengers within Study Area

	Percentage
No Automobiles	8 %
One Automobile	31 %
Two Automobiles	42 %
Three or more	19 %

Source: COATS Travel Demand Model

4.1.4 Ridership Levels

From October 2008 through June 2009, the weekday per hour rider ship for route 34 was 23 persons while route 36 had 14 persons. Saturday service during the same period showed 15 persons per hour on route 34 and 10 persons per hour on route 36. There is no Sunday service on either route.

Peak hours for the riders on Route 36 are during the weekday are the 7 - 8 a.m. time frame for commuting into work (average of 21 persons/hour) and in the afternoon from 4 - 5 p.m. (17 persons per hour) when residents are returning home. Ridership decreases on Saturdays as most riders board the routes in the afternoon between 1 and 5 p.m.

Weekday data for Route 34 was unavailable, but the weekend ridership totals were provided by CMRTA. Saturday ridership levels are consistent through the day with a slight increase in the hours between 1 and 5 p.m.

4.1.5 Major Stop Locations

There are several popular destinations along the two CMRTA routes serving the study area, including Columbiana Center and Harbison State Forest. Population destinations outside the study area, but along the two routes, include Dutch Square Mall, Riverbanks Zoo and downtown Columbia.

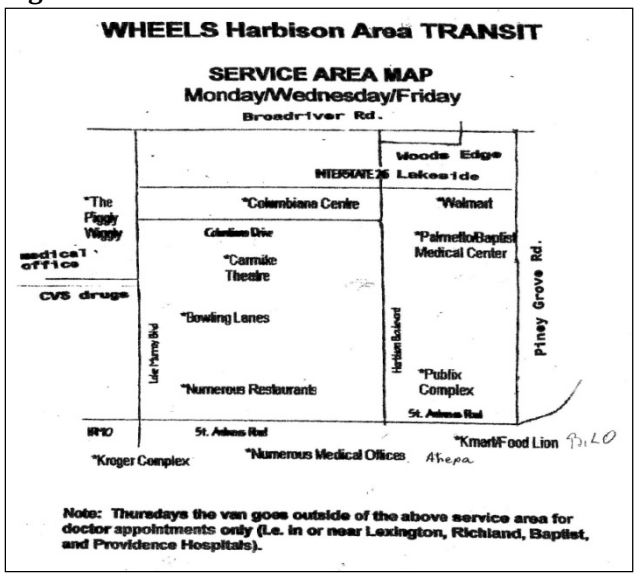
4.2 SMARTRIDE

The Newberry County Council on Aging operates an express bus service between the City of Newberry and the City of Columbia. There are two separate morning runs starting and 6 and 7 a.m. in the City of Newberry and two afternoon runs starting at 4:05 and 5:05 p.m. from the City of Columbia. There are no stops within the study area. The closest stop is at the Exxon gas station at the Chapin exit 91 (Columbia Avenue) of I-26 (6:30 and 7:30 a.m. for morning run and 4:52 and 5:57 p.m. for the evening run). The cost for the Newberry Express SmartRide is $30 per week (weekly pass) or $4 for a one-way trip.

4.3 Other Transit Providers

Harbison Wheels is a nonprofit organization providing transportation to senior and mentally and physically disabled residents in the Harbison area. Service is available Mondays, Wednesdays and Fridays from 9 a.m. to 12:30 p.m. within the service area and for doctor's appointments outside of the service area on Thursdays. They currently serve the HUD housing in the Harbison area. Bus operation pick-up locations are the apartment developments of Lakeside on the Circle and Woods Edge. Routes take the residents across I-26 to shopping, restaurants, and medical offices in the areas between Lake Murray Boulevard and Piney Grove Road and Broad River Road and Saint Andrews Road. Harbison Wheels Route Map is shown in **Figure 9**.

Figure 9: Illustrates the service area for Harbison Wheels.



Source: Harbison Wheels Website (http://harbisonwheels.googlepages.com/wheelsserviceareamap)

5. Existing Bicycle and Pedestrian Facilities

Mobility within a community relies heavily on its citizens' ability to move about using safe facilities for pedestrians and bicycles. Designated bicycle and pedestrian facilities in the study area are predominantly leading to the crossroads of St. Andrews Road/Woodrow Street and Lake Murray Boulevard. The Harbison area ties to the community through the trail system which provides a comfortable reach between the neighborhoods and the center of the City. Mobility within some of the suburban neighborhoods is accommodated through internal sidewalk network; however, interaction between neighborhoods and schools is incomplete or not addressed at all throughout the study area.

Data sources used to evaluate existing bicycle and pedestrian facilities include the COATS Bikeway and Pedestrian Plan, the Richland County GIS Department, Google Maps, field review and discussion with the Advisory Committee.

5.1 Bicycle Facilities

Lake Murray Boulevard (SC 6) has a dedicated bike lane from US 378 (Sunset Boulevard) in Lexington to St. Andrews Road. For this study's purposes, the facilities bound will begin at the Lake Murray Dam and on to St. Andrews Road. There a total of 3.4 miles within the study area along this route. Although this is the primary dedicated bike lane in the study area, many cyclists with various levels of experience can be seen on many of the roads in the rural areas, mostly for recreational riding. Some of the roads commonly used include Kennerly Road, Shady Grove Road, and Koon Road in the northern portion of the study area because of their rural setting and lower traffic volumes.

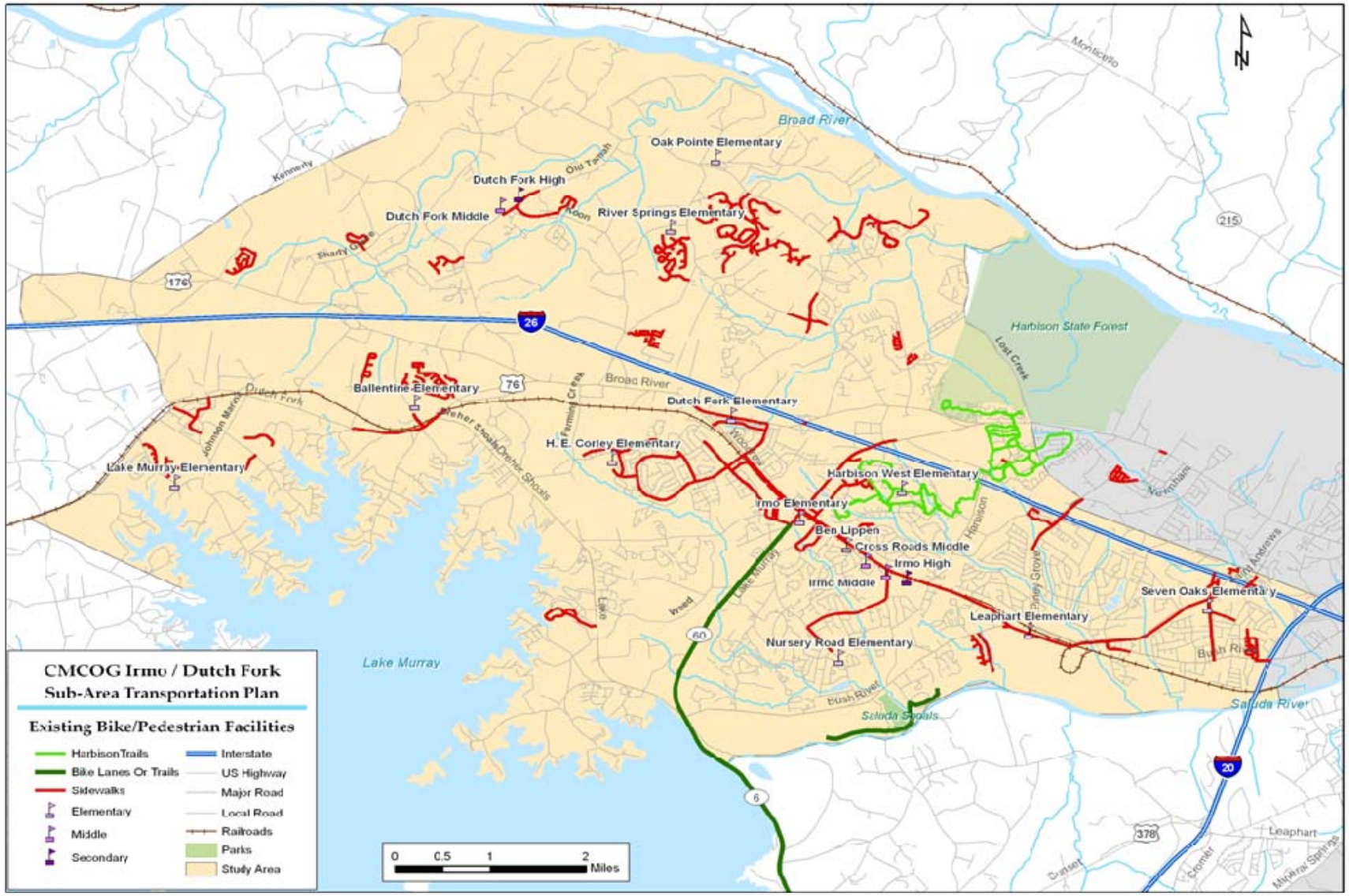
5.2 Pedestrian Facilities

Pedestrian facilities are predominately sidewalks within the study area, providing a total of 75.9 miles of sidewalk for the community. As shown in **Figure 10**, the sidewalks are within neighborhoods and along some principal arterials like Lake Murray Boulevard and St. Andrews Road. A breakdown on the sidewalk facilities identifies 32.8 miles within Richland County, 22.8 miles within Lexington County, and 20.3 miles within the City of Irmo.

The sidewalks also connect to the Harbison Neighborhood Trails, which provide safe crossing locations away from traffic of I-26 and Broad River Road. There are very few connections to schools, shopping centers and parks in the urban and suburban sections with little or no connections in the rural area.

The City of Irmo has been successful in using Transportation Enhancement Funds to add sidewalks. It is currently developing a sidewalk plan to identify future sidewalk connections necessary to bring the community together and will also be used to obtain funding.

Figure 10: Existing Bicycle and Pedestrian Facilities in the Study Area



Source: Central Midlands COG

The level of existing sidewalk connections to schools located within the study area is shown in **Table 14**. Direct sidewalk access means that sidewalk facilities connect the school campus to residential or mixed-use developments. The levels of sidewalk access are:

- None - no sidewalk connectivity
- Poor - more than one sidewalk facility within a half mile of the school
- Fair - more than one sidewalk facility within a quarter mile of the school
- Good - direct sidewalk connectivity to neighborhoods

Currently, there are 16 public schools with 11 elementary, 3 middle, and 2 high schools. There is one private elementary school (Ben Lippen) and the local campus of Midlands Technical College. No school in the study area has a comprehensive Safe Routes to School Plan.

Table 14: Level of Existing Sidewalk Connections to Schools

School Name	Direct Sidewalk Access	Level of Sidewalk Access
Seven Oaks Elementary	Yes	Fair
Irmo Elementary	Yes	Good
Leaphart Elementary	Yes	Poor
Harbison West Elementary	Yes	Good
Dutch Fork Elementary	No	None
Nursery Road Elementary	No	None
H.E. Corley Elementary	No	None
Ballentine Elementary	Yes	Fair
Lake Murray Elementary	No	None
Oak Pointe Elementary	No	None
River Springs Elementary	Yes	Good
Cross Roads Middle	Yes	Fair
Irmo Middle	Yes	Fair
Dutch Fork Middle	No	None
Irmo High	Yes	Fair
Dutch Fork High	No	None
Midlands Technical College - Harbison	Yes	Good
Ben Lippen Elementary	Yes	Good

Source: Wilbur Smith Associates

5.3 Greenway Trail Facilities

There are no regional greenway connections within the study area. There are discussions of extending the a greenway along the northern bank of the Saluda River to connect Irmo with the proposed extension of the Three Rivers Greenway, which extends to the I-20 crossing of the Saluda River. This would link Saluda Shoals Park to the Riverbanks Zoo. Extending the Greenway to the Lake Murray Dam would also provide a link to the new pedestrian facility across the dam. Since its completion just a couple of years ago, the pedestrian pathway on the dam have become a popular regional attraction.

The Harbison Neighborhood Trails and Quail Valley Trails are a 12-mile network of paved off-road multi-purpose trails that link together residential, commercial and recreational land uses. The trails provide opportunity for safe crossing of Broad River Road and I-26.

Saluda Shoals Park provides recreational trails for hiking, biking and horseback riding. A total of 1.6 miles exist currently along the river with the Irmo-Chapin Recreation Commission evaluating the possibility to expand the facilities at Saluda Shoals. Although these trails do not currently fit with mobility of the study area, it does demonstrate the commitment of the community to provide facilities for healthy active living.

5.4 Suggested Bicycle and Pedestrian Improvements

The following improvements are identified in the COATS Bike and Pedestrian Pathways Plan:

- Add sidewalks on both side of Columbiana Drive
- Develop a design for the Three Rivers Greenway along the Saluda River
- Install pedestrian signals and crosswalks at intersections along Harbison Boulevard

These projects, along with plan recommendations, will be evaluated and discussed in the needs assessment portion of this study.

6. Development Trends

6.1 Existing Land Use

Stretching from the I-20/I-26 interchange to the western Richland County line, the study area includes suburban and rural land use patterns.

Suburban Development: Encompassing the area from I-20 to the Town of Irmo, suburban development includes a mix of medium and high density residential retail and service commercial establishment in strip centers and a small amount of industrial uses.

Rural Development: Encompassing the area north and west of the Town of Irmo to the study boundary, rural development includes agricultural activity, low density residential, some as scattered lots but most in subdivisions, and a small amount of commercial establishments.

Land uses in the study area have the following characteristics:

- Residential- Large lot single-family residential to multi-building apartment complexes
- Office- Small professional offices to large office parks
- Retail- Small retail shops to a regional mall
- Services- Personal and business
- Industrial- Light industrial, textile, manufacturing
- Institutional- Retirement facilities, places of worship, and schools
- Civic- Public Safety, municipal facilities, recreational use
- Open space- managed and unmanaged land

Existing land use and projected land us in the Irmo/Dutch Fork study area were developed by several jurisdictions responsible for their own land use policy and developed to address differing needs.

6.2 Population Projections

Most of the growth, in the study area, is expected around Lake Murray and along the Kennerly Road corridor. The rural areas of the study area (Dutch Fork and Ballentine) expect to realize the most increase. The projected 2035 population is 137,728. This is calculating a 1.64 percent annual growth rate from 2008 to the horizon year of 2035. This growth is slower than years past. However, given the undeveloped portion of the study area is poised for development, the likelihood for this continued growth is high.

From this growth, projection regarding households, school age students, and employment can also be determined. From 2000 to 2035, households will increase from 23,705 to 40,115; a difference of 69 percent or 16,410 households. School age children will increase from 13,265 in 2000 to 25,888 in 2035; an increase of 91 percent or 12,073 new students. Employment will also increase to 37,360 working citizens, an increase of over 70 percent or 15,445 working individuals since 2005.

6.3 Future Land Use Classes

The "Richland County Planning Areas 10-Year Future Land Use Classes" map was developed in January 7, 2009 by Richland County. The map, shown in **Figure 11**, depicts predicted and proposed locations of major land use classes in Richland County. The map shows estimated boundaries of urban, suburban, rural, and conservation land use classes, as well as annexation boundaries and planning area boundaries. Additionally, the map designates Long-Range Transportation Plan (LRTP) projects and areas of priority development. The Richland County maps shows the extension of suburban development further into the northwestern part of the study area, a rural area beyond the suburban fringe, conservation of many of the creeks in the study area, and identifies four priority investment areas.

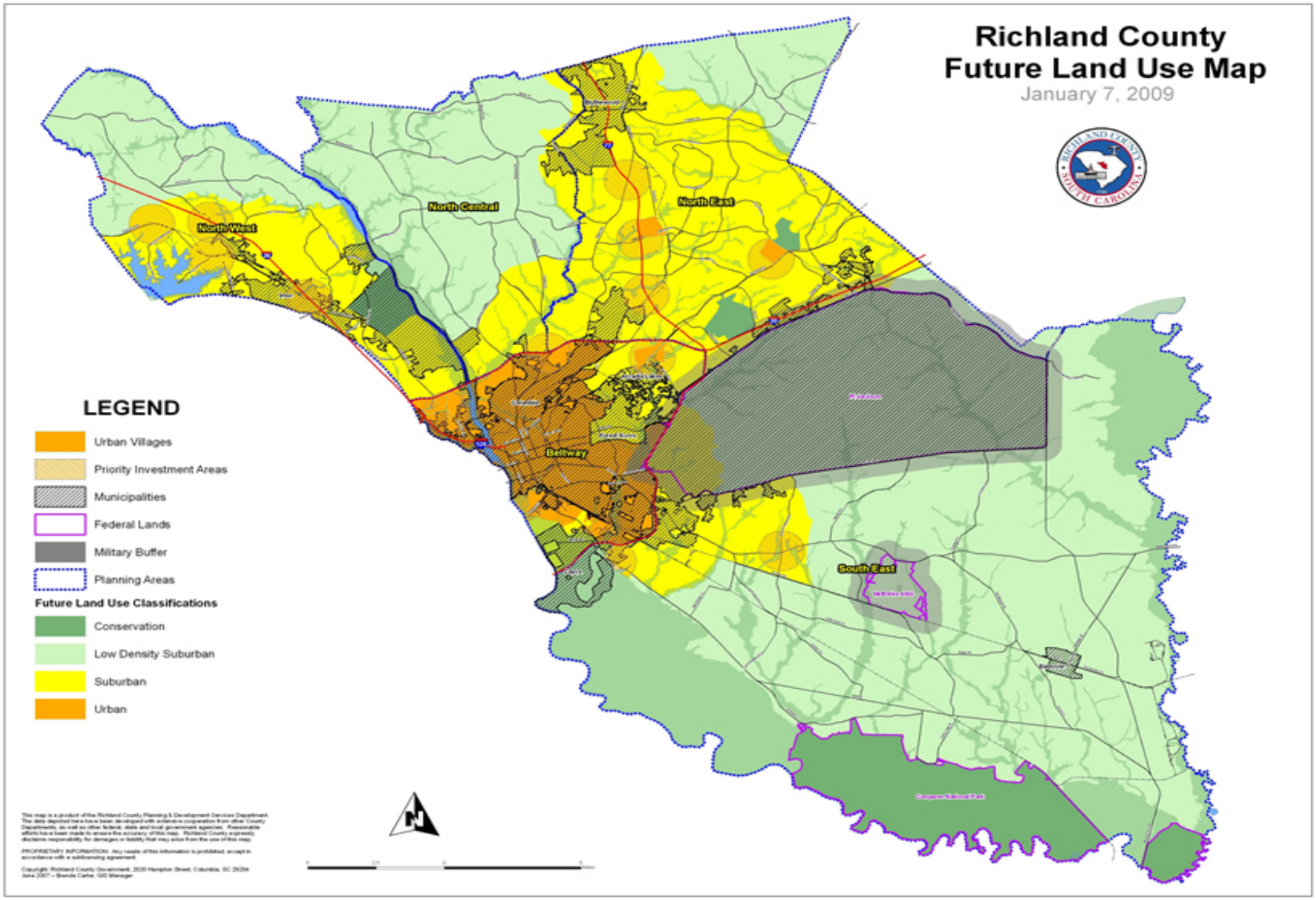
The City of Columbia future land use map also identifies suburban development but it does not extend as far as the county's designation, nor does it identify a rural area beyond the suburban boundary. This map is shown in **Figure 12**.

The Town of Irmo refines the land use pattern by concentrating commercial development along the major corridors while protecting the residential development from the commercial encroachment. **Figure 13** shows the planning for future land use in this area.

6.4 Infrastructure Issues

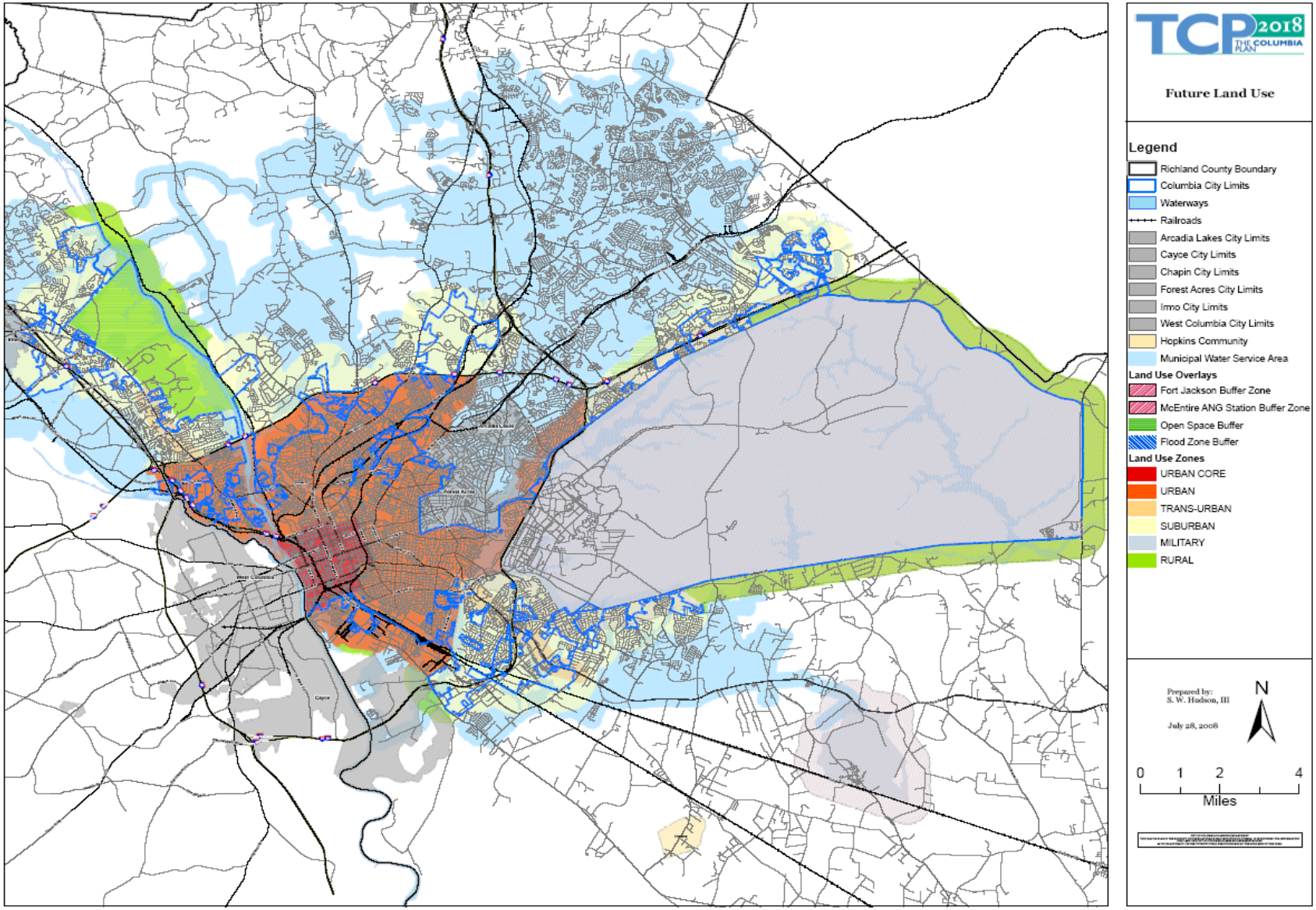
With the City of Columbia having a water treatment plant within the study area and Richland County Utilities recently completing upgrades to its waste-water treatment plant, the availability of water and sewer in the study area should be sufficient to support long-term growth. The City of Columbia, which provides sewer service to the southern portion of the study area, has also considered running an "interceptor" line along the Saluda River to add capacity so that some of the smaller sewer providers would be consolidated to the Columbia system. This would help address water quality issues in the Saluda River.

Figure 11: Richland County Planning Area Future Land Use Map



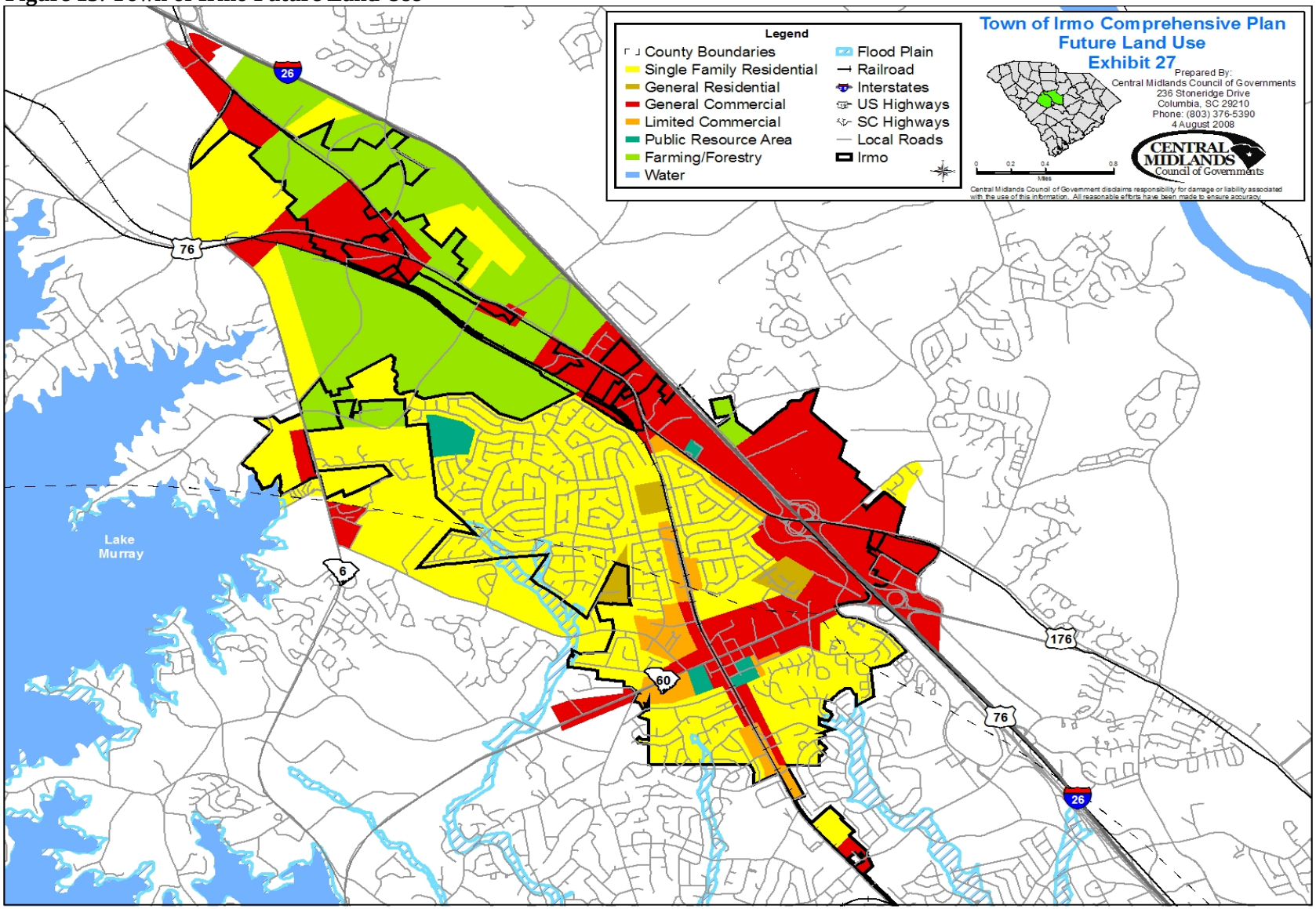
Source: Richland County

Figure 12: City of Columbia Future Land Use



Source: City of Columbia

Figure 13: **Town of Irmo Future Land Use**



Source: Town of Irmo

6.5 Development Impacts on Transportation

As development extends into the Dutch Fork area, transportation facilities and infrastructure are important to maintain the development. As noted earlier, Kennerly Road between Broad River Road and Freshly Mill Road is the only COATS 2035 LRTP projects in Irmo Dutch Fork study area. This collector serves several subdivisions, but also provides access to two elementary schools. The widening of this segment would relieve congestion to commuters accessing Broad River Road near the I-26 interchange.

In 2006, Richland County Council approved temporary funding to continue the Central Midlands Regional Transit Authority (CMRTA) services to the Irmo/Dutch Fork area, but a long-term funding solution is needed to ensure continued operation of the system. A recent study conducted by CMRTA is evaluating service and funding options for the transit authority, but results will not be released prior to completion of this report.

6.6 Potential New Developments

The new Wal-Mart shopping center in Ballentine (the Wal-Mart grand opening was August 19, 2009), has created new development opportunities at the intersection of Broad River Road and Dutch Fork Road. Tractor Supply Company also recently opened in the area along with a Dollar General. There are plans for several fast-food restaurants in this study area as well. As shown in **Figure 13**, Town of Irmo Map, the future land use is anticipated for general commercial use up Broad River (US 176) to the Peak exit (#94) of I-26.

Residential development has slowed in the entire region, but there is an abundant supply of vacant land available for development. Due to the economic downturn, developers have been reluctant to initiate new residential developments. However, Richland/Lexington School District Five are planning to build three new schools in the developing area of northwest Richland County. This construction will spark interest in the area for both residential and commercial developments.

Many major developers continue to grow. Even in a down economy, local and national residential developers like Essex Homes, Mungo Homes and DR Horton have large scale neighborhoods in the study area. Essex Homes has three which total almost 210 new homes. Mungo currently has five developments in the area and more potentially when demand returns.

6.7 School Development

On November 4, 2009, the voters of Lexington-Richland School District Five approved a bond referendum that would not only fund improvements to existing schools, but fund the construction of three new schools: one elementary, one middle and one high school. Currently, the location of the high school and middle school are known. The middle school site is near the northern intersection of Freshly Mill Road and Broad River Road, while the high school site is at the northern end of Kennerly Road.

The proposed high school will have a capacity of 1,700 students, while the middle school will hold 1,200 students and the elementary school will accommodate 900. All students are expected to open doors by the 2015 school year. The schools will help relieve existing district schools but are also being constructed

for the projected growth in the area. Historical trends in the area and nationally show that development will follow school openings similar to the growth after Dutch Fork High School opened in 1992. Now, 18 years later, Dutch Fork High School will be only a short drive from the new schools in the rural Northwest Richland County.

6.8 Park Developments

The following six parks are located within the study area:

- Seven Oaks Park
- Saluda Shoals Park
- Friarsgate Park
- Town of Irmo Park
- Dutch Fork Tennis Center
- Ballentine Community Center

Irmo City Recreation Commission has issued a strategic Master Plan for its park facilities, which include both Seven Oaks Parks and Saluda Shoals Park. Improvements to these parks include:

- Seven Oaks Park - the park is a heavily used sports facility with multiple playing fields. The primary investment will be improving facilities and services through general modifications.
- Saluda Shoals Park – this is a heavily visited park as it provides shelters, water park, and after school programs. The park will continue to increase services to target growth in attendance. Main expansion projects in future years will be Nature's Theater and Saluda River Greenway Trail.

In September 2008, Richland County Council approved $50 million bond to buy land for future development, updated facilities, and construct new parks for the Richland County Recreation Committee. Friarsgate Park is cited for general improvements and facility expansion under the bond. Activities are currently underway to implement the bond projects. It is unclear how bond will impact the other two parks within the study area – Dutch Fork Tennis Center and Ballentine Community Center.

The Town of Irmo Park is a municipal park next to the Irmo Police Department. The facility is popular for town events and general visits by citizens. No major development is planned for the park.

6.9 Development Implications

As discussed earlier, the transportation infrastructure must stay ahead of development or work in unison with growth to due decrease congestion burden due to population increases. While a portion of the study area has already been developed, the northwest Richland County section of the study area is poised for growth. A recent article in *The State* newspaper discussed the development potential in this area, also called Irmo North as it is just beyond municipal boundary. The article offers insight on the areas likelihood for growth as it interviews developers, as well as captures some citizen resentment as residents discuss the reluctance for growth in the area.

Growth will be slow and steady (not dramatic) until the economy rebounds from the recent recession. Further growth in the outlying areas will negatively affect the congestion along I-26 and have a ripple effect as traffic builds thru the study area. Kennerly Road will see increased volumes due to school and residential development on both ends of the roadway between Broad River Road and Freshly Mill Road.

Some roads and areas will likely be more affected than others. Along with increased traffic there could be increased outcry by existing citizens as growth comes to the once spacious rural areas.

7. Public Input

In addition to Public Meetings and Focus Groups held during the project, other specific public involvement actions were taken to allow citizens to voice concerns or raise questions.

7.1 Project Facebook Page

For the study, WSA established a project specific account through the social networking site, Facebook. The site provided an avenue for reaching residents in a way that fits into their everyday routine. The site allowed the project team to push information about meeting dates, surveys, and general information regarding the study area and the project. It also allowed those connected to the project page to comment on potential improvement areas and the project process. While still in a development mode and perfecting the use as related to project material, the site proved to be a useful interaction tool with the public.

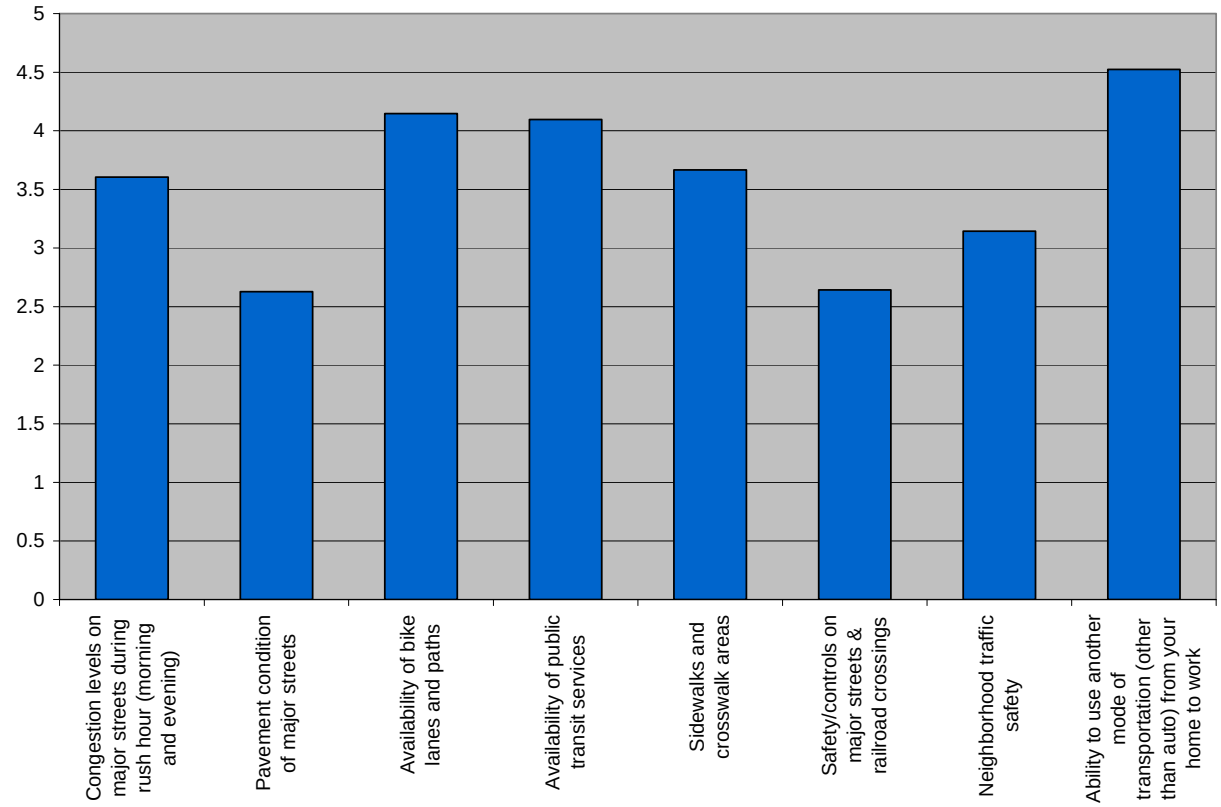
7.2 Survey Results

To extend public participation and provide residents another avenue to voice concerns about transportation related issues within the study area, an online survey was established through the survey

host site SurveyMonkey.com. The questionnaire form can be found in **Appendix A**. The survey was made up of 13 general questions that allowed preference and comments about existing facilities, resident mode choice, and areas of importance. The following will discuss some of the findings.

Fifty-one (51) individuals participated in the survey which lasted seven weeks from December 2009 to January 2010. The majority of respondent (72%) were Male. Ages ranged from 24 to 72 years, with the average being around 44.5 years old. When asked about their interaction with the study area, 82.4 percent of the participants live within the study area. Only 26 percent of participants work in the study area, but of those respondents, 92 percent of them live in the study area also. Automobile/motorcycle was the dominate mode choice with 98 percent of the responses. Only 1 participant relied on bus/public transit for their primary mode of transportation.

Figure 14: Survey Results from "How would you rate the current conditions of the transportation system in the Irmo / Dutch Fork area?"



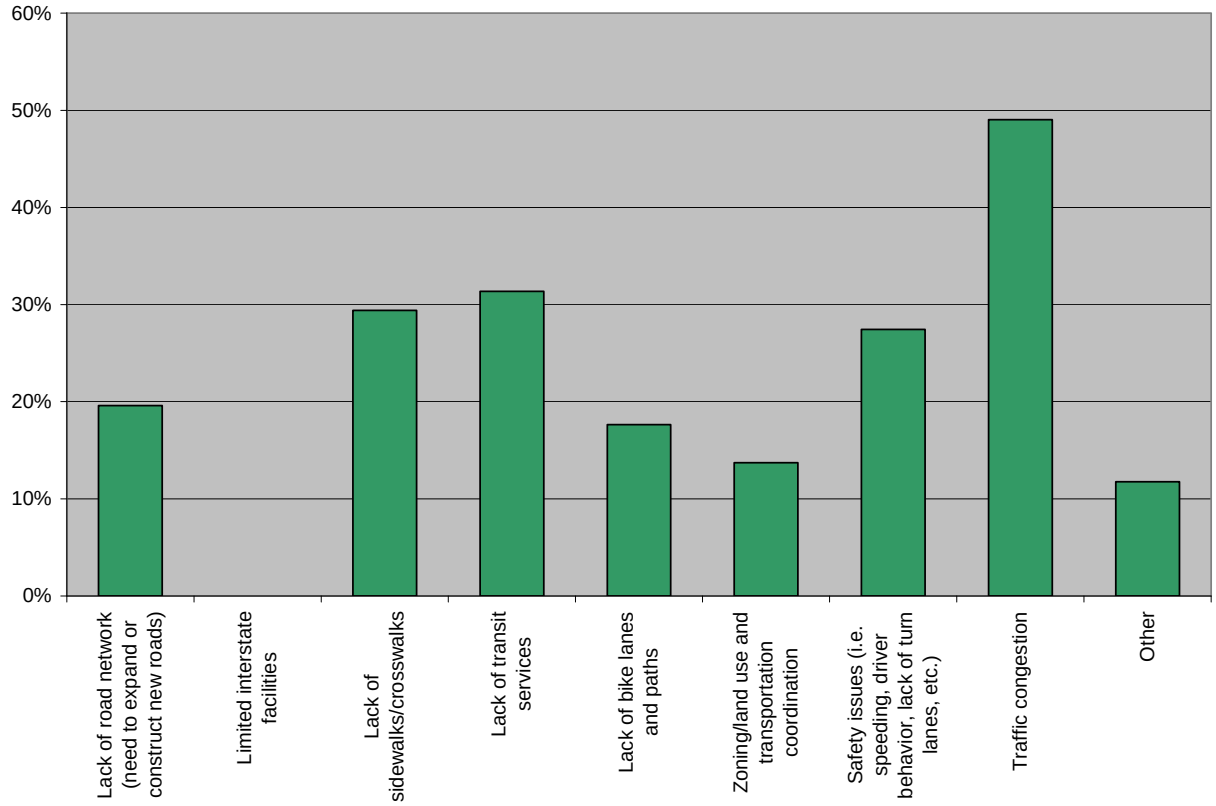
Source: Irmo/Dutch Fork Online Survey

When analyzing the current conditions within the study area, the survey asked to rate eight areas based on a scale of 1 being "Acceptable/Very Good" and 5 being "Unacceptable/Very Poor". Among participants who work and live in the study area, the top responses on the acceptable end of the spectrum were, "Safety/Controls on major streets & railroad crossings" and "Pavement condition of major streets". Both responses had a average rating of 2.6. With a 3.1 average score, "Neighborhood traffic safety" was the next highest rated. Results of the current conditions rating are shown in **Figure 14**. Similarly, lowest rated issues can be interpreted as areas of concern. According to participants surveyed, these were

"Availability of public transit services" and "Availability of bike lanes and paths", which both received a 4.1 average rating, and "Ability to use another mode of transportation (other than auto) from your home to work" with an average rating of 4.5.

Transportation as a whole is a very important issue with respondents. Sixty-three percent chose it to be a very important community need. On a scale of 1 to 5 (1 being "Very important"), transportation averaged 1.4 on the scale with responses ranging from 1 to 3 ("Somewhat" important"). When asked to identify the most critical transportation issues for the Irmo/Dutch Fork Area, forty-nine percent respondents chose "Traffic congestion". "Lack of transit service" and "Lack of sidewalks/crosswalks" was also chosen often with 31 percent and 29 percent respectively. **Figure 15** illustrates the responses. This question response, coupled with the ratings from the previous question, begins to show a local desire for commuting and transportation options. The availability of options is important to the residents, commuters, and shoppers in the area.

Figure 15: Survey Results from "What are the most critical transportation issues in the Irmo / Dutch Fork area today?"



Source: Irmo/Dutch Fork Online Survey

For the focus of planners and decision makers, participants who live and work in the study area identified the need to plan for "widening of congested roadways" and "safety and traffic flow improvements at intersections" as the highest rated with 1.5 and 1.6 respectively (on a scale of 1 to 5 with 1 being very important). When asked to identify the two most effective ways to reduce congestion in the future, the

overwhelming choice with 54.9 percent (over half of the participants choosing it) was improving highway operations through signal coordination, turn lanes, access control, etc. The next closest method is improving transit operations (31.4%).

The responses thus far have shown a recognized need for alternative modes of transportation beyond the automobile. Some participants are reluctant to rate bike lanes, pedestrian facilities, and transit on a higher level. There is still a desire by residents to improve the roadways through expansion or modernization to relieve the congestion troubles. Previous responses can be interpreted to show this, but the following questions frame a concise picture of this concept.

Participants were asked to allocate funds (by percentage) to improve four modes – sidewalk, bike lanes, highway, and transit. Highway needs collected the highest average response with 48.6 percent of the funds allocated to highway improvements. Transit service was next with 23.5 percent average, sidewalks next with 15.5 percent, and bike lanes were last with 12.4 percent. The large disparity depicts an acknowledge reliance on the road network. Table 14 shows the need choice, average allocation, most commonly selected values, total number of entries with 0 percent, and entries with 100 percent.

Table 15: Survey Results from "If you were in charge of funding for transportation improvements, how would you spend it?"

Need Type	Average	Mode	Total 0%	Total 100%
Sidewalk	15.5	10	8	1
Bike Lane	12.4	10	9	0*
Highway	48.6	50	5	3
Transit Service	23.5	30	10	1

*33% was the highest allocation

Source: Irmo/Dutch Fork Online Survey

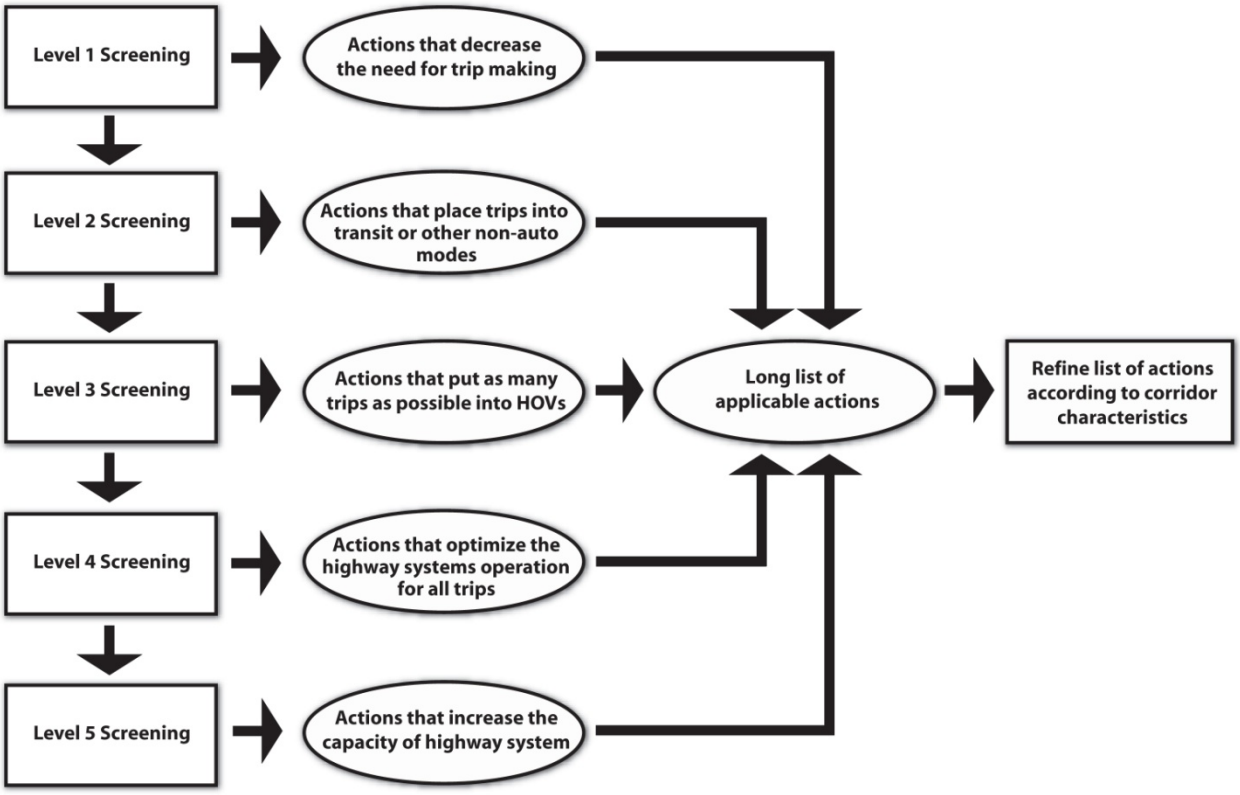
A more in depth review shows that all participants (19) who answered above the most common Highway answer of 50 percent are at an average age of 48.3 years old. Conversely, participants (32) who gave a 50 percent value or lower had an average age of 42.3. This could signal a changing social philosophy or just a change in concerns as younger people will have younger children while older participants likely have kids driving or grown and out of their homes.

8. Needs

The CMCOG encourages the use of a five step screening process for addressing congestion issues on key corridors. **Figure 16** is a diagram of this five level screening system and describes the improvement action's outcome at each level. With the use of this flow chart, improvements from the Irmo/Dutch Fork plan can be characterized and adopted in a manor contiguous with current agency standards.

Most improvements recommended within this study are non-highway oriented, thus falling into the "Level 2" screening action which attempts to decrease the reliance on automobiles and place trips onto alternative modes. Non-highway needs are discussed in **Section 8.1**. Other recommendations fall into levels 3 and 4 respectfully, as the projects should encourage rideshare efforts and system operations. Following this progression, transit recommendations are discussed in **Section 8.2**. Access Management and Intersection Improvements are then discussed in **Sections 8.3.1** and **8.3.2**. Expansion of the existing system is an option according to **Figure 16**, but as "Level 5" it is recommended for only the most severely congested corridors, where applicable.

Figure 16: Five Step Screening Process for Congested Roadways



Source: CMCOG

8.1 Future Non-Highway Needs

Mobility is essential for a community. Often our impressions of a city or a region are made from our traveling experiences between our activities and a certainly influence our way of life. We plan our travel around our choice of travel mode and if we choose to travel by car we plan according to the traffic congestion we expect to have to deal with.

Along these same lines, we find ourselves limited to only being able to travel by car to some of destinations that in an ideal world we would choose to walk or bike. When planning vacation to a resort whether to the beach or to the mountains, the locations that allow us to park our cars for a week and walk to our destinations or use a shuttle service often rank as the top choices. The adults have the freedom from having to drive and the children have the freedom to choose their schedules independent of the drivers.

Similarly, we can build our communities so we can live every day with these choice and move away from being so reliant on our cars. Retrofitting our existing infrastructure for modal choice is implemented piece by piece and with our understanding of the bigger picture, we will ultimately have a community that is more mobile for a broader population. This study has revealed some key non-highway routes that will be important in our retrofit planning by adding sidewalks for more connectivity, extend bike lanes, and introduce more off road multi-purpose paths.

Sidewalks provide mobility for more people than any other transportation facility. Although the study area has many sidewalks, connecting these smaller networks into the larger transportation network brings great value to the community. Road widening recommendations, such as Broad River Road, should include sidewalks. Adding more sidewalks to enhance access to Harbison Shopping is recommended to allow patrons to make walking a choice.

Each school should include extensions from the school reaching to the adjacent neighborhoods to tie into those networks. Specifically the projects shown in **Table 16** would qualify for Safe Routes to School infrastructure funding.

Table 16: Safe Routes to School Infrastructure Improvements

School Name	Recommendation	Description	Length (miles)
Dutch Fork ES	Crosswalk	Upgrade on Broad River Road	Each
Harbison West ES	Sidewalk	Columbiana Road	1.60
Harbison West ES	Sidewalk	Crossbow Drive	1.36
Irmo ES	Sidewalk/Path	Neighborhood Access	0.25
Seven Oaks ES	Crosswalk	Cross Street Andrews Road	Each
Dutch Fork MS	Sidewalk	Old Tamah Road, Shady Grove to Koon Road	1.55
Ballentine ES	Sidewalk/Path	Bickley Rd, entrance to Wise or Path through back of property	0.30
Nursery Road ES	Sidewalk	Nursery Rd, Kiawah Road to Rusty Barn Road	0.73
Leaphart ES	Sidewalk	Piney Grove Road, Railroad to Oberlin Road	0.75

Source: Wilbur Smith Associates

The school projects listed above benefit the community as a whole. Safe Routes to School focus on the school through Engineering, Education and Encouragement but there is no doubt, as depicted in the map, these sidewalks close gaps in the broader network.

Additional segments of sidewalk that close gaps which may also fall within Safe Routes to School programs but most importantly complete the network include:

- Bush River Road east of St. Andrews
- Nursery Road south of Lake Murray Boulevard
- Farming Creek Road east of Dreher Shoals Road

The COATS Bike and Pedestrian Plan included recommendations for Irmo. Implementation remains important for mobility throughout the study area, which include the following:

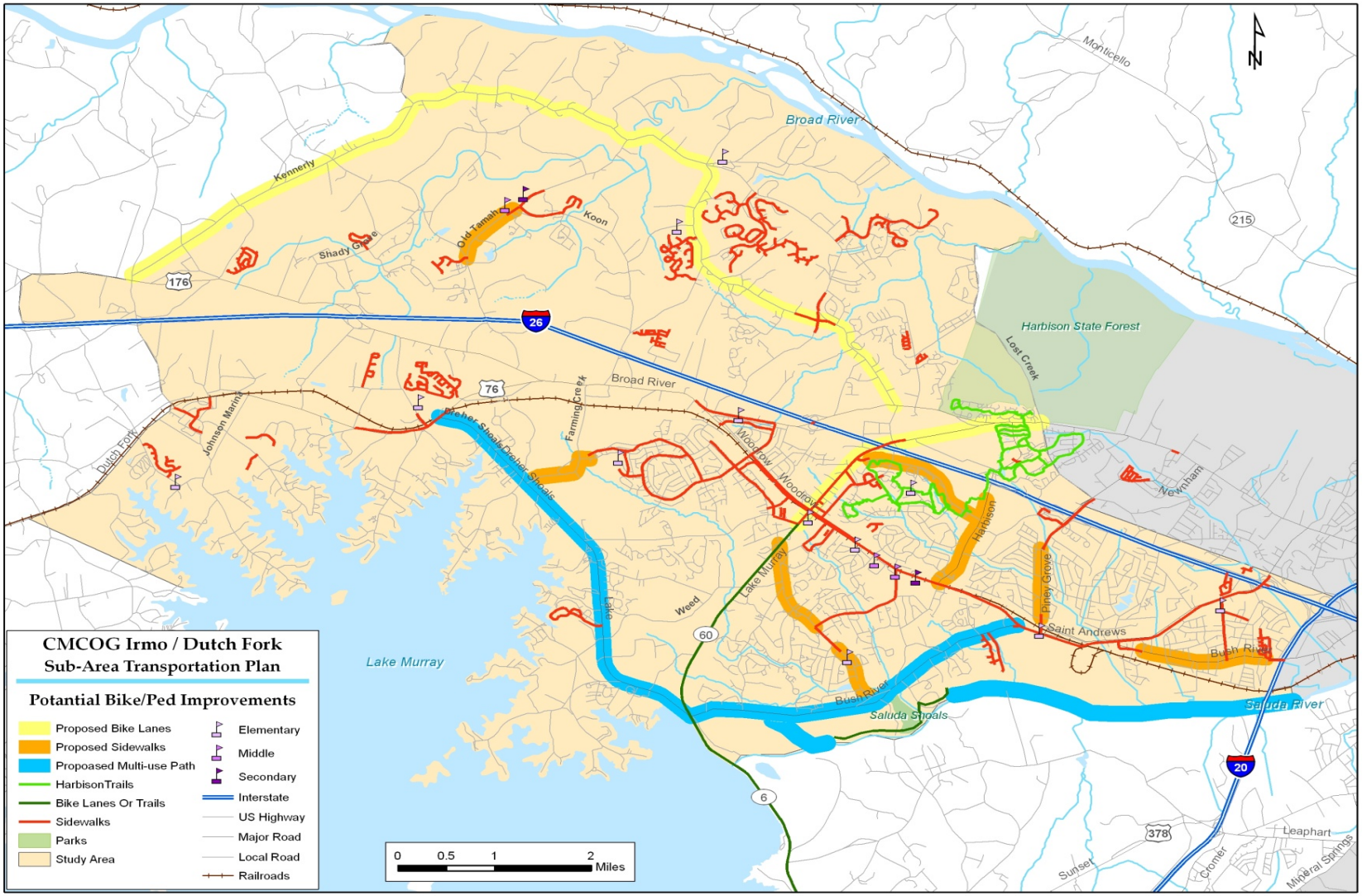
- Sidewalks should be provided on both sides of Columbiana Drive to make it easier for pedestrians in adjacent developments to walk to Columbiana Centre Mall and the businesses on Harbison Boulevard to the south and on Lake Murray Boulevard to the north
- Sidewalks should be added on both sides of Harbison Boulevard between St. Andrews Road and Broad River Road
- New high-visibility crosswalks and pedestrian countdown signals should be installed at several intersections along Harbison Boulevard, one of the largest concentrations of retail stores in the Central Midlands region

The existing bike lane of Lake Murray Boulevard provides an initial promotion of sharing the road facilities. An extension of the lanes to the northeast up to Harbison State Forest increases opportunities for people within the community to go longer distances on their bikes that are much safer. Adding bike lanes with wider shoulders and/or bike lanes on Kennerly Road from Broad River Road to Freshly Mill Road opens up these opportunities to even a larger population. The Kennerly Road section and character varies along its route. The bike facility may carry some variation in the type of accommodation, albeit bike lanes or a wide shared lane, should be based on the appropriate context. These lanes allow for cyclists to move between residential clusters to recreational areas such as Saluda Shoals Park and Lake Murray, to the Harbison retail area or to less traffic volume routes where a shared roadway is enjoyed.

Off road multi-purpose paths are recommended on the more rural routes that carry a reasonable amount of traffic at higher speed limits such as Dreher Shoals Road/North Lake Drive and Bush River Road. The Bush River Road path would maximize its potential with connections to and collaboration with efforts put forth by the Three Rivers Greenway along the Saluda River. This becomes a connection of regional significance as it opens non-motorized access to the Riverbanks Zoo and downtown.

The map of these recommendations, as shown in **Figure 17**, allows us to see the bigger picture and realize how these pieces bring the mobility of the community together. We will not always want to choose to walk or ride our bikes to our local destinations; however, having a community that enables us to make a choice is community that provides for a high quality of life.

Figure 17: Non-Highway Recommendations



Source: ESRI, CMCOG, and Wilbur Smith Associates

8.2 Public Transit Needs

As the region continues to grow, it is important that CMRTA expand the transit routes and schedules, so public transit will be a viable and convenient option for local citizens and visitors. Transit service is an important transportation mode in any community, since it provides access to jobs for residents who do not own a car, protects the environment, and decreases congestion. The following provides study area transit recommendations, followed by specific discussion:

- Increase route frequency of fixed routes for transit-dependent passengers
- Develop feeder system to fixed routes
- Provide alternative commuter routes to downtown Columbia for commuters
- Construct park-and-ride facilities for commuters traveling between Ballentine, Chapin, Irmo, and Columbia to decrease vehicle traffic on I-26
- Construct bus pull-over lanes
- Design/modify roads and intersections to accommodate transit vehicles
- Encourage additional ridership

Currently, the study area densities are not suitable to sustain increased public transportation services, but as the region grows, densities could be supportive in horizon year for expanded regular service. In the future, citizens will not only move to developing locations, but will seek greater density developments around existing infrastructure. The Harbison Boulevard and St. Andrews Road area are likely locations for such development. A policy measure to coordinate land use and transit supportive developments will help increase the ridership of the existing routes.

Congestion on some of the main arterials traveling to and from the I-26 corridor is great and projected to intensify in the future. Harbison Boulevard and St. Andrews Road are among these heavily traveled arterials. These roads are also bus routes within the study area. When buses stop for riders to get on and off, it causes traffic to build behind the buses. It is a safety hazard to buses, transit riders, and citizens. Bus pull-over lanes would maintain the flow and safety of vehicle traffic on major roadways such as Harbison Boulevard and St. Andrews Road. The SCDOT has explored bus pull-over lanes along main corridors where there is major shopping or employment centers. The bus pull-over lanes would alleviate congestion on local roadways and improve safety since public transit vehicles would have an area to stop outside of the normal travel lanes.

However, the bus pull-over lanes would be a permanent route stop and would not allow for route flexibility. Exact locations and estimated costs have not been established for the bus pull-over lanes. At a minimum, bus pullover lanes should be identified along Harbison Boulevard and St. Andrews Road by CMRTA.

8.2.1 Park-and-Ride Service

Through research and public survey, the implementation of an express bus service between the study area and downtown Columbia would be a well-received addition. This service would provide an option for commuters and help reduce traffic volume on I-26. The service should be provided during AM and PM rush hours during the Monday – Friday business week.

CMRTA previously operated a SmartRide service presently operated by the Newberry County Council on Ageing. This is the Newberry SmartRide. Fares range from $4 for a one-way pas to a $30 week pass. No expansion of this existing service is planned.

Based on the online survey results, the final question shows potential support for transit operations. Participants were asked the following "Yes/No" question:

If park and ride lots were provided in your area, would you use them for the following:

- Car/van pooling to work
- Public transit (traditional bus with multiple stops along a fixed route and continual service all day long) to work or shopping
- SmartRide service (express bus route with limited stops that usually services work commuters in outlying areas to downtown during morning and evening rush hours)

Results show that while carpooling and use of general transit from park and ride locations was not overly popular (36.7 percent and 42.9 percent approval respectively), the concept of an express bus service did resonate well with residents. Twenty-eight respondents to the survey (56 percent approval) said they would likely use such a service. This response to even a small sample size gives credence to the recommendation of a service being implemented.

CMRTA developed a Park-and-Ride Study (PRS) in January 2010 as part of its Comprehensive Study Project. The study's purpose was to help determine which areas are best suited for having a park-and-ride facility, potential sites for establishing park-and-ride facilities, and the type of ownership. Similarly, The SCDOT SmartRide Project was conducted to examine the feasibility of establishing a transit service designed specifically for working commuters to the Columbia CBD. Three corridors (Newberry to Columbia, Camden to Columbia, and Batesburg-Leesville to Columbia) were identified in both studies. The Newberry to Columbia includes locations within the Irmo/Dutch Fork area for potential stop locations and will be discussed in the following paragraphs.

Within the PRS, a number of express routes were analyzed for potential service. The data presented in this report clearly indicate that the Newberry Corridor has the highest potential for effective park-and-ride service in this region. Population density in this corridor is as high as other corridors, while traffic volumes and projected demand are clearly higher than the other corridors being considered.

The Irmo and Dutch Fork area was identified as a primary option for this service. In the short-term recommendations for the Newberry-to-Columbia corridor include a proposed route that would operate directly on I-26/I-126 into downtown Columbia. The route would serve six park-and-ride facilities between Chapin and downtown. Four of those stops for this proposed route are within the Irmo/Dutch Fork study area:

• I-26/St Andrews (Exit 106 A/B along I-26)

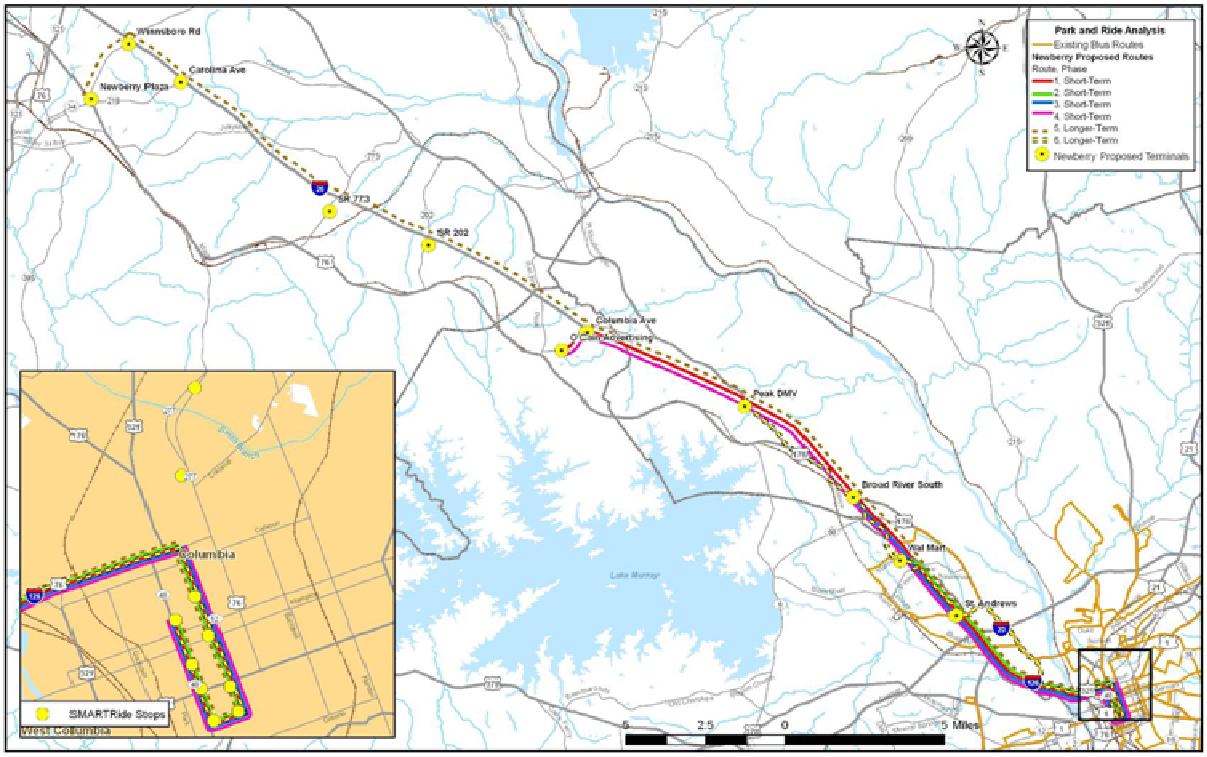
• Harbison Wal-Mart (Exit 103)

• I-26/Broad River South (Exit 101 A/B)

• SC Department of Motor Vehicles (DMV) at Peak (Exit 97)

In downtown Columbia, the route would serve the downtown SmartRide. The entire proposed corridor and service locations are shown in **Figure 18**.

Figure 18: Proposed Service and Park-and-Ride Lots on Newberry Corridor



Source: CMRTA Park-and-Ride Study Final Report, Figure 7-4, January 2010

For long-term recommendations, the PRS shows an expansion of the Newberry-to-Columbia corridor with potential direct routes from single areas to downtown (without multiple stops) and increased frequency of busses in the AM and PM service hours. Specific to the Irmo/Dutch Fork study area, these direct routes, as defined within PRS, include:

Route NW2 – St. Andrews — A proposed direct service that would originate at the park-and-ride lot at St. Andrews Road and then proceed to downtown Columbia via I-26 and I-126.

Route NW3 – Irmo — A proposed direct service that would serve the park-and-ride lot at I-26/Broad River Road South and then the proposed transit center on Harbison Boulevard. From there, the route would proceed to downtown Columbia via I-26 and I-126.

Route NW4 – Chapin — A proposed limited stop route that would originate at the park-and-ride lot at O'Cain Advertising in Chapin and make a stop at a second park-and-ride lot in the Chapin area, at I-26 and Columbia Avenue. The route would make a third stop at the Peak DMV location at I-26 and Broad River Road (north) before proceeding to downtown Columbia via I-26 and I-126. The second stop is just beyond this study's boundary and the third stop is within the Irmo/Dutch Fork study area. Both are easily accessible for the residents around Ballentine and Dutch Fork. For discussion purposes and incorporation from another study, the entire route will be considered as servicing the study area.

8.2.2 Encouraging Additional Ridership

To encourage more ridership, CMRTA may need to educate local residents and businesses of existing opportunities that assist in funding public transit at the user level. The federal tax code offers employers incentives to support the transportation needs of their employees and the Taxpayer Relief Act of 1997 allows employers to offer public transit passes and to reimburse employee transportation costs. These reimbursement opportunities can provide additional ridership on public transit vehicles, if local residents and businesses participate in the program.

In addition to general education about transit service, the benefits to both community and conservation can be highlighted. According to the American Public Transportation Association, access to bus and rail lines reduces driving by 4,400 miles per household annually[1]. Americans living in areas served by public transportation save 646 million hours in travel time and 398 million gallons of fuel annually in congestion reduction alone. Information and cost/benefit analysis will be important to the expansion of transit services. However, the area growth and commuting patterns of residents in the study area make transit a viable tool in reducing congestion and improving traffic operations.

Recently, U.S. Transportation Secretary Ray LaHood proposed that new funding guidelines for major transit projects could be based on livability issues such as economic development opportunities and environmental benefits[2]. This is additional criteria to the existing metrics of cost and time saved. Modified parameters will change how projects are selected to receive federal financial assistance in the Federal Transit Administration's (FTA) New Starts and Small Starts programs. While this is preliminary, it is important to note as part of the potential developments for transit.

[1] American Public Transportation Association – http://publictransportation.com/facts/

[2] United States Department of Transportation – Federal Transit Administration- http://fta.dot.gov/news/_events11036.html

8.3 Road and Intersection Needs and Improvements

To determine the improvement potential for some of the area roadways, a list of potential programmatic improvements was established and modeled if possible. This section will discuss the improvement projects and the model results of those improvements.

8.3.1 Intersection Needs

A number of individual intersections were identified by technical analysis, stakeholders and members of the public as needing improvements. **Table 16** shows the recommended intersection improvements.

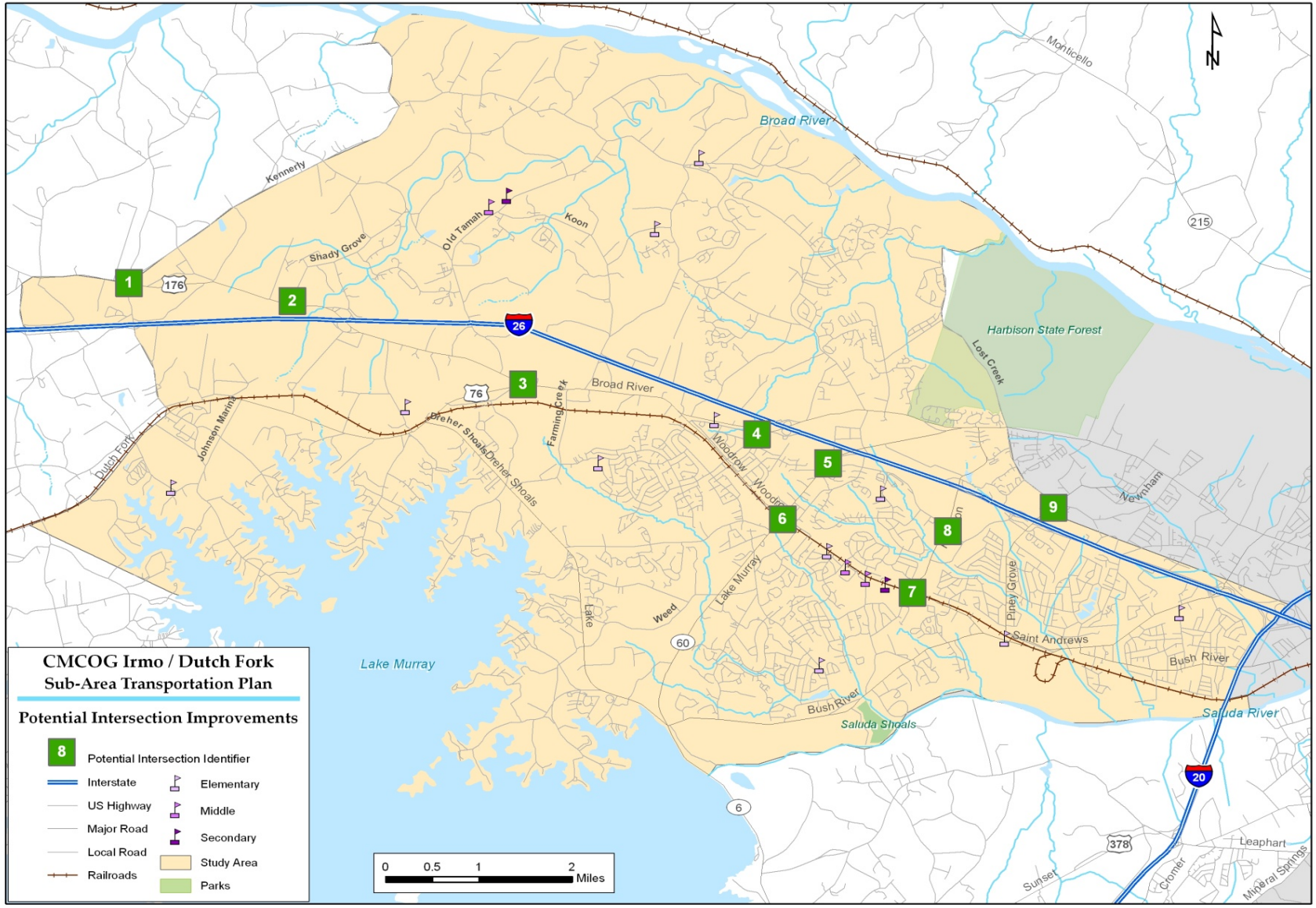
Table 16 – Potential Intersection Improvements

ID	Road 1	Road 2	Action
1	Broad River Road (US 176)	Freshly Mill Road	Full control signal
2	Broad River Road (US 176)	Shady Grove Road	Full control signal
3	Broad River Road (US 176)	Dutch Fork Rd / Broad River Rd (US 76)	Capacity increase
4	Broad River Road (US 76)	Royal Tower Road	Full control signal
5	Lake Murray Boulevard	Columbiana Drive	Right turn lane
6	St. Andrews Road	Lake Murray Boulevard	Capacity increase & railroad crossing
7	St. Andrews Road	Harbison Boulevard	Capacity increase & railroad crossing
8	Harbison Boulevard	Park Terrace	Right turn lane
9	Piney Grove Road	Fernandina Road / Piney Woods Road	Operations improvement & capacity increase

Source: Wilbur Smith Associates

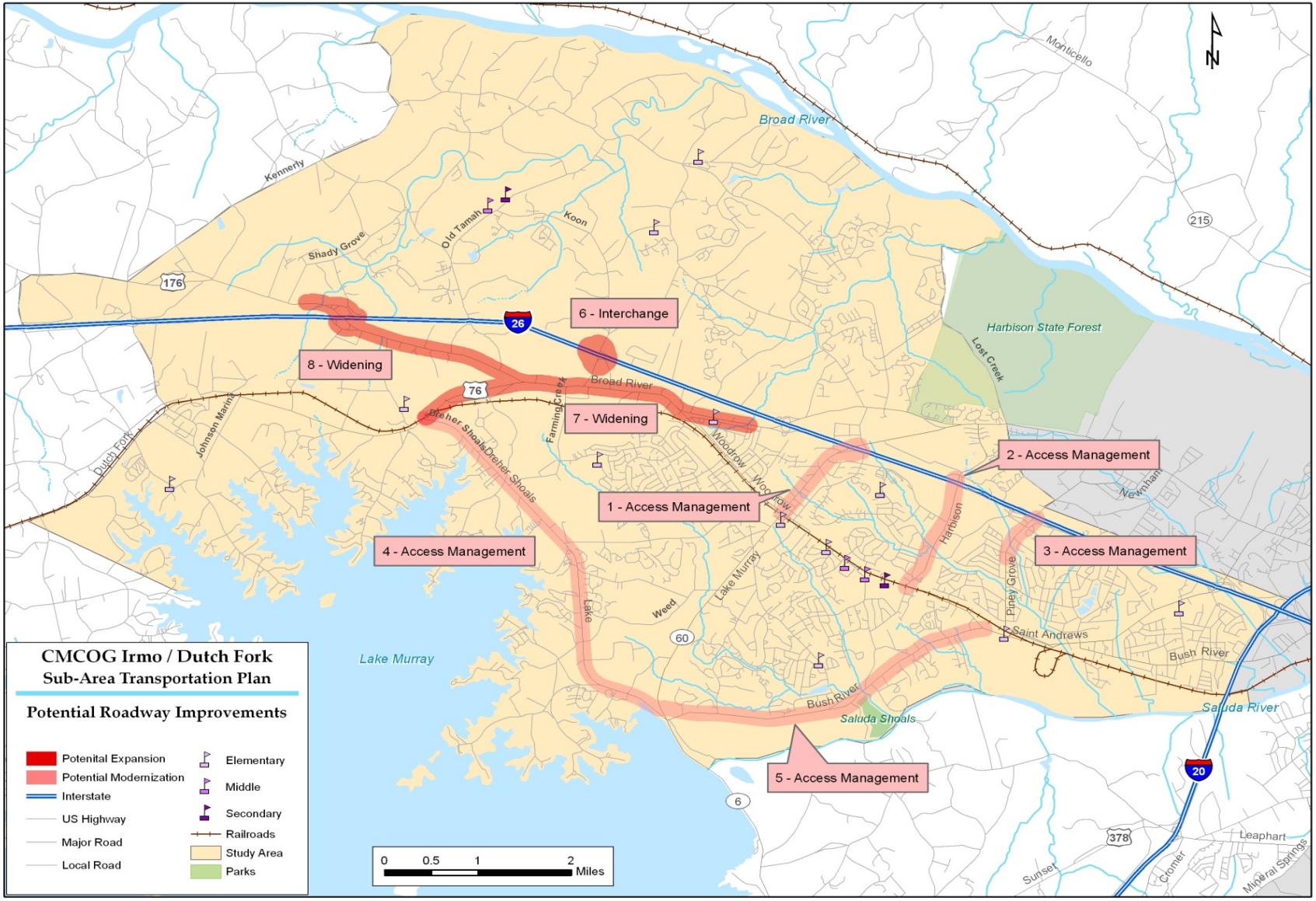
These improvements are designed to improve mobility and operations in an effect to reduce congestion in the area. **Figure 19** shows the location of the intersection listed in **Table 16**.

Figure 19: Intersection Improvement Recommendations



Source: Wilbur Smith associates, ESRI

Figure 20: Roadway Improvement Recommendations



Source: Wilbur Smith associates, ESRI

8.3.2 Access Management

For some roads, expansion is not a feasible option. Roads such as Harbison Boulevard and Lake Murray Boulevard between I-26 and St. Andrews Road are so heavily developed that it is not feasible to rely on widening to solve traffic issues. In these cases, a combination of items must be utilized. These actions constitute implementing access management strategies.

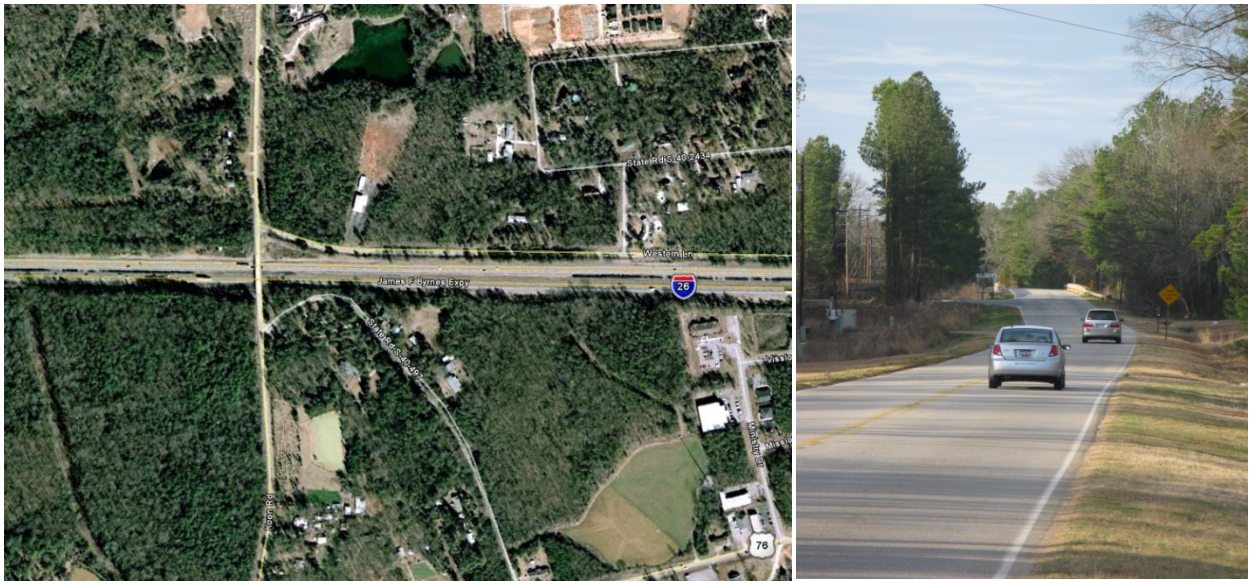
Access management strategies would involve controlled turning movements at intersections and the elimination of mid-block turns between signaled intersections. This improvement would require modification of medians and signal operations, additional storage bays for turning, and shared points of entry by business with road frontage. Most commercial development along Harbison and Lake Murray are developments and not single business facilities, so the shared driveways may be less of an issue than some places. To protect and preserve the existing commuting corridors, access management strategies along the following roadways should be implemented:

Lake Murray Blvd from St. Andrews Road to I-26
Harbison Blvd From St. Andrews Road to I-26
Piney Grove from I-26 to Piney Woods Road
North Lake Drive and Dreher Shoals Road from SC 60 (Lake Murray) to Dutch Fork (US 76)
Bush River Road from SC 60 (Lake Murray Boulevard) to St. Andrews Road

All projects are shown in **Figure 20**. Project numbers are used for identification and not prioritization.

8.3.3 New Facilities

An interchange option was modeled along with the widening improvements. The interchange on I-26 at Koon Road models well and has a couple of important effects on the community. **Figure 20** shows the roadway improvements, including this interchange listed as project 6. Please note project numbers do not reflect priority.



Interchange location – aerial view of Koon Road/I-26 overpass (left) and a view of the existing 2-lane Koon Road (right)
Source: Google Earth

The new interchange on I-26 would provide direct access to the interstate in a developing area. The space between the Peak Exit and Broad River Exit is five miles. This requires commuters in the developing neighborhoods along Shady Grove, Old Tamah and Koon to either exit early and add to congestion along Broad River Road, or exit at the Peak exit and backtrack along the 2-lane collectors and local roads. Thus the new interchange provides relief to Broad River Road, Kennerly Road, and surrounding collectors that are used by commuters along an indirect route to and from home. While it removes traffic off of Broad River Road, a potential interchange also provides easier access to adjacent developments, such as Friarsgate. The decrease in volume will have a positive effect on intersection movements at Royal Tower or Woodrow, which will help relieve rush hour burden when leaving or entering the Friarsgate neighborhood.

Alternatively, the interchange at Koon Road would increase the traffic on the 2-lane roadway. The section of Koon Road between Broad River Road and the interstate would likely need to be expanded to accommodate the anticipated traffic. Currently, Koon Road has turning lanes at the Broad River Road and Old Tamah intersection. Additional turning lanes would need to be implemented along Koon Road to allow access to the neighborhoods.

As shown in the COATS model, the addition of an interchange at I-26 and Koon Road would greatly decrease the VMT and VHT within the adjacent study area. Along with the better performing roads, direct interstate access in this area will improve traffic operations at Lake Murray and Broad River I-26 interchange. By adding the interchange to I-26, the VMT in 2035 went from 2,774,207 to 2,660,890. This calculated to be a 4.17 percent improvement. Similarly, the VHT reduction is 7.2 percent as it decreases from 3,788,853 to 3,515,664 in 2035 model year scenario.

8.3.4 Roadway Widening

There are a number of widening projects that have the potential to improve traffic flow, provide better mobility and increase safety, such as the following:

1. Broad River Road/Dutch Fork Road (US 76) from Dreher Shoals Road to Royal Tower Road – 5 lane
2. Broad River Road (US 176) from US 76 to Shady Grove Road – 4 lane
3. Kennerly Road from Broad River Road to Hollingshed Road – 5 lane
4. I-26 from Broad River Road to Koon Road – 6 lane

Two of the projects are incorporated within the COATS LRTP. Projects 7 and 9 widen existing 2-lane roads to 5-lane. These projects were discussed in **Section 3.2.5** – COATS 2035 LRTP improvements. However, the recommendation of this study is to extend the widening of project 7 on US 76 (Broad River/ Dutch Fork Road) to SC 6 (Dreher Shoals Road). This increase will give the area of Hilton and Balentine a 5-lane thoroughfare to the interstate.

The remaining projects were identified after assessment of existing condition and forecasting of local growth in the area. Project 8 is a widening of US 176 (Broad River Road) as it splits from US 76 (Dutch Fork Road) and goes north into northwest Richland County. The roadway is quickly becoming a major route as it helps connect the development residential areas to I-26 at Exit 94 (Peak) and to commercial developments south of the interstate. Project 10 is a capacity increase for I-26 by adding a lane in each direction. The lanes extend the 6-lane from Broad River Road (Exit 98) to the proposed interchange at Koon Road. Therefore project 5 should be done in coordination with project 6 (interchange).

With all widening projects, access management strategies should be implemented during design and construction to maximize benefit. These strategies were mentioned in **Section 8.3.2**. Specific to these

projects, the middle lanes on Project 7 and 9 should provide a defined turn lanes and median control throughout the section.

8.3.5 Model Results of Improvement Projects

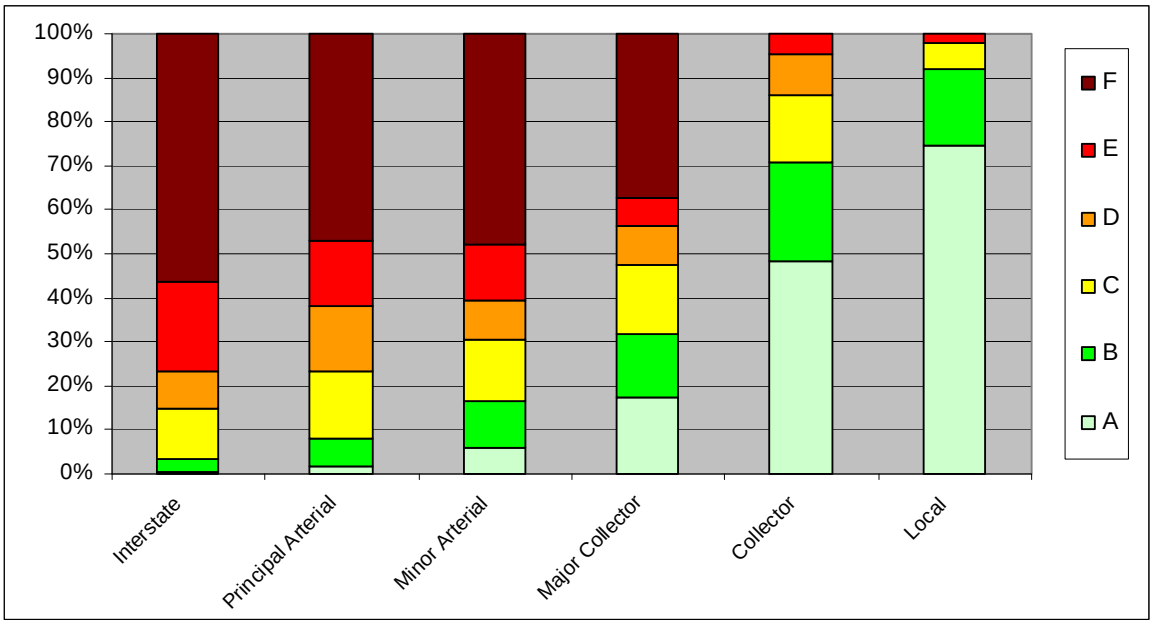
The COATS TransCAD model supplied results that could be directly compared to the existing system performance. The 2035 E+C+I (Existing Roads + Committed Projects + Improvement Projects) Network is shown in **Figure 21** and **22** respectfully.

When examining the Level of Service for the 2035 E+C+I Network, it is easier to determine the impact of the projects. **Figure 21** shows the LOS for the 2035 Model Year E+C+I Network. When compared to **Figure 5**, the 2035 LOS, it can be seen how the improvements affected the service level along collectors and arterials such as Broad River Road (US 76), Kennerly Road, Bush River Road (US 176), and Bush River Road. The LOS for all 4 roads was "E" or "F," but is now within the acceptable levels of "C." The only places still in concern are the interchanges with I-26 and I-20 respectfully, and where the improvement terminates.

Figure 22 shows the 2035 E+C+I Network Volume Map. Growth is still shown throughout the study area, but the primary difference between the improvement projects and the 2035 E+C network, as shown in **Figure 3**, is the decreased volume shown on Broad River Road (US 76) and resulting increase on Koon Road because of the new interchange. A slight decrease along Kennerly Road also occurs because of the new interchange as traffic chooses to exit at Koon Road rather than Broad River Road and navigate Kennerly Road.

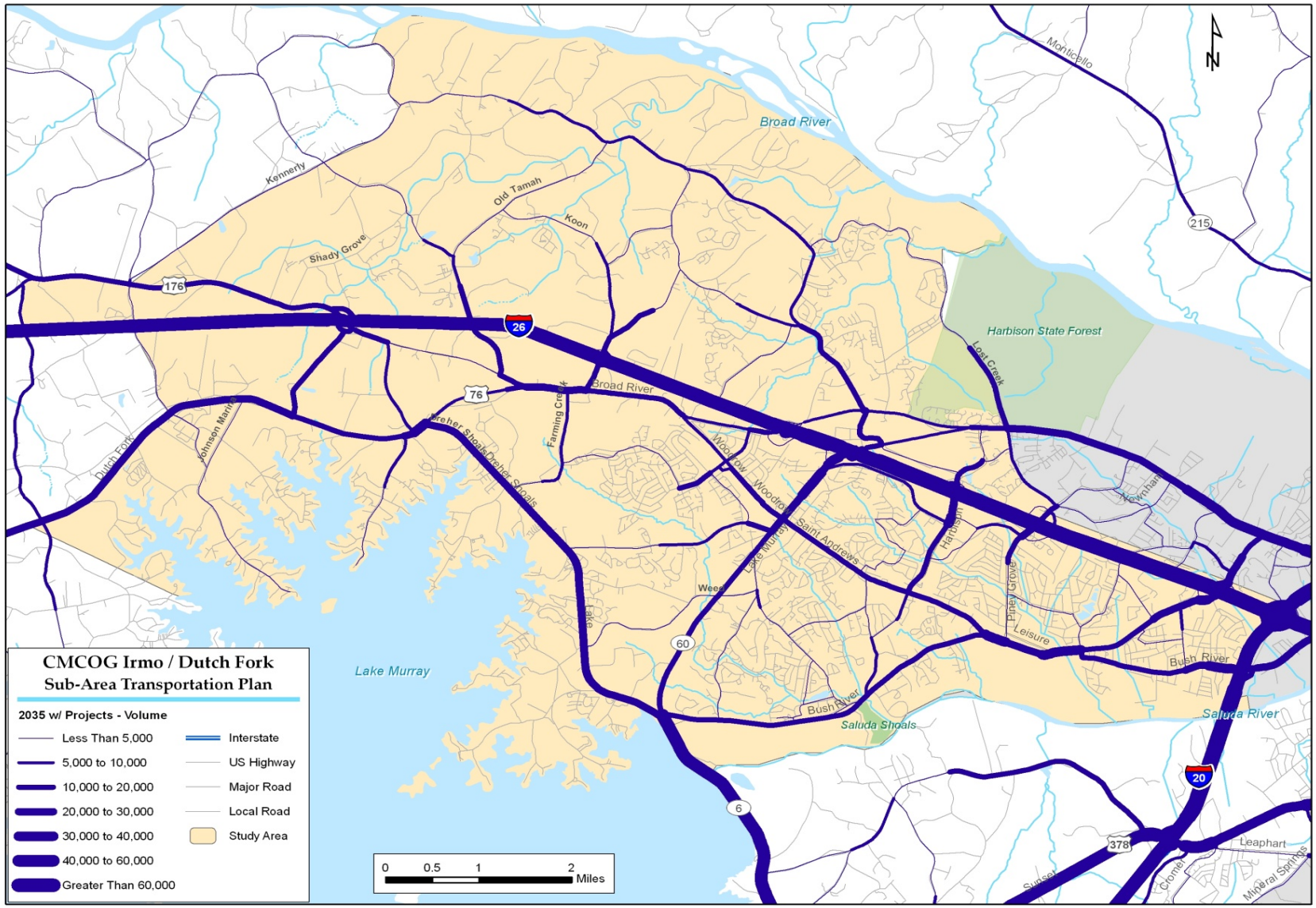
Some improvements, such as the access management, intersection improvements, and 3-lane widening projects, are unable to be modeled with the COATS model.

Figure 21: 2035 Model Year E+C+I Network LOS



Source: COATS Travel Demand Model

Figure 22: 2035 Model Year E+C+I Network Volume Map



Source: COATS Travel Demand Model

8.4 Freight Corridor Needs

In 2009, CMCOG adopted the Regional Motor Freight Study Report which examined the movement of goods in and between the four counties that comprise the CMCOG bounds, which included the counties of Fairfield, Lexington, Newberry and Richland. General improvements that apply to areas accommodating truck traffic are to widen roads, lay down more sidewalks, increase public transportation hours and increase the number of buses on the roads. One recommendation that is specific to the Irmo/Dutch Fork Plan is to improve the on and off ramp to I-26 from St Andrews Road and Harbison Boulevard.

Another recommendation to the plan was establishing a designated truck route system. There are roadways identified within the potential truck route map that are specific to the Irmo/Dutch Fork study area. These roads are:

- Broad River Road – Tier 1
- Interstate 26 – Tier 1
- Interstate 20 – Tier 1
- US Highway 6 – Tier 2

Below is a brief explanation of the tier categories and design goals for roadway improvements;

8.4.1 Tier I

Roads classified as "Tier I" are routes highly used by trucks. These routes primarily experience high truck volumes compared to other routes in the region. Over 1,200 trucks per day use these routes. From an industry usage standpoint, these routes should at least be able to support Class 9 commercial vehicles of up to 102" in width, 65 feet in length at a gross vehicle weight of 80,000 pounds. These routes should have no restrictions and be open for all commercial vehicles to travel at any time. In addition, these routes should provide access across the Central Midlands region and to markets outside of the region.

In addition, the road characteristics of the route are suitable for truck travel and contain the following:

- Wide lanes of 12 feet or more
- Pull off shoulders of 6 feet or more
- Clear site lines
- Bridges and overpasses along the route are over 14.6 feet in height
- Minimal 90 degree sharp turns
- Roads carrying a high volume of truck traffic
- Roads with high overall traffic volumes (passenger and truck)
- Major regional connectors to surrounding regions
- Roads best suited for transport of Hazardous materials
- Suitable for all levels of truck traffic; allow for Class 9 to Class 13 trucks with no restrictions

8.4.2 Tier II

Roads classified as "Tier II" are routes that used frequently by trucks, but due to road characteristics and route locations, these roads may not best suited for large commercial vehicles (Class 8). These routes can experience high truck volumes similar to Tier I of over 1,200 trucks per day, but truck traffic on the route would be composed of smaller commercial vehicles. These routes may have more narrow lanes, more narrow shoulder widths and more turns along the route than Tier I roads. From an industry usage standpoint, these routes should be able to support Class 5 to Class 8 commercial vehicles. Although these routes are travelled by Class 9 vehicles, these routes may not be as suitable as Tier I roads and would be more suitable for vehicles that have fewer 5 axles but greater than two axles, with six tires. These roads may have restrictions and may not be open for all commercial vehicles to travel along certain segments of the route.

In addition, these roads should provide access across the Central Midlands region but not necessarily to markets outside of the region. The road characteristics for these roads contain the following:

- Lanes of less than 12 feet
- Pull off shoulders of 4 feet or more
- Bridges and overpasses along the route are over 14.6 feet in height
- Moderate number of sharp turns
- Roads carrying an intermediate level of truck traffic
- Roadway design and pavement condition less suitable for heavy truck traffic volume
- May consist of truck restrictions along the route

The improvement of highway corridors is a benefit to commuters as well as commercial freight vehicles. The movement of freight goods is reliant on a network that it shares with commutes in automobiles, transit services, bicyclist, and pedestrians. Any improvement to safety and functionality along a route is a great benefit to freight. In turn, any improvement which makes goods movement more reliable and faster is an economic benefit to businesses and the community as a whole.

8.5 Policy Needs and Recommendations

Based upon information provided by the Advisory Committee, local stakeholders, general public and the consultant team, policy needs and recommendations to be considered are identified below:

- Encourage transit-oriented development, where appropriate
- Encourage mixed-use development, where appropriate
- Create "complete streets" to enable safe access for all users so pedestrians, bicyclists, motorists, and public transit riders of all ages and abilities are able to safely move along and across a street
- Continue to consider the impacts of new development on existing transportation infrastructure
- Focus development in areas with adequate infrastructure including water, sewer, schools, and other public facilities
- Continue to examine the impact of development on traffic countywide

- Maximize the availability of transportation options by providing sidewalk, bike lanes and expanded public transit to areas that would safely support these modes
- Ensure all available transportation options and future system expansions are ADA (Americans with Disability Act) compliant
- Support the preservation of agriculture and open space through such measures as the purchase of land or easements
- Develop a comprehensive vision when planning, re-developing, or improving major thoroughfares
- Establish a development threshold consistent with the willingness and ability to provide the infrastructure and services needed to support this development
- Ensure cooperative planning is established and maintained between city, county, and developers so that the timing of development and placement of infrastructure are properly coordinated
- Protect right of way along growth corridors and require developers to off-set their improvements off of the protected roadway corridor
- Examine opportunities to improve the balance of jobs and housing to reduce commutes and enable people to live, work and recreate in the same area
- Continue to provide a variety of housing types and affordability, including areas that are served or could be served by public transit
- Encourage higher densities at major activity centers to support a mix of uses that are served by adequate multimodal transportation facilities
- Require developers to provide direct pedestrian, bicycle and vehicle access from surrounding neighborhoods to public transit stops, schools, parks, shopping centers, and other public infrastructure
- Create mixed-use centers dense enough to encourage walking, biking and access to public transit
- Use Context Sensitive Design on roadway capacity improvements to protect the rural character and natural amenities
- Develop access management policies along major roads to limit turning movements, improve safety, and reduce congestion
- Consider traffic calming measures in residential neighborhoods
- Encourage schools to complete and submit Safe Routes to Schools applications to improve pedestrian systems around schools
- Require the design and incorporation of turning lanes in and out of business and residential developments
- Support the creation and coordination of bus turn out lanes along major roadways

9. Multimodal Improvement Cost Estimates

There are numerous short, medium, and long-range needs in the study area. As noted, the Advisory Committee and the general public provided detailed information on how the multimodal transportation system could be improved in Irmo/Dutch Fork area. After review and analysis, multimodal improvements were identified for roadways, intersections, bicycle facilities, pedestrian facilities and public transportation services. The planning level cost estimates (PLCE) for all multimodal transportation capital improvements in the study area total $100 million and are categorized as follows:

- $87.5 million in roadway improvements;
  - $36.8 million are identified as short-range;
  - $26.1 million are identified as medium-range;
  - $24.6 million are identified as long range;
- $3.2 million in intersection improvements (short-range);
- $2.4 million in bicycle facility improvements (short range);
- $1.6 million in pedestrian facility improvements (short-range);
- $5.4 million in other pedestrian facilities and off-road multi-use pathways (medium range).

In addition, annual expenditures for increased service of transit operations are shown below. Short term costs implement the service along the entire Newberry-to-Columbia corridor with multiple stop locations along the route. Costs for the long term recommendations vary based on the implementation of phases which increase the service for a specific direct route.

- $0.2 million annually in short term transit service improvements;
- $0.5 to 1.2 million annually in long term service improvements on direct routes;
  - $129,000 to $220,000 annually for Route NW2 (Saint Andrews Direct);
  - $134,000 to $265,000 annually for Route NW3 (Irmo Direct);
  - $182,000 to $320,000 annually for Route NW4 (Chapin Direct).

Results are categorized by timeframes which equate to: Short term is up to 2011, Medium term is 2011 to 2020, and Long term is 2021 to 2035. In total, costs appear as follows according to potential improvement timelines (minus annually operational costs for transit service):

- Short term $44.2 Million
- Medium term $31.5 Million
- Long term $24.6 Million

Of the roadway projects presented earlier, the PLCE was determined for each project. The costs are shown by roadway project in **Table 17**.

Table 17: PLCE for Potential Roadway Improvements

Timeframe	Roadway Project	Improvement	Ref #	PLCE
Short	Lake Murray Blvd from St. Andrews Road to I-26	Access Management	1	$1,050,000
Short	Harbison Blvd From St. Andrews Road to I-26	Access Management	2	$1,620,000
Short	Piney Grove from I-26 to Piney Woods Rd	Access Management	3	$880,000
Short	North Lake Drive/Dreher Shoals Road (SC 6) from SC 60 to US 76	Access Management	4	$2,240,000
Short	Bush River Road from SC 60 to Saint Andrews Road	Access Management	5	$1,790,000
Short	Broad River Road (US 76) from Royal Tower Rd to Dreher Shoals Rd (SC 6)	Widening	7	$29,200,000
Medium	Broad River Road (US 176) from Dutch Fork Rd (US 76) to Shady Grove Rd	Widening	8	$13,850,000
Medium	Kennerly Road from Broad River Road to Hollingshed Road	Widening	9	$12,260,000
Long	I-26 from Broad River Road to Koon Road	Widening	10	$9,750,000
Long	New I-26 Interchange At Koon Road	New Facility	6	$14,880,000

Source: Wilbur Smith Associates

APPENDIX A

Irmo/Dutch Fork Online Survey Form

CENTRAL MIDLANDS Council of Governments

CMCOG Irmo/Dutch Fork Sub-Area Plan

1. CMCOG Transportation Study

The Central Midlands Council of Governments (CMCOG) is conducting a transportation study of the Irmo and Dutch Fork area. The Irmo/Dutch Fork Sub-Area Plan is a multimodal transportation study, which means it will examine existing roadway, pedestrian, bicycle, and transit facilities as well as future needs in the area. The study area includes portions of Lexington and Richland counties and contains the town of Irmo and the communities of Ballentine and White Rock, as well as portions of the city of Columbia.

To create a plan that reflects the needs of our region; we need to know what you think. Your response to this survey will help us determine what goals and objectives are important to residents of our community, and how they should be reflected in the region's plan. Your efforts here will help shape the planning process for the region. Please take a few minutes to take this survey, and remember, your opinion counts!

1. Please answer the following:

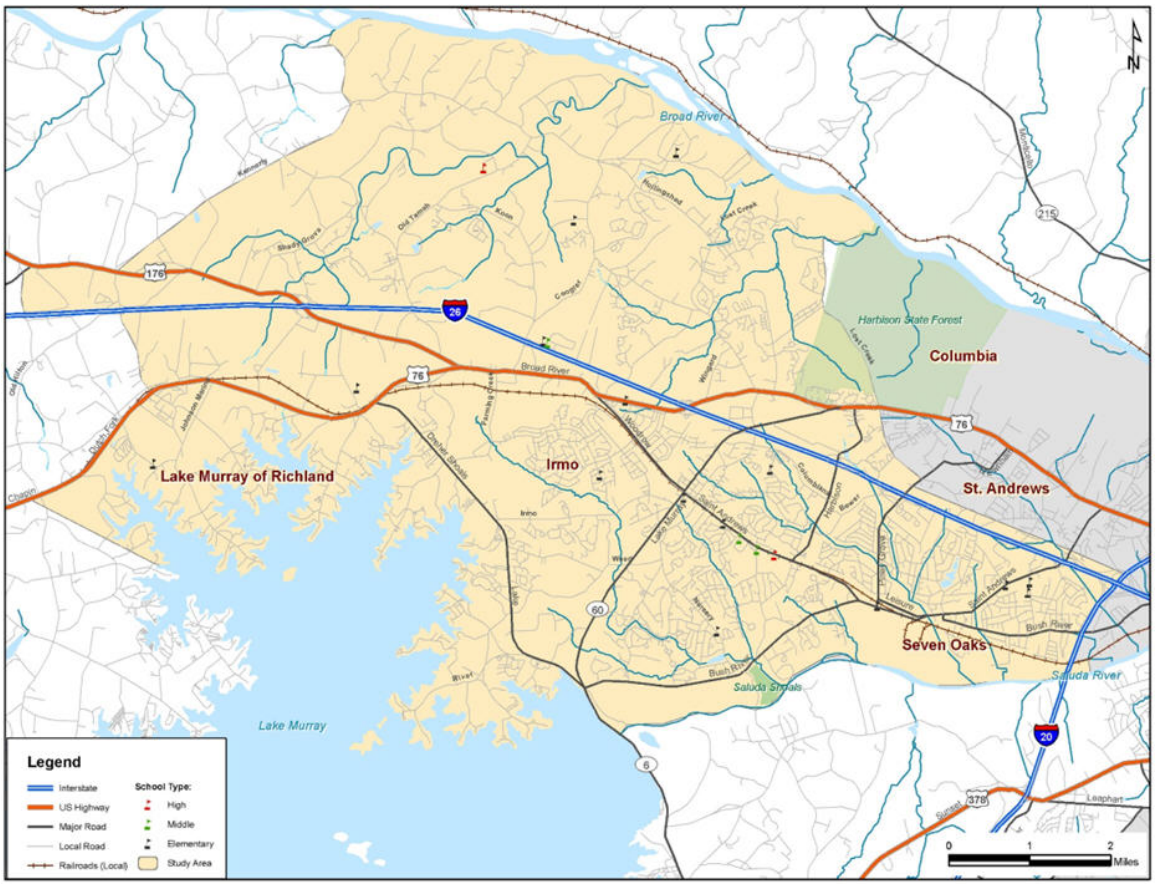
	Male	Female
Your Gender?	☐	☐

2. Your Age?

☐

3. Please answer the following questions:
(See study area map below)

	Yes	No
Do you live in the study area?	☐	☐
Do you work in the study area?	☐	☐
Do you visit the study area regularly for shopping, school, recreation, or other purposes?	☐	☐



4. Do you have access to sidewalks, bike paths, or transit?

	Yes		No	
Sidewalks	☐		☐	
Bike paths	☐		☐	
Transit	☐		☐	

5. What do you use most often?

- ☐ Automobile/Motorcycle
- ☐ Bicycle
- ☐ Bus/Public Transportation
- ☐ Walk
- ☐ Other

Other (please specify)_____

6. How would you rate the current conditions of the transportation system in the Irmo / Dutch Fork area?

Please rate on a scale of 1 to 5 with 1 being "Acceptable/Very Good" and 5 being "Unacceptable/Very Poor?"

	1 Acceptable / Very Good	2	3	4	5 Unacceptable / Very Poor
Congestion levels on major streets during rush hour (morning and evening)	☐	☐	☐	☐	☐
Pavement condition of major streets	☐	☐	☐	☐	☐
Availability of bike lanes and paths	☐	☐	☐	☐	☐
Availability of public transit services	☐	☐	☐	☐	☐
Sidewalks and crosswalk areas	☐	☐	☐	☐	☐
Safety / controls on major streets & railroad crossings	☐	☐	☐	☐	☐
Neighborhood traffic safety	☐	☐	☐	☐	☐
Ability to use another mode of transportation (other than auto) from your home to work	☐	☐	☐	☐	☐

7. What are the most critical transportation issues in the Irmo / Dutch Fork area today? (Check two)

☐ What are the most critical transportation issues in the Irmo / Dutch Fork area today? (Check two) Lack of road network (need to expand or construct new roads)

☐ Limited interstate facilities

☐ Lack of sidewalks/crosswalks

☐ Lack of transit services

☐ Lack of bike lanes and paths

☐ Zoning/land use and transportation coordination

☐ Safety issues (i.e. speeding, driver behavior, lack of turn lanes, etc.)

☐ Traffic congestion

☐ Other:

Other (please specify)

8. What should decision makers and elected officials focus on when planning for this area's future?

Please rank each of the following using a scale of 1 to 5, where 1 means "Very Important" and 5 means "Little Importance."

	1 Very Important	2	3	4	5 Little Importance
Planning for widening of congested roadways	☐	☐	☐	☐	☐
Planning for safety and traffic flow improvements at intersections	☐	☐	☐	☐	☐
Planning for the ongoing roadway maintenance and preservation	☐	☐	☐	☐	☐
Planning for new interchanges and roads to respond to future growth	☐	☐	☐	☐	☐
Planning for more bicycle paths and multi-use paths	☐	☐	☐	☐	☐
Improving bicyclist and pedestrian safety	☐	☐	☐	☐	☐
Improving transit services	☐	☐	☐	☐	☐

9. Please give us your opinion on the following:

	1 Very Important	2 Important	3 Somewhat Important	4 Not Important
How would you rank the importance of transportation among overall community needs?	☐	☐	☐	☐

10. What do you think is the most effective way to reduce transportation congestion in the region in the future? (Check two)

- ☐ I do not think congestion is an issue in this area
- ☐ Grade separation at intersections with railroads
- ☐ Expanding the highway system
- ☐ Use of dedicated HOV lanes (high occupancy vehicles)
- ☐ Improving coordination of zoning/land use and transportation planning
- ☐ Improving highway operations (i.e. coordinate traffic signals, adding turn lanes, intersection functionality, access controls, etc.)
- ☐ Improving transit operations
- ☐ Maintaining existing system (i.e. repair roads, bridges, transit services, etc.)
- ☐ Expanding biking and walking facilities

☐ Other

Other (please specify)

11. If you were in charge of funding for transportation improvements, how would you spend it?

Please divide percentages up among the following items, so that it reflects the relative importance of each improvement to you.

You can allocate all the funds (100%) to one item or spread it around.

Sidewalk Needs

Bike Lane Needs

Highway Needs

Transit Service

12. If park and ride lots were provided in your area, would you use them for the following:

	Yes	No
Car/van pooling to work	☐	☐
Public transit (traditional bus with multiple stops along a fixed route and continual service all day long) to work or shopping	☐	☐
SmartRide service (express bus route with limited stops that usually services work commuters in outlying areas to downtown during morning and evening rush hours)	☐	☐

13. Please Provide General Comments Below:

Thank you for your time. For questions or more information, please contact:

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