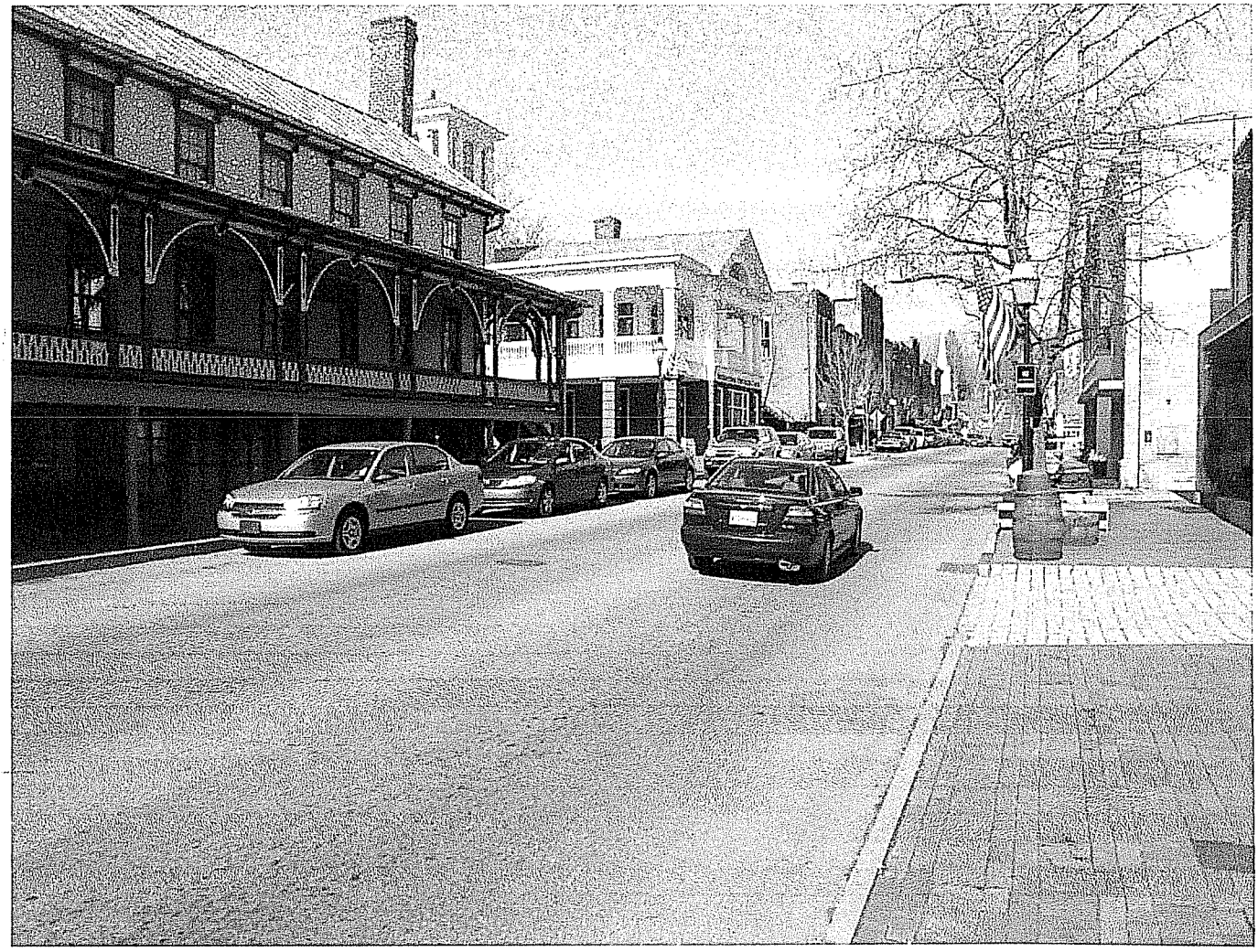


THE TOWN OF JONESBOROUGH ECONOMIC DEVELOPMENT AND TRANSPORTATION STUDY

FINAL REPORT

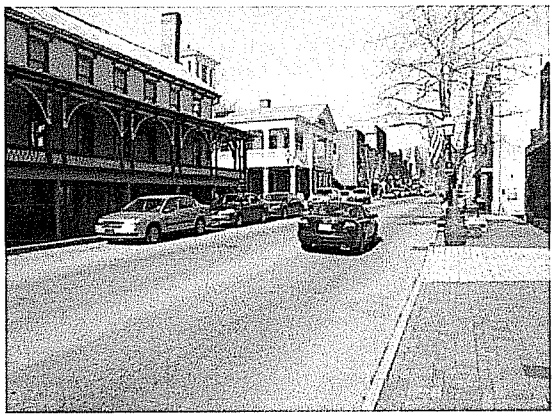
JUNE, 2008

DRAFT

Town of Jonesborough
Transportation and Economic Development
Strategies for Smart Growth

Every community has a story. The history and heritage that has shaped the Town of Jonesborough dates back to the early 1700's when trappers, hunters and a few brave settlers located in the western most region of North Carolina. The first permanent settlements in Washington and Sullivan County were established in the mid 1700's as people began to migrate to what is now East Tennessee along the Great Valley Road from the north or an early "highway" that led to the Jonesborough area from New Bern, North Carolina. Those early roadways connected many east Tennessee settlements to the Town of Jonesborough, and today many of those historic corridors still link neighborhoods and larger cities through the Town of Jonesborough.

Jonesborough is Tennessee's oldest incorporated town and the County Seat of Washington County. Jonesborough's outstanding historic preservation efforts have made the Town one of the most authentic historic districts in the nation. Jonesborough is also home to the International Storytelling Center that features numerous special storytelling events and festivals. This annual occasion, which takes place within the heart of the downtown historic district, welcomes tourists and generates significant economic benefits for the community and the region. The Town of Jonesborough, Washington County and its neighboring Tri-Cities of Bristol, Johnson City and Kingsport, Tennessee all lie in the heart of the southern Appalachian Mountains. The natural beauty of the architectural and cultural surroundings in upper East Tennessee makes this area a beautiful place to live, work and visit.



Given the continuing growth in western Washington County and within Jonesborough, the location of the region's major employment center to the east of town, existing roadways that bring truck traffic through the historic downtown, and the importance of accessibility to the tourism economy, the transportation network

serving the Town of Jonesborough today may actually serve as a barrier to certain key elements of the town's future economic development. The Town of Jonesborough is keenly aware of the increasing traffic congestion along 11-E and is concerned about the impact of this traffic on existing businesses along this route, on tourists desiring to access the historic areas of town, and on commuters.

Goal #1

The Town leadership wants to foster appropriate new development while preserving the small town historic character of this unique community. This study was launched to find solutions that could help reduce congestion and conflicts among the various modes of transportation and improve safety for all. The study will help identify strategies for enhancing transportation and economic development while continuing to preserve Jonesborough's historic and cultural character. The study consisted of five major components:

- Initial community reconnaissance
- Transportation and existing corridor analysis
- Identification of economic opportunities
- Future transportation alternatives
- Economic and community development Strategies

Through the assistance of the Tennessee Department of Transportation, the Town of Jonesborough engaged Wilbur Smith Associates to identify transportation alternatives and economic development opportunities that could:

- Help to improve the flow of traffic
- Enhance existing businesses along U.S. 11-E
- Support new residential, business, and retail developments
- Preserve and foster the small town character and historic village attributes of the town

Community Overview:

Jonesborough is blessed with a unique history and heritage that is reflected in the built environment principally found in the historic downtown area and historic buildings throughout the community and further reflected in the community's character and values. In the "Community Vision Plan" developed in 1997 the town established their vision for the future, to be "A town that found a way to balance small-town values with the need to allow families and businesses to grow and prosper".

The Town of Jonesborough is characterized by predominately rural areas to the west, Johnson City to the east, the Cherokee National Forest to the south, and primarily residential development and agricultural land to the north. According to Woods & Poole Economics a nationally recognized demographic data analysis firm, the population of Washington County will reach 115,860 in 2008 a 10.8% increase in population growth since the 2000 census. By 2030 the county population is projected to exceed 137,800 (Woods & Poole). Between 2000 and 2007, there were 455 residential building permits issued in the Town of Jonesborough (SOCDS Building Permits Database), 380 for single family structures and 75 multi-family units. With an average household size of 2.26 in Jonesborough according to the 2000 US census and a homeowner vacancy rate of 1.2%, this new residential development has generated an estimated increase of 1008 new residents in Jonesborough. This represents a 24% increase in population between 2000 and 2007 bringing Jonesborough's estimated 2007 population to 5,176.

According to The Economic Growth Strategy developed by the Center for Business and Economic Research at the University of Tennessee the seven county region of upper East Tennessee (Carter, Greene, Hamblen, Johnson, Sullivan, Unicoi, and Washington Counties) experienced 12% growth in population from 1990 to 2003. Employment in this region grew by 10.8% between 1993 – 2003 with the highest average wages found in information and manufacturing. Within this region 16.5% of the population above the age of 25 held a Bachelor's degree or higher compared to 18.7% in Jonesborough. Statewide nearly 20% of the population has at least a bachelor's degree or higher. This statistic is important to a community because it is often used by companies as an indicator of the workforce skill base in a region.

In 2002 there were 2,398 business firms in Washington County with approximately 52,000 employees. The county's economy is primarily concentrated in the service sector which represents 40% of all jobs in the county. Between 1997 and 2002 the most significant annual rate of new job creation occurred in the finance, insurance,

and real estate (FIRE) sectors with 1,866 new jobs created, a 58% increase over five years followed by a 10.2% increase in employment in the services sector generating 3,793 new jobs. The most significant job losses occurred in the retail trade sector with a decrease of 5,025 jobs, followed by the loss of 2,215 jobs in the manufacturing sector.

Globalization and new technologies are redefining business priorities, challenging transportation networks, and creating new economic challenges and opportunities in places never before imagined. As the global economy changes, the needs of businesses in the Jonesborough region are being transformed. The dramatic growth of international trade has placed new competitive pressures on existing businesses in the region and created a range of new challenges and opportunities for emerging businesses sectors that may consider locating in the region in the future. To compete in this changing world economy it is important for Jonesborough to clearly understand the community's assets and the competitive advantages that they offer and work in partnership with the regional business community to help create the most competitive business environment possible.

According to the 2000 US Census data, residents of Jonesborough travel an average of 25 minutes to work (one way) each day. The primary employment centers for the region are located east of town in Johnson City, although the addition of Koyo Corporation and Nakatetsu Machining in the Washington County Industrial Park located west of town will provide additional job opportunities for the town. More and more businesses are making location decisions based upon where their employees or potential employees want to live. Many small towns today are employing a variety of asset-building techniques to create the quality environments that will attract specific targeted populations; retirees, young professionals with children, or artists. These techniques include development of a range of housing options including infill development that allows for walkable access to dynamic downtown areas; revitalization of commercial corridors focused on creating more convenience and choice for residents; and development of special magnet schools that meet the educational expectations of these targeted populations.

Current economic conditions are likely to focus more interest in the proximity of jobs, homes, shopping, and recreation, creating opportunities for people to live, work, and play without having to drive great distances to do so. While many of the larger employers are outside of Jonesborough there are opportunities to create additional employment centers within the region and to build upon the unique characteristics of Jonesborough to foster additional entrepreneurial business opportunities.

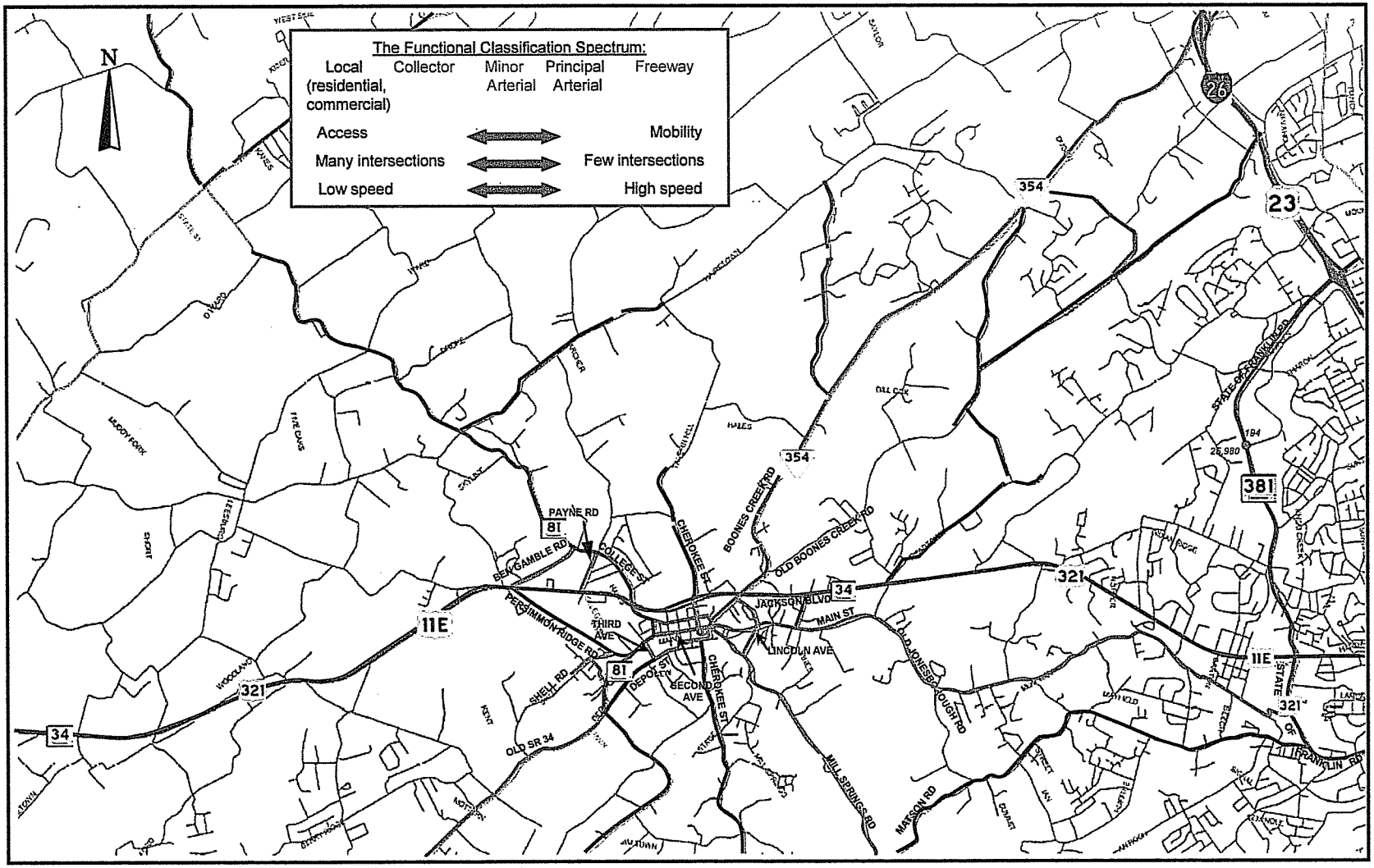
Transportation and Existing Corridor Analysis:

In order to fully understand Jonesborough's transportation needs, an assessment of the town's existing traffic conditions was performed within the town's urban growth boundary. This evaluation helped to identify deficient roadway conditions and traffic operations that would eventually reduce safety and increase congestion on major roadways in the town. As a part of this study, a more detailed traffic analysis was conducted for US 11E, SR 81, and the intersection of Main Street and Boone Street in order to develop specific recommendations for these locations.

Road Functional Classification System

Jonesborough's roadways are designated by TDOT as principle arterials, minor arterials, collectors, and local access streets depending upon the street's function in the roadway network. Principal or major arterials within the study area include US 11E, SR 81 and minor arterials include SR 354 (Boones Creek Road), Main Street, Ben Gamble Road, Shell Road, Mill Springs Road, and Old SR 34. Collector streets include Cherokee Street, Old Boones Creek Road, Persimmon Ridge Road, Headtown Road, Matson Road and Hairetown Road. These roadways are identified in Figure 1.

ROAD FUNCTIONAL CLASSIFICATION



LEGEND

- INTERSTATE
- PRINCIPAL ARTERIAL
- MINOR ARTERIAL
- COLLECTOR

Figure 1

It is evident from Figure 1 that many of Washington County's roads radiate from a core hub, the Town of Jonesborough. On the north side of Jonesborough SR 81 and SR 354 are key roadways serving the area. Part of their importance is tied to the fact that both roads interchange with the US interstate system. SR 81 interchanges with I-81 and SR 354 with I-26. On the south side of Jonesborough more roads provide a pathway into the city including Old SR 34, SR 81, and non-state routes like Cherokee Street, Mill Springs Road and Main Street/Old Jonesborough Highway. By far the most significant regional roadway link in Jonesborough is US 11E.

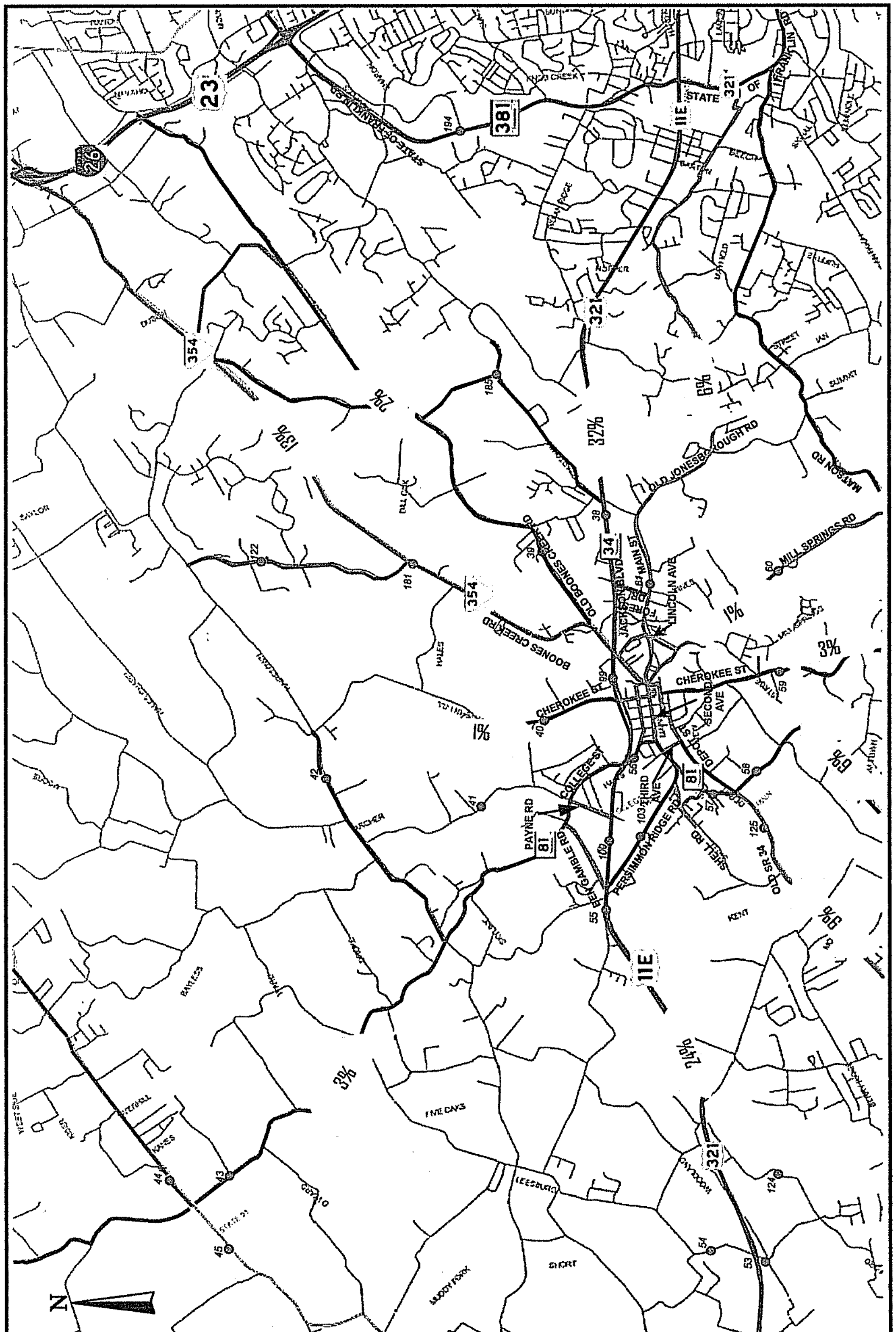
Jonesborough Portal Traffic Distribution

Figure 2 depicts the distribution of traffic at the principal Jonesborough portals. Fifty-six percent of all Jonesborough traffic enters and departs the area via US 11E with 24 percent of that oriented to the west towards Greeneville and 32 percent oriented to the east towards Johnson City. Following US 11E, the next most popular gateway into and out of Jonesborough is SR 354, Boones Creek Road at 13 percent. In terms of general orientation, the approximate percent of traffic arriving and departing Jonesborough from the four major compass directions are as follows:

- North- 19 percent;
- East- 38 percent;
- South- 19 percent; and
- West- 24 percent.

The east is served by US 11E and Old Jonesborough Highway, which is a viable alternative to access Johnson City's populated State of Franklin Road area. Boones Creek Road was treated as a north route even though it takes a northeast alignment towards I-26.

JONESBOROUGH PORTAL TRAFFIC DISTRIBUTION



LEGEND

XX% TRAFFIC DISTRIBUTION BASED ON 2005 ADT

INTERSTATE
PRINCIPAL ARTERIAL
MINOR ARTERIAL
COLLECTOR

Figure 2

2005 Daily Traffic

Daily traffic volumes provide an excellent means of evaluating a road system in broad overall terms. Transportation planners often compare planning-level daily roadway link capacities with traffic volumes to determine a general Level of Service (LOS). The groundwork for this analysis is to examine existing daily traffic, which is presented in Figure 3 for Jonesborough and its surrounding area. In the heart of Jonesborough, US 11 E accommodates over 30,000 Vehicles per Day (VPD). Outside the Jonesborough city limits, US 11E accommodates over 23,000 VPD on the east side and over 17,000 on the west side.

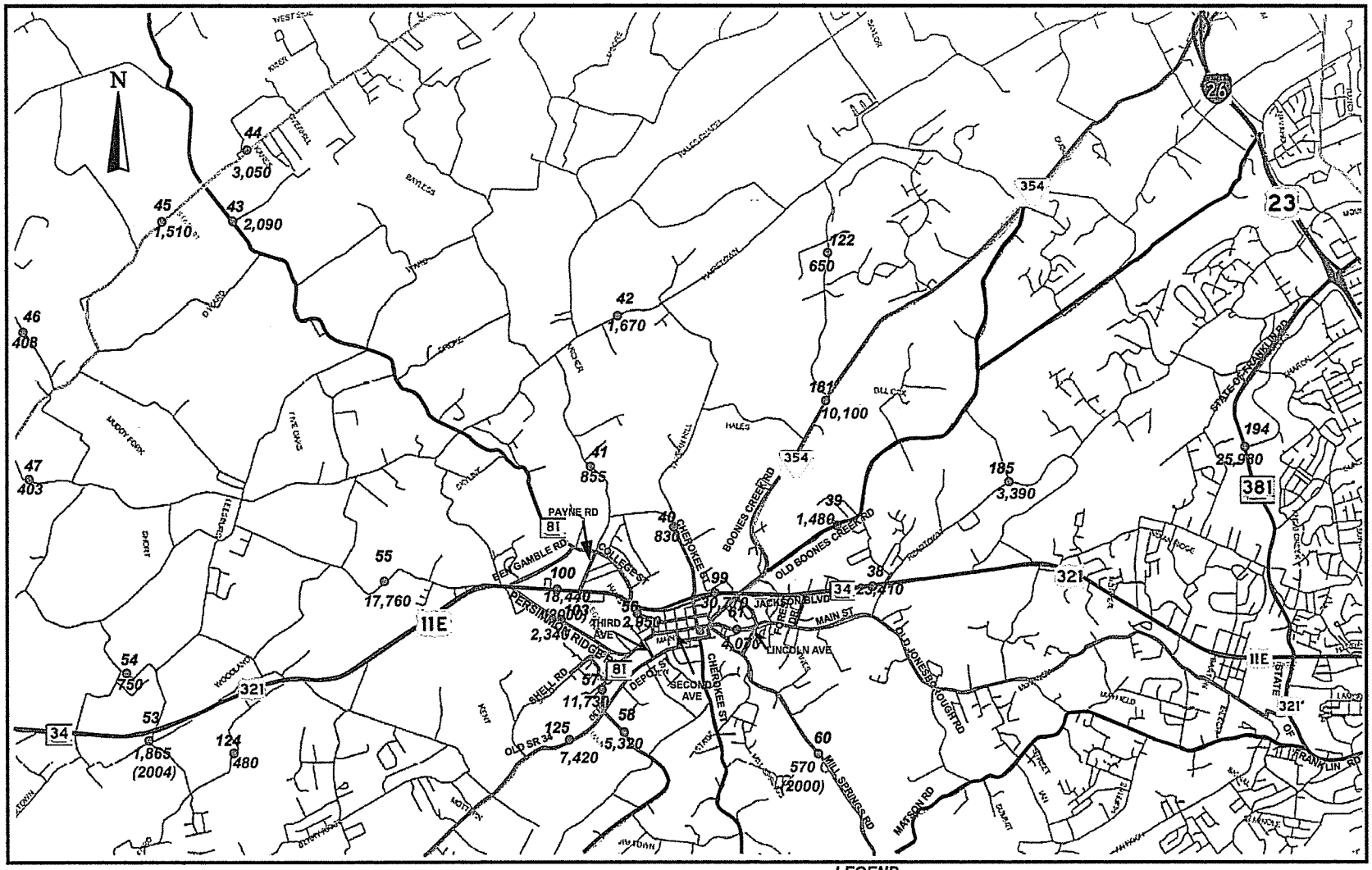
TDOT Station 43 on SR 81 northwest of Jonesborough had a reported Average Daily Traffic (ADT) volume of 2,090, which suggest that this is not the preferred route to Jonesborough for motorists arriving from the west.

Roadway Link Level of Service Thresholds

It is common to evaluate roads by comparing their daily traffic volumes with their daily traffic capacity. This type of analysis will provide a general indication of deficiencies from the standpoint of the entire corridor. In most cases, deficiencies identified with these broad order-of-magnitude analyses continue to hold true when additional detailed analyses is undertaken.

Table 1 presents daily traffic LOS thresholds for various road classifications with the highlighted roadways being those classifications found in Jonesborough. LOS A through D is normally considered to be acceptable whereas LOS E is usually unacceptable. LOS F is the upper limit of capacity and usually denotes over-capacity conditions and delays. Again, note that these are planning values, and that peak hour analyses may be required to better identify specific deficiencies. On a 4 lane divided principal arterial like US 11E the upper limit of LOS E is 45,020; consequently daily traffic exceeding 45,020 would be considered as LOS F conditions.

2005 DAILY TRAFFIC



LEGEND

● *75 TDOT Station Number*

23,410 Daily

Figure 3

TABLE 1.
LEVEL OF SERVICE THRESHOLD BY FUNCTIONAL CLASSISFICAITON

FUNCTIONAL CLASSIFICATION	LANES	LEVEL OF SERVICE- UPPER LIMIT				
		A	B	C	D	E
Freeway	4	28,710	43,360	58,600	67,390	78,520
Expressway	4	20,580	31,080	42,000	48,300	56,280
Principal Arterial- Divided	4	16,460	24,860	33,600	38,640	45,020
Principal Arterial- Undivided	2	7,150	10,800	14,600	16,790	19,560
Principal Arterial- Undivided	5	16,460	24,860	33,600	38,640	45,020
Minor Arterial- Divided	4	12,150	18,350	24,800	28,520	33,230
Minor Arterial- Undivided	2	5,290	7,990	10,800	12,420	14,470
Minor Arterial- Undivided	5	12,150	18,350	24,800	28,520	33,230
Collector	2	4,800	7,250	9,800	11,270	13,130
Collector	4	8,400	12,700	17,200	19,800	23,000
Collector	5	9,600	14,500	19,600	22,500	26,300

Projected Traffic Growth

Historic traffic growth trends are often used to predict future traffic volumes. TDOT maintains good records on daily traffic in Washington County so this information was used to estimate Year 2015 and 2030 daily traffic on Jonesborough's major roads. A map in the Appendix depicts the average annual percent growth estimated based on historic growth trends. Based on their history, most roads are expected to grow annually at approximately 1-3 percent, which is average for most roads in Tennessee.

Johnson City has a regional Travel Demand Model (TDM) that uses projected future land use to predict future daily traffic on its road network. Much of Jonesborough and its Urban Growth Boundary fall within the limits of the Johnson City TDM, hence it too can be used to estimate future traffic. The advantage of the TDM is that it does not rely on historic traffic data, which may not always be a good indicator of future conditions. Instead, it relies on what planners consider to be their best estimate of how land will develop in terms of location and intensity.

The historic traffic growth method was used exclusively to estimate Year 2015 traffic volumes in Jonesborough but Year 2030 conditions were estimated using both the historic and TDM methodologies. Subsequent sections of this report describe the results of this ADT LOS analyses.

Roadway Levels of Service

Existing and projected future traffic volumes and number of traffic lanes were examined to estimate planning level levels of service on Jonesborough's classified streets. The results of this analysis are described in the following sections.

2005 Roadway Link LOS- There is isolated traffic problems in Jonesborough, but Figure 4 above suggests that most roads were operating at an acceptable LOS in 2005. A section of SR 81, south of downtown Jonesborough was operating at LOS D and some sections of US 11E and Boones Creek Road were operating at LOS C. Later in this report the reader will find a section discussing more detailed analyses of US 11E where the isolated problems are identified. The most congested intersection in Jonesborough is US 11E at Boones Creek Road.

2015 Roadway Link LOS- By Year 2015, traffic conditions on US 11E will worsen as evident by the projected LOS D conditions for the segments within the Jonesborough city limits. A closer review of this analysis reveals that US 11E will operate nearly at LOS E in 2015. A summary of the projected Year 2015 roadway link operating conditions are shown in Figure 5. Again the reader should be cautioned that actual peak hour conditions may be worse because this is a planning level analyses intended to identify major corridor deficiencies. SR 81 is the other facility that is expected to operate at a marginally acceptable LOS in 2015.

2030 Roadway Link LOS-

By Year 2030, most segments of US 11E in Jonesborough and a segment of SR 81, south of the downtown will operate at LOS F, using either the historic trend or Johnson City MTPO TDM methodology. Figure 6 presents the LOS analysis results using the historic trend methodology and Figure 7 presents them using the Johnson City TDM results. The TDM predicts worse results than the historic trend methodology because all of Boones Creek Road and most of Main Street/Old Jonesborough Road should operate at LOS D. Likewise; a segment of Cherokee Street is expected to operate at LOS D. According to the TDM, even the outer portions of SR 81, south of downtown Jonesborough should be deficient with a LOS E condition.

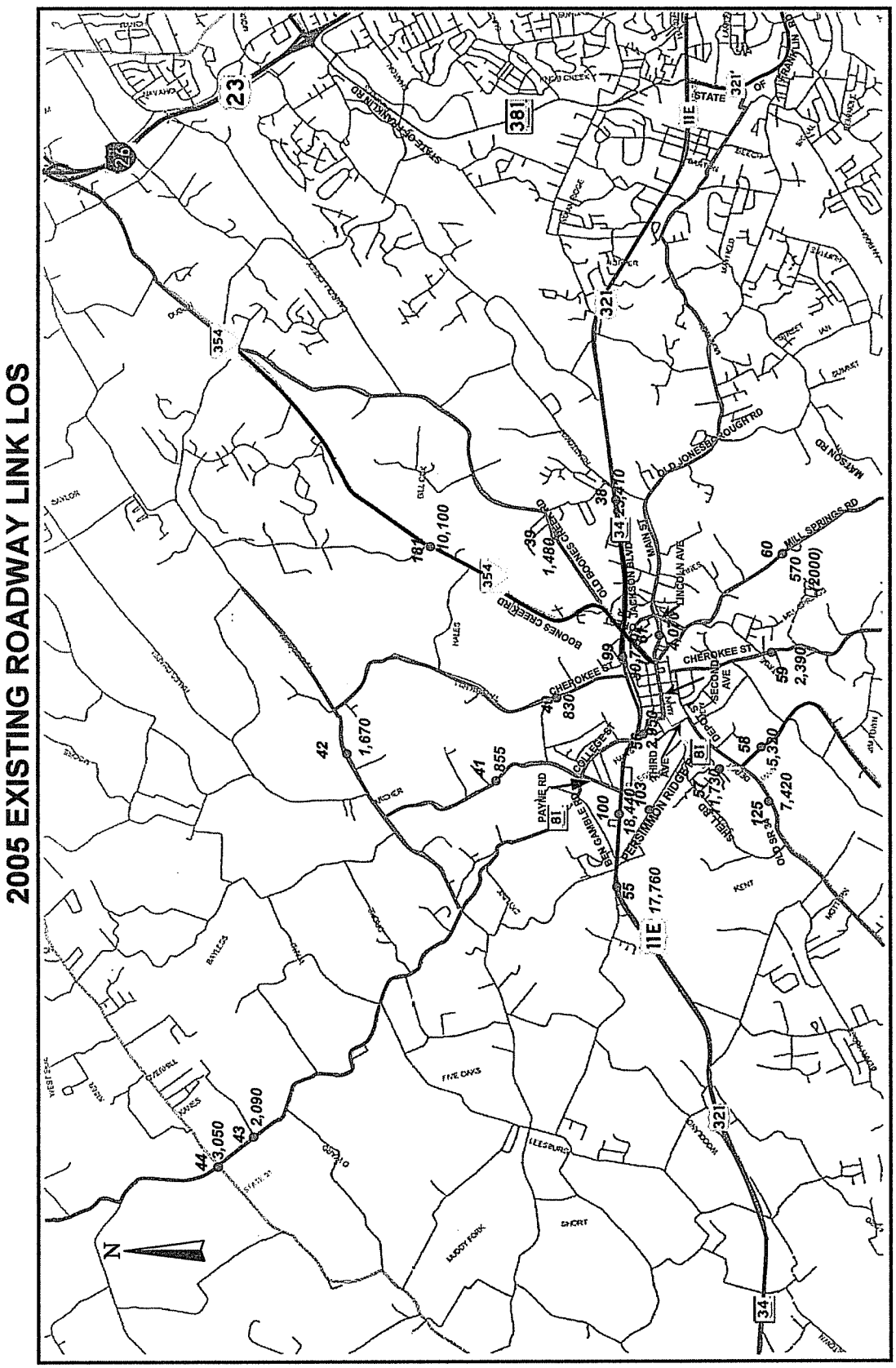
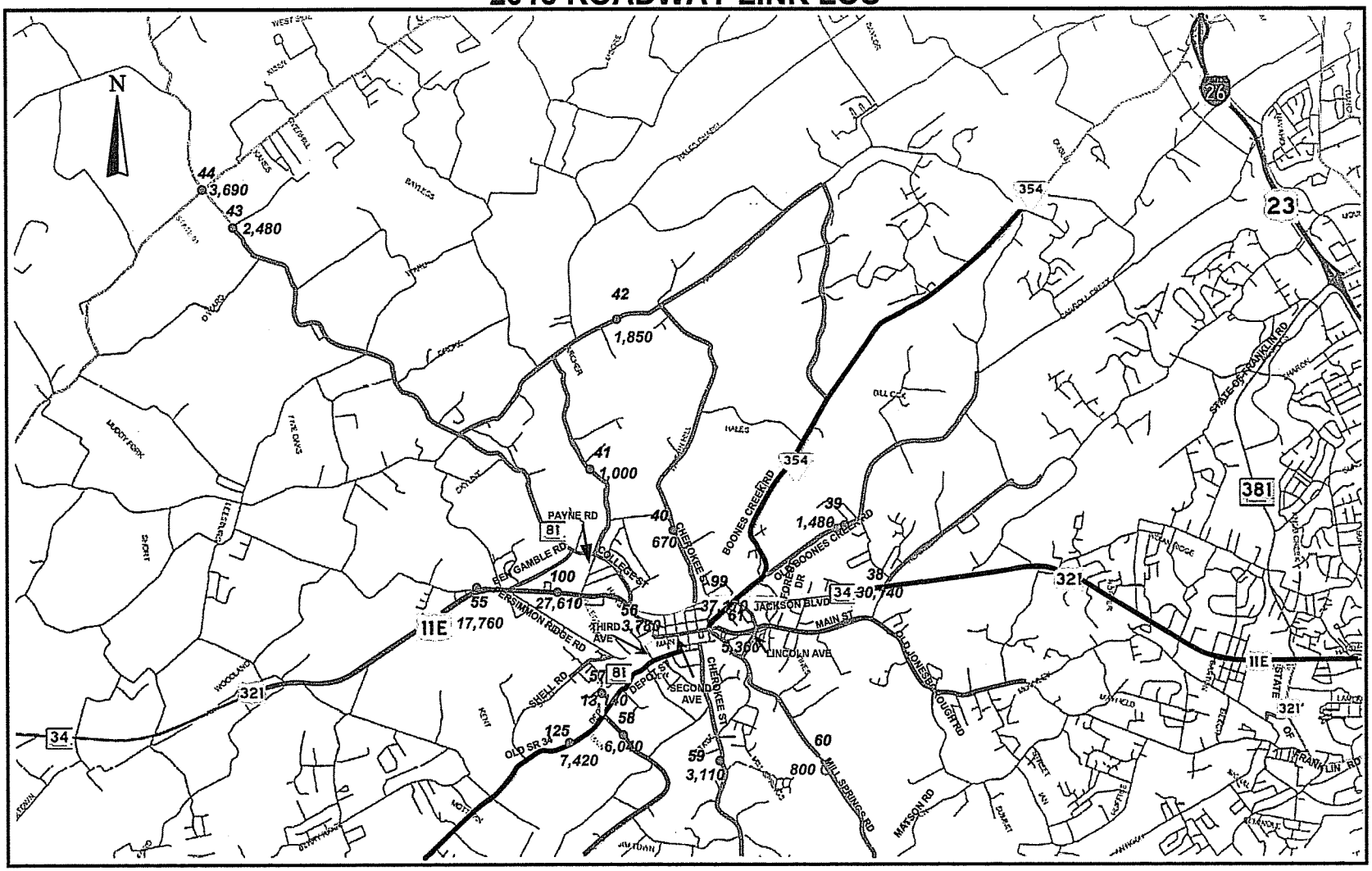

2005 EXISTING ROADWAY LINK LOS
LEGEND
A
B
C
D
E
F
@ 75 TDOT Station Number
23,410 Daily
N

Figure 4

2015 ROADWAY LINK LOS



LEGEND

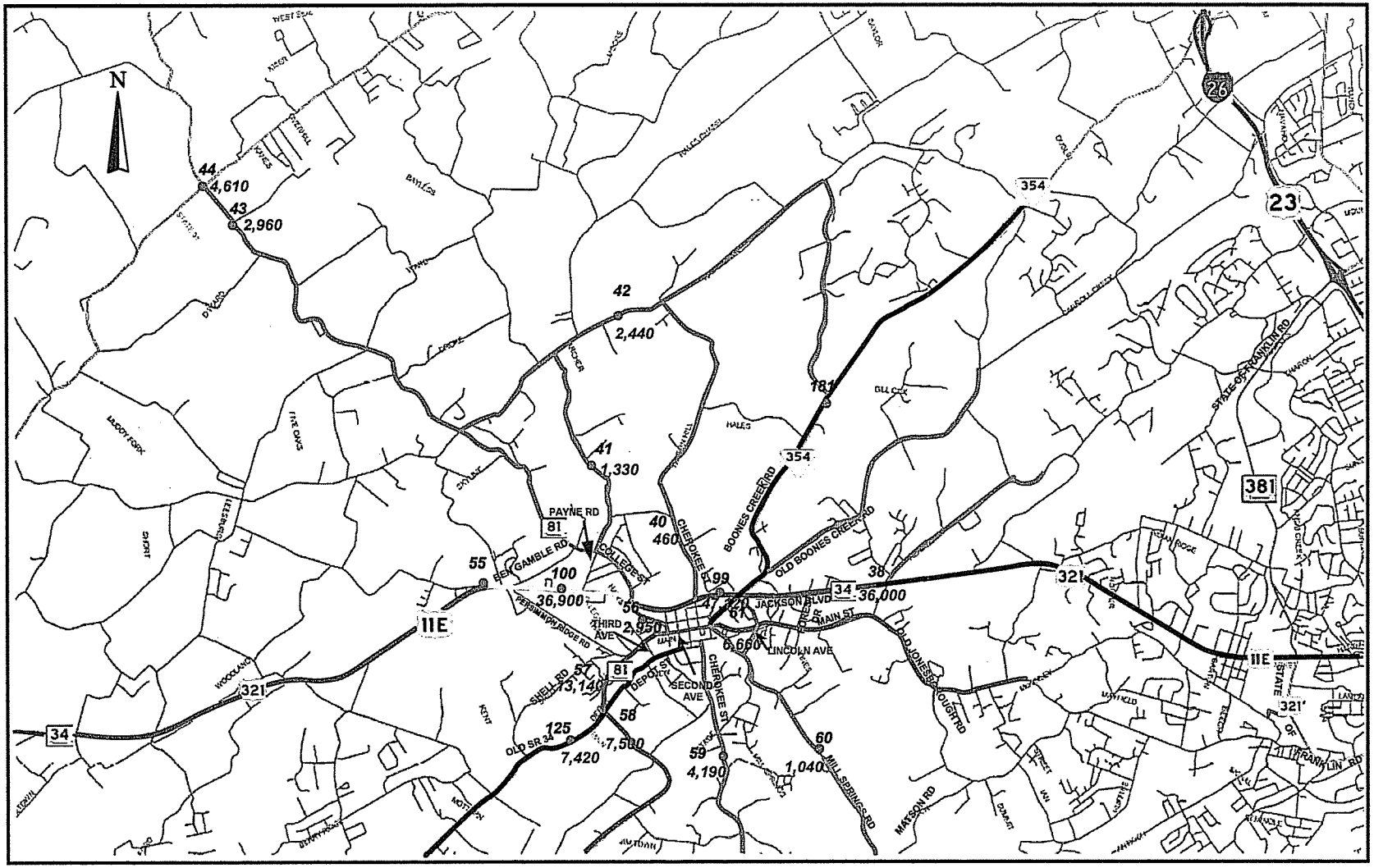
A — D
B — E
C — F

● 75 TDOT Station Number

23,410 Daily

Figure 5

2030 ROADWAY LINK LOS: HISTORIC TREND METHODOLOGY



LEGEND

A — D

B — E

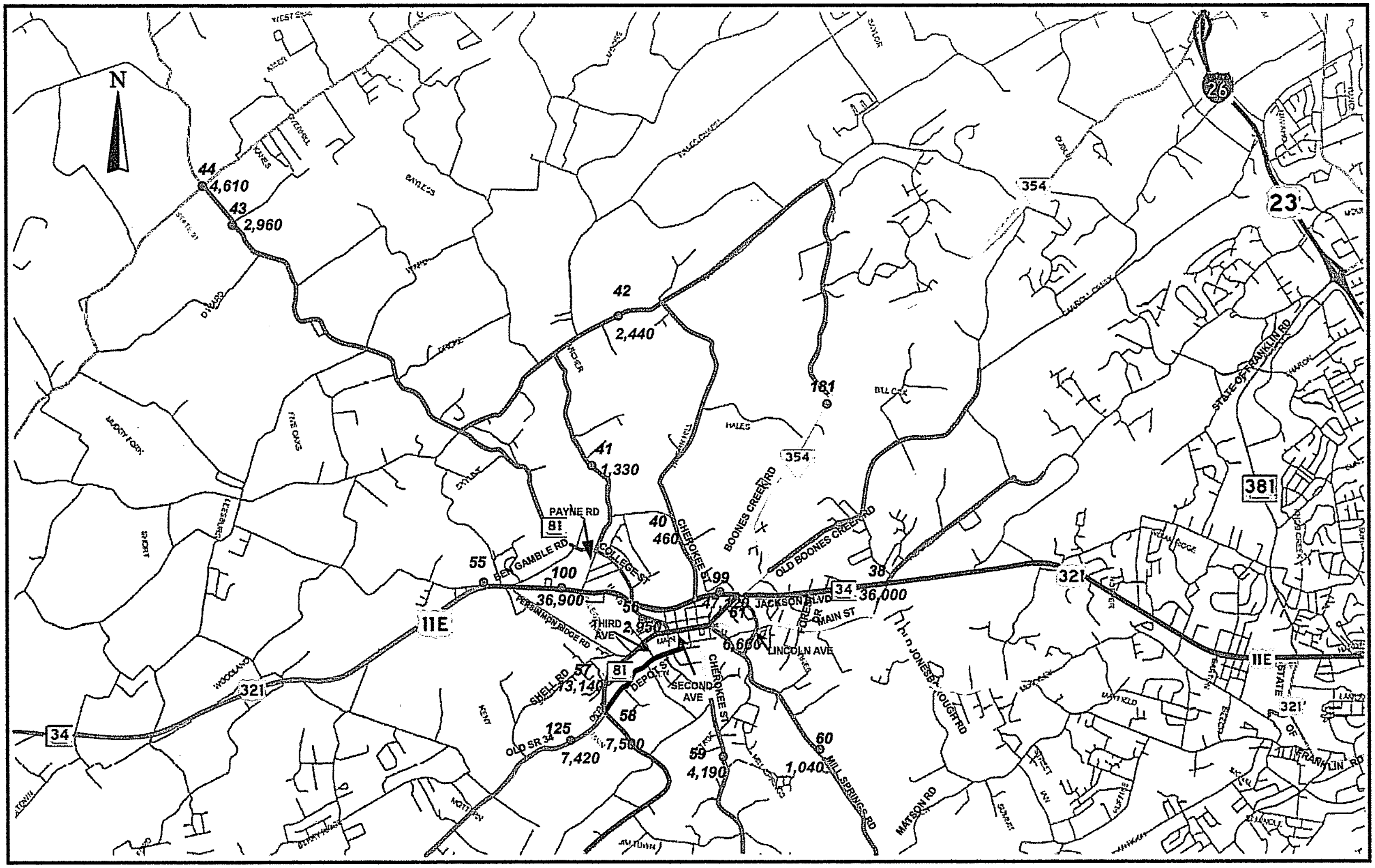
C — F

◎ 75 TDOT Station Number

23,410 Daily

Figure 6

2030 ROADWAY LINK LOS- JOHNSON CITY MPO LRTP



LEGEND

A
B
C
D
E
F

⊙ 75 TDOT Station Number

23,410 Daily

Figure 7

Small Area Traffic Analysis

As the study progressed, it became increasingly apparent that more emphasis needed to be placed on analysis and studies of US 11E, SR 81, and the intersection of Main Street and Boone Street in downtown Jonesborough. For this reason the WSA staff discussed these corridors and intersection with the Town of Jonesborough and identified a more comprehensive evaluation plan. The evaluation plan included intersection turning movement counts, crash data analysis, intersection LOS analysis, and traffic signal warrant analysis at the unsignalized intersections. The comprehensive "small area" analyses resulted in specific recommendations ranging from new traffic signals to adding turn lanes. In some cases, further investigation was recommended.

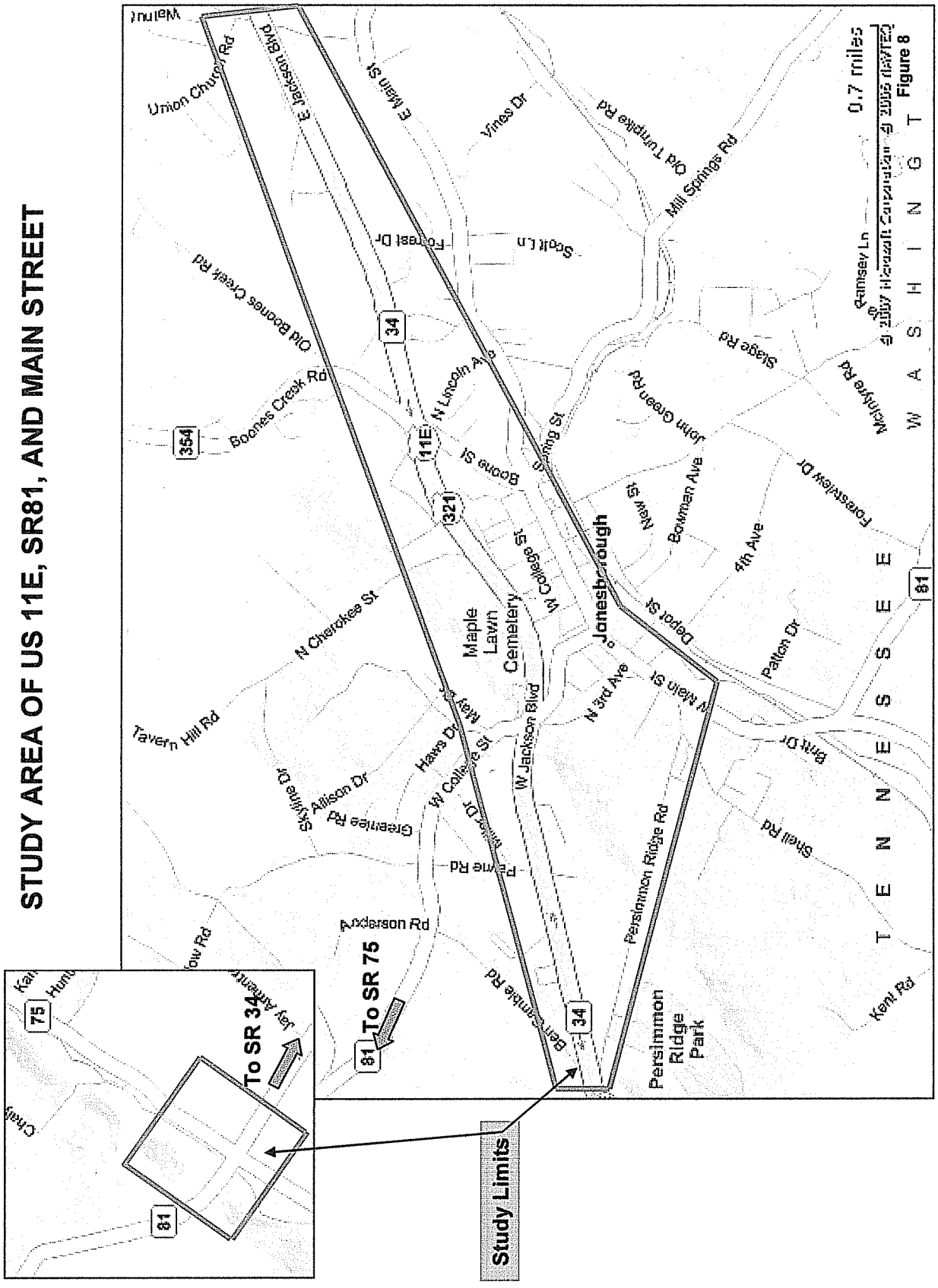
Study Area and Intersections

The small area analysis study area is defined in Figure 8. Listed below are the intersections that underwent the more detailed analyses:

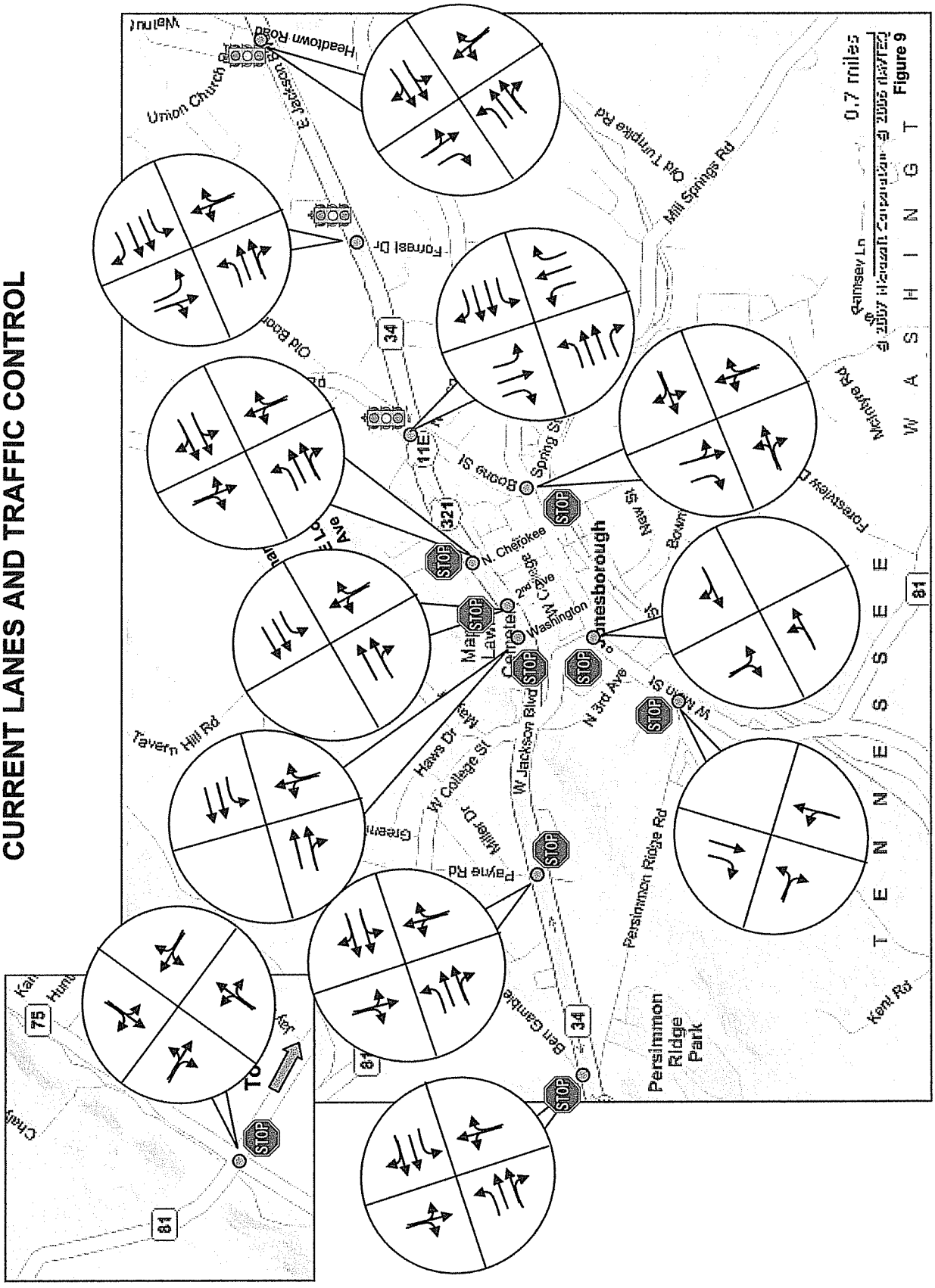
- US 11E at Persimmon Ridge Road/ Ben Gamble Road
- US 11E at Payne Road/Creasy Road
- US 11E at Washington Drive
- US 11E at 2nd Avenue
- US 11E at Cherokee Street
- US 11E at SR 354 (Boones Creek Road)
- US 11E at Forest Drive
- US 11E at Headtown Road
- SR 81 at Persimmon Ridge Road
- SR 81 at Main Street
- Main Street at Boone Street/Spring Street
- SR 81 at SR 75

Intersection Geometry and Traffic Control

The intersection traffic control devices and approach laneage are shown in Figure 9 Only 3 study area intersections are signalized including US 11E at Boones Creek Road, US 11E at Forest Drive, and US 11E at Headtown Road.


STUDY AREA OF US 11E, SR81, AND MAIN STREET
WASHINGTON
TENNESSEE
Jonesborough
Maple Lawn Cemetery
Persimmon Ridge Park
Union Church Rd
E Jackson Blvd
E Main St
Vines Dr
Old Turnpike Rd
Mill Springs Rd
Ramsey Ln
Scott Ln
Foxtail Dr
Old Boones Creek Rd
Boones Creek Rd
N Lincoln Ave
Boone St
S Boone St
John Green Rd
Slagle Rd
McIntyre Rd
New St
Bowman Ave
4th Ave
Forestview Dr
Depot St
W College St
N Cherokee St
Tavern Hill Rd
Hays Dr
W Jackson Blvd
N 3rd Ave
W Main St
Patton Dr
Barn Dr
Shell Rd
Kent Rd
Persimmon Ridge Rd
Greenlee Rd
Skyline Dr
Allison Dr
Anderson Rd
Petrie Rd
Bean Hollow Rd
To SR 75
To SR 34
Study Limits
0.7 miles
Figure 8

CURRENT LANES AND TRAFFIC CONTROL



Crash Data

From TDOT, intersection crash data were obtained for the most recent 3 year period from 2004 through 2006. That data were provided in a summary format that included location, date, time, total vehicles involved, type of crash, number of vehicles involved, and severity. Crash type was provided (e.g. rear end, side swipe, and right angle) but crash diagrams were not, so it was not possible to determine exact patterns. For instance, it is useful to know that a substantial number of crashes were rear end, but it would have been more useful to know on which approach the rear end crashes occurred. Nevertheless, the data did provide extremely useful information to help draw conclusions and to formulate recommendations.

Figure 10 illustrates total number of crashes and severity (property damage and injury) in the 3 year period spanning 2004 through 2006. Figure 11 shows crash rate data for the study area intersections. Three values are provided in Figure 10: the actual crash rate of the intersection, the average crash rate of similar intersections in Tennessee, and the critical crash rate of the intersection. The critical crash rate is calculated from an empirical formula, and if exceeded, is an indication that there are causative factors (a pattern) contributing to the crashes. Crash data is further summarized in Table 2, which presents crash type by location.

TABLE 2.
SUMMARY OF CRASH DATA BY LOCATION

	Cross street	Log Mile	# crashes	Angle	Rear-end	Sideswipe	Fixed object	Pedestrian	Head-on	Other	PDO	Injury	Fatality	Crash Rates: Location	Crash Rates: Critical
11E at	Persimmon	9.11	7	3	2					2	6	1		0.33	0.57
	Payne/Creasy	9.69	7	3		3			1		6	1		0.29	0.55
	Washington	10.42	18	4	11	2				1	17	1		0.54	0.5
	2nd Ave	10.5	8	6	1	1					7	1		0.24	0.5
	Cherokee	10.68	13	9	2	2					8	5		0.38	0.5
	Boone	11.07	56	4	48	3			1		42	14		1.27	1.27
	Forest	11.62	43	19	23	1					19	24		1.45	1.36
	Headtown	12.29	33	8	24				1		21	12		1.1	1.35
81 at	Persimmon	12.07	9	2	5				2			8	1	0.67	0.64
	Main St	12.31	2		2							2		0.06	0.48
	75	18.01&7.83	8	8							8			1.52	1.02
Main St at	Boone/Spring		0												
	TOTAL		204	66	118	12	0	0	5	3	134	69	1		

Total by severity 204

2004-2006 CRASH DATA

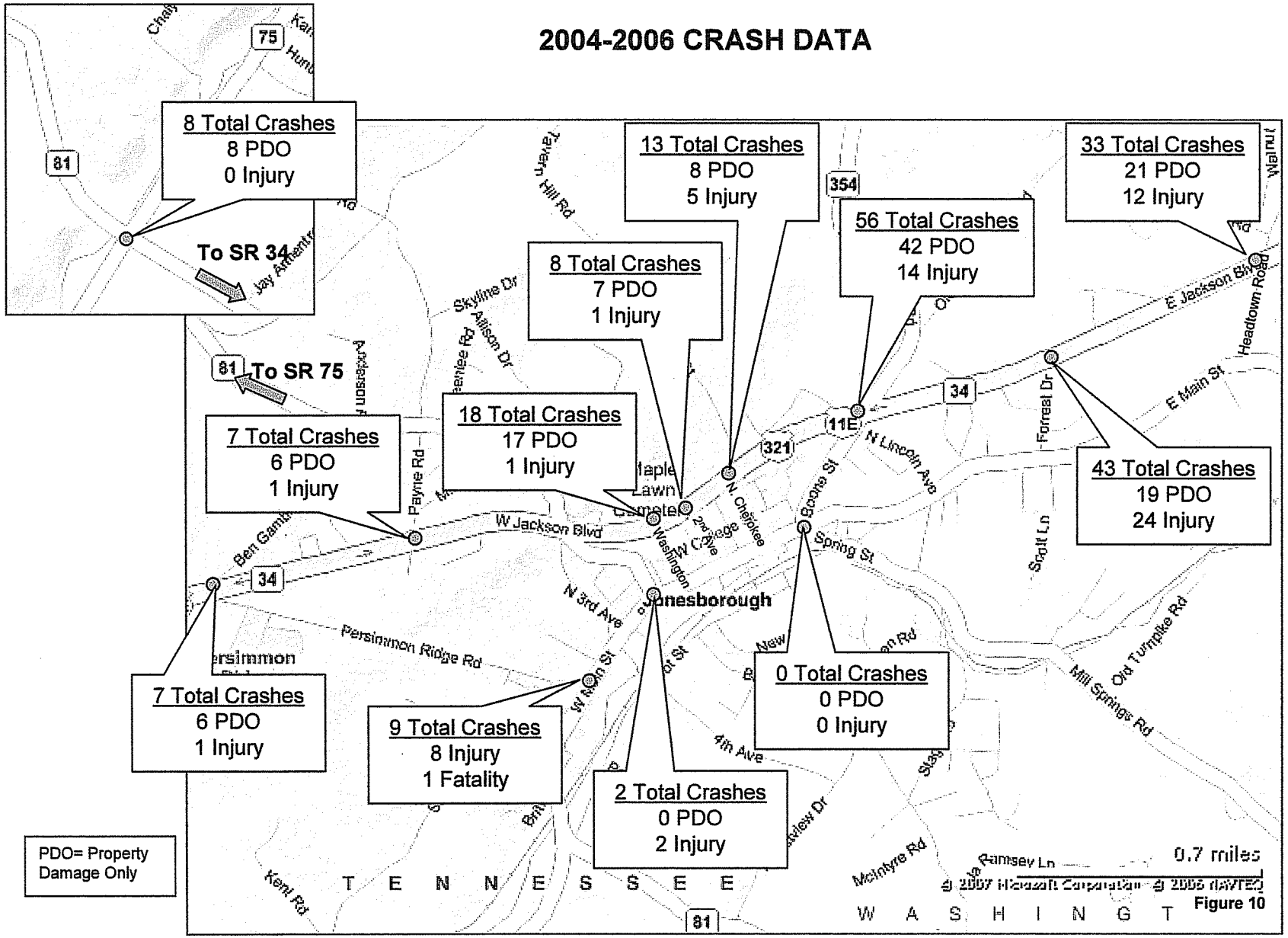
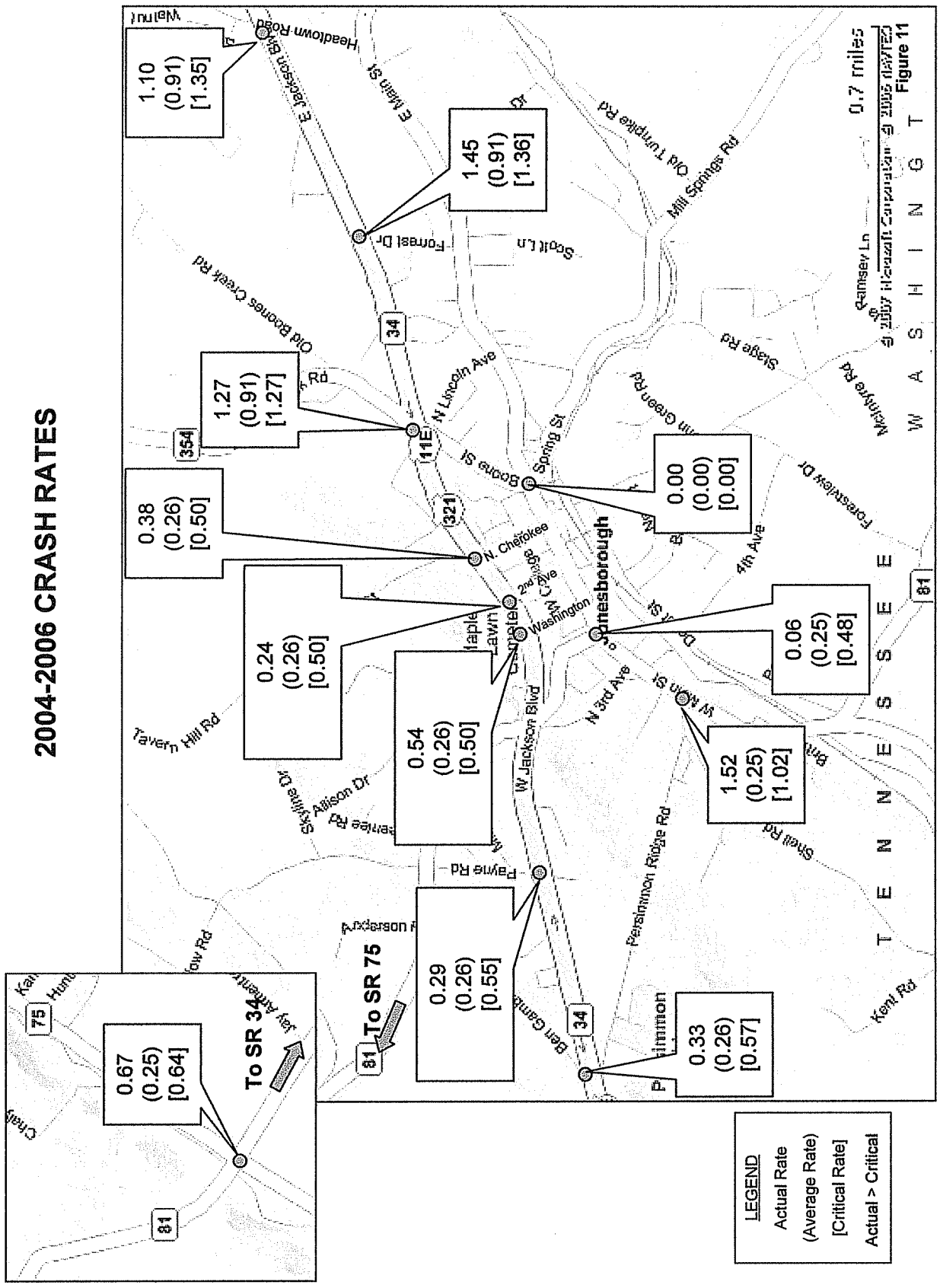


Figure 10


2004-2006 CRASH RATES
1.10 (0.91) [1.35]
1.45 (0.91) [1.36]
1.27 (0.91) [1.27]
0.38 (0.26) [0.50]
0.00 (0.00) [0.00]
0.24 (0.26) [0.50]
0.54 (0.26) [0.50]
0.06 (0.25) [0.48]
1.52 (0.25) [1.02]
0.29 (0.26) [0.55]
0.33 (0.26) [0.57]
0.67 (0.25) [0.64]
To SR 75
To SR 34
Jonesborough
LEGEND
Actual Rate
(Average Rate)
[Critical Rate]
Actual > Critical
0.7 miles
Figure 11

The three signalized intersections along US 11E had the highest number of reported crashes at 56 for Boones Creek Road, 43 for Forest Drive, and 33 for Headtown Road. Of the 132 combined crashes at those 3 intersections, 95 or 72 percent were rear end crashes. Boones Creek Road and Headtown Road are especially prone to rear end crashes with 86 and 73 percent, respectively, of the total being of that variety. A high percent of rear end crashes at these three signalized intersections could be caused by clearance intervals that need to be adjusted, pavement with poor skid resistance, or poor visibility of the traffic signals. Eighteen crashes were reported at the intersection of US 11E and Washington Drive and 61 percent of those were also rear end. According to antidotal information, many of these crashes are caused by the westbound left turn lane queue spilling onto the mainline roadway and through traffic running into the un-stored left turn vehicle.

FHWA's Manual on Uniform traffic Control Devices- 2003 Edition (MUTCD) provides criteria by which intersections can be evaluated for traffic signalization. Warrant 7- Crash Experience- says that a traffic signal may be warranted if there have been 5 crashes in a 12 month period that are susceptible to correction with a traffic signal. According to the 2004 through 2006 crash data, none of the intersections studied meet the Crash Experience warrant. Washington Drive had more than 15 crashes in that 3 year period, but the vast majority of them were rear end, and these cannot be prevented by a traffic signal.

Fortunately, two-thirds of all reported crashes at the study area intersections were property damage only. Unfortunately, one fatality occurred at the intersection of SR 81 and Persimmon Ridge Road.

At 4 of the 11 study area intersections the actual crash rate exceeded the critical crash rate, suggesting a pattern that may be correctable.

Intersection Traffic Volumes

In March 2007 traffic counts at most of the study area intersections were conducted by TDOT Region 1 or Town of Jonesborough staff. Intersections counted by TDOT included:

- US 11E at Persimmon Ridge Road/ Ben Gamble Road
- US 11E at 2nd Avenue
- US 11E at Cherokee Street

- US 11E at SR 354 (Boones Creek Road)
- SR 81 at Persimmon Ridge Road
- SR 81 at Main Street
- SR 81 at SR 75

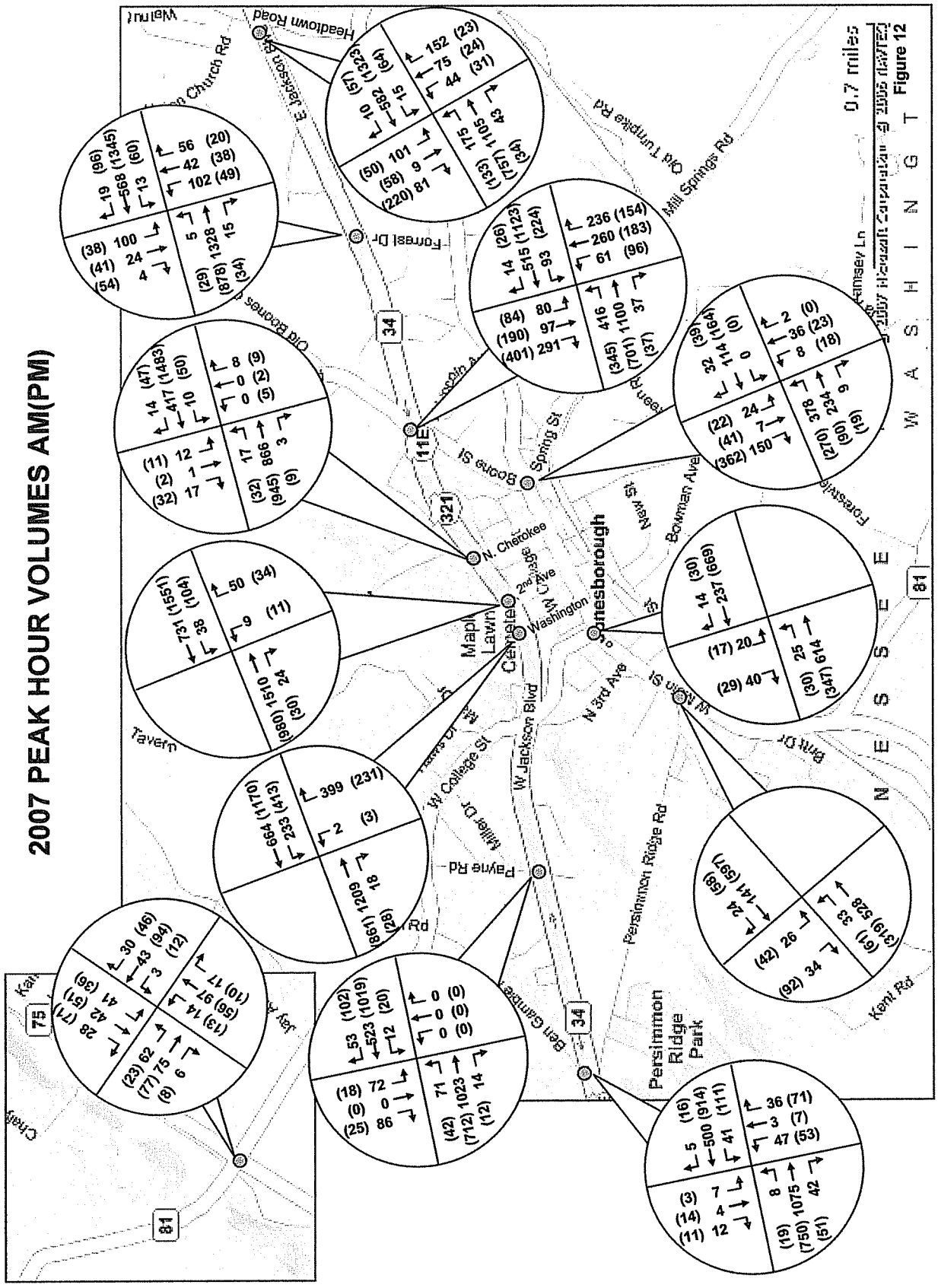
Intersections counted by the Town of Jonesborough under the supervision of WSA staff included:

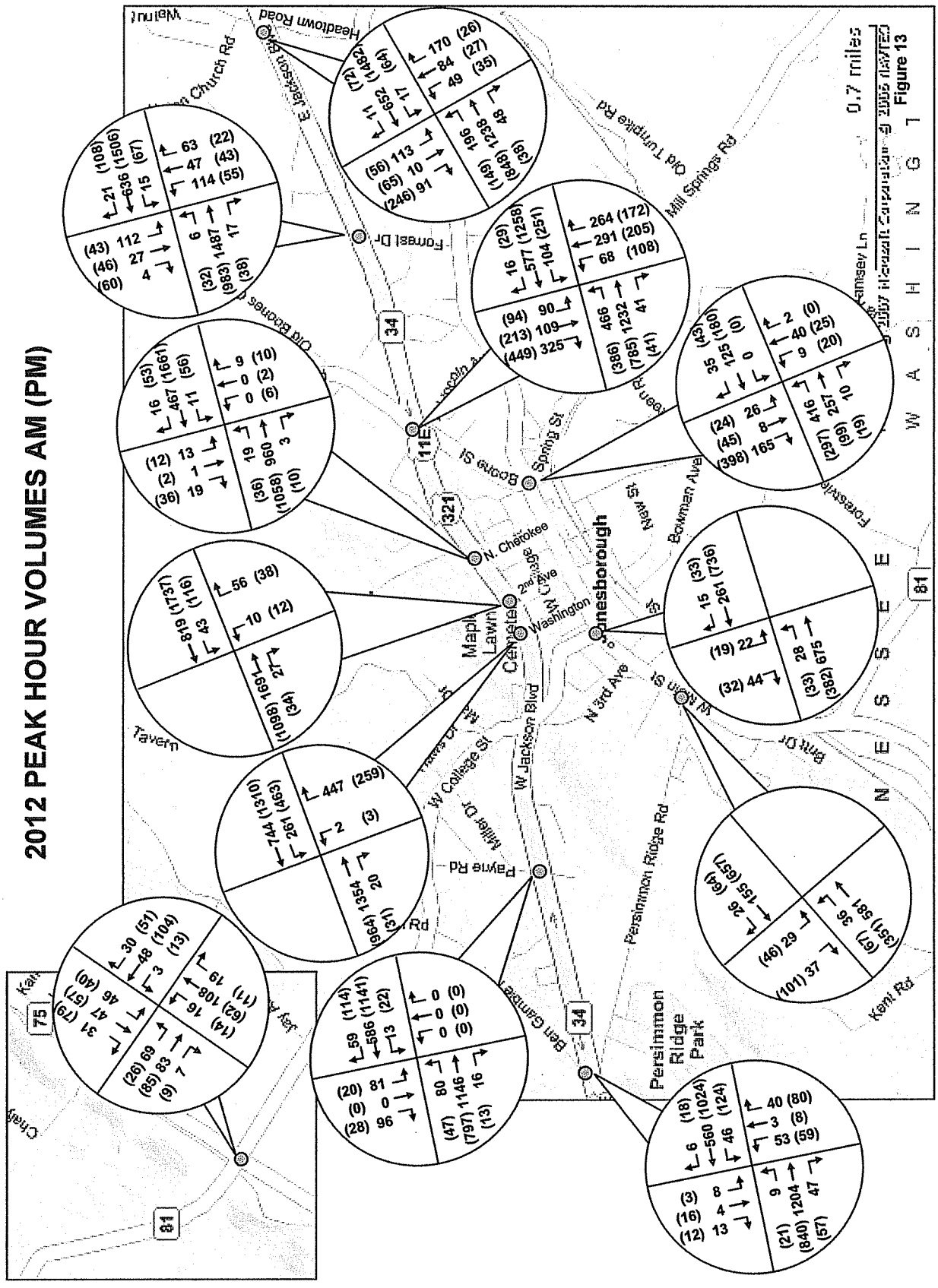
- US 11E at Payne Road/Creasy Road
- US 11E at Washington Drive
- US 11E at Forest Drive
- US 11E at Headtown Road
- Main Street at Boone Street/Spring Street

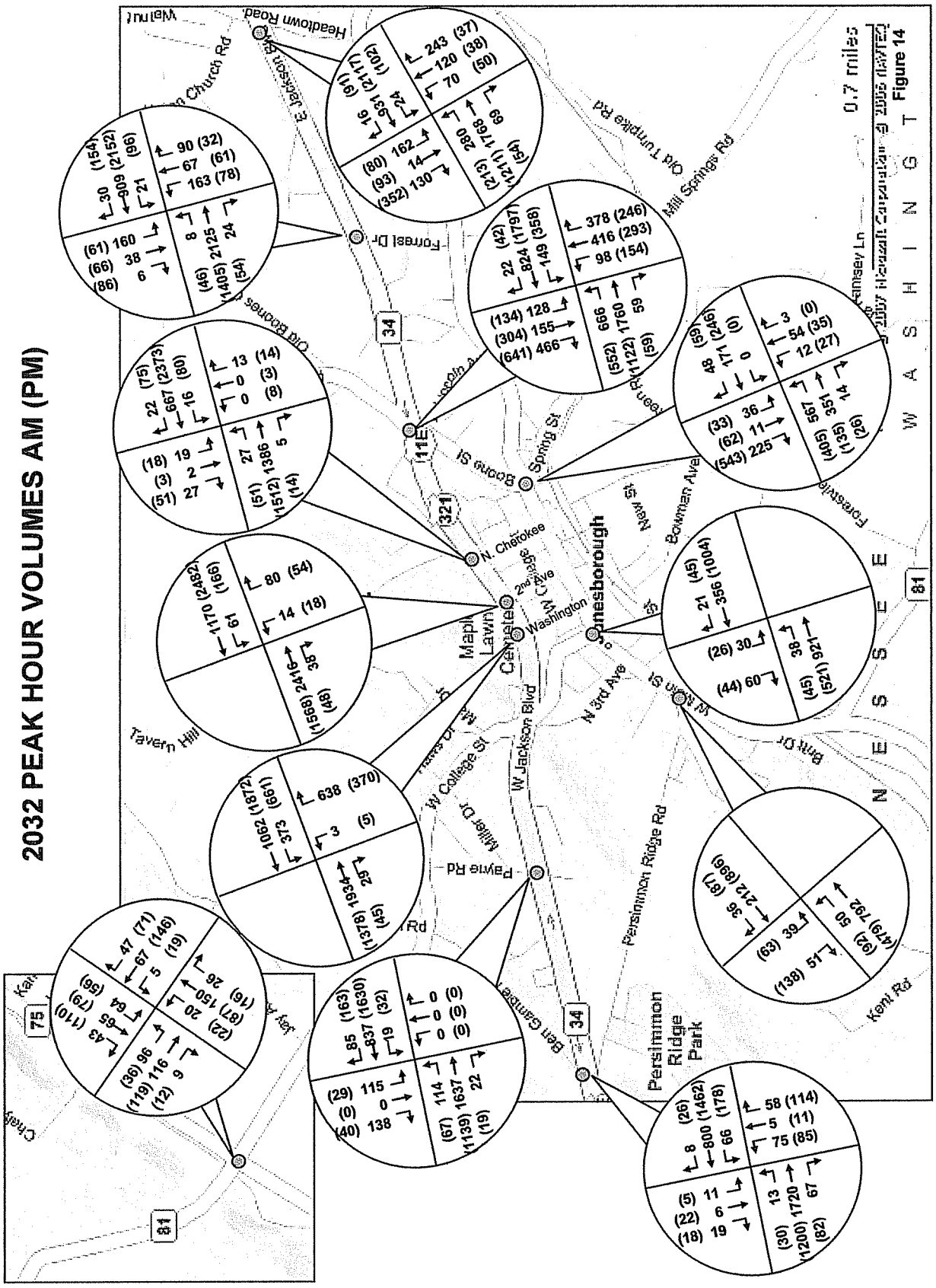
2007 Traffic Volumes- Figure 12 depicts AM and PM peak hour traffic volumes in 2007. In order to examine a worst-case scenario, each intersection's peak hour was used instead of a composite peak hour from all 12 intersections. At all intersections the morning peak hour occurred from 7:00 to 8:00 AM or from 7:15 to 8:15 AM. The afternoon peak hours were either 4:30 to 5:30 PM, 4:45 to 5:45 PM, or 5:00 to 6:00 PM.

2012 Traffic Volumes- Using past historic traffic growth as a guideline, Year 2012 traffic was estimated for each intersection and the results illustrated in Figure 13. In the past, traffic volumes on US 11E have grown at an average rate of 2.4 percent per year. As such, Year 2012 traffic on that road was assumed to grow over the 5 year period by a total of 12 percent, or an average of 2.4 percent per year. At the intersection of SR 81 and SR 75, a 2.2 percent annual growth is expected if historic growth trends continue. This results in a total 5-year growth of 11 percent. At the 3 other study area intersections that are south of US 11E, a 2 percent per year growth rate is expected, resulting in a total 5-year increase of 10 percent.

2032 Traffic Volumes- If historic trends continue into the long term future (this is a conservative approach); the resulting traffic shown in Figure 14 should exist in Year 2032. Total traffic increases over this 25 year span will be 60 percent on US 11E, 55 percent on SR 81, north of US 11E, and 50 percent on intersections south of US 11E.


2007 PEAK HOUR VOLUMES AM(PM)
Figure 12
0.7 miles
Jonesborough
Persimmon Ridge Park
Maple Lawn Cemetery
Tavern
Old Boones Creek Rd
Old Jonesborough Rd
Old Tunpike Rd
Mill Springs Rd
Ramsey Ln
Forbes Rd
Forest Hills Dr
Boone St
Spring St
Bowman Ave
Main St
N. Cherokee
Washington
2nd Avenue
W Jackson Blvd
W College St
Payne Rd
Persimmon Ridge Rd
Kent Rd
Barn Dr
Forest Dr
Forrest Dr
Headtown Road
Old Jackson Rd
Old Church Rd
Jay K
Kan
Chap
11E
321
34
75
81
W E S T N A S H I N G T O N


2012 PEAK HOUR VOLUMES AM (PM)
Figure 13
0.7 miles
W A S H I N G T O N
Jonesborough
Maple Lawn Cemetery
Tavern
Persimmon Ridge Park
Headtown Road
Old Turnpike Rd
Mill Springs Rd
Ramsey Ln
Forest Dr
Bowman Ave
Spring St
Boone St
N. Chalokee
2nd Ave
W Jackson Blvd
W College St
N 3rd Ave
N Main St
Payne Rd
Persimmon Ridge Rd
Kent Rd
Old Boones Creek Rd
E Jackson Blvd
Forrest Dr
11E
321
34
81
75


2032 PEAK HOUR VOLUMES AM (PM)
Figure 14
0.7 miles
Jonesborough
Persimmon Ridge Park
Tavern Hill
Maple Lawn Cemetery
Old Boones Creek Rd
Old Turnpike Rd
Mill Springs Rd
Headtown Road
Forrest Dr
Spring St
Boone St
N. Cherokee
Washington
Bowman Ave
Forestdale
W Jackson Blvd
W College St
Persimmon Ridge Rd
Kent Rd
Payne Rd
Park Dr
N Main St
N 3rd Ave
N Main St
Ben Gamble
Walnut
Church Rd
Kan
Chap
Jay
Ridgeway Ln
11E
321
34
81
75
E A S T T E N N E S S E E
W A S H I N G T O N

Intersection Evaluation Criteria

Intersections are also evaluated using LOS criteria, but the process is more specific than planning-level link LOS analysis. Instead, capacity and level of service for signalized and unsignalized intersections were calculated using the **2000 Highway Capacity Manual, Special Report 209** published by the Transportation Research Board (TRB). Signalized and unsignalized intersections are evaluated based on estimated intersection delays, which may be related to level of service (LOS).

Level of service and capacity are the measurements of an intersection's ability to accommodate traffic volumes. Levels of service for intersections range from A to F. LOS A is the best, and LOS F is failing. For signalized intersections, a LOS A has an average estimated intersection delay of less than 10 seconds, and LOS F has an estimated delay of greater than 80 seconds. A LOS of C and D are typical design values. Within urban areas, a LOS D, delay between 35 and 55 seconds, is considered acceptable by the Institute of Transportation Engineers (ITE) for signalized intersections.

Unsignalized intersections levels of service have lower thresholds of delays. A LOS of F exceeds estimated delays of 50 seconds. For urban arterials, minor approaches may frequently experience levels of service E. A full level of service description for signalized and unsignalized intersections is presented below in Table 3.

TABLE 3.
LEVEL OF SERVICE DELAY CRITERIA FOR INTERSECTOINS

Level of Service	Average Control Delay (seconds/vehicle)	
	2-Way STOP	Traffic Signal
A	0 to 10	0 to 10
B	>10 to 15	>10 to 20
C	> 15 to 25	> 20 to 35
D	> 25 to 35	> 35 to 55
E	> 35 to 50	> 55 to 80
F	> 50	> 80

Intersection LOS

At each intersection, AM and PM peak hour conditions were evaluated using the Highway Capacity Software (HCS) for Year 2007, Year 2012, and Year 2032 traffic volumes. The results of this analysis are described in the following sections.

2007 Levels of Service- Overall, the three traffic signalized intersections along US 11E- Boones Creek Road, Forest Drive, and Headtown Road operate at an acceptable LOS in the morning and afternoon peak hours. Figure 15 illustrates the existing AM and PM peak hour operating conditions. The Boones Creek Road intersection operates at LOS D in both the AM and PM peak hours. At Forest Drive, the AM peak hour operates at LOS D whereas the PM peak hour operates at LOS C. At the unsignalized intersections, five have movements that are undesirable including:

- US 11E at Persimmon Ridge Road
- US 11E at Payne Road
- US 11E at Washington Drive
- US 11E at Cherokee Street
- Main Street at Boone Street

All of the aforementioned intersections have at least one movement operating at LOS F except US 11E at Cherokee Street, where the southbound movement operates at LOS E in the PM peak hour. LOS F at an unsignalized intersection indicates a traffic signal might be warranted.

Tables 4 and 5 provide a more detailed breakdown of the LOS analysis for 2007, 2012, and 2032.

2012 Projected Levels of Service- By 2012 conditions are expected to worsen at the three signalized intersections along US 11E. In the PM peak hour, the intersection of US 11E and Boones Creek Road should operate at an overall LOS F indicating that some mitigation will be required to decrease delays. Likewise, the intersection of US 11E and Headtown Road is expected to operate at an overall LOS F in the AM peak hour. Figure 16 summarizes the anticipated service levels in Year 2012.

2032 Projected Levels of Service- Levels of Service in 2032 suggest that major improvements to the existing street system will be required and/or new corridors may need to be developed. Figure 17 illustrates projected 2032 services levels for the study area intersections. All three signalized intersections along US 11E will fail in 2032 during one or both peak hours. Moreover, most of the unsignalized intersections will

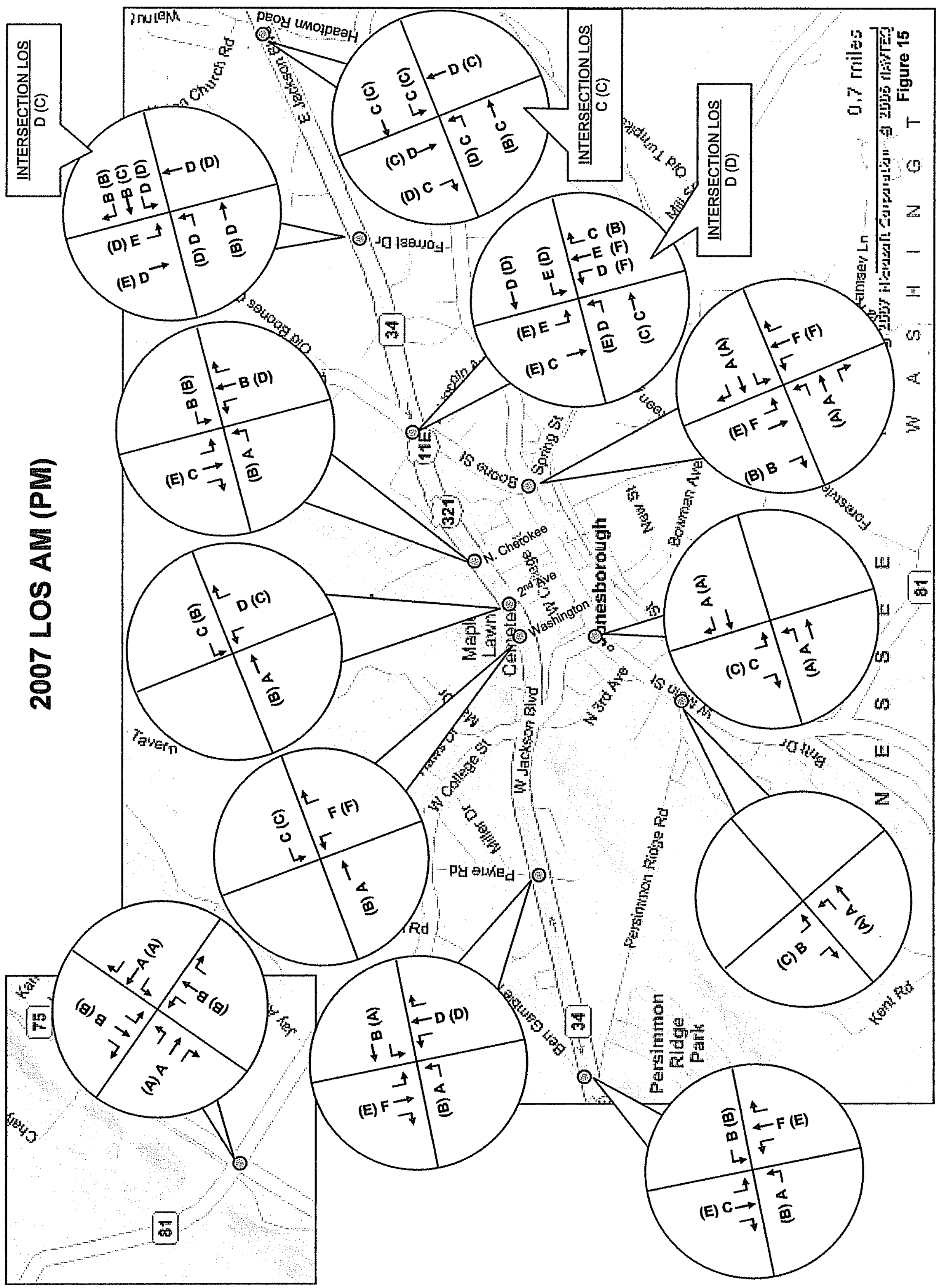
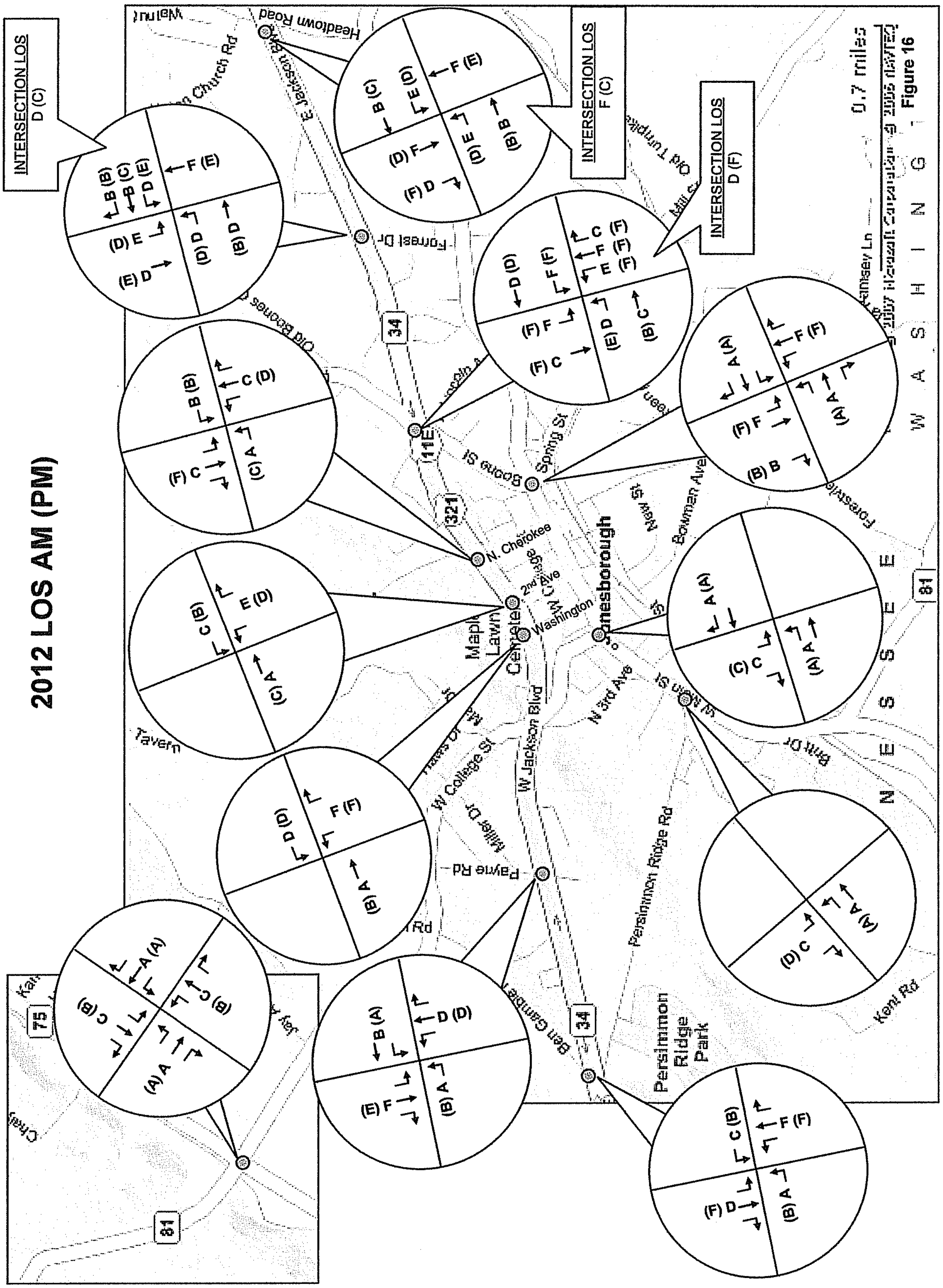

2007 LOS AM (PM)
INTERSECTION LOS
D (C)
INTERSECTION LOS
C (C)
INTERSECTION LOS
D (D)
0.7 miles
Figure 15
WASHINGTON
TENNESSEE
Jonesborough
Persimmon Ridge Park
Maple Lawn Cemetery

TABLE 4.
LOS AT SIGNALIZED INTERSECTIONS

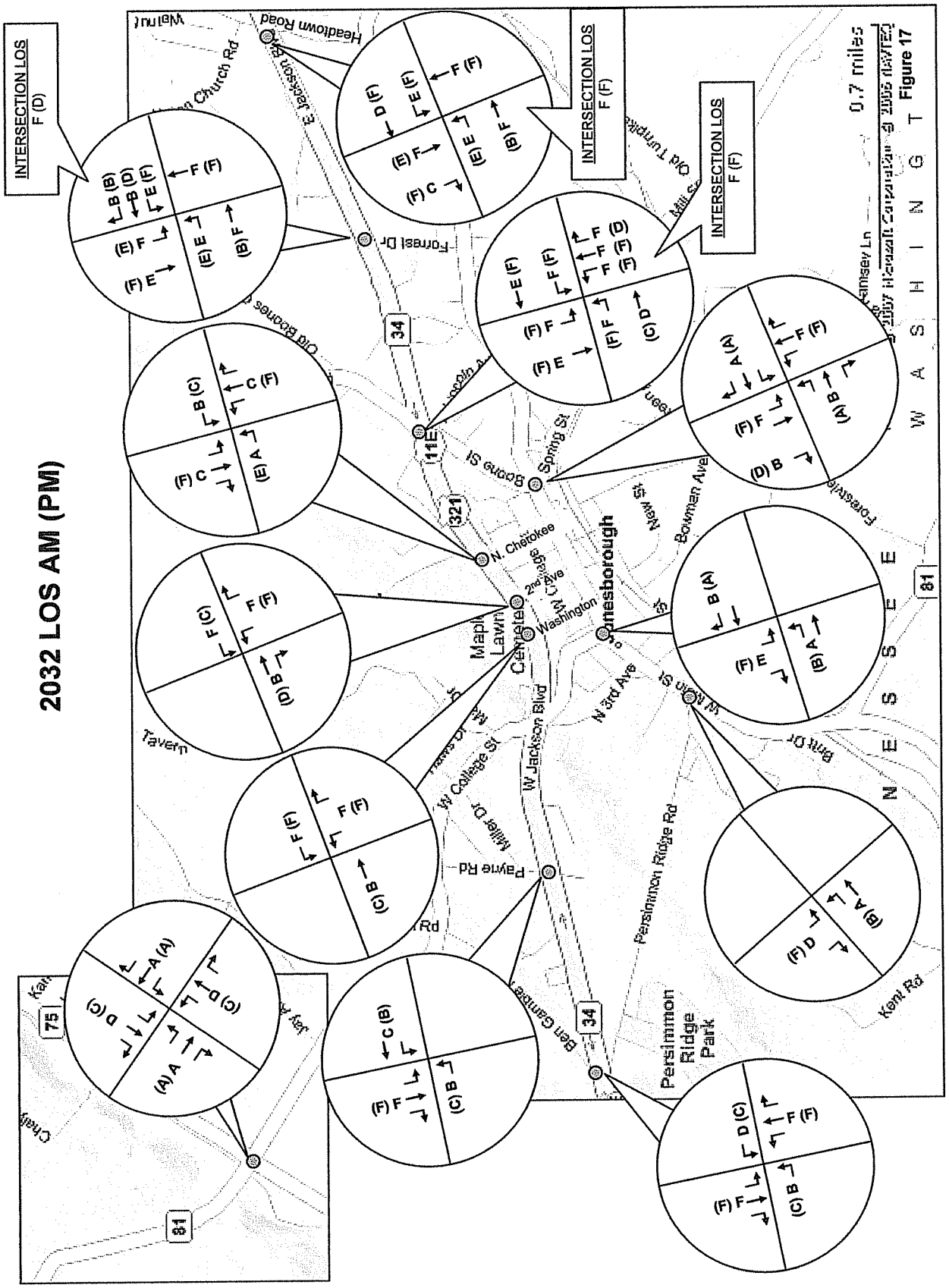
Intersection	Major	Minor	2007				2012				2032			
			AM		PM		AM		PM		AM		PM	
			LOS	v/c	LOS	v/c	LOS	v/c	LOS	v/c	LOS	v/c	LOS	v/c
US 11E - SR 354/Boone St	US 11E	Eastbound Left	D	0.85	E	0.93	D	0.88	E	0.95	F	1.09	F	1.5
		Eastbound Thru	C	0.79	C	0.59	C	0.83	B	0.47	D	0.95	C	0.62
		Westbound Left	E	0.73	D	0.61	F	0.88	F	1.13	F	1.33	F	1.81
		Westbound Thru	D	0.75	D	0.95	D	0.84	D	0.96	E	0.94	F	1.25
	SR 354/Boone St	Northbound Left	D	0.54	F	0.99	E	0.68	F	1.27	F	1.26	F	1.34
		Northbound Thru	E	0.94	F	0.98	F	1	F	1.12	F	1.86	F	1.98
		Northbound Right	C	0.456	B	0.31	C	0.64	*	*	F	1.13	D	0.76
		Southbound Left	E	0.64	E	0.76	F	0.81	F	0.96	F	1.47	F	1.01
		Southboubd Thru	C	0.31	E	0.89	C	0.33	F	1.01	E	0.62	F	1.79
US 11E - Forest Dr	US 11E	Eastbound Left	D	0.04	D	0.21	D	0.07	D	0.28	E	0.09	E	0.55
		Eastbound Thru	D	0.98	B	0.57	D	0.95	B	0.56	F	1.24	B	0.69
		Westbound Left	D	0.11	D	0.43	D	0.16	E	0.59	E	0.24	F	1.11
		Westbound Thru	B	0.41	C	0.82	B	0.4	C	0.8	b	0.52	D	0.99
		Westbound Right	B	0.03	B	0.13	B	0.03	B	0.13	B	0.04	B	0.16
	Forest Dr	Northbound Thru	D	0.81	D	0.65	F	0.97	E	0.84	F	1.42	F	1.34
		Southbound Left	E	0.84	D	0.27	E	0.8	D	0.27	F	1.52	E	0.4
		Southboubd Thru	D	0.23	E	0.7	D	0.22	E	0.68	E	0.4	F	1.03
US 11E - Headtown Rd	US 11E	Eastbound Left	C	0.46	D	0.75	E	0.84	D	0.59	E	0.8	E	0.84
		Eastbound Thru	C	0.86	B	0.48	B	0.68	B	0.48	F	1.22	B	0.59
		Westbound Left	C	0.12	C	0.36	E	0.19	D	0.29	E	0.22	F	1.09
		Westbound Thru	C	0.69	C	0.84	B	0.4	C	0.85	D	0.89	F	1.23
	Headtown Rd	Northbound Thru	D	0.81	C	0.45	F	2	E	0.71	F	1.66	F	1.17
		Southboubd Thru	D	0.64	C	0.4	F	1.99	D	0.53	F	1.44	E	0.72
		Southboubd Right	C	0.21	D	0.79	D	0.34	F	0.96	C	0.31	F	1.2

TABLE 5.
LOS AT UNSIGNALIZED INTERSECTIONS

Intersection	Street	Direction	2007				2012				2032			
			AM		PM		AM		PM		AM		PM	
			LOS	v/c	LOS	v/c	LOS	v/c	LOS	v/c	LOS	v/c	LOS	v/c
US 11E - Persimmon Ridge Rd	SR 34/US 11E	Eastbound L	A	0.01	B	0.03	A	0.01	B	0.04	B	0.07	C	0.08
		Westbound L	B	0.11	B	0.16	C	0.14	B	0.2	D	1.65	C	0.41
	Persimmon Ridge Rd	Northbound LTR	F	0.65	E	0.63	F	0.92	F	0.88	*	*	*	*
		Southbound LTR	C	0.14	E	0.31	D	0.19	F	0.46	F	*	*	*
US 11E - Creasy Rd	US 11E	Eastbound L	A	0	B	0	A	0	B	0	B	0.2	C	0.23
		Westbound LT	B	0	A	0	B	0	A	0	C	0.07	B	0.06
	Creasy Rd	Northbound LTR	D	0.02	D	0.02	D	0.03	D	0.03	F	*	F	*
		Southbound LTR	F	0.98	E	0.31	F	1.31	E	0.41	F	2.72	F	0.84
US 11E - Washington Dr	US 11E	Eastbound LT	A	0	B	0.01	A	0	B	0.01	B	0	C	0.02
		Westbound L	C	0.51	C	0.6	D	0.67	D	0.74	F	1.74	F	1.6
	Washington Dr	Northbound LTR	*	*	*	*	*	*	*	*	*	*	*	*
		Southbound LTR	F	*	F	*	F	*	F	*	*	*	*	*
US 11E - 2nd Ave	US 11E	Eastbound LT	A	0.01	B	0.02	A	0.01	C	0.03	B	0.02	D	0.09
		Westbound L	C	0.11	B	0.17	C	0.15	B	0.21	F	0.46	C	0.48
	2nd Ave	Northbound LTR	D	0.33	C	0.26	E	0.46	D	0.35	*	*	*	*
		Southbound LTR	B	0.01	F	0.06	B	0.01	F	0.09	F	*	F	*
US 11E - N. Cherokee St	US 11E	Eastbound L	A	0.02	B	0.08	A	0.03	C	0.11	A	0.03	E	0.32
		Westbound L	B	0.02	B	0.08	B	0.03	B	0.09	B	0.03	C	0.21
	N. Cherokee St	Northbound LTR	B	0.06	D	0.12	C	0.07	D	0.16	C	0.05	F	*
		Southbound LTR	C	0.09	E	0.33	C	0.11	F	0.46	C	0.19	*	*
SR 81 - Persimmon Ridge Rd	SR 81	Northbound LT	A	0.03	A	0.08	A	0.03	A	0.09	A	0.05	B	0.17
	Persimmon Ridge Rd	Eastbound LTR	B	0.17	C	0.44	C	0.2	D	0.55	D	0.44	F	1.34
SR 81 - Main St	Main St	Eastbound LTR	A	0.02	A	0.04	A	0.03	A	0.05	A	0.04	B	0.09
		Westbound LTR	A	0	A	0	A	0	A	0	B	0	A	0
	SR 81	Southbound LR	C	0.21	C	0.19	C	0.26	C	0.24	E	0.58	F	0.62
Main St - Boone St/Spring St	Main St	Eastbound LTR	A	0.34	A	0.24	A	0.38	A	0.27	B	0.54	A	0.4
		Westbound LTR	A	0	A	0	A	0	A	0	A	0	A	0
	Boone St /Spring St	Northbound LTR	F	0.99	F	0.56	F	1.49	F	0.9	F	*	F	39
		Southbound LT	F	1	E	0.4	F	*	F	0.53	F	*	F	2.08
		Southbound R	B	0.22	B	0.48	B	0.24	B	0.54	B	0.36	E	0.82
SR 81 - SR 75	SR 81	Northbound LTR	A	0	A	0.01	A	0	A	0.01	A	0	A	0.01
		Southbound LTR	A	0.05	A	0.02	A	0.06	A	0.02	A	0.09	A	0.03
	SR 75	Eastbound LTR	B	0.25	B	0.3	C	0.3	B	0.35	D	0.64	C	0.59
		Westbound LTR	B	0.3	B	0.17	C	0.36	B	0.19	D	0.65	C	0.35



2012 LOS AM (PM)
INTERSECTION LOS
D (C)
INTERSECTION LOS
F (C)
INTERSECTION LOS
D (F)
Figure 16
Headtown Road
E Jackson St
Forrest Dr
Old Boones Crk
Old Turnpike
N. Cherokee
2nd Ave
Washington
Maple Lawn Cemetery
Jonesborough
Boone St
Spring St
New St
Bowman Ave
W College St
W Jackson Blvd
N 3rd Ave
Persimmon Ridge Rd
Persimmon Ridge Park
Ben Gamble Rd
Payne Rd
Miller Dr
Tavern
Kent Rd


2032 LOS AM (PM)
INTERSECTION LOS
F (D)
INTERSECTION LOS
F (F)
INTERSECTION LOS
F (F)
Jonesborough
Persimmon Ridge Park
Figure 17

contain movements operating at LOS F, indicating a need for a traffic signal or other improvements. The only intersection that is projected to operate at an acceptable LOS is SR 81 at SR 75.

Potential Traffic Signals

In addition to the traffic signal crash warrant, the MUTCD also has three volume warrants used to evaluate the need for a new traffic signal. The three volume warrants are:

- Warrant 1- Eight Hour Vehicle Volume
- Warrant 2- Four-Hour Vehicle Volume
- Warrant 3- Peak Hour

Warrant 1 has two conditions:

- Condition A, Minimum Vehicular Volume, is intended for application at locations where a large volume of intersecting traffic is the principal reason to consider installing a traffic signal
- Condition B, Interruption of Continuous Traffic, is intended for application at locations where Condition A is not satisfied and where the traffic volume on a major street is so heavy that traffic on a minor intersecting street suffers excessive delay or conflict in entering or crossing the major street.

According to the MUTCD the Four-Hour Vehicle Volume signal warrant conditions are intended to be applied where the volume of intersecting traffic is the principal reason to consider installing a traffic control signal. As its title suggest, this warrant is based on major and minor street traffic for any four hours of the day.

Warrant 3 is met when the minor street experiences excessive delay for at least one hour of the day. It is typically reserved for unusual circumstances such as manufacturing plants where a large number of vehicles are discharged in a short period of time.

Warrant 1 is generally considered the strongest from the perspective of many public agencies. Furthermore, public agencies like TDOT sometimes are reluctant to allow a new traffic signal to be installed based on Warrant 2 or 3. Some public agencies also subtract minor street right turn traffic; especially if it is in a separate right turn lane, from the traffic signal warrant evaluation.

Existing Warrant Analysis- Table 6 presents a summary of the traffic signal warrant evaluation and the Appendix includes a detailed breakdown of the analysis. The need for a traffic signal should be carefully weighed against its benefits. For example, a traffic signal will increase delays to traffic on the main street and will increase the potential for rear end automobile crashes. Conversely, a traffic signal will create gaps for side street traffic, thereby reducing their delays and improving safety.

TABLE 6.

MUTCD SIGNAL WARRANT FOR YEARLY VOLUMES

Intersection	2007 Warrant			2012 Warrant			2032 Warrant		
	1	2	3	1	2	3	1	2	3
US 11E-Persimmon Ridge Rd/ Ben Gamble Rd	YES	YES	YES	YES	YES	YES	YES	YES	YES
US 11E-Payne Rd/ Creasy Rd	NO	NO	YES	NO	NO	YES	YES	YES	YES
US 11E-Washington Dr	YES	YES	YES	YES	YES	YES	YES	YES	YES
US 11E-2nd Ave	NO	NO	NO	NO	YES	NO	YES	YES	YES
US 11E-N. Cherokee St	NO	NO	NO	NO	NO	NO	NO (7/8)	YES	YES
SR 81-Persimmon Ridge Rd	NO	NO	NO	NO	NO	NO	YES	YES	YES
SR 81-Main St	NO	NO	NO	NO	NO	NO	NO	NO	NO
Main St-Boone St/ Spring St	NO	NO	NO	NO	NO	NO	NO	NO	NO
SR 81-SR 75	NO	NO	NO	NO	NO	NO	NO	NO	NO

The analysis in Table 6 assumed that operating speeds on US 11E are greater than 40 MPH, consequently the traffic signal warrants were evaluated using 70 percent of the volume values as per the MUTCD. This 70 percent factor was also used for the intersections of SR 81 at Main Street and SR 81 at SR 75. Only two intersections, SR 81 at Persimmon Ridge Road and Main Street at Boone Street/Spring Street, were evaluated using the 100 percent volume value, which assumes operating speeds of less than 40 MPH. All of the intersections were initially evaluated with existing laneage. None of the side streets for which the need for a traffic signal was evaluated have 2 lane approaches. If a side street has 2 approach lanes instead of 1, the volume requirement to meet the warrants is greater.

Based on the aforementioned application of the 3 principal traffic signal warrants, 3 intersections met 1 or more of the warrants based on existing traffic volumes. These include:

- US 11E at Persimmon Ridge Road/Ben Gamble Road;
- US 11E at Payne Road/Creasy Road; and,
- US 11E at Washington Drive.

By far, the most worthy location out of the three for a new traffic signal is US 11E at Persimmon Ridge Road/Ben Gamble Road. This intersection meets Warrants 1, 2, and 3 as shown in Table 6. Warrant 1 is met even if another approach lane is added to Persimmon Ridge Road and Ben Gamble Road. It is also met for 5 of 8 hours with 2 side street approach lanes ***and*** operating speeds of less than 40 MPH. For the 3 unmet hours, they are at 86 percent of the required volume. It is important to note that operating speeds on US 11E more closely reflect the 45 MPH posted speed limit.

Today, the intersection of US 11E at Payne Road/Creasy Road meets only the Peak Hour Warrant from 7:00 to 8:00 AM where 116 vehicles were counted on the southbound approach. Of these 116 southbound vehicles, 63 were reported to be right turns. With the 70 percent factor in place (40 MPH or greater operating speeds), this intersection significantly exceeds the 1 lane approach criteria (75 vehicles) and barely exceeds the 2 lane approach criteria (100 vehicles) for minor street traffic volumes. Given the southbound Payne Road right turn contribution towards the traffic signal warrant and the goal to minimize traffic signals on US 11E, a traffic signal at this location is not recommended.

The intersection of US 11E at Washington Drive strongly meets Warrants 1, 2 and 3 even if operating speeds of less than 40 MPH prevailed and the side street approach had 2 instead of 1 lane. Although the predominate northbound movement on Washington Drive is a right turn, which may be discounted, the reciprocal movement is a westbound left turn from US 11E onto Washington Drive. Although a traffic signal is warranted, this intersection needs to be examined in conjunction with the access needs of the Washington County Jail and Justice Center, which are located near Second Avenue and Cherokee Street. In fact, the consultant, Wilbur Smith Associates, has been contracted by Washington County to examine access need of the Justice Center Complex and the feasibility of a traffic signal at one or more of the following intersections on US 11E: Washington Drive, Second Avenue, or Cherokee Street.

Year 2012 Projected Traffic Signal Warrant Analysis- For planning purposes, traffic was projected for Year 2012 and the traffic signal warrants reevaluated with the

results shown in Table 6. With additional traffic anticipated, only the intersection of US 11E at Second Street is expected to meet any traffic signal warrants in Year 2012. Warrant 2, the Four Hour Warrant is expected to be met. Also note that the intersection of US 11E and Payne Road/Creasy Road will continue to meet only the peak hour warrant in Year 2012. As previously indicated this evaluation is a planning exercise so that town and state leaders can understand the character and needs of US 11E in the future.

Year 2032 Projected Traffic Signal Warrant Analysis- An even further look into the future was undertaken to prepare town and state leaders for what might be necessary relative to traffic signals. By Year 2032 all of the primary intersections on US 11E will require a traffic signal suggesting significantly more traffic in an urban setting. Moreover, the traffic projections indicate that the intersection of SR 81 and Persimmon Ridge Road will warrant a traffic signal by 2032.

Recommendations

This section contains a discussion on TDOT planning organizations, funding procedures, and transportation recommendations. The recommendations are broken into those of small magnitude that could be considered short term and those of greater magnitude that should be considered long term.

The Role of Transportation Planning Organizations

All of the Jonesborough city limits are within the Johnson City Metropolitan Transportation Planning Organization (MTPO) area. The appendix contains an illustration that defines the Johnson City MTPO limits. Furthermore, the Johnson City MTPO area contains a significant amount of Washington County that is within the Jonesborough Urban Growth Boundary. As can be seen from the illustration in the Appendix, the Johnson City MTPO area extends to the west and northwest to SR 81 and SR 75. It follows the west Jonesborough city limit line, and then extends southwest generally along SR 353.

The western portion of Jonesborough's Urban Growth Boundary in Washington County is not in the Johnson City MTPO and is therefore in the First Tennessee Rural Planning Organization (RPO).

In order to receive federal funding, all transportation projects in Jonesborough must be approved by the Johnson City MTPO or the First Tennessee RPO. Most of the

proposed projects are in the Johnson City MTPO. To be "approved" by the Johnson City MTPO they must be included in their Long Range Transportation Planning (LRTP) document. Once in the LRTP document, the projects must go through a normal NEPA process. This process would normally include developing a Transportation Planning Report followed by an environmental study, which could be a Category Exclusion (CA), an Environmental Assessment (EA) or and Environmental Impact Statement (EIS). The RPO process does not require a LRTP document, but does have a formal process in which they must adhere for prioritizing projects.

In all likelihood, many of the significant transportation projects recommended in this study will require TDOT and federal funds. However, there have been some discussions with Town of Jonesborough leaders regarding private assistant on road projects. What they envision is a new road corridor identified and reserved by the Town of Jonesborough and construction in conjunction with private development. If a developer owns property adjacent to the new road corridor, they would be responsible for constructing the road along their frontage.

For the smaller road improvements proposed in this report, federal and TDOT funding might not be necessary. Some of these projects could be funded privately or through local governments.

Small Area- US 11E, SR 81, and Main Street

2008 Recommendations- Figure 18 shows the small area recommendations that should be pursued immediately. These are divided into conducting more studies and investigation to better determine what should be done, installing a traffic signal, and adding a turn lane.

Along US 11E a high number of crashes were reported at the three existing signalized intersections and the data suggest a significant number are rear end. This would indicate a sight distance or traffic signal visibility problem or pavement skid resistance problem. At 2 of the 3 signalized intersections on US 11E, Boones Creek Road and Forrest Drive, the actual Crash Rate is at or greater than the Critical Crash Rate. These intersections should undergo further investigation to determine what is causing the problem.

2008 RECOMMENDATIONS

Two other intersections, SR 81 at Persimmon Ridge Road and SR 75, have actual Crash Rates that exceed the Critical Rates for similar intersections; consequently more investigation is recommended.

Further investigate is also required to determine where a new traffic signal should be installed on US 11E near the Justice Center Complex. Three intersections are under consideration including Washington Drive, Second Avenue, and Cherokee Street. WSA is under contract with Washington County to assess the access needs of the Justice Center and determine where a traffic signal is most appropriate. Note that the analysis contained in this report revealed that a traffic signal is warranted at Washington Drive.

The intersection of US 11E and Persimmon Ridge Road currently meets the requirements for a traffic signal; consequently the Town of Jonesborough should pursue this endeavor. Along with a new traffic signal, the northbound side street approach should be modified to include a separate left turn lane and shared though/right turn lane.

Finally, a southbound turn lane should be added on Payne Road. The traffic volumes suggest that an exclusive left turn lane be added so that southbound right turn traffic will not be blocked. Although not as likely, this additional turn lane will also eliminate the possibility of southbound right turn traffic blocking left turn movements.

2012 Recommendations- By 2012 additional congestion on US 11E is anticipated to the extent that some additional lanes will be needed. Figure 19 depicts the recommendations, which include adding another eastbound left turn lane on US 11E at Boones Creek Road and at Headtown Road, and accommodating the second left turn lane by adding a second receiving lane on the side streets.

At the intersection of US 11E and Headtown Road, a proposed Lowe's development is planned, and the off site improvements call for adding a northbound left turn lane on Headtown Road. By 2012 a separate exclusive right turn lane will be required if traffic growth follows historical trends.

2012 RECOMMENDATIONS

2032 Recommendations- If traffic continues to grow as anticipated, more intersection improvements will be needed to mitigate congestion and delays beyond what is normally considered acceptable. As shown in Figure 20, additional lanes will be needed at the following intersections:

- SR 81 at Persimmon Ridge Road
- SR 81 at Main Street
- Main Street at Boone Street/Spring Street
- US 11E at Boones Creek Road
- US 11E at Forrest Drive

At the intersection of US 11E and Boones Creek Road a second westbound left turn lane will be needed, and this will necessitate adding a second southbound lane on Boone Street so that dual left turn traffic can be accommodated. These improvements will mirror the Year 2012 improvements at this intersection that include a second eastbound left turn lane and second receiving lane.

By 2032 a left turn lane should be installed on northbound SR 81 at Persimmon Ridge Road. Additionally, Persimmon Ridge Road will need separate left and right turn lanes on its approach to SR 81. This report recommends conducting a safety audit at this intersection, and that study may suggest a complete reconfiguration of this unusual intersection. It may be prudent to make all improvements to this intersection at one time including adding the laneage suggested and aligning Persimmon Ridge Road so that it intersects SR 81 at a right angle.

Two downtown intersections should be improved including Main Street at SR 81 and Main Street Boone Street/Spring Street. An eastbound left turn lane should be installed on Main Street at Boone Street to accommodate increased traffic volumes. Finally, a southbound lane needs to be added to West College Street at Main Street so that separate left and right turn lanes are provided.

Lastly, by 2032 a separate northbound left turn lane on Forrest Drive needs to be added at US 11E.

2032 RECOMMENDATIONS

Figure 20

Regional Issues

Traffic circulation and mobility in Jonesborough and its Urban Growth Boundary are restricted today primarily by two regional deficiencies, namely growing congestion on US 11E and the lack of connectivity on SR 81 north and south of downtown Jonesborough. The Town of Jonesborough is making strides towards improving US 11E by implementing new and retrofitting existing developments with good access control and access management measures. For instance, the outparcels at the proposed new Lowe's development at Headtown Road will have no direct connection to US 11E. Despite these efforts, good access control and other efficiency measures like coordinated traffic signal control are limited relative to their effectiveness on roads that are over-capacity. Such will be the case on US 11E in the future. SR 81 is a major north-south route through Jonesborough but it does not directly connect with US 11E. Instead it passes under US 11E; consequently vehicular traffic moving between the two roads must use Washington Avenue and truck traffic must use Persimmon Ridge Road.

To address the regional traffic challenges in the Urban Growth Boundary, several alternate corridors are being proposed and these are illustrated in Figure 21. These new corridors would help relieve congestion on US 11E and provide a more direct connection between SR 81 north and south of US 11E. A combination of the North Historic Jonesborough Parkway and the SR 81 Connector would probably replace the existing SR 81, which uses Main Street and West College Street to traverse Jonesborough. The proposed North Historic Jonesborough Parkway would also provide an alternative to the heavy traffic movement between US 11E and Boones Creek Road.

The proposed South Historic Jonesborough Parkway would began at Old Embreeville Road, probably opposite Jim Town Road, and continue in a northeast direction towards US 11E. North of Mill Springs Road two alternative alignments are possible including one that would probably be incorporated into Headtown Road and the other somewhere west of Green Pond Road. The SR 81 Connector B alignment would also be opposite Jim Town Road, so this facility could provide a link between the SR 81 Connector and the South Historic Jonesborough Parkway. If the SR 81 Connector A alignment is favored, a complete loop south of downtown Jonesborough is probably not feasible. SR Connector A alignment would probably intersect SR 81 at or near Old Tennessee SR 34. The SR 81 Connector would probably intersect US 11E west of Persimmon Ridge Park.

POTENTIAL NEW CORRIDORS IN URBAN GROWTH BOUNDARY

Figure 21

SR 81 in Washington County is a north-south road extending from I-26 at Erwin, TN to I-81 near Harmony, TN. Some sections of SR 81 have a good vertical and horizontal alignment and sufficient lane width and shoulders. By contrast, other sections of SR 81 have poor vertical and horizontal alignment and lack shoulders. It is proposed that regional access to Jonesborough be improved by upgrading deficient sections of SR 81 as shown in Figure 22. Specific sections that need to be improved have not been identified because it was beyond the scope of this project. All improvements are proposed to be along the existing alignment.

Along with Boones Creek Road, SR 75 provides a key regional access link between the heart of Washington County and I-26. In its current configuration, it extends from I-26 in a southwest direction towards US 11E and intersects US 11E just over 1 mile east of Davy Crockett Birthplace State Park. Like SR 81, SR 75 also contains some sections that would benefit from shoulders and improved vertical and horizontal alignment. Hence, it is recommended that plans be initiated to improve SR 75 from its unimproved section southwest of I-26 to US 11E.

To augment the proposed improvements to SR 75, it is also recommended that planning commence on constructing a roadway spur from SR 75 south to US 11E. This proposed SR 75 spur would follow a generally north-south alignment, and perhaps become an improved Leesburg Road near US 11E. A goal of this proposed SR 75 spur is to provide a better connection between the industrial park and the interstate system. This proposed road would also help stimulate other industrial development in this area.

Figure 22 depicts a recommended new roadway link that will have a local and regional impact on the Jonesborough transportation system. As mentioned in a previous section of this report, the connection between US 11E and SR 81 is poor. Currently, cars are directed up and down Washington Drive to make this connection. The intersection of Washington Drive and West College Street has poor geometrics and a sight distance restriction due to a vertical curve on Washington Drive. This proposed connection would allow a more direct and safe connection between US 11E and SR 81. This proposed connection would also be appropriate for the US 11E to SR 81 Truck Route, which is currently signed for Persimmon Ridge Road.

POTENTIAL JONESBOROUGH CONNECTORS IN A REGIONAL CONTEXT

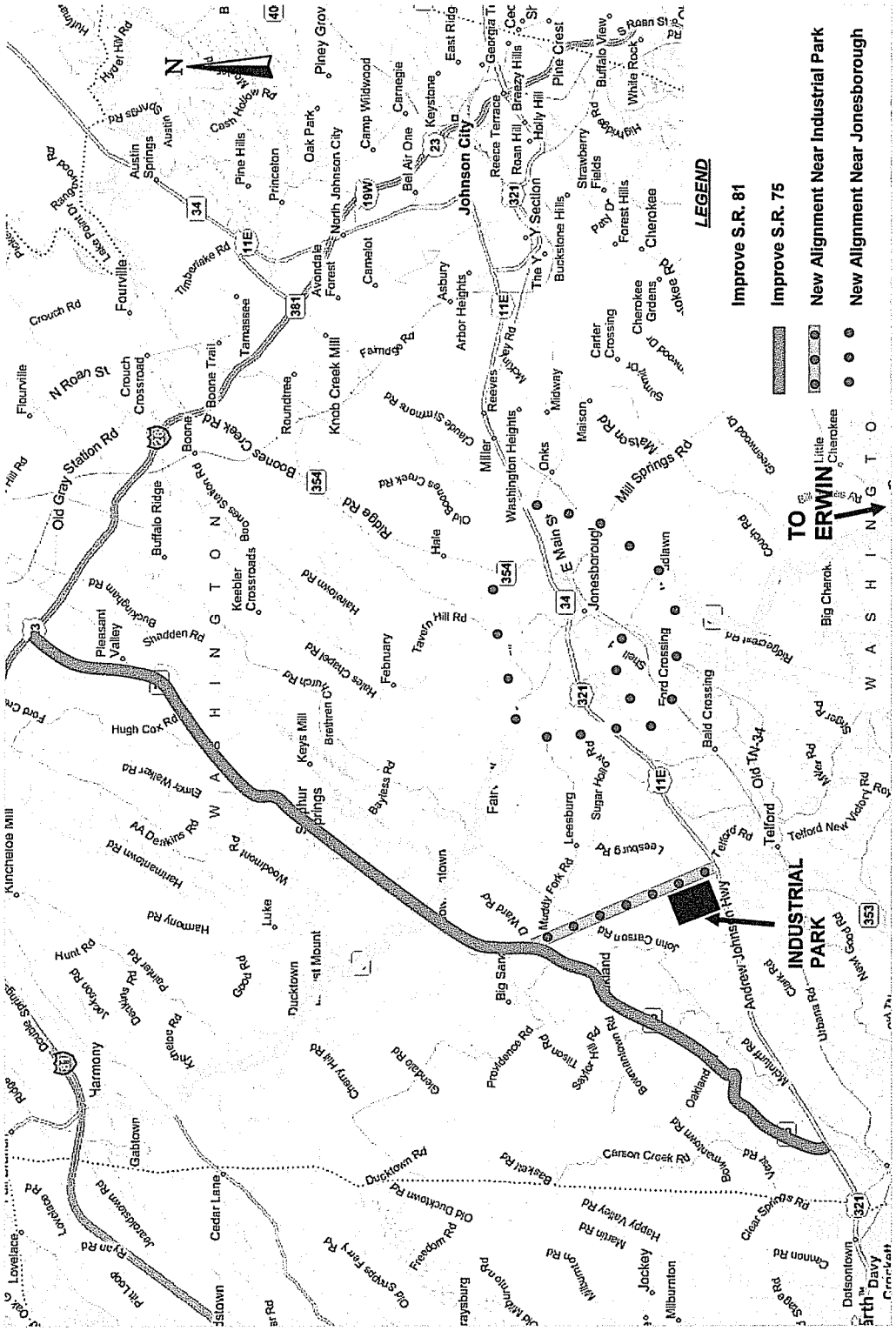


Figure 22

Summary and Conclusions

Listed below are the transportation tasks associated with this study and how they were addressed.

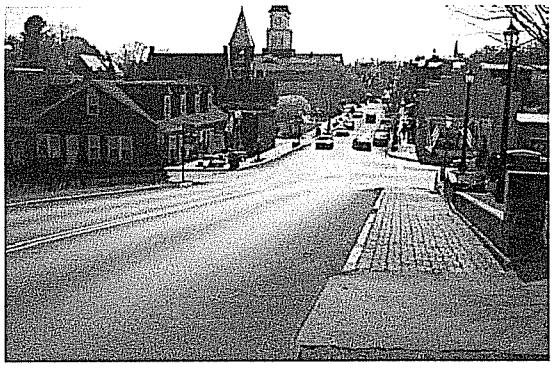
Transportation and Existing Corridor Analysis:

- Review state and county roads leading into Jonesborough considering the improvements that may be needed within the next 5, 10, and 20 years. Determine how well these roads handle existing traffic. *A broad brush planning analysis was performed for all major road links and it predicted marginally acceptable conditions on most roads in 2015 and deficiencies on US 11E and SR 81 in 2032.*
- Review opportunities for frontage or service roads associated with commercial development, limiting access to main arterial corridors and reducing congestion. *The Town of Jonesborough has several current projects whereby they are examining frontage roads and good access management plans. The consultant supports this effort.*
- Study the possibility of creating a transportation grid system in Washington County that would guide future development and avoid overcrowding and over use of arterial corridors. *Wilbur Smith Associates has examined the existing street system in conjunction with terrain and other physical barriers and concluded that a regional grid street system is not feasible.*
- Develop a traffic improvement plan that provides multiple opportunities to reach destinations, reducing congestion and increasing safety and at the same time enhancing opportunities for existing and future business in Jonesborough and western Washington County. *This has been addressed through the detailed analysis of the small area- namely intersection analysis of US 11E and SR 81. Additionally, regional mobility enhancements have been suggested including the Historic Jonesborough Parkway and improved connectivity for SR 81 through Jonesborough.*
- Review gateway corridors into Jonesborough particularly SR 354 because the MPO plans for this roadway to be widened to 4 lanes. Identify potential strategies to accommodate growth in traffic without widening this corridor. *Isolated intersection improvements at Boones Creek Road and US 11E will adequately accommodate the traffic into the long term future. The analysis in this study suggests that widening Boones Creek Road to multilane within Jonesborough or its Urban Growth Boundary is not required.*

Overview of Development along the U.S. 11-E Corridor

While transportation facilities can be designed to support and foster economic activity, it is important to recognize that transportation alone is not a sufficient condition to ***cause*** economic development to occur. Transportation is a crucial link to sustaining existing businesses, attracting other business interests to the area, providing effective customer access to service businesses in the community, and supporting access to employment opportunities throughout the region. Accessibility is also very important to the economic viability of tourism businesses. For many visitors, the road/drive can be part of the adventure providing beautiful view sheds and historic information that allows the visitor to "begin the experience" before they reach the destination.

Most of the roadway networks that connect the Town of Jonesborough to other areas of the region were developed long before communities recognized the important connection between transportation and community and economic development. Today roadway corridors are designed to enhance mobility, safety, and connect people and places. While it might seem beneficial to have "all roads leading to Jonesborough" the existing roadway network within this historic town does not necessarily foster the best mobility or optimize development opportunities for the community in today's economic environment.



The development along much of U.S. 11-E generally follows a traditional linear pattern with a variety of relatively intensive uses concentrated along the highway frontage. A mix of uses are found along U.S. 11-E including farm supply stores, fast food restaurants, the new jail facility and Justice Center, offices, retail and convenience store/gas stations. This development form is common in areas outside of the city/town center and often contributes to traffic problems, repetitive and sometimes nondescript buildings that lack an identifiable sense of place within a community, dependence on automobile transportation as this type of development often does not promote effective pedestrian access, and creates a development pattern that frequently does not optimize efficient utilization of the community's land base or infrastructure particularly for development and tax base purposes.

The "Jonesborough Community Vision Plan" established goals for an *Aesthetic Highway 11-E Business Corridor* that included:

- Parking, landscaping, and signage regulations to guide commercial business development
- New commercial architecture that is complementary to Jonesborough
- Preservation of grass median along 11-E with additional landscaping in median
- Frontage roads or common driveways to minimize curb cuts on 11-E
- Lighting that eliminates light leakage on adjoining residential areas

In recent years, the Town of Jonesborough has worked closely with developers to promote a more clustered development pattern on 11-E where several users access a common driveway and share parking. The town has also promoted the use of landscaping along access corridors to create a more park-like quality of development that is attractive to residents and visitors. This "clustered development model" promotes more compact development around appropriate intersections and designated development "nodes" and promotes better utilization of the town's land base and infrastructure as this type of development utilizes the full depth of the site rather than concentrating only along the road frontage. This clustered development model also promotes more efficient trips for customers as they can travel to one location and complete several tasks, a factor that will become increasingly important to citizens as the price of gasoline continues to climb.

There are a number of advantages for the Town of Jonesborough continuing to promote more clustered development:

- Promotes lower development costs for the Town and often for developers by creating fewer demands on public infrastructure improvements such as utility extensions
- Improves the mobility of traffic by consolidating access points allowing more efficient movement along 11-E
- Preservation of developable land and high quality of development results from minimizing access points and promoting improved entrance landscaping for fewer driveways
- Allows the town to create an identify that establishes a "brand" for Jonesborough that residents and visitors recognize and appreciate

Focus on 11 E Businesses

As a part of this study, WSA conducted a survey of 11 E businesses to assess the competitive advantages and challenges facing these businesses. Sixty businesses located along 11 E within the town participated in this study. Twenty-eight percent of the businesses responding to the survey classified their business operations as retail, twenty percent of the responding businesses were involved in health care, and twenty-two percent of the businesses are financial and insurance firms. The vast majority of the 11 E businesses primarily provide goods and services to local and regional customers although several firms have clients outside of Washington County and some businesses serve clients in North Carolina, Virginia, and other parts of the southeast.

Most of the businesses in Jonesborough are "non-traded" sectors businesses, they exist primarily or exclusively to serve the needs of the local population. Non-traded sector businesses include health care, retailing, consumer services, and most government operations. These businesses are important to the local quality of life and it is reasonable to assume that these non-traded sector businesses will continue to provide the bulk of employment opportunities within Jonesborough in the years to come. It is important to understand that it is not possible to **grow** the overall economy of the region by selling more of these inherently local services to ourselves. Local businesses can grow only as fast as the local market expands, these businesses are dependent on population growth in the community to expand their businesses.

Traded sector businesses sell their goods and services to customers outside of the region bringing in new income that ultimately gets spent locally creating growth locally through multiplier effects. For the Town of Jonesborough, tourism represents an important traded sector business operation. Traded sector businesses can expand much more quickly depending upon national and international economies, these types of businesses are not dependent upon the expansion of the local population to enhance their economic viability. These businesses compete against businesses in other places and effectively "import" money into the community.

While traffic along 11 E is vital to the success of the local non-traded businesses, the traffic congestion frequently impacted by the linear development on this corridor often hampers the ability of customers to access these businesses. Traffic is a two-edged sword for non-traded sector businesses and the results from the 11 E Business Corridor survey support this in Jonesborough. Traffic is also a challenge for the primary traded sector business in Jonesborough, tourism. Visitor accessibility to and

within Jonesborough is critical and the tourism experience can be significantly enhanced through the use of signage, streetscapes, and other related features.

The majority of the business owners who responded to the survey currently live in the Town of Jonesborough and indicated that most of their customers also live in the town. Thirty percent of the businesses said their second largest concentration of customers were located west of Jonesborough in Washington County and twenty-five percent of the businesses had customers from throughout the Washington County region.

Based upon employment the vast majority of the businesses along 11 E are small business operations with fewer than 20 full time employees. Sixty-four percent of these businesses reported that they had the same number of employees this year as they did in 2007 and twenty percent reported that they had added additional employees. Only sixteen percent of the businesses responding to the survey reported that they had fewer employees this year than last.

Often as strip commercial developments age, tenant turn-over increases creating significant problems for building owners that can lead to reduced maintenance, decreasing rents, and higher vacancy rates. Thirty seven of the businesses participating in the study have been in operation for over ten years and forty-seven percent of the businesses have operated at their present location on 11 E for more than ten years. This is not to suggest that vacancy or turn-over rates along 11 E are nonexistent, in fact twenty-seven percent of the businesses have been in operation for less than three years at their current location, but it does indicate a relatively stable business market along this corridor.

The 11 E businesses were asked to evaluate whether they believed their business operations had improved in 2007 compared to previous years and sixty-two percent said that their business had increased. Even more impressive, seventy-eight percent of the businesses said they anticipate their business opportunities along 11 E will continue to improve in the future.

The 11 E businesses were asked to identify the attributes that contribute most significantly to the economic success of their businesses and the top three attributes were:

- Growing local population
- Accessibility of my business to customers
- Reasonable costs for doing business

Attributes contributing the most to economic success of 11 E Businesses

Attribute	Percentage of Businesses
Growing local population	72%
Accessibility of my business to customers	57%
Reasonable costs for doing business	52%
Increasing traffic on 11 E	45%
Skilled Workforce	40%
Development of new housing in community	37%

Also identified as important to the success of these 11 E businesses was the increasing volume of traffic on 11 E, a skilled workforce, and the development of new housing in the community. Businesses participating in the study were quick to point out the advantages of customer loyalty to hometown businesses, the importance of strong communications between the public and private sectors, and the benefits of "knowing" your customers in a small town. Several businesses expressed concern about the town's strong focus on heritage tourism and the Storytelling Center and were encouraged by the emphasis of this study on 11 E businesses and broader transportation issues that affect 11 E businesses as well as other businesses in the community. It may be important in the future for these inherently local businesses to gain a better understanding of the importance of "importing" money into the community and the benefits of tourism and other traded sector businesses to the entire economic fabric of the town.

The three most important challenges facing the economic success of the 11 E businesses included "big box" competition, traffic congestion on 11 E, and rising local unemployment. Businesses were also concerned about the location of newer developments away from Jonesborough, regulations, and the lack of "enough" new housing as important challenges to their future success. While forty-five percent of the 11 E businesses considered the growth of traffic along 11 E as important to their future success they also recognized that traffic congestions on 11 E could have a negative impact on their operation. The efficient movement of traffic and providing for enhanced accessibility from 11 E is clearly perceived as a crucial element to the success of businesses along this corridor.

When 11 E businesses were asked what types of businesses they would most like to see locate in Jonesborough, manufacturing, new industrial employers, and business offices were most frequently sited. There was significant interest in attracting "nice

sit down restaurants" to Jonesborough along with small unique retail stores, and a movie theater. Many of the 11 E businesses wanted to focus on bringing more jobs to the community particularly good paying jobs.

The majority of businesses along 11 E do not experience any change in their operations during special events and activities in historic downtown Jonesborough. Nineteen percent of the businesses experienced a moderate increase in business, those were primarily in the accommodations and food service sectors while thirteen percent of the businesses report a moderate decrease in business during these events. Several businesses suggested that the town might consider some events that would focus customer attention on 11 E businesses.

The 11 E businesses were very clear about the changes that would generate the greatest benefits for their future business success. Sixty-three percent of the businesses want to see more businesses and jobs attracted to the area and forty-eight percent were concerned about providing improved turning movements into their business location. Thirty-five percent of the businesses participating in the survey wanted to see an increase in the free flow of traffic along 11 E through the use of traffic signals, better signage, and the use of turn lanes and median cuts. A number of businesses also wanted to see more marketing activities to promote the town overall. Several businesses were interested in promoting a pedestrian/bike trail that would allow people to walk or bike to different businesses along 11 E.

(Insert Graph here)

As a part of the survey, businesses were asked to identify community issues that were important to them as citizens of the community as well as business leaders. The issues most frequently sited in order of response are:

1) Attracting more economic development to the region
2) Continued population growth
3) Maintaining the unique character of the town
4) More development in the Town of Jonesborough
5) Improved highway access to Jonesborough and Quality of local highways and roads

The quality and price of utilities and zoning and business regulations were also important to area businesses. Thirty-five percent of the participating businesses indicated that the quality and pricing of utility services were important to

Jonesborough. Several businesses expressed concern about attracting big box operations to the town that would compete with smaller existing businesses and also impact the town's water and sewer services.

Several area businesses asked that the town consider optimization of the traffic signals particularly after Lowe's and the Justice Center are completed to improve the flow of traffic along 11 E. Four businesses mentioned concerns about the sight distance on Headtown Road at 11E and additional concerns about congestions on Headtown Road were expressed by other businesses responding to the survey.

The businesses along 11 E are an important part of the Jonesborough economy and there are a variety of options that could improve and enhance their business operation, "brand" this corridor to more effectively link this area of the city with the branding activities that are currently underway in Jonesborough, and improve the flow of destination oriented traffic through the town. The businesses along 11 E are dependent upon transportation networks. These businesses are also very sensitive to congestions issues and when their customers tell them that it is difficult to get into their place of business, delivery trucks have a hard time delivering goods, or traffic back ups during certain peaks times of the day causing some of their customers to go elsewhere, the concerns about traffic congestion become even more pronounced.

The transportation assessment included in this study provides an honest evaluation of the community transportation network serving Jonesborough and this survey of 11 E businesses helps to focus more specifically on how these transportation facilities influence existing businesses. Enhanced transportation networks can help to enhance the sense of community, improve the appearance and scenic quality of the community, and provide a growing base of revenues to support needed public services.

Context Sensitive Design and Solutions

The Town of Jonesborough may want to consider how Context Sensitive Design and Solutions (CSD/CSS) could enhance the transportation and economic development of the town while preserving the historic and small town character of the community. CSD/CSS activities are designed to position transportation projects within the natural and cultural context of the community in order to conserve and enhance important community resources. CSS is a means to an end, a way of doing business that can improve the overall quality of transportation planning and decision-making and provide efficient and environmentally sensitive transportation solutions.

(insert CSS Paris Pike example)

Successful transportation and community planning fosters partnerships to achieve community consensus on future transportation improvements or modal choices that become integrated into the community's vision, goals, and objectives. The businesses along 11E may not be familiar with the term "CSS" but many of the principles they discussed in this study are actually important components of CSS. CSS involves stakeholders in developing transportation plans and facilities that complement the community's physical settings and preserve and enhances scenic, aesthetic, community, cultural, historic and environment resources while maintaining safety, accessibility and mobility.

By applying CSS principles in transportation planning, needs may be stated in terms of a balanced context of economic, land use, quality of life or other community values as well as mobility and safety needs. The goal in using CSS is to develop and/or enhance transportation facilities that fit and work within the physical setting while preserving scenic, aesthetic, cultural, historic and environmental resources.

Jonesborough's "brand" is strongly linked to its historic character and culture. The attractive historic downtown has increased tourism in the region. Using decorative period-style lights, planters, brick sidewalks and other aesthetic features a very special sense of place is further emphasized focusing on the small-town character and civic pride. Expanding this identify to the 11 E corridor is certainly possible and would create economic benefits for local businesses and the town as a whole. Developing a "Historic Gateway Corridor" into the city along Boones Creek Road using CSS principles might benefit the developments along Boones Creek and also create a more appealing entrance into the town.

As the town considers the recommendations of the traffic assessment and economic development recommendations contained in this study in context with the needs and concerns of businesses particularly those along the 11 E corridor, using CSS principles in planning for changes, modifications, as well as new improvements in the transportation network serving Jonesborough will help to build community consensus and a shared understanding of the major sources of change that can impact the future of the community.

Strategies to Enhance Small Town Character and Foster more diverse Economic Development along 11 E

The Town of Jonesborough is truly a unique community that balances heritage preservation, historic buildings, and new urbanist developments with walking trails, unique shops and restaurants, and a commercial corridor along U.S. 11-E that may sometimes seem out of character with the historic qualities of the town but continues to be an important part of the community's economy. Protecting and preserving the unique small town character, historic assets, and enhancing the commercial success of 11 E businesses in the Town of Jonesborough is not only important to the people who live and work here and to the tourism economy, it offers an opportunity to capture additional economic opportunities for the future.

There are a number of tools and strategies that can be used to continue to preserve and further enhance the small town character of Jonesborough. There are also tools and strategies that could effectively revitalize the 11 E corridor and foster better utilization of land, improved traffic flow, and perhaps even allow for façade improvements and redevelopment that would create a special "sense of place" for 11 E businesses that could attract more customers. Many of the tools and strategies outlined in the following section focus on revitalization and redevelopment options to enhance community economic development and improve the related transportation connectivity. Transportation facilities can be designed to integrate, support, and even trigger economic activities that benefit the entire community by evaluating land uses, improving land values and tax revenues, promoting jobs, and attracting capital to the community.

Tools and Strategies to Enhance Small Town Character:

The Town of Jonesborough is nationally recognized for their historic preservation activities. Residents in earlier strategic planning studies identified the importance of preserving the "small town character" of the community and more recently 43% of the 11 E businesses said that maintaining the unique character of the town was a very important issue to them as citizens and business owners. The tools and strategies discussed below focus on maintaining the towns "brand" identity and enhancing the town's sense of place for residents and visitors.

1. Developing entry gateways on 11-E and at Boone's Creek Road using landscaping and appropriate signage can enhance the "brand" identify of the town. Working with TDOT, the town could develop "portals" at the 11-E gateways into the city so that residents and visitors know they have arrived in the "Historic Town of Jonesborough". If Boone's Creek Road continues as a primary visitor access corridor, the town should consider developing a "history corridor story" from I-26 along Boone's Creek Road using special signage to begin to "tell the story" of Historic Jonesborough before visitors actual reach the town.

2. The town has promoted the development of "new urbanism" residential development that promotes better utilization of existing infrastructure, higher densities to preserve common open space, and extension of amenities such as walking trails and enhanced landscaping. Adopting strategies that encourage more traditional commercial and retail development patterns, infill development and redevelopment, and promotes appropriate new development will help the town to extend their "brand" identity throughout the area and create that "sense of place" that is so important today.

   Strategies to encourage and promote "redevelopment or revitalization" of existing retail and commercial corridors is not a simple task. It requires partnerships between property owners, businesses, financial institutions, and the town to find strategies that leverage the desired outcomes. For example, higher density development may be perceived as a negative but from a retail standpoint greater density can mean more customers. Density encourages walkability. More traditional design patterns can be adapted to leverage the revitalization of corridors like the 11 E business corridor.

   The economics of an 11 E revitalization plan should be carefully evaluated working with area developers and property owners to ensure that there is a clear understanding of the additional benefits that can result from a redevelopment program. Businesses and owners should also be educated about traffic improvements, potential for additional customers, and other advantages that could be generated by revitalizing this corridor.

3. Jonesborough enjoys a vibrant and historic downtown with public spaces that create a unique sense of place and identify for the community. Within many older communities there are often opportunities to promote in-fill development and redevelopment that can optimize the use of existing utilities and provide new residential and business development options. Infill development conserves financial resources by taking advantage of existing utility and transportation infrastructure, increases the *walkability* of communities, and allows for new development that can help to add to that special "sense of place" that sometimes gets lost in many newer development projects. Many communities have adopted "Smart Codes" that foster in-fill development and redevelopment compatible with existing development that encourages reinvestment in older areas of the community.

   Several sections of the Zoning Ordinance for the Town of Jonesborough allows for mixed use development and residential development of varying densities, however, it may be beneficial to consider specific regulations that encourage infill and redevelopment in certain areas of town. Sometimes there are barriers to infill development and redevelopment that can be readily resolved by considering allowable exceptions to the existing zoning ordinance and other regulations.

   In evaluating opportunities for infill development the town should consider **physical barriers** such as poor drainage or soils, adjacent uses that may be perceived as less than desirable, or lot sizes that may require costly design solutions. **Regulatory barriers** in existing ordinances and codes that may inadvertently preclude infill or redevelopment options, parking or stormwater management requirements that might make parcels unattractive if not impossible to develop, or requirements relative to smaller lots that may restrict development options. Finally, **economic barriers** that result from higher land acquisition costs for infill sites, higher construction and design costs, and uncertainty about the permitting and approval process.

   There are many benefits that can result from a strategy that encourages infill and redevelopment activities including enhancing the small town character and functionality of the community, creating

greater vitality downtown as more residents and businesses can be located in proximity to the downtown activities, and creating new development opportunities that introduce compatible or complimentary uses to meet community or economic needs. By using context sensitive design it may be possible to develop additional housing, office space, or specialized facilities that blend architectural styles and building scales that are appropriate for the town.

As a part of developing an infill development program, the town should consider compatibility guidelines to insure that new infill structures are compatible with adjacent buildings as well as the overall character of the neighborhood. There are a number of existing "toolboxes" to promote infill development including the "Models and Guidelines for Infill Development" prepared by Maryland Department of Planning, State of Georgia Planning website, and "Smart Growth On-Line".

Depending upon local market conditions, the Town of Jonesborough can enhance the development/redevelopment process and increase the marketability of in-fill sites that can be developed or redeveloped consistent with the town's goals by considering the following strategies:

- Create a vacant property (land and buildings) inventory for the Town of Jonesborough that includes information about parcel or building attributes, location, zoning, ownership, tax status, assessed value, and other relevant information. By identifying the location of vacant parcels and buildings, the Town can develop a database to promote infill development or redevelopment of vacant properties in the town, continue to build upon the historic development patterns, and optimize the utility and transportation infrastructure as well as tax base within the town. This information will be valuable to the town planning and development activities and to developers and real estate brokers.

- Use density bonuses for residential development, desired mixed-use developments, to preserve sensitive or unique environmental areas, or to guide development to preferred locations that make best use of existing transportation and

utility infrastructure. Density bonuses allow developers to increase the maximum allowable development on a property in exchange for meeting certain critical public development goals. For example, a developer might be allowed to increase the square footage or number of units in a development if they agree to make some number of homes more affordable to first time homebuyers, or developers might be allowed to construction additional commercial space on a site in exchange for façade improvements and shared parking.

According to the Urban Land Institute (ULI) shared parking is the use of a parking space to serve two or more individual users without conflict or encroachment. The key goal of shared parking is to find a balance between providing adequate parking to support commercial and retail development and minimize the negative aspects of excessive land area or resources devoted solely to parking. Development that seeks to create a mixed-use, pedestrian-friendly environments can use shared parking to create a "village" setting that provides parking for a number of businesses in a more aesthetic setting.

- There may be opportunities to assemble parcels into larger sites that could support a different type of in-fill development. To increase the marketability of key parcels the Town could play a role in clearing title issues, properly zoning the property, and serving as or finding a conduit to assemble multiple parcels into a single site.

- Funding for infill development or redevelopment can be challenging however, there are public and private programs that can provide financial assistance. Establishing a revolving loan fund could provide some initial capitalization to promote key infill development or redevelopment activities that achieve important town goals. These funds can be created initially from preservation foundations, private foundations, grants to local governments, even the Federal Home Loan Bank Board has participated in revolving loan funds for infill development in the past.

- Although the town's vacancy rate is relatively low, there are vacant or underutilized buildings in town. Those in proximity to the town's historic and commercial areas could become part of a program to attract storytellers and other artists to the town. The Artist Relocation Program, a very successful program developed in Paducah, Kentucky, might be worthwhile to evaluate for the town of Jonesborough. The Paducah program provided flexible zoning that allows dual zoning for commercial and residential uses so that residents can have a gallery/studio, restaurant/café, and their living space all under one roof.

  Working with lenders and other financing entities in Paducah, financing has been provided for purchase and rehabilitation of an existing structure or the construction of a new infill structure. In the Paducah program the city provided initial seed money for architectural services or other professional services that would be needed to develop or redevelop structures. This has been an extraordinarily successful project revitalizing the historic neighborhood of Lowertown and creating an amazing artists community that has attracted artists from around the country.

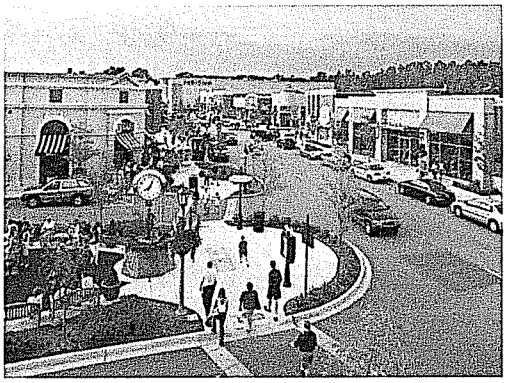
Tools and Strategies to Foster Diversified Economic Development along 11 E

Many 11 E businesses expressed concern about newer developments that have located away from the town of Jonesborough and out-of-region and internet shopping opportunities that take customers away from "home town" businesses. While the 11 E Business Corridor does not exhibit the blighting influences that have plagued many inner-ring suburbs for the past several decades, some of the properties along this corridor could benefit from revitalization activities. As shopping patterns change, the cost of gasoline continues to rise, and concern about traffic congestion continues, the future of strip commercial developments becomes less certain and the need to consider how to revitalization and reposition these areas becomes more important to business and real estate owners as well as the community.

When they were originally developed, strip commercial properties were very competitive often attracting tenants away from older downtowns to stores that provided convenient free parking. Today, strip commercial developments often lack

a sense of place or community and consumers now have a variety of shopping options—shopping centers, new town centers, revitalized downtowns, big-box stores, and mixed-use developments. A common trend with many of these retail options is the increased connectivity to other activities that allow customers to get a number of tasks done in one stop.

The existing linear development pattern along 11-E is characterized by conventional suburban style development that does not provide a strong sense that one is entering some place that is unique and special. These first visual images of the community create a lasting impression about the Town of Jonesborough. The competition from a new shopping destination or big box store is very real and customer demands are changing. While population in Washington County is aging new housing in Jonesborough is attracting new younger families into the community. There is a growing interest in pedestrian-friendly, walkable retail development where customers can shop, dine, purchase services, and be entertained all at one location.



Several recent studies suggest that with increasingly sophisticated shoppers who are offered diverse retail options, the competitive position of many strip centers will eventually decline without a restructuring of their physical layout and repositioning of their market mix to provide a more attractive shopping experience for customers. Over time, many strip developments in many communities have become underutilized and sometimes less than attractive creating "gaps" in the community's development grid. All too often, these linear developments are "out competed" by newer developments in the area drawing jobs and tax base away from existing development corridors. To keep this from happening along 11-E, it is important to understand the lifecycle of these strip developments and work with the businesses and the real estate owners to devise strategies that can enhance these properties and help them remain a vital part of the region's economy.

The following tools and strategies might be considered to revitalize the 11 E Business Corridor, improve the connectivity between the existing linear developments along 11-E, reduce traffic congestion, and develop an identity or brand for this area of the community that is more in keeping with the historic and heritage identify the community has already developed.

- Develop a unifying streetscape plan for the 11-E business corridor that includes appropriate median and street landscaping, a signage strategy for commercial and business uses along the corridor, and wayfinding signage for historic areas and other locations is important. This streetscape plan will help to create a more unified community identity that relates the entire community including the 11-E business corridor with the historic small town character

- Prepare a revitalization/redevelopment plan for the 11 E Business Corridor. Identify a specific vision for the corridor, improvements needed to bring the corridor in line with the vision, work with business and property owners to develop clear design goals to improve signage, store fronts, opportunities to eliminate curb cuts in exchange for increased building square footage, strategies to promote shared parking (see ULI Shared Parking Manuel), improved landscaping, installation of sidewalks or other safety features, as well as other improvements. Local real estate professionals will have ideas about how this corridor could be made more attractive to customers.

  Working collaboratively, it may be possible to define a redevelopment plan for 11 E that can achieve a number of economic benefits and improve the traffic flow for the community and businesses along this corridor. Access into business nodes could be improved perhaps eliminating some curb cuts and providing improved signalization and turning lanes into shared parking areas. If consensus can be reached on a revitalization/redevelopment plan it should be formally adopted along with an implementation strategy that defines public improvements to be made over time, funding and financing options, and schedules for implementation of specific tasks.

- Identify opportunities to reconfigure larger parking or open areas associated with retail and commercial businesses along the 11-E business corridor to maximize the development or redevelopment potential of a number of parcels along the corridor. This can be accomplished by using a variety of tools to

allow for greater density of building development, creating opportunities for shared parking between existing buildings, eliminating some of the existing curb cuts, promoting mix-use and lifestyle center type developments, and other development options that could result in a more "historic" feel within the existing developments and a more urban relationship between the buildings and the roadway corridor.

With careful planning, it may be possible to reduce the size of certain parking areas, reduce the total number of curb cuts, improve landscaping and signage, allow for construction of additional buildings and link façade improvements of existing buildings to the increased development density.

The development of The Village of Rochester Hills in Michigan (shown in photos) is an excellent example of a commercial redevelopment project. Completed in 2002, this new 375,000 square foot redevelopment was built on and around an older retail development. This project created a pedestrian scale marketplace-style shopping experience with small green spaces with benches for relaxing. There's even a playground, restaurants, and offices in addition to retail.

- By allowing for more intense development on certain key parcels careful planning will be required to manage storm water and other environmental affects. The use of low impact design strategies can be very beneficial under these

conditions to provide better storm water management systems in non-traditional settings.

- Retail and business environments evolve and must find ways to meet the expectations of their customers. Increasingly retail development and other services are being integrating into a "total destination" where people can shop, work out, and buy a prepared dinner to take home. As customer demands change, Jonesborough must anticipate and evaluate how the town can help businesses and property owners to respond. There is a growing interest in mixed-use projects with amenities like sit-down restaurants, cultural activities, entertainment, and recreational opportunities. Jonesborough can begin to take steps to create an 11 E Business Corridor that *fits* the community's brand.

- Consider creating an "11 E Business Improvement District". Business Improvement Districts or BID's are a legal mechanism that allow private businesses and property owners to tax themselves to fund special services, projects, and activities that will improve a defined business district. These projects or services might include funds for joint targeted marketing and advertising, special corridor banners, support for special events that would attract customers to the corridor, and other activities or projects that the businesses decide they need or want.

- Overlay zones provide a regulatory tool that essentially creates a special zoning district that is put in place over an existing base zoning. An overlay zone can be used to establish additional development requirements for future projects, it can be used to facilitate higher development densities, enhance the character of an area or create a special district. Unlike a Business Improvement District, an overlay zone can be used solely as a control mechanism for the community. Generally overlay zones have a specific purpose to achieve and clear rules or guidelines must be established to insure that those goals are achieved.

- An overlay zone may provide an appropriate tool to implement changes in building setbacks, density standards, reduction of

existing parking area requirements, and other features to facilitate improvements within the 11 E corridor. Great care must be taken when developing new parking standards to insure that the peak hour needs of all of the businesses are considered along with other unique requirements that should be evaluated. These requirements must be discussed with property owners and businesses well in advance of approval and it is usually advisable to develop certain incentives or inducements to effectively engage property owners in acceptance of additional control requirements. Overlay zones have been used effectively in a number of communities to promote mixed use development and "village" type design features.

- Identify opportunities on 11-E to link existing commercial development nodes by developing pedestrian paths and/or bike trails that would enable customers to walk between several developments safely

- Identify opportunities to eliminate curb-cuts along 11-E and create shared access points in exchange for redevelopment incentives, density bonuses, or other benefits.

- In additional to encouraging infill development, density bonuses can be used to help vitalize the 11E business corridor. Consider using density bonuses to increase the maximum allowable building development on parcels in exchange for achieving important community development goals such as façade improvements, eliminating curb-cuts, installation of planned landscaping, improved signage, and other features that create an identify and can enhance economic viability. Density bonuses are usually tied to zoning ordinances and can also be associated with subdivision regulations. These density bonuses are generally related to specific community goals and objectives such as encouraging infill development; promoting building façade improvements or advancing smart growth strategies that optimizes the use of existing utilities, protects open space or creates a public amenity such as a public plaza or pedestrian walkway.

In using density bonuses, it is critical to clearly define the areas where bonuses are allowed linking them to the goals and objectives they are designed to promote. For example, if density bonuses are used to enhance the community brand along the 11-E business corridor within Jonesborough, then land within that specific corridor would be included. Specific policy and legal language is required to insure that the allowable densities, development standards, provisions for assuring that amenities are created, and other features are clearly defined.

- Enhance the region's understanding of the development process in Jonesborough. Many regional and national developers may assume that development in an historic town like Jonesborough is very challenging. In actuality the town's development process is very similar to a public-private partnership. The Town of Jonesborough has instituted a number of very progressive development practices resulting in improved developments and the town continues to work **with** developers to achieve the best outcome for the community. To help foster even more high quality development it is important for developers to clearly understand the development process in Jonesborough.

  The town might consider developing a written "Development Guide for Jonesborough" that could be use to inform and also to promote development opportunities within the town. With the creation of a "Development Guide for Jonesborough" the town could provide a concise tool that would outline the community's development goals, establish clear steps to be followed in the development process, and provide information about a seamless and streamlined process that would help attract even more developers and encourage them to tackle more challenging projects because they understand how the process works and can reasonably predict the time involved. A development guide could include specific performance requirements, the town's historic design guidelines, describe any development incentives that the town might offer, and provide names and contact numbers for information and planning assistance in additional to providing information about ordinances and regulations.

As a part of the development process Jonesborough may want to consider requiring Traffic Impact Studies for developments that will generate a certain level of traffic. In many East Tennessee towns and cities, the development process requires that a Traffic Impact Study (TIS) be prepared for projects that are expected to generate a minimum number of daily or peak hour trips. The TIS usually covers the immediate access points and nearby intersections. The Lowe's development is an example where a TIS was prepared. The Town of Jonesborough should carefully consider requiring traffic impact studies to insure that good corridor access is maintained and site plans meet minimum traffic engineering standards.

People go to places that they find appealing. As travel patterns changes due to rising gasoline prices many customers will limit trips and try and group tasks. All things being equal, people in Jonesborough would likely prefer to do business with local businesses and limit driving around to multiple locations. Jonesborough recognizes that the traffic conditions in the town have an impact on their ability to attract businesses, visitors, and new residents that enhance the community's economy. By considering various options to improve existing transportation corridors, revitalize existing business and commercial corridors, and implement more smart growth strategies, Jonesborough can realize improved tax base, preserve their unique historic and small town characteristics, and continue to foster an excellent quality of life.

Tools and Strategies to Foster more diversified Economic Development opportunities:

Transportation connections are important to economic development. Workers need access to jobs and employers want access to a quality workforce. Manufacturers need to receive raw materials and other components and then send their finished products to consumers and other businesses. Retailers receive consumer goods and they want customers to be able to reach their stores so that they can purchase those goods. Tourists and business travelers want access to regional attractions, lodging, and local services and transportation accessibility is particularly important to them.

There are several significant tourism studies currently underway in Jonesborough. The Ralph Appelbaum study is developing an interpretive master plan for Historic Jonesborough and Destination Development is working on a branding study. These studies will focus specifically on tourism and the important role that tourism plays not only in Jonesborough's economy but the economy of all of upper east Tennessee. According to "The Economic Impact of Travel on Tennessee Counties 2004" study conducted by the Travel Industry Association of America, Washington County ranked 10th in expenditure levels for tourism.

Many factors influence tourism expenditures including the availability of a range of lodging and restaurant options, access to tourism services, the quality and diversity of attractions and tourism "products" that are of interest to a range of age groups and income levels; accessibility of the area on safe and reliable roads; the availability of marketing and advertising funds that increase public awareness and the brand identify of the region. Rising fuel costs will have a significant impact on visitor travel and the importance of expanding the community's brand to the 11 E corridor and providing walkable connectivity will continue to be important to visitors.

The sufficiency of transportation connections are a growing concern to many regional businesses and economic developers throughout upper east Tennessee. The survey of 11 E businesses clearly indicates their concern about the impacts of traffic congestion and also their desire to see an increase in the number of vehicles that travel along 11 E that represent their customer base. Increased competition in the global marketplace, rising fuel costs, and traffic congestion around key interchanges are putting the squeeze on many businesses in the region and presenting a unique challenge for the long term economic development of Jonesborough.

As the global marketplace continues to evolve, the needs of businesses in the region are being transformed and new economic opportunities are emerging. A strong and diversified economy in and around Jonesborough is essential to the well-being and quality of life for all citizens. A healthy, growing economic base that enables the region to compete with other areas of the country provides employment opportunities and community prosperity for the entire region. Jonesborough is uniquely positioned to stimulate additional economic opportunities that can create new jobs, income, and tax base for the community and the broader region. It is important for Johnson City and Washington County to understand the unique advantages that the Town of Jonesborough can contribute to the regional economy in the future and assist the town in their efforts to capitalize on those assets.

In many ways, Jonesborough's economy is tied to the economy of Johnson City and Washington County and ultimately to the global economy. The most strategic economic opportunities for the town of Jonesborough will come from continuing to collaborate with regional economic development partners and building on unique assets that complement the town's existing strengths including the unique character and "Brand" of the town, the heritage and historic tourism assets, new opportunities for quality development and redevelopment, and continued strategic growth in housing development.

In the past the most significant predictor of population growth was the growth of employment opportunities. Recent analysis of population migration data shows that the strongest job growth is consistently taking place in regions where young, educated families want to live. In the book A Whole New Mind: Moving from the Information Age to the Conceptual Age, by Daniel Pink, the emerging community characteristics that are important to attracting and retaining talented knowledge workers are analyzed in detail. Interestingly, many of the community characteristics describe as attractive qualities in Mr. Pink's book are readily found in the Town of Jonesborough including:

- Performing Arts; Historic Preservation
- Civic involvement; diversity of interests
- Recreational variety; whimsical architecture and natural spaces
- Number of faith-based organizations; connectivity to the global economy and society

While many larger cities have focused on attracting the young urban single professional, recent research indicates that it is the young professional families who are becoming the primary economic drivers and the key workforce that most

businesses want to attract. Increasingly, housing costs are having a significant impact on corporate decision makers and on the employees that they want to hire and retain. According to an analysis of migration data by Praxis Strategy Group, the ability to attract these young professional families long term is more a function of offering a range of economic opportunities, affordable housing, and family friendly communities that are not too distant from work than it is a function of bright lights and hip stores.

The key to successful economic development in any community is understanding the community's assets and competitive advantages, being realistic about challenges, and building on what you already have. Those young professional families are looking for appealing communities, that special ***PLACE*** where they can live, work, shop, and play.

The following tools and strategies can assist the Town of Jonesborough in their efforts to further diversify the town's economy and continue to enhance the historic and heritage identify the community has already developed.

- Working with the Washington County/Johnson City/Jonesborough Economic Development Board, develop a business retention program specifically focused on the 11 E business corridor. The economy is changing rapidly and these changes have a profound impact on regional businesses. It is vital to the region's economy to continue to attract and retain traded sector businesses that bring new money into the community. However, a retention program focused on small businesses in Jonesborough could create important benefits for the region. Developing stronger relationships between the business community, the Town of Jonesborough, and the EDB helps local businesses realize how important they are to the community and also makes them more aware of the many business services that are already available in the region to help and support them.

- A business incubator to support the development and growth of entrepreneurial businesses perhaps focused on the historic preservation, storytelling, and related tourism business cluster in the region. The National Business Incubator Association has a wealth of information about creating and operating business incubators. It might be possible to affiliate a business incubator with ETSU or Northeast Community College particularly linked to their business programs, tourism management, or other specialized activities. There are a number of successful business incubators in Tennessee that have helped to span new technology firms, small specialized manufacturing

businesses, advertising and publishing businesses, and other niche market businesses.

- Support the expansion of the Washington County Industrial Park and evaluate potential design standards for the park as it expands to insure that it will remain a "good neighbor" in the future as the town boundaries expand. Use of landscaping, berms, lighting and noise controls, and other minimal standards will help to minimize any public opposition to increasing the size of the industrial park.

- Create a "scenic heritage trail" that lead to Jonesborough and evaluate how a scenic heritage trail could be linked with other scenic highways in the region. Kentucky has developed a number of targeted trails including the Artisan Heritage Trail, the Kentucky Bourbon Trail, the Summer Theater Trail, the Barbeque and Bluegrass Trail, and the 400 Mile Sale Trail. The Kentucky Department of Tourism web site provides information about each trail, sites of interest, local events, maps, and local communities have found these trails to be very successful in helping them attract an expanded visitor base to their areas.

- The potential new corridors within the town's Urban Growth Boundary offer opportunities for new greenfield development. As the discussion of these corridors moves forward, it be will important to consider the utility services needed to support development, master planning these areas to insure that development can be accomplished in accordance with the town's goals and smart growth strategies, and zoning and other standards and controls should be in place well in advance of the corridor development.

  These new corridors will open up several outstanding areas for economic development activities. The town should begin working with the Washington County Economic Development Board to evaluate strategies tracts that could be targeted for a new business park. There are a number of financing strategies and joint venture opportunities that could be considered to facilitate the development of this development particularly along the SR 81 Connector.

There are ten principles of Smart Growth that have been recognized by the International Economic Development Council as important to smart growth development, jobs, wealth, and quality of life. Those principles of smart growth are:

- Mixed land uses
- Use land efficiently
- Create a range of safe, convenient, and affordable housing opportunities and choices
- Create walkable neighborhoods
- Foster distinctive, attractive communities with a strong sense of place
- Preserve natural lands, farmland, and critical environmental areas
- Strengthen and direct development toward existing communities
- Provide a variety of transportation choices
- Make development decisions predictable, fair, and cost-effective
- Encourage community and stakeholder collaboration in development decisions

Job opportunities, homes, shopping, and recreation in and adjacent to Jonesborough increase business opportunities, helps to create a sense of place, and will continue to attract new residents who want to live in a town that has preserved its history and continues to nurture the small town characteristics that make it a special community.

Future Transportation Alternatives

- Study opportunities for new construction that will increase alternative routes to various destinations. *The north and south Historic Jonesborough Parkway as well as the SR 81 Connectors are recommended for further study and analysis.*
- Study alternatives to link County and State routes feeding into Jonesborough with arterial routes serving Johnson City. *The north and south Historic Jonesborough Parkway achieves this objective.*
- Determine the viability of a north-south connector from I-26 to I-81 using the SR 81 corridor through or around Jonesborough. *An alternative to SR 81 in Jonesborough is being proposed.*
- Study alternatives to provide safe and convenient truck and car traffic connections from I-81 to Jonesborough, western Washington County, and to the Washington County Industrial Park. *Improvements all of SR 81 and SR 75 are proposed. The study also proposes a SR 75 spur that would connect SR 75 with US 11E.*

- Incorporate currently planned traffic related improvements in western Washington County, Jonesborough, and Johnson City into the economic development plan.