CITY OF JOHNSON CITY, TENNESSEE

TRANSPORTATION ELEMENT

COMPREHENSIVE PLAN

Johnson City's transportation system is comprised of a variety of elements including interstate highways, a local road system, alleys, mass transit, sidewalks, bike lanes, railroad lines, and air transportation. In addition, there are amenities supporting the transportation network such as off-road trails, which are discussed extensively in the Bikeway/Greenway Plan. The transportation system is designed to balance safety, service, cost, community character, and convenience. Each element of the transportation system is complementary to the others and serves the community as a network.

PURPOSE OF THE PLAN

As Johnson City continues to grow and develop, the land use and traffic characteristics change. The purpose of this report is to analyze those changes, evaluate existing transportation systems, and make recommendations for improvements. This report is intended to study the city's transportation network as a multi-model system and evaluate each mode (sidewalks, bikeways, streets, and public transit) to determine areas of deficiencies and to offer recommendations to improve each system. This element has been divided into four separate plans; the Bikeway-Greenway Plan, the Sidewalk Plan, the Public Transit Plan, and the Major Thoroughfare Plan, all dealing with population mobility.

PREVIOUS PLANNING EFFORTS

Johnson City has had an ongoing planning program that has responded to growth issues and pressures facing the city. The following actions summarize previous planning efforts related to transportation:

1946 – Tennessee Department of Transportation (TDOT) Study

1959 – Traffic and Parking, Wilbur Smith and Associates for TDOT

1968 – Johnson City Tennessee Transportation Study, TDOT

1971 – General Plan, the city of Johnson City

1985 – Major Thoroughfare Element of the General Plan, the city of Johnson City

1990 and 1995 – Sidewalk Plan, the city of Johnson City

1996 – Long Range Transportation Plan, Johnson City Metropolitan Transportation Planning Organization (Johnson City MTPO)

2005 – Updated Long Range Transportation Plan, Johnson City MTPO

SIDEWALK PLAN

PURPOSE OF THE PLAN

The purpose of this plan is to update the 1995 Sidewalk Plan and to continue the development of a connected network of sidewalks that allow residents to walk in their neighborhoods and surrounding areas, as well as to destinations such as schools, parks and recreational facilities, shops, work, churches, and public transit facilities.

Walking is the most accessible mode of transportation, and studies have shown that walking is the most common recreational activity in the nation. Improving the pedestrian environment enhances residents' quality of life, health, and provides an important transportation option. Sidewalks allow walking and jogging while being safely separated from vehicular traffic. Improving the pedestrian environment will also bring benefits associated with reducing vehicular traffic.

It is estimated that nationally over 25 percent of the adult population cannot drive due to advanced age, disability, or financial limitation. It is important for the city to accommodate the needs of all of its citizens and not just those who drive.

The support for more sidewalks is reflected in the Citizen Survey where 71 percent of residents surveyed stated that they would walk more often if safe sidewalks were provided. These opinions are similar to those expressed during the Dover-Kohl led design workshops in 2000, where many residents expressed a concern about the lack of sidewalks in their neighborhoods.

EXISTING INVENTORY

A comprehensive inventory and inspection of the city's sidewalks was conducted by the Public Works Department in the summer of 2005. The inspections were completed using a specified rating system: New, Good, Fair, or Poor.

New - Sidewalks built within the last five years.

Good - Slightly to moderately weathered, slight distress, slight hairline cracks.

Fair - Severely weathered or slight to moderate levels of distress.

Poor - Moderate to severe distresses including load related types such as "alligator" cracking.

There are approximately 176 linear miles of sidewalks in Johnson City. Overall, the condition of the city's sidewalks are in good repair. Seventy-eight percent (138 linear miles) of the sidewalks were rated either new or in good condition. Eighteen percent of the sidewalks were rated in fair condition (32 linear miles) and only three percent (5.3 linear miles) were rated in poor or substandard condition.

Table 1: Sidewalk Conditions

Condition	Linear Feet	Linear Miles	Percent of Total
New	135,532	25.67	14.5%
Good	595,269	112.74	64.0%
Fair	171,850	32.55	18.5%
Poor	27,943	5.29	3.0%
Total	930,594	176.25	100.0%

Source: Johnson City Public Works Department, 2005

BENEFITS OF SIDEWALKS

There are a number of benefits associated with sidewalks. These include:

1. Reduced Congestion

Sidewalks serve as critical links in the transportation network providing pedestrian access to commercial districts, schools, businesses, government offices, and recreation areas. In addition, for mass transit to be effective, users must be able to walk between transit stops and other destinations of interest.

2. Increased Mobility

It is estimated, that one-quarter of the adult population in the U.S. cannot drive due to advanced age, disability, or financial limitation. In 2000, the percent of households in Johnson City that did not own a car was 10.1 percent[1]. This compares with 7.7 percent statewide and 10.3 percent nationally. Providing other transportation options such as sidewalks for this segment of Johnson City's population is critical to their quality of life.

3. Property Values

By making neighborhoods safer and more livable, well-planned pedestrian facilities can raise property values and marketability. A 1998 report by the Real Estate Research Corporation determined that, over the next 20 years, real estate values will rise faster in neighborhoods with safe pedestrian networks.

4. Public Health

People across America are suffering from air pollution to a large degree caused by vehicle emissions. Each summer, high smog levels cause some 159,000 trips to the emergency room, 53,000 hospital admissions, and 6,000,000 asthma attacks nationwide.

5. Health Considerations

There are a number of health benefits to consider, they include[2]:

- Nearly one in three Americans are obese;
- Estimated cost of physical inactivity in the United States is $37.2 billion annually;
- Seventy-four percent of Americans are not physically active on a regular basis and 28 percent of those do not participate in any physical activity;

[1] U.S Bureau of the Census, 2000

[2] National Center for Bicycling and Walking

- Between 1977 and 1995 the number of trips the average American adult took on foot each year dropped 21 percent;
- Regular physical activity reduces the risk of developing diabetes, high blood pressure, and colon or breast cancer;
- Regular physical activity lowers blood pressure, helps build and maintain healthy bones, muscles and joints, and promotes psychological well-being; and
- Communities that develop pedestrian and bicycle-friendly infrastructure with links to destinations of interest have more physically active residents.

6. Death and Injuries[3]

- Each year 6,000 pedestrians are killed and 90,000 are injured nationally. One in five is a child;
- A person is 36 times more likely to be killed walking than driving a car. A person is 300 times more likely to be killed walking than flying;
- Less than 6 percent of Americans' trips are on foot, yet 13 percent of all traffic deaths involve pedestrians;
- For every pedestrian killed by a car, at least 14 more are injured; and
- Almost 60 percent of pedestrian deaths occur in places where no crosswalk is available.

SIDEWALK PRIORITY

Because there is a great need for sidewalks throughout the city and only limited funds for construction available, a scoring system was developed to objectively rank the priority of sidewalk projects. Criteria to rank these projects include:

1. Pedestrian Trip Generators

Priority should be placed on completing sidewalks in close proximity to the following pedestrian trip generators:

- Proximity to schools: all elementary schools, Indian Trail Middle School, the Liberty Bell/Science Hill Complex, and East Tennessee State University;
- Park and recreational facilities;
- Public buildings;

[3] Mean Streets 2000: Pedestrian Safety, Health and Federal Transportation Spending. Surface Transportation Policy Project.

- Streets serving commercial and employment centers;
- Community and Senior Citizens Centers; and
- Proximity to Johnson City Transit Routes.

2. Street Classifications

Points should also be awarded based on the classification of the street. Street classification indicates relative volume and speed, both of which can create an unsafe or uncomfortable environment for pedestrians when there are no sidewalks. Because arterials have higher traffic volumes and speeds and present a greater safety hazard, they should be awarded additional points.

3. Completing Networks

If a segment of sidewalk is missing on a route that would otherwise complete a sidewalk network, additional points should be awarded.

Table 2: Summary of Scoring System

Feature	Point Value	
Pedestrian Trip Generators	1/4 Mile Radius	1/2 Mile Radius
Schools	25	10
Parks and Recreational Facilities	20	15
Public Buildings	10	5
Community/Senior Centers	10	5
Major Commercial/Employment Centers	15	10
Street Classification		
Arterial Streets	15	
Collector Streets	10	
Other Considerations		
Close Proximity to Transit Route	10	
Completing Sidewalk Networks	15	

Source: Johnson City Planning Department

The highest scoring project had a score of 80. It included a section of Pactolas Road between Knob Creek Road and Liberty Bell Boulevard.

Two projects each had scores of 75. They include: a section of Knob Creek Road between West Market Street and Peachtree Street and a two-mile section of East Oakland Avenue between Princeton Road and East Holston Avenue. Because of its length along East Oakland Avenue, this collector street passes by the Princeton Arts Center, Rotary

Park, and within one-half mile of Fairmount Elementary School, Saint Mary's School, and Civitan Park.

All three projects are located near schools, complete sidewalk networks, and are on public transit routes.

Table 3: List of Sidewalk Improvements

Road Segment	From	To	Length in Feet	Collector/ Arterial Streets	Proximity to Schools	Proximity to Parks/Rec Facilities	Public Buildings Community/ Seniors Centers	Major Comm./ Employment Centers	Complete Network	Transit Route	TOTAL	Approx. Cost
Pactolas Rd	Knob Creek Rd	Liberty Bell Blvd.	700	10	25	20			15	10	80	$ 17,500
East Oakland Ave	Princeton Rd	E. Holston Ave	10,500	10	10	20	10		15	10	75	$ 262,500
Knob Creek Rd	W. Market St	Peachtree St	1,600	10	10	20	10		15	10	75	$ 40,000
Knob Creek Rd	Pactolas Rd	South approx. 1,000'	1,000	10	25	20			15		70	$ 25,000
Indian Ridge Rd	W. Market St	State of Franklin Rd	5,100	10		10		15	15	10	60	$ 127,500
Sunset Dr	Sundale Rd	I-26	3,700	10	10			15	15	10	60	$ 92,500
Carroll Creek Rd	Bristol Highway	N. Roan St	17,000	10	25	20					55	$ 425,000
West Market St	Center St	City Limits	12,800	20		10		15		10	55	$ 320,000
Woodland Ave	E. Oakland Ave	E. Lakeview Dr	5800	10	10	10			15	10	55	$ 145,000
Morningside Dr	Knob Creek Rd	Pactolas Rd	950		25	10			15		50	$ 23,750
North Roan St	Browns Mill Rd	Mountain View Rd	7,000	15	10			15		10	50	$ 175,000
Cherokee Rd	University Parkway	Cherokee Elem Sch.	12,500	10	25					10	45	$ 312,500
Bristol Highway	N. Roan St	Carroll Creek Rd	15,000	15		20				10	45	$ 375,000
Southwest Ave	Cherokee Rd	ETSU	2,500	10	25					10	45	$ 62,500
Antioch Rd	W. Walnut St	Willow Springs Park	7,100	10		20				10	40	$ 177,500
John Robert Bell Dr.	Seminole Dr	J.L. Seehorn Jr. Rd	400		25				15		40	$ 10,000
E. Main St	Broadway	City Limits	7,200	10		20	10				40	$ 180,000
Milligan Highway	Kings Spring Rd	Cedar Grove Rd	5,000	10	10	10				10	40	$ 125,000
Lone Oak Rd	S. Greenwood Dr	Cherokee Rd	4,400	10	25						35	$ 110,000
Orleans St	Broadway	E. Main St	2,100		10	10			15		35	$ 52,500
Browns Mill Rd	Peoples St	Chapman St	3,800	10	10					10	30	$ 95,000
Buffalo Rd	S. Roan St	Cherokee Rd	8,200	10		20					30	$ 205,000
Huffine Rd	W. Walnut St	Willow Springs Park	3,500	10		20					30	$ 87,500
Old Gray Station Rd	N. Roan St	City Limits	9,500	10					15		25	$ 237,500
Austin Springs Rd	E. Oakland Ave	City Limits	5,000	10			10				20	$ 125,000

Table 3: List of Sidewalk Improvements (continued)

Road Segment	From	To	Length in Feet	Collector/ Arterial Streets	Proximity to Schools	Proximity to Parks/Rec Facilities	Public Buildings Community/ Seniors Centers	Major Comm./ Employment Centers	Complete Network	Transit Route	TOTAL	Approx. Cost
Browns Mill Rd	Carroll Creek Rd	Mountain View Rd	4,200	10	10						20	$ 105,000
E. Mountainview Rd	Bristol Highway	N. Roan St	9,000	10						10	20	$ 225,000
Forest Ave	Baxter St	E. Oakland Ave	3,500		10	10					20	$ 87,500
Indian Ridge Rd	W. Market St	Baldridge Dr	5,500	10	10						20	$ 137,500
Mayflower Rd	S. Roan St	Old Lewis Rd	2,500	10						10	20	$ 62,500
Old Lewis Rd	Tall Oak Circle	S. Hill Drive	3,000	10						10	20	$ 75,000
S. Roan St	University Parkway	Primrose Ct	12,200	20							20	$ 305,000
Swadley Rd	Plymouth Rd	Milligan Highway	2,500	10						10	20	$ 62,500
West Lakeview Dr	E. Mountcastle Rd	E. Oakland Ave	4,000	10	10						20	$ 100,000
Boones Creek Rd	JCPB	The Ridges	15,000	10							10	$ 375,000
Boones Creek Rd	Browns Mill Blvd	Lake Park Dr	2,500	10							10	$ 62,500
Carroll Creek Rd	N. Roan St	Browns Mill Rd	4,000	10							10	$ 100,000
Carter Sell Rd	W. Walnut St	McKinley Rd	3,500	10							10	$ 87,500
E. Watauga Ave	Canterbury Rd	City Limits	10,800	10							10	$ 270,000
Plymouth Rd	S. Roan St	Swadley Rd	2,000	10							10	$ 50,000
S. Greenwood Dr	Colony Park Dr	City Limits	5,500	10							10	$ 137,500
W. Mountainview Rd	N. Roan St	W. Oakland Ave	8,500	10							10	$ 212,500
W. Walnut St	CSX Railroad	Sunny Slopes Dr	11,400	10							10	$ 285,000

Source: Johnson City Planning Department, 2005

CONSTRUCTION COST

The cost to construct sidewalks can vary greatly depending on whether they are included in the reconstruction of a roadway or if the project is being built along an existing roadway. Items such as grading, utility relocation, culverts and pipes, curb work, tree removal, and an occasional property acquisition can affect each project differently.

For the purpose of this plan, it has been estimated that the cost to build a five-foot wide concrete sidewalk is $25 per linear foot. This is based on recent (2005) bid contracts submitted to the city by private contractors. If the city bids out the work, this is approximately what it can expect to pay. If the city utilizes its Public Works Department crews, the sidewalks can be built at a reduced cost.

FUNDING SOURCES

Funding for sidewalk improvements typically is included in the city's general fund or as part of a road project. Another method the city utilizes is to require developers to install sidewalks as part of their development. The city currently requires developers to construct sidewalks along the street frontage of all new commercial, office, and multi-family developments. In addition, the city requires developers to construct sidewalks along proposed streets in all new subdivisions. In the foreseeable future, these methods will remain the most viable tools for constructing sidewalks. However, there are a variety of sources, programs, and mechanisms available to fund sidewalk improvements.

1. Federal Funding

In 2005, the Safe, Accountable, Flexible, Efficient, Transportation Equity Act: A Legacy for Users (SAFETEA-LU) was approved providing funding for highways, highway safety, and public transportation. The primary goals of SAFETEA-LU are improving safety, reducing traffic congestion, improving efficiency in freight movement, increasing intermodal connectivity, and protecting the environment. SAFETEA-LU will continue to fund many of the former TEA-21 programs for pedestrian improvements. In addition, a program has been created under SAFETEA-LU to address the increasing problem of child obesity. The Safe Routes to School Program is an initiative that provides increased sidewalks near schools thereby promoting greater physical activity. The program provides specific funding to local authorities for the construction of sidewalks, traffic calming, and bicycle facilities in order to provide safer routes to schools. This program also requires a 20 percent local match for participation.

2. Surface Transportation Program (STP)

Projects eligible for funding under this program include construction, reconstruction, and rehabilitation of any Federal-Aid Highway, rural minor collector, or bridge project on any public road. Sidewalk construction is an eligible activity provided the roadway is on the State Functional Classification System. All projects funded by the STP must be included in the Johnson City Metropolitan Planning Organization's Transportation Improvement Program (TIP) which is a three- to five-year capital plan for roadway construction and multi-modal transportation improvements. This program also requires a 20 percent local match for participation.

3. Property Owners

The 1990 Sidewalk Plan called for the construction of sidewalks in existing subdivisions through the use of Special Assessments Districts. This would be a voluntary program where neighborhoods would have the choice of participating. The amount of the assessment would amount to no more than two-thirds of the sidewalk construction cost and would be paid over time through an increase in property taxes. The city would contribute the remaining one-third cost. Since the sidewalks would generally benefit the neighborhood residents, it is reasonable to expect the residents to pay a portion of the construction cost.

Johnson City's Code of Ordinances also includes provisions to require property owners to construct sidewalks when the Board of Commissioners determines they are necessary. This section of the Code places the responsibility of sidewalk construction and maintenance on the property owner. The Code states as follows:

> 16-202. When owner to construct or repair sidewalk. For the purpose of securing good and substantial sidewalks in the city and securing uniformity in the construction thereof, the board of commissioners, whenever deemed necessary by it, for the public welfare, may require the owner of any lot, in the city, fronting upon any public street, to construct and keep in repair a good and substantial sidewalk or foot pavement, along the whole street frontage of his lot, and width and material prescribed by the board.

CROSSWALKS


State of Franklin Road and Sells Avenue

Another important component of an adequate sidewalk system is crosswalks. Crosswalks should be safe and convenient. If a pedestrian can't cross a street safely, the street will become a barrier to pedestrian travel and block the creation of sidewalk networks.

Crosswalks should be situated frequently enough so that a pedestrian is not encouraged to dart out into the traffic lanes during a break in the traffic. If pedestrians are faced with a long walk to the next crosswalk, they will most likely choose their own crossing points.

Crosswalks can be controlled (with signals) or uncontrolled, depending on the volume of traffic on a street. On wider streets, crosswalks can be connected with crossing islands set at an angle so that pedestrians will slightly face the approaching traffic.

Safety


State of Franklin Road

People generally think of marked crosswalks as safety devices, and most jurisdictions give the pedestrian the right-of-way when in a crosswalk. However, there is evidence that many pedestrians feel overly secure when using a marked or striped crosswalk. Feeling safe, they may aggressively enter crosswalks without proper consideration of approaching traffic in the mistaken belief that the motor vehicle can and will stop for them. By contrast, a pedestrian using an unmarked crosswalk generally feels less secure and exercises more caution in waiting for safe gaps in traffic before crossing.

Visibility is a primary key to safe crosswalks. Motorists must be aware that they are approaching a crosswalk. Different striping patterns and proper signage can aid visibility to the motorist. Often, a crosswalk simply needs to be re-painted in order to increase the safety level for pedestrians. Other techniques that can help improve pedestrian safety include:

- Install a center median to provide a safe zone for pedestrians;
- Increase crossing times so that people who walk slowly will have sufficient time to cross before the signal changes;
- Restrict right turns on red;

- Enhance the visibility of the crosswalk marking or consider raised crosswalks;
- Reduce crossing distances and increase pedestrian visibility through the construction of bulb-outs or curb extensions; and
- Install pavement warning techniques to alert motorists of approaching pedestrian crosswalks (rumble strip).

Some high volume pedestrian crossings where crosswalk improvements are needed include:

Buffalo/Main St./Market St.

The section of Buffalo Street between State of Franklin Road and North Roan Street was originally constructed as a bypass around the downtown. This is a wide three-lane roadway that effectively divides the downtown into two separate districts. Adding to the problem is that the street curves making it difficult for pedestrians to see on-coming vehicles

Constructing bulb-outs or curb extensions along Buffalo Street would reduce the pedestrians' crossing distance and would increase their visibility to see around the curve.

University Parkway

University Parkway is a four-lane, major arterial roadway, which is an obstacle between East Tennessee State University and the Tree Streets neighborhood. Because it is a wide street, motorists tend to drive faster along it. This street also curves making it difficult for pedestrians to see on-coming vehicles. There is a crosswalk at the West Walnut Street intersection; however, it is several blocks out of the way for many residents and is unlikely to be used except for those pedestrians traveling on West Walnut Street.

The city has received approval from TDOT to install a traffic signal at the Southwest Avenue intersection. At the time the signal is installed, the city could enhance the intersection with crosswalk pavement marking and electronic pedestrian crossing equipment.

GOAL, POLICIES, AND ACTIONS

Goal

TO PROVIDE A SAFE, CONVENIENT, AND COMPLETE SIDEWALK SYSTEM FOR PEDESTRIAN TRAVEL THROUGHOUT THE CITY.

Policies and Actions

To achieve this goal the city will pursue the following policies and actions:

Policy 3.1.1: It is the policy of the city to maintain existing sidewalks in good condition and replace substandard sidewalks where needed.

Actions

- Actively enforce the sidewalk maintenance regulations so that city sidewalks can be enjoyed to the fullest.
- Repair and properly maintain those sidewalks which were rated "Poor" in the 2005 Public Works Department Sidewalk Study.

Policy 3.1.2: It is the policy of the city to promote improved fitness, safety, and quality of life by providing a sidewalk network that allows pedestrian access to all parts of the city.

Actions

- Continue to require sidewalks as part of all multi-family developments and along streets of all new subdivisions.
- Continue to require sidewalks as part of all commercial developments and along streets of all commercial subdivisions.

Policy 3.1.3: It is the policy of the city to construct sidewalks along new streets and when major improvements occur.

Actions

- Construct new sidewalks as part of any major street improvement.
- Require sidewalks as part of all new street construction projects.

Policy 3.1.4: It is the policy of the city to adopt a sidewalk priority scoring system which gives priority to sidewalk improvements in close proximity of schools, park and recreational facilities, major commercial and employment centers, and community centers, which are located along collector and arterial streets, along public transit routes, or in the vicinity, or to complete sidewalk networks.

Action:

- Adopt the following scoring system for new sidewalk construction projects:

Feature	Point Value	
Pedestrian Trip Generators	1/4 Mile Radius	1/2 Mile Radius
Schools	25	10
Parks and Recreational Facilities	20	15
Public Buildings	10	5
Community/Senior Centers	10	5
Major Commercial/Employment Centers	15	10
Street Classification		
Arterial Streets	15	
Collector Streets	10	
Other Considerations		
Close Proximity to Transit Route	10	
Completing Sidewalk Networks	15	

Policy 3.1.5: It is the policy of the city to pursue alternative funding sources to construct sidewalks.

Actions

- Investigate the use of the federally-funded Safe Routes to School Program as a revenue source to construct sidewalks near school facilities.
- Coordinate efforts with the Johnson City Metropolitan Planning Organization to secure funding for sidewalks in Johnson City.
- Investigate the creation of a Special Assessment District for the purpose of sharing the cost of sidewalk construction within participating neighborhoods.
- Investigate the creation of a Fee-in-Lieu provision to be included in the Subdivision Regulations.

Policy 3.1.6: It is the policy of the city to provide and maintain safe and convenient crosswalks.

Actions

- Maintain and enhance safe crosswalks to ensure they are visible to passing motorists.

- Reduce crossing distances and increase pedestrian visibility through the construction of bulb-outs or curb extensions and improved lighting.
- Where feasible, install center medians to provide a safe zone for pedestrians.
- Where feasible, increase crossing times so that people who walk slowly will have sufficient time to cross before the signal changes.
- Install pavement warning techniques such as rumble strips or signage to alert motorists of an approaching pedestrian crosswalk at major intersections.

PUBLIC TRANSIT PLAN

PURPOSE OF THE PLAN

The purpose of the Public Transit Plan is to update the 1987 General Plan, Public Transit Plan, and to provide direction in the provision of safe, inexpensive, and convenient fixed-route services, paratransit services for individuals with disabilities, various demand-response call-in services, and school bus transportation.

BENEFITS OF PUBLIC TRANSIT[4]

The provision of public transit is a valuable asset to the community. Some of the benefits associated with public transportation include:

1. **Improves mobility –** Nationally, nearly 70 percent of the current transit riders do not have access to vehicles. One-third have yearly household incomes below $15,000, well below $17,600, the poverty level for a family of four in 2000.

   By 2020, 40 percent of the U.S. population will be senior citizens; many will be unable to drive. In fact, one-fourth of today's 75+ age group does not drive. Meeting the transportation needs of seniors is a major community objective as well as a national goal. Public transportation and related travel options represent a lifeline for seniors, linking them with family, friends, and a changing society.

2. **Energy conservation -** The supply of oil is finite. Public transportation is crucial in helping to save energy and in using it wisely. Each year, public transportation saves 1,500 million gallons in auto fuel consumption.

3. **Reduces road congestion -** Public transportation takes cars off the road. According to Maryland DOT's estimates, that reduction amounts to 60 cars for a full bus and 12 cars for a full van.

4. **A cleaner environment -** Emissions from road vehicles are the largest contributors to smog. Over 200 million passenger cars and light trucks log almost 2 trillion miles on American roads every year. These vehicles account for about 50 percent of air pollution nationwide — even higher in polluted cities.

5. **Public health -** People across America are suffering from air polluted to a large degree by vehicle emissions. Every summer, high smog levels cause some 159,000 trips to the emergency room, 53,000 hospital admissions, and 6,000,000 asthma attacks.

6. **Reduces travel time -** Fewer cars on the road would significantly reduce the commuting time of urban drivers, who, in 1999, spent an average of 36 hours — nearly 5 work days

[4] **Source: National Alliance of Public Transportation Advocates**

— in traffic delays. In the 68 urban areas it studied, the Texas Transportation Institute found that one-third of daily travel occurs under congested conditions.

7. **Enhances economic opportunity -** Public transportation use lowers household expenses and frees up more income for other needs. For every dollar earned, the average household spends 18 cents on transportation, 98 percent of which is for buying, maintaining, and operating vehicles the largest source of household debt after mortgages. With the increasing cost of gasoline, public transit is becoming more economical as a means of transportation.

JOHNSON CITY TRANSIT

Johnson City Transit Center

Johnson City Transit (JCT), a department of the city of Johnson City, began operations in 1979 as the first new municipal transit system in Tennessee since World War II. JCT operates fixed-route services, paratransit services for individuals with disabilities, and various demand-response call-in services. The transit system accommodates 1,355 passengers per day. JCT provides bus services within the city to all major commercial and institutional facilities including; East Tennessee State University, the Mountain Home Veterans Administration Center, hospitals, shopping malls and centers, and government offices. In addition, the major residential neighborhoods and group housing complexes are served.

FIXED-ROUTE SERVICE

JCT operates eleven fixed-routes in the city. Ten of JCT's fixed-routes have 30-minute running times and are paired together, using five buses which each serve two routes. Therefore, each of these ten routes is served once per hour. One fixed-route has a 60-minute running time, and therefore is served every hour and is not paired with another route. The fixed-routes all originate and terminate at the Johnson City Transit Center which is located in the downtown area, and which serves Greyhound as well as JCT.

The Transit Center is the only terminal for the fixed-route system, and is where most transfers occur. In addition to the Transit Center, which provides a passenger lobby (equipped with restrooms, seating, vending machines, telephones, and an information window), passenger-waiting shelters are provided at key points along each route for passenger comfort.

The current hours of operation for fixed-route service are from 6:15 a.m. to 6:15 p.m. Monday through Friday, and from 8:15 a.m. to 5:15 p.m. on Saturdays. JCT buses do not operate on Sundays or major holidays. Monday through Friday, 1,031 fixed-route miles are covered, and on Saturday 671 fixed-route miles are covered, totaling 5,826 route miles per week. Route mileage for each fixed-route is provided in Table 4.

Figure 1. Transit Routes

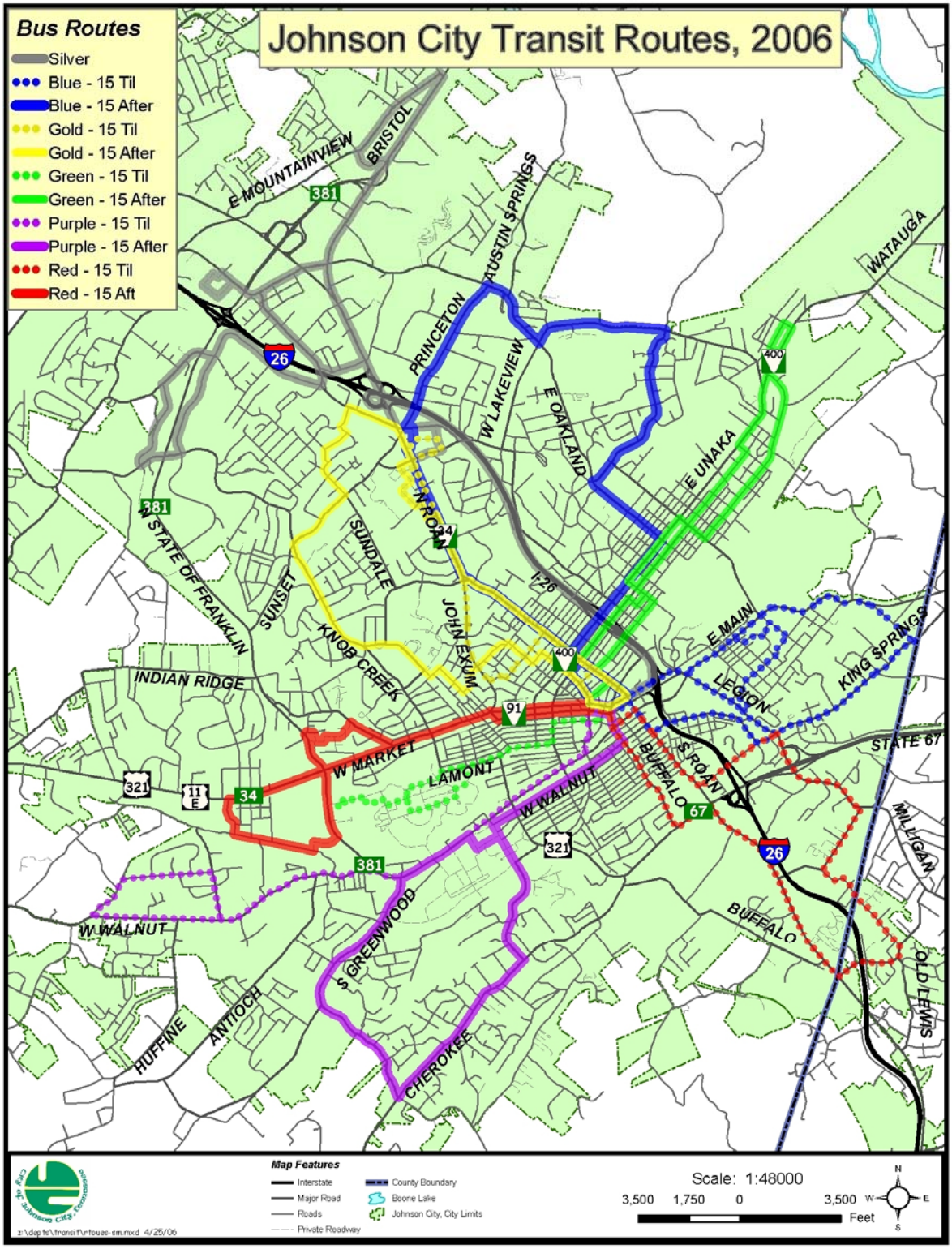


Table 4: Transit Routes

Fixed-Route	Total Daily Weekday Route Miles	Total Daily Saturday Route Miles
Blue 15 After	102	0
Blue 15 Till	96	72
Gold 15 After	90	67.5
Gold 15 Till	81.5	59.4
Green 15 After	75.5	56.1
Green 15 Till	57.6	43.2
Purple 15 After	90.7	75
Purple 15 Till	111.6	0
Red 15 After	75.6	56.7
Red 15 Till	90	81.4
Silver 15 After	160	160
TOTAL	**1030.5**	**671.3**

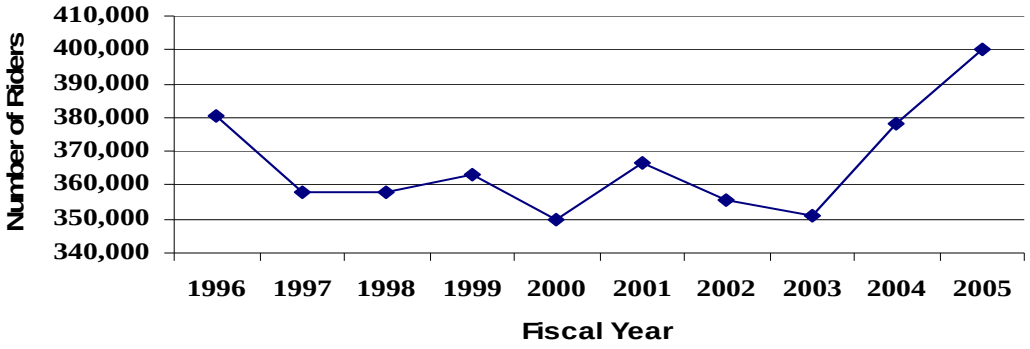
Source: Johnson City Transit

The 2006 price for a fixed-route base fare is 60 cents. Seniors (age 65 and over), children (grades K-5), and individuals with disabilities or with Medicare cards pay half-fare or 30 cents. Children under the age of 5 ride free. Discounted multi-ride passes are available, and transfers are 10 cents. The average number of weekday transfers is 222 passengers, the average number of Saturday transfers is 173. Transfers are used the most on the Gold, Red, Green, and Silver routes.

The average total ridership per day on fixed-routes is 1,355. This is approximately 66 percent of the total carrying capacity of the system. Figure 2 depicts JCT fixed-route ridership during the past ten fiscal years.

Although ridership has not risen significantly, the total carrying capacity has dropped significantly. This is largely due to the decision to switch to smaller and more efficient buses. In 2004, JCT switched from a larger 25-30-passenger vehicle to a smaller 14-passenger bus. These smaller buses are less expensive to operate and are more versatile.

Figure 2: Ridership by Fiscal Year



Source: Johnson City Transit

Overall, ridership has fluctuated over the past ten years. In 1996, ridership was 380,560 and over the next seven years, ridership fluctuated between 350,000 and 360,000. However, over the past two years ridership has risen by approximately 50,000 riders to a ten year high of 400,243. Much of this gain in ridership is attributed to the ETSU shuttle service (JCT Bucshot), which serves the campus and housing areas near the campus. This service is also open to the public.

JOB ACCESS SERVICE

Johnson City Transit provides Job Access service as a supplement to the JCT Fixed-Route service to low-income individuals and/or welfare recipients for employment-related trips. The Job Access and Reverse Commute Grant Program was authorized under Section 3037 of the Transportation Equity Act for the 21st Century. Funding for competitive grants under this program became available in 1999. The Job Access program is intended to support the implementation of a variety of transportation services to connect welfare recipients and low-income individuals to jobs and related employment activities. Transit providers in Tennessee have been encouraged by the Tennessee Department of Transportation (TDOT) to apply for this grant funding to enhance transportation services to the citizens of Tennessee.

JCT has received funding under this program since 1999, when its Job Access service began. Job Access grant funds have allowed JCT to expand operating hours for Job Access trips to 5:30 a.m. through midnight, Monday through Saturday, and to provide

Job Access trips to locations in the urbanized area not served by the fixed-route system. A portion of JCT's Job Access grant funding has also been utilized to purchase additional passenger vehicles to meet the additional JCT service demands generated by the Job Access program. Job Access service is available on a demand response basis, with a 48-hour advance request.

The portion of Job Access service provided by Job Access demand response vehicles is curb-to-curb service. This means that the JCT vehicle will not drive onto private property, and will remain on public streets and areas.

Reservations must be made with JCT at least two days in advance of a Job Access demand response trip. Service is available from 5:30 a.m. until midnight, Monday through Saturday (excluding holidays). Job Access ridership has increased from 1,681 in FY 2000 to 8,512 in FY 2005.

"XTRA" PARATRANSIT SERVICE

Johnson City Transit provides a specialized, demand-response, paratransit service for individuals with disabilities. The paratransit service utilizes vehicles equipped with wheelchair lifts (or ramps), grab rails, and low steps. Curbside boarding assistance is provided by JCT drivers, if needed. To use the paratransit service, JCT requires completion of an eligibility application and verification of the applicant's status by a physician or social service agency.

JCT provides curb-to-curb Paratransit service for mobility impaired individuals who meet eligibility criteria and complete an application process. This demand response service, called JCT "XTRA," is available (with a 24-hour advance request) within the city limits of Johnson City.

The current hours for JCT XTRA are Monday through Friday from 6:15 a.m. to 6:15 p.m. and on Saturday from 8:15 a.m. to 6:15 p.m. The 2006 fare for XTRA is $1.20 per one-way trip if the trip is located with ¾ miles of the fixed-route service area. Outside of this area, the one-way fare is $3.00. Buses for XTRA are equipped with wheelchair lifts, grab rails, and low steps.

Since its inception in 1989, the JCT XTRA service has expanded from an operation of one part-time paratransit vehicle, and an annual ridership of 4,261 in FY 1989, to the operation of five full-time/three part-time vehicles, and an annual ridership of 21,650 in FY 2005. Due to long-term demographic projections that show a growing elderly population seeking medical services in Johnson City, it is anticipated that demand and ridership will increase.

CHILD ACTIVITY TRANSIT SERVICE

The Child Activity Transit provides a curb-to-curb service from home, city schools, or other locations to various destinations: summer school programs; after school appointments; sport practices; ball games; dance or music lessons; etc. One-way fares are based on a flat rate per destination. Rates depend on travel distance from school to final destination. Rates apply for children in grades K-12. A 24-hour advance notice is required and can be made on a weekly basis.

CONTRACTED SERVICES

East Tennessee State University (Bucshot)

The Bucshot service began in August 2003, through a contractual agreement between JCT and ETSU. The BucShot provides shuttle service on the ETSU campus and adjacent housing areas. This service, which is available to the public, is provided during ETSU's fall and spring semesters (last week of August through the first week of May). There are two Bucshot routes, with two vehicles operating (one on each route) from 7:15 a.m. to 4:15 p.m. Monday through Friday, one vehicle serving both routes from 4:15 p.m. to 10:15 p.m. Monday through Thursday, and one vehicle serving both routes from 4:15 p.m. to 7:15 p.m. on Friday. The service does not run on weekends, JCT holidays, or ETSU holidays and breaks. There is a 30-minute headway during the day, and a 45-minute headway in the evening/night. The Bucshot averages 217 route miles per day and 250 riders per day. All buses used for Bucshot service are ADA accessible. ETSU students, faculty, and staff ride the Bucshot free, with a valid ETSU I.D. They (including University School students) may also ride the entire JCT fixed-route bus system free with valid ETSU I.D.

Girls Inc.

JCT provides daily service from schools to Girls Inc. via School Transit and Mass Transit. Specialized return home drop-off service to certain areas is also provided.

Boys & Girls Club of Johnson City/Washington County

JCT provides daily service from schools to the Boys & Girls Club via School Transit and Mass Transit. Specialized return home drop-off service to certain areas is also provided.

OTHER PUBLIC TRANSPORTATION SYSTEMS

Greyhound Bus Lines

Greyhound provides transportation services from Johnson City to various locations across the United States. Greyhound also provides charter services and express services for package deliveries. The Greyhound station is located within the Johnson City Transit Center at 137 West Market Street. Hours of operation are Monday through Friday from 8 a.m. to 5:30 p.m. and Saturday, Sunday and holidays from 8:00 a.m. to 11:59 a.m., 2:30 p.m. to 4:30 p.m., and 8:00 p.m. to 9:45 p.m. Greyhound is ADA accessible.

Taxi Services

There are two taxi services operating in Johnson City, Mom's Taxi, and WW Cab Company. WW Cab Company provides 24-hour a day services. WW Cab provides transportation to the Tri-Cities Regional Airport, as well as local and long distance transportation. Mom's Taxi is an 18-hour a day local transportation service. Its service area is a 600-mile radius from Johnson City. It also provides transportation service to the Tri-Cities Regional Airport.

Railroad Service

Two Class I railroads and one short-line railroad provide services for goods movement within the Johnson City Urbanized Area. Norfolk Southern, which has 1,023 miles of railway within Tennessee, connects Bristol, Johnson City, Knoxville, and Chattanooga. These lines carry shipping containers throughout the area. The majority of this freight is headed from major ports in the eastern U.S. to be distributed in the Midwestern markets. The Norfolk Southern route passing through Johnson City is one of the primary eastern railways in the nation. The line allows clearance for containerized shipping which many railway networks are unable to accommodate.

CSX Railroad enters Northeast Tennessee from southwest Virginia near Kingsport and travels through Johnson City on to Western North Carolina. CSX has 911 miles of railway within Tennessee, second only to Norfolk Southern.

Both of these rail lines are heavily traveled and serve an extremely large number of railway cars. At times, the length of these trains can disrupt automobile traffic several times a day, especially through the downtown where the rail crossings are all at-grade. Rail crossing safety has long been a major issue for Johnson City and rail conflicts with the surface street system remains a continuing concern.

In addition to the two major rail lines, the Genessee and Wyoming Railway provides a local short line service supporting the two major lines.

Passenger Rail

Johnson City has a rich history as a railroad town. Today, there are two Class I railroad lines (CSX and Norfolk-Southern) and one short-line service (Genessee and Wyoming) providing freight rail service to the community. This existing rail infrastructure could provide opportunities for passenger service in the future.

Currently, only Memphis and Nashville operate passenger rail service in Tennessee. Memphis, with a Metropolitan Statistical Area (MSA) urbanized population of 1,200,000 people operates a light-rail trolley system that runs on a 5-mile loop through the downtown area. Nashville, with an MSA urbanized population of 1,300,000 recently began operating a thirty-two (32) mile commuter rail line from downtown Nashville to the city of Lebanon, becoming the first commuter rail service in Tennessee.

In an effort to relieve traffic congestion along I-40 and I-81, the state's Transportation Plan calls for the long-term development of a passenger rail system running across the state from Bristol to Memphis. If this plan is successful, it could take automobile traffic off existing roadways and offer travelers an alternative mode of transportation

The cost to construct and operate a passenger rail service is also significant. It is estimated that at a minimum it would cost $1.2 million per mile to upgrade an existing freight line to accommodate passenger service. In addition, operating a passenger rail system can be expensive. The revenues generated from passenger fares rarely cover operating expenses. The Music City Star's FY2007 annual operating budget projects approximately $3.4 million in operating expenses while projecting only $1.1 million in passenger fare revenues. The remaining $2.3 million will be covered by federal, state, and local subsidies. These subsidies will be required for the foreseeable future since the FY2017 projected budget projects a deficit between operating expense and fare revenues of $2.7 million. This deficit is reflective of passenger rail service nationally. AMTRAK is requesting $1.8 billion in annual federal funding to remain in operation through this calendar year.

CSX Spur line along State of Franklin Road

CSX Spur along State of Franklin Road

Recently, there has been considerable debate over the CSX freight rail spur that runs from Buffalo Street to University Parkway along State of Franklin Road. This is a corridor in transition from former industrial uses to commercial and residential uses. Because of this, there has been no demand for freight service and the tracks have been idle for a number of years. These tracks, which have not been maintained, also create an eye sore for travelers along State of Franklin Road. Recently, CSX announced that it intends to remove the tracks. The tracks are located within the State of Franklin Road right-of-way so the property will be retained by the state. The Public Works Department recently contacted the abutting property owners and there has been little or no interest expressed in keeping the tracks for freight purposes.

There has been some interest in converting this freight rail system into a passenger rail system that would provide transit service from the University to the downtown. Also, it was expressed that this could be a possible link in a commuter rail system, which could connect Johnson City, Elizabethton, Jonesborough, and the rest of the state.

The city has a number of concerns regarding this proposal. First, the cost to construct and operate a passenger rail system is very expensive. The cost to convert the freight lines to passenger lines are estimated at well over a million dollars a mile. In addition, the existing road crossing would also need to be upgraded to provide a smooth grade transition. Also, if revenues generated from passenger rail rarely cover the operating and maintenance cost, this would place a financial burden on the federal, state, and local governments to subsidize this service. If the Music City Star in Nashville with a MSA of over 1.3 million people and a concentrated downtown workforce anticipates losing money well into the future, is it logical to expect Johnson City with a MSA urbanized area of 181,607 to succeed without substantial assistance from federal, state, and local governments?

Finally, a shuttle service from the University to the downtown would be a duplication of services the city currently provides. The Johnson City Transit presently operates the BucShot, a shuttle service on the ETSU campus and adjacent housing areas to the downtown.

The city's proposed Bikeway-Greenway Plan recommends the construction of a multi-purpose trail along this corridor. The Plan states that the first choice would be to construct the trail along the north side of State of Franklin Road but also recognizes the value of a trail along the south side as an alternative. This would create a pedestrian connection between the University and the downtown, eliminate an existing eye sore, and

could help spur redevelopment along this corridor. Although a pedestrian trail along the north of State of Franklin Road associated with some landscaped stormwater detention features would be ideal, there are a number of viable commercial businesses along this route, which would cost substantial funding and a considerable time to purchase and relocate. A trail along the former rail bed could be constructed immediately and at only a fraction of the cost. Also, if in the future, the city does acquire these commercial properties and constructs a trail, the city could create a pedestrian loop utilizing both trails.

Although the benefits of passenger rail are numerous, any attempt to develop a passenger rail system at this time would be premature. In the future, as Johnson City grows and reaches the population density necessary to support a commuter rail system, this mode of transportation could be re-evaluated. The opportunity for rail service will still be available. Removing this short spur line will have no impact on current or future service to Jonesborough or Kingsport. Also, if in the future it is determined that a rail shuttle service between the University and downtown is desirable and feasible, the right-of-way is still there and new rail lines could be constructed to accommodate passenger service.

Air Travel

The **Tri-Cities Regional Airport,** formerly known as the Central Airport, opened on September 1, 1937 on a 323-acre site in Sullivan County. This site was selected because of its central location between the tri-cities. The cost of the new airport was $794,757, which included the purchase of land, construction of both a 3,584-foot east-west runway and a 3,150-foot north-south runway, taxiway, lighting, roadways, and terminal building.

Today's full-service, commercial airport facility covers an area of 1,150 acres and includes: two runways, the longest being 8,000 feet and includes a Category II Instrument Landing System, and a 118,835 square-foot main terminal building.

Airlines currently serving the airport include: American Connection, Delta Connection, Northwest Airlink, and US Airways Express. They provide non-stop service to Atlanta, Charlotte, Cincinnati, Detroit, Memphis, Nashville, and Orlando.

Overall, air passenger volumes have increased by 7 percent from the year 2000, increasing from 449,801 passengers in 2000 to 481,433 in 2004. Commercial air carriers' passenger trips decreased significantly immediately following the 9/11 air tragedies. However; since then, overall passenger volumes have been slowly increasing and have surpassed previous levels.

Table 5: Air Passenger Travel

Category	2000	2003	2005
Enplaned Passengers			
Air Carriers	222,832	193,992	240,317
Charters	2,300	2,721	2,230
Sub-total	225,132	196,713	242,547
Deplaned Passengers			
Air Carriers	222,369	191,645	236,658
Charters	2,300	2,814	2,228
Total	449,801	391,172	481,433

Source: Tri-Cities Regional Airport

NEEDS ASSESSMENT

As the city continues to grow, JCT will face increasing challenges and demands. The city is rapidly growing north into the Boones Creek and Gray communities. Major retail development, call centers, a major payment center, and the Johnson City Power Board have created new employment and shopping destinations. In addition, these areas are also experiencing a significant amount of residential growth.

Transit service in the north has not been able to keep pace with development. The northern area of the city is served by the Silver Route, which runs on a one-hour cycle and only extends as far north as State of Franklin Road. All other routes run on one-half hour cycles. However, due to the length of the Silver Route this is not possible. JCT does provide Job Access service to the area and is evaluating the feasibility of fixed-route service to the Boones Creek and Gray communities. If this route is successful, a transfer station may be necessary. A transfer station does not need to be a full-service transit station similar to the main station located on West Market Street, but can simply be a covered platform (similar to the one on the right) where passengers can transfer from one bus to another safely.

There have also been attempts to develop an intercity bus service between Johnson City and Kingsport. JCT working with the Kingsport Area Transit (KAT) proposed the construction of a transfer station in Gray where both transit systems would meet. The proposed route would also include transfer stops at Eastman and ETSU. JCT and KAT submitted a “demonstration” grant application to TDOT in 2001 for start-up cost and first year’s operating expenses, but was not funded.

In order to provide adequate service to these larger employment and shopping destinations (over 100,000 square feet), it is important that as these projects are designed

that consideration is given to ensure that transit buses can enter the site, drop-off and pick-up riders, and leave the site. This involves ensuring that there are adequate turning radius for the transit buses, and an area where passengers can board and exit the bus safely.

In addition, another obstacle to providing access is low hanging canopies or porticos often found at drop-off points in front of medical facilities, assisted living facilities, and other facilities serving seniors and the disabled. These overhangs are often designed for automobiles, which generally have a six to seven-foot clearance. The para-transit vehicles require a clearance of approximately 11.5 feet. In the past, there have been problems where the top of the transit vehicle has either hit the canopy or the vehicle was required to park away from the canopy requiring passengers to walk a greater distance, sometimes in the rain to get to the vehicle.

Since the terrorist attack of 9/11 and the July 2005, bombings of London's subway and buses, security for mass transit has become a major concern and initiative for the Federal Transit Administration. In order to address this mandate, JCT is currently in the process of developing a safety/security plan to improve the overall security of the JCT system.

Funding Sources

Funding sources for Johnson City Transit include federal, state, and local governments. JCT receives federal funds under the Federal Transit Administration's Section 5307, Section 5309, and Job Access programs. Federal funds cover 50 percent of net operating costs, 83 percent of ADA vehicle costs, and 80 percent of other capital costs. (Net operating costs equal total operating costs less directly generated revenues – farebox, passes, etc.). In addition, JCT receives funding from the Tennessee Department of Transportation (TDOT) for operations based on a funding formula incorporating population, number of vehicles in operation, etc. TDOT operating funds cover 50 percent of the non-federal net operating cost. TDOT also provides 8.5 percent matching funds for vehicle purchases and 10 percent matching funds for all other capital items. The city of Johnson City funds 50 percent of the non-federal net operating cost, 8.5 percent of ADA vehicle costs, and 10 percent of other capital costs. Future technology-related projects will be eligible for Johnson City Intelligent Transportation Systems funds.

Bio-diesel Fuel

Recently, the city and the JCT have begun to convert its larger vehicles to a bio-diesel (B-10) fuel. This is in an effort to reduce fuel costs and to find a cleaner more environmentally friendly fuel source. B-10 diesel fuel is a mix of 10 percent bio-diesel and 90 percent diesel fuel. Bio-diesel is primarily made from domestically-produced soybean oil, but vegetable oils, recycled cooking grease, and animal fats are also used. Long-term, the city's goal is to switch to a B-20 diesel fuel, which is a 20 percent bio-diesel mix.

Alterative Fuel Sources

In 2000, the city ran a "trial run" using an electric bus provided by the Electric Transit Vehicle Institute (ETVI), based in Chattanooga. However, the electric bus had difficulty climbing some of the hills in the city, and the city's operating hours were longer than the battery pack life on the bus could withstand. In addition, the capital outlay and operating costs of electric buses were significantly higher than for diesel buses making their use cost prohibitive.

Chattanooga Downtown Shuttle

Another alternative fuel source is compressed natural gas. Natural gas buses have been on the road for more than a decade and have a long track record of success. Approximately one in seven transit buses currently on order in the United States is powered by natural gas. Natural gas transit buses are being used in cities throughout the country, including Los Angeles, New York, Tacoma (Washington), Phoenix, State College (Pennsylvania), Cleveland, Dallas, and Atlanta.

GOAL, POLICIES, AND ACTIONS

The Johnson City Comprehensive Plan is the official statement of the Board of Commissioners setting forth its policies regarding the city's public transit system. The Public Transit Plan consists of the following policy statements and system recommendations.

The policies may be used as guides to review overall system performance and requests for transit service extensions. The policies should also be flexible to permit application based upon varying future conditions.

Goal

TO PROVIDE SAFE, EFFICIENT, EFFECTIVE, AND RELIABLE PUBLIC TRANSPORTATION WITH FIXED-ROUTE SERVICE ALONG DESIGNATED ROUTES AT SCHEDULED TIMES AND CALL-IN CURB-TO-CURB DEMAND-RESPONSIVE SERVICE.

Policies and Actions

To achieve this goal the city will pursue the following policies and actions:

Policy 3.2.1: It is the policy of the city to promote the role of public transit as a key element of the overall transportation system and the development of the overall community.

Actions:

- Coordinate with representatives from the city's major medical and educational institutions to increase service levels and transportation options to the rapidly developing State of Franklin Road corridor.

- Monitor the effects of land use changes and traffic congestion in north Johnson City and the efficiency of the existing route structure.

- Continue service coordination with the Greyhound Corporation, the FTHRA, and local taxi companies in order to enhance passenger transfers between systems operating in the Johnson City area.

- Develop and maintain demographic profiles of each residential area in the city in order to evaluate the existing route structure and to identify areas with additional ridership potential.

- Continue to explore opportunities to partner with the Kingsport Area Transit to develop future intercity transit routes.

- Develop and promote financial participation in local transit services by major institutions, employers, and social service agencies to supplement limited federal, state, and local funding sources.

- Develop a transit fleet of varying sizes including buses, mini buses, and vans to accommodate differing needs in the community.

Policy 3.2.2: It is the policy of the city to maintain a cost-effective public transit system as a vital service comparable to other basic city services.

Actions:

- Evaluate the installation of Automated Vehicle Location (AVL) technologies on buses. An AVL system would improve routing, provide route documentation, and improve security. Real-time route information could be provided via the internet.

- The area served by the JCT is limited to the Johnson City corporate limits unless special subsidy agreements are developed with other areas that desire service. Such subsidized service beyond the city limits must not exceed the capacity of the existing system as defined by the route structure identified in this plan.

- As economics and logistics become feasible, the city shall provide ¼ mile transit route coverage to concentrations of multi-family housing including publicly-assisted and subsidized housing.

- Minimize the number of routes with lengths exceeding 15 miles round trip in one hour except on routes characterized as express routes serving employment centers or activity centers along major arterials.

- Maintain a system of designated bus stops, the location of which will be based on demand and use, following the general criteria listed below:
    - As feasible, in residential areas bus stops should not be placed less than 700 feet apart and no more than 1,320 feet apart and should be placed at every signalized intersection. However, the determining factor in actual stop location will be safety.
    - The placement of bus stops in the Central Business District shall occur at signalized intersections, as determined necessary.

- Maintain the following standards for timeliness of the system.
  Peak: Regular routes, 90 percent of buses 0 to 5 minutes late.
  Off Peak: Regular routes, 95 percent of buses 0 to 3 minutes late.

- Any major changes in transit service should be made on a minimum six-month experimental basis. The route performance of any new service should compare favorably with that of the existing ridership system.

- Evaluate the feasibility of providing transit service on private properties when the daily boardings and disembarkments exceed 25 persons and when the following criteria can be met:
    - Establish "No Parking" zones, the distance and signing of which must meet the transit system's criteria.
    - Establish official bus stops in accordance with the signage system recommended by JCT.
    - Conformance with all safety requirements established by JCT.
    - Provide adequate ingress and egress as determined by JCT.

- Evaluate providing passenger shelters at major inbound stops in residential neighborhoods and in other areas of the community that serve 50 - 100 or more boarding or transferring passengers daily. Other criteria will include availability of space for the shelter, number of elderly or physically challenged individuals in the area, proximity to major activity centers, and frequency of service.

- Maintain the regular maintenance inspection according to the manufacturer's specifications, but not exceeding 3,000 mile intervals.

- Maintain a system of signs to identify bus stops and prevent conflicts with other modes of transportation.

Policy 3.2.3: It is the policy of the city to maintain a multi-purpose transit system which is oriented to the needs of senior citizens, handicapped, children, and major employment and activity centers.

Actions:

- Provide a continuing emphasis on the specialized needs of handicapped, elderly, and other population segments with limited alternate modes of transportation.

- Provide information upon request for handicapped persons and others on how to use transit system services.

- Develop a diversified transportation program for the elderly and handicapped, improving ease of access to the system, and providing a variety of choices based upon needs of the individual.

- The transit system should evaluate the feasibility of service provision to major employment concentrations (75 or more employees), schools, and hospitals.

Policy 3.2.4: It is the policy of the city to encourage improvements to the public transit system which will result in energy conservation and the alleviation of traffic congestion.

Actions:

- Study and implement, as necessary, shuttle systems to alleviate traffic congestion along congested major highway corridors.

- Continue outreach of the marketing program, including target groups, to encourage higher transit ridership which reduces both energy consumption and traffic congestion.

- Initiate demonstration fixed-route service to Boones Creek and Gray.

- Investigate other possible route changes to improve ridership.

Policy 3.2.5: It is the policy of the city to improve the safety of the passengers riding the transit system.

Actions:

- Revise the city's Zoning Ordinance and Subdivision Regulations to include provisions for transit in new developments.

- Complete the comprehensive Safety and Security Plans for implementation within the Long-Range Plan period. Plan(s) will incorporate anti-terrorism elements.

- Evaluate the installation of chemical and biological sensors in the Transit Center as a security measure to obstruct any terrorism targeted at JCT patrons, employees, or facilities.

Policy 3.2.6: It is the policy of the city to explore alternative fuel sources in an effort to find cleaner more environmentally friendly fuel.

Actions:

- Continue and expand the use of blended bio-diesel fuels.
- Continue to investigate alternative fuel sources such as electricity or natural gas as new technologies develop.

BIKEWAY-GREENWAY PLAN

PURPOSE OF THE PLAN

Bicycling is becoming an important mode of transportation in Johnson City and is available to people of all ages and socio-economic levels. Bicycling is a particularly efficient and convenient form of transportation and exercise in urban areas. Like the automobile, bicycling provides a high degree of independence, flexibility, and freedom of choice relative to schedule and destination.

Johnson City has committed to creating a comprehensive multi-modal strategy that includes bicycling and walking as integral parts of the transportation infrastructure. Johnson City's vision seeks to take advantage of the benefits that bicycling can offer to the city, such as greater mobility, lower transportation cost, safer streets, cleaner air, less traffic congestion, increased daily exercise, lower healthcare costs, and a greater quality of life. The Johnson City Bikeway-Greenway Plan is intended to help turn this vision into reality.

This plan serves to update and supersede the 1994 Bicycle Plan for Johnson City. It identifies on-street bicycle facility (generally bike lanes/paved shoulders) needs, recommends off-street paths/trails, and bicycle routes for the Johnson City urban area and rural Washington and Carter counties. This information was used to identify on-street bicycle facility needs and in particular, travel corridors that serve as barriers to bicyclists' mobility due to their low compatibility for bicycling and the lack of reasonably direct alternative routes.

Along with adding bicycle facilities, education and promotion are important elements in increasing bicycling while also improving safety. Together, they can improve the skills and confidence of bicyclists to ride safely in traffic, which is critical for increasing their effective mobility. This plan makes recommendations for building upon current education and promotion activities.

The main purpose of this plan is to provide the city with a guide to its actions and decisions concerning:

- Providing safe, convenient bicycle facilities;
- Institutionalizing bicycling within all aspects of the community;
- Making bicycling an attractive option;
- Ensuring that growth occurs in a manner that is conducive to cycling;
- Maintaining existing bicycle facilities;
- Monitoring progress in the development of bikeways; and
- Assuring funding for bicycle facilities and programs.

BENFITS OF WALKING AND BICYCLING

An alarming number of Americans are becoming more sedentary, obese, and consequently risking their lives, reports the Center for Disease Control[5]. "Obesity is an epidemic and should be taken as seriously as any disease epidemic," warns CDC director Jeffrey Kaplan.

In recent studies, the CDC found that as a result of the American lifestyle of convenience and inactivity, cycling and walking have been replaced by automobile travel for all but the shortest distances.

Even a small increase to moderate physical activity will produce dramatic benefits among those who are least active. They can cycle for pleasure, and integrate bicycling for: a trip to the store; to a sporting event or party; to a concert; or to a friend's house. Cycling to work once a month, and then once a week may lead to cycling more frequently and, as a result, a healthier lifestyle.

Daily physical activities will help reduce the risk of coronary heart disease, stroke, and other chronic and life-threatening illnesses. It will also help lower health care costs, help enhance physical health, improve a person's mental outlook, and the overall quality of life.

Regular exercise also provides a myriad of health benefits for senior adults including a stronger heart, a positive mental outlook, and an increased chance of remaining independent - a benefit that will become increasingly important as our population ages in the coming years.

1. Childhood Obesity

In the 20th century, children represented the largest cycling population. But, thanks to a number of contributing factors - among them, unsafe neighborhoods, heavy traffic, and a de-emphasis on physical activity, few American children now cycle frequently. And, children who cycle infrequently grow up to be adults who cycle less or not at all.

Promoting and encouraging physical activity at a young age will have numerous health, economic, environmental, and social benefits. Of particular concern, is the problem of childhood obesity. Today, 1 in 5 children is overweight or obese[6]. Childhood obesity is likely to persist into adult life and puts individuals at risk for stroke, hypertension, diabetes, and other chronic diseases. The magnitude of obesity is far-reaching:

- Approximately one in five children in the United States is now overweight;

[5] Center for Disease Control /www.cdc.gov
[6] Center for Nutrition Policy and Promotion, October 27, 1998

- Overweight during childhood and adolescence is associated with overweight during adulthood;
- Parental obesity more than doubles the risk of adult obesity among both obese and non-obese children under 10 years of age; and
- Over $68 billion are spent each year on direct health care related to obesity, representing 6 percent of total U.S. health care expenditures.
- The number of overweight children 6 to 17 years of age has doubled within three decades; and
- The prevalence of overweight children has increased from 7.6 to 10.9 percent for children age 6 to 11 years and from 5.7 to 10.8 percent for adolescents age 12 to 19 years between 1976-80 and 1988-91.
- Fewer than 50 percent of school children received daily physical education, with games and competitive sports being the mainstays of existing programs; and
- For physical education programs to contribute to the public health goal of lifelong activity, they should include activities of moderate intensity and should not focus exclusively on team-oriented sports activities.

An increasing amount of evidence demonstrates that the places in which we live and work affect our health. The built environment encompasses those aspects of our environment that are human-modified, such as homes, schools, workplaces, parks, industrial areas, farms, and highways. Availability and accessibility of bicycle and walking paths, exercise facilities, and overall safety and aesthetics of an environment play a major role in determining the type and amount of physical activity in which people engage.

2. Economic Benefits

Bicycling and walking are inexpensive means of transportation. Walking is essentially free, and bicycles are readily available to most Johnson City residents. In contrast, owning and maintaining an automobile is very expensive. The average cost of operating an automobile for one year is about $5,170; and families, on average, spend 18 percent of their income on owning and maintaining a single automobile.[7] The average family makes ten trips by automobile every day, and the average American spends the equivalent of 55 eight-hour workdays behind the wheel of a vehicle every year.[8] Estimates by the U.S. General Accounting Office cite that highway congestion results in national productivity losses of more than $100 billion a year.[9] Johnson City's low density pattern of development is such that an automobile is a practical necessity for almost every family. Nevertheless, policies and

[7] www.bicyclinginfo.org/pp/benefits/econoben

[8] Benfield, F. Kaid; Raimi, Matthew D.; and Donald Chen. Once There Were Greenfields. New York: National Resources Defense Council, 1999. 36

[9] Kunstler, James Howard. "Car Crazy: We can no longer afford a car dominated world." Forum for Applied Research and Public Policy Winter 1998: v13 i4 p108(7) Online. Infotrac. 20 February 2002.

improvements that make walking and bicycling more attractive can reduce the number of trips and can, in many instances, eliminate the need for a second vehicle.

Converting an abandoned rail line to a trail can also be an economically feasible decision. According to the Rails-to-Trails Conservancy, cities and towns across America are finding that converting abandoned rail corridors is an economically wise choice. Rail-trails often bring job growth in construction and maintenance, as well as in tourism-related businesses, i.e. bike shops, restaurants, and lodging. A National Park Service study revealed the total economic impact of a trail involves a combination of new trail-related jobs and the expansion of existing businesses related to travel, equipment, clothes, food, souvenirs, and maps. For example, the Virginia Creeper Trail in Damascus, Virginia and related tourism has bolstered the local economy by 70 percent.

Trails can also have a direct impact on a community's ability to attract jobs - many companies seeking to relocate or establish a corporate headquarters have cited the availability of trails as a significant factor in their decision to choose one location over another. After considering several cities, Ruby Tuesday, Inc., moved its Restaurant Support Center to a site adjacent to the Greenway Trail in Maryville, Tennessee. Samuel E. Beall, III, chairman and CEO, stated, "I was very impressed with the beauty of the park, which helps provide a sense of community to this area, as well as the many benefits it provides to our more than 300 employees."

3. Environmental Benefits

Walking and bicycling are pollution free modes of transportation. Motor vehicles, on the other hand, are not. Reports show that motor vehicle emissions account for 31 percent of total carbon dioxide, 81 percent of carbon monoxide, and 49 percent of nitrogen oxides released into the atmosphere in the United States. Furthermore, studies indicate that short trips are disproportionately high polluting because pollution control devices do not have time to begin working effectively.[10] Encouraging people to walk or bicycle when making short trips will help reduce harmful auto emissions. In fact, substituting a four-mile round trip by bicycle or foot decreases the amount of pollutants in the atmosphere by approximately 15 pounds per year.[11] Decreasing the number of trips people make by automobile will also result in less wear and tear on the automobile and the need for replacement of both parts and the vehicle itself. Reduced traffic levels also reduce noise pollution.

4. Social Benefits

The social benefits of enhanced pedestrian and bicycle activity, though more subjective, are no less compelling. In a community where the only option for

[10] www.bicyclinginfo.org/pp/benefits/environben/index.htm
[11] www.bicyclinginfo.org/pp/benefits/enviroben/index.htm

transportation is the private automobile, contact between friends and neighbors is often limited to a wave through the windshield. Increased walking and biking can also help people gain a deeper understanding and appreciation of the city's built and natural environment. When driving, people often fail to notice many of the subtleties that make Johnson City so charming.

HISTORY OF BICYCLE PLANNING IN JOHNSON CITY

Past efforts have been completed to make walking and bicycling more integral components of Johnson City's transportation system. In the early 1990s the construction of the State of Franklin Bikeway began, a 2.3 mile bikeway which runs parallel to State of Franklin Road. In 1996, a one-mile section was added; extending the bikeway to approximately 3.3 miles connecting north Johnson City to West Market Street. In 1994, the Bikeway/Greenway Committee was charged with recommending a comprehensive plan for the development of bikeways and greenways in Johnson City. A Master Plan was completed by the committee in 1995. The plan contributors were professional planners, avid bicyclists, and members of the community. The Bikeway & Greenway Advisory Council since it's founding in 1994 holds monthly meetings and has continued to add supportive insight to the needs and implementation of bicycle facilities in Johnson City.

Existing Bicycle Facilities

As with pedestrian facilities, the presence of well-designed bicycle facilities also influences decisions to bicycle for transportation. According to the *National Personal Transportation Survey*, 40 percent of all trips are less than two miles in length.[12] This is a practical distance for bicycling when well-designed and continuous bicycle facilities exist.


Bike Lane on Boones Creek Road

When riding in the street, bicyclists need sufficient space to operate comfortably. This usually means wider-than typical travel lanes or bike lanes and the absence of hazards.

Like many American cities, bicycles have not historically been a focus in Johnson City's transportation planning. As a result, bicycle facilities are limited within the community. Although the existing facilities are sparse, once connected they will provide effective bicycle access for localized areas and offer a foundation for future bikeway improvements (See Map 2: Existing Trails). Each of these facilities receives use by the

[12]www.bicyclinginfo.org/pp/benefits/tranben/index.htm

public and exemplifies how bicycle facilities can co-exist with the existing transportation network. Facilities on Oakland Avenue and Boones Creek Road comprise the approximately 2.5 miles of on-street bikeways that exist. These bike lanes were retrofitted into the existing streets as road improvements were made to the corridors. The State of Franklin Multi-Purpose Trail is a separated trail that runs parallel to the road for 3.3 miles from West Market Street to the Johnson City Crossing shopping center, positioned in a North-South orientation.

Existing Roadway Network

More than any other public space, the roadway network impacts Johnson City's citizens each and every day. Everyone is reliant on the network, in one form or another, as they engage in daily activities. Like many other U.S. cities, Johnson City's roadway network has been designed primarily to efficiently move motor vehicles through the community. Accommodating pedestrian and bicycle traffic has, until recently, been much less of a priority. Bicycle accommodations, such as bike lanes and traffic signals that detect bicycles, are conspicuously absent.

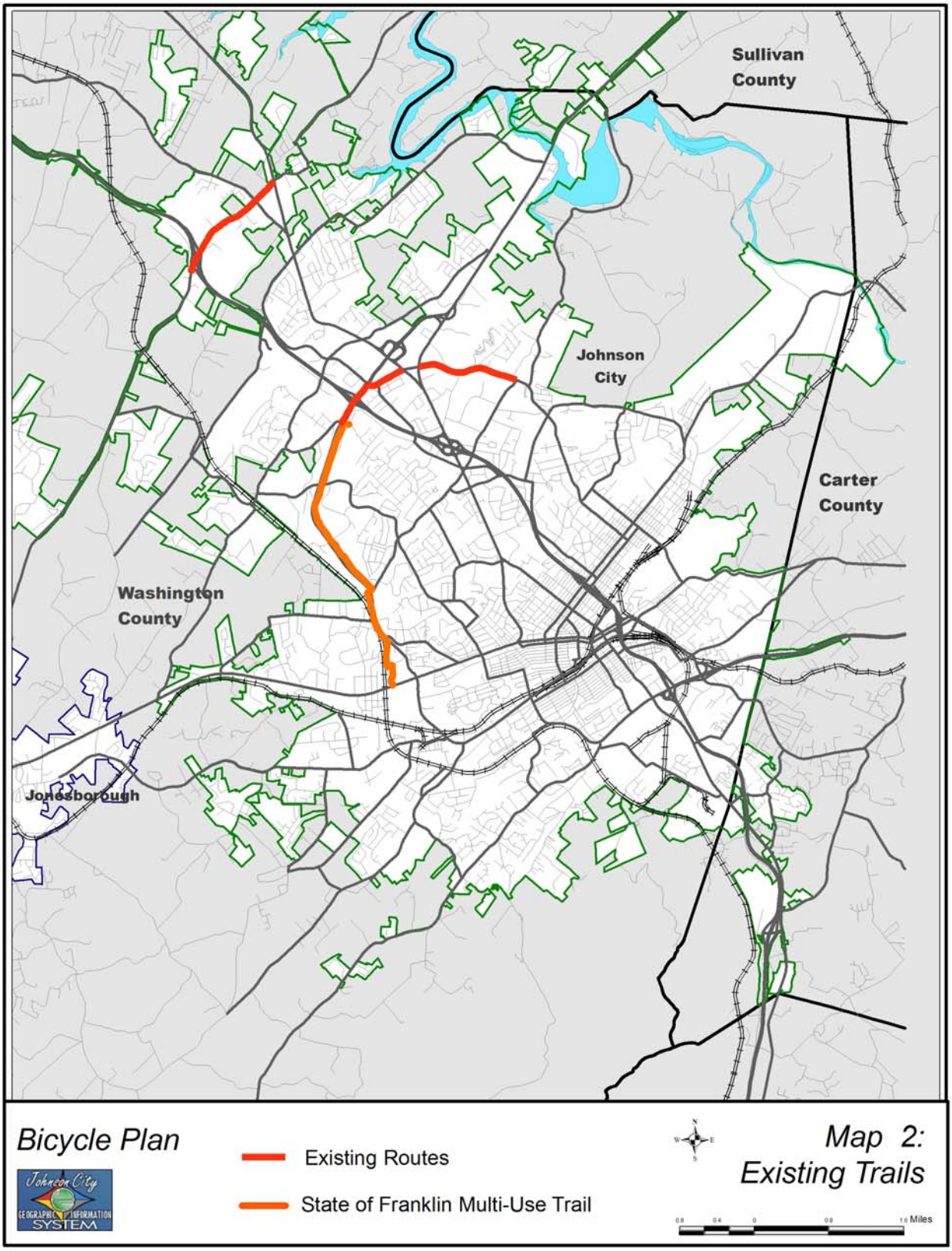
STREET HIERARCHY

A well-designed city street system should consist of a street network designed to efficiently serve different functions and types of traffic. It is imperative that the volume and composition of vehicular traffic be compatible with adjoining land uses to alleviate potential safety and zoning problems.

The hierarchy of streets includes local, collector, arterial, and expressways/freeways, with the function of each changing as one moves up the hierarchy. The function changes from a low volume, unrestricted access street serving adjacent land uses exclusively to a high volume, limited access street whose primary function is to move through traffic.

Local **-** The primary function of local streets is to provide access to adjacent land uses. Through traffic should be discouraged from using these streets. On-street parking may be permitted where demand exists. These streets make-up the largest percentage of roadways in the city. However, individually they carry only a small proportion of the total vehicle traffic. Each local residential street generally carries less than 1,000 vehicle trips per day (VTPD).

Collector **–** These streets are designed to collect local street traffic and direct it to major streets, but they also provide access to abutting land uses. Collector streets are generally not lengthy and do not handle long through trips.


Sullivan County
Johnson City
Carter County
Washington County
Jonesborough
Bicycle Plan
Existing Routes
State of Franklin Multi-Use Trail
Map 2:
Existing Trails
Miles

Arterial **-** This class of roadway is designed to carry large volumes of through-traffic. Arterials connect the principal traffic generators within the city as well as important rural routes, moving traffic between communities and activity centers. They generally carry 10,000 to 25,000 trips per day and arterials may handle up to 40,000 trips per day. As the volumes increase, the primary function of the roadway changes from serving the adjacent land uses to moving traffic through the city.

Expressways/freeways **-** This class of street is devoted entirely to traffic movement with little regard to access to adjacent land uses. In all cases, freeways are limited access roadways. Freeways such as Interstate 26 serve large volumes of higher speed traffic on longer through trips, with traffic volumes generally ranging over 25,000 trips per day.

PEER CITIES REVIEW

A review of bicycle planning and facilities in other selected cities provides a useful context for Johnson City's own initiatives and aspirations. Comparisons were made with cities predominantly in Tennessee, with the exception of Asheville, North Carolina and Abingdon, Virginia. The cities range in size of population with Abingdon being the smallest at 7,938 and Chattanooga the largest at 155,554. Although Chattanooga is significantly larger than Johnson City, it was chosen as a comparison for two reasons; one, a large city such as Chattanooga has urban densities that support alternative forms of transportation, and two, because of its progressive initiatives on bikeways. However, for the most part, selected cities are comparable to Johnson City's population.

With the exception of Oak Ridge, Tennessee, all of the cities reviewed had or were developing a bicycle plan. The plans provide direction and focus for planning efforts, and they provide a means of communicating the vision of the community to the decision-makers. Typically, without a plan, bicycling planning efforts result in ad hoc decisions that only provide single independent facilities rather than a comprehensive network.

Design standards were established within each city reviewed. The cities either used standards published by the Association of State Highway and Transportation Officials (AASHTO), American Disability Association (ADA), or their state highway design standards (TDOT, VDOT, NCDOT). Design standards assure that all bicycle facilities will be built in a consistent manner.

The only two cities to have bicycle racks on buses were Asheville, North Carolina and Chattanooga, Tennessee. Both cities are larger cities in the comparison, and also very progressive towards promoting bicycling. This provision greatly expands a cyclist's travel options. Such an option should be incorporated on all city buses to encourage and expand cycling throughout Johnson City.

Approximately, one-half of the cities reviewed have created some form of bicycle/pedestrian coordinator position. This position facilitates the delivery of information, the coordination of programs, and the review of development policies.

Education programs vary from place to place, and most provide educational materials and bicycle workshops. Often, city staff works closely with bicycle clubs to provide education and encouragement programs. Other ideas included:

- Bike mentoring programs
- Advertisement
- Bicycle Rodeos
- Bike to Work Programs
- Safety courses

In order to enhance the safety of the cyclist using the bicycle facilities, many cities have instituted bicycle facility maintenance programs. Often these involve spot maintenance[13] crews that respond to cyclists who submit spot maintenance forms. Many cities also assured that street sweeping was conducted on streets with bicycle facilities.

All cities in the comparison have some form of bike trail, shared roadway, path, or greenway. Most cities have multiple types of recreational trails and bicycle friendly roadways that provide transportation opportunities. Insight into successful, city-specific bicycle programs, design guidelines, and other details can be useful in evaluating the most appropriate strategies for Johnson City. Table 6 summarizes the characteristics of each city.

[13] Appendix B. 8: Maintenance, Section E. Spot Improvements Program

Table 6: Peer Cities Review

	Bike Plan	Design Standards	Bike racks on buses	Bike/Pedestrian Coordinator	Education Program	Maintenance Program	Mileage
Abingdon, VA	Yes	VDOT	No	Partial	Yes, Non-profit group	Yes (Public/Private partnership)	Virginia Creeper Trail 34 miles
Asheville, NC	Yes	NCDOT standards	Yes	Yes, Partial	Yes	Yes, Limited	5 mi. bike lanes; 60+ mi. shared; 10 mi. trails
Bristol, TN	Yes	TDOT standards	No	Yes, Partial	Yes	Yes	2 mi. shared road;10 mi. mountain bike trails; 8 mi. bike lanes
Chattanooga, TN	Yes	TDOT ASHTO	Yes	Proposed	Yes	Yes	140 miles existing and previously planned
Clarksville, TN	Yes	TDOT	No	No	No	No	1.7 mi. Rails-Trails (1999)
Elizabethton, TN	Yes	TDOT	No	Yes, partial	Yes	Yes, Parks & Recreation	4 miles multi-use trail; 2 miles planned
Johnson City, TN	Yes	TDOT	No	Yes, partial	Yes, Police Department (Bike Rodeo)	Yes, Streets Division	3.3 mi. multi-use trail; 2.5 mi. bike lanes; 2.3 mi. bike lanes currently under const.
Kingsport, TN	Yes	TDOT	No	Partial	No	Yes	7 mi. greenway
Maryville, TN	In progress	TDOT, ADA	No	No	Police Department	Yes, built in budget	14 mi. of trail (connects Maryville to Alcoa)
Morristown, TN	In progress	TDOT	No	No	No	Yes	10 mi. bike trail; 2 phases under construction (approx. 15 miles)
Murfreesboro, TN	Yes	TDOT ASHTO	No	Part-time	No	Yes (Rec. Department handles trails in park, Street division handles road)	5 mi. bike trail; 11.3 separated trail; 4 mi. shared road, 6 mi. under design
Oak Ridge, TN	No	TDOT	No	No	No	No	2 mi. shared roadway

Source: Johnson City Planning Department, 2005

BICYCLE USER AND FACILITY TYPES

The recommended facility network provides a comprehensive multi-jurisdictional network of facilities that accommodates cyclists of various skill levels.

User Types

The plan provides facilities for all user types and offers options for differing skill levels. User types include the following:

- Class A: Expert
- Class B: Casual
- Class C: Inexperienced

Class A includes expert or experienced riders. Expert riders generally use their bicycles as transportation and desire direct connections to destinations with minimal delay. These riders are typically confident riding their bicycles alongside motor vehicles and are able to negotiate high speed roadways without special bicycle facilities. In designing facilities for expert riders, adequate space should be provided so that the cyclist and motorist can pass comfortably without shifting positions (Picture: cyclist on Boones Creek Road).

Class B includes casual or less confident riders. Most of these adult riders prefer to use roadways with fewer motor vehicles and more operating space. These casual riders also use their bicycles for transportation, but wish to avoid heavy, high-speed traffic. They prefer neighborhood streets and multi-use paths separated from roadways. Busier streets should include a designated bike lane or wide shoulder to accommodate casual riders. (Picture: example of casual cyclist)

Class C includes inexperienced riders, including children. Children are often confident riders with skilled bicycle handling abilities, but they lack the "traffic sense" and experience of maneuvering in high volume/speed motor traffic. For these riders, connections are necessary to destinations including schools, convenience stores, and recreational areas. Multi-use paths linking these facilities, in combination with neighborhood bike lanes can accommodate this group. (Picture: children/inexperienced riders)

Facility Types

The following types of bicycle facilities are recommended for use in Johnson City:

- Class I: Multi-Use Paths
- Class II: Bike Lanes
- Class III: Bike Routes
- End Trip Facilities

Class I Facilities include multi-use paths, more popularly known as greenways. Greenways do not allow motor vehicle traffic, but they do permit a range of non-motorized travel including bicycling, walking, running, and in-line skating. Although typically constructed in an independent right-of-way, park, or easement, greenways may also be located within road rights-of-way, separated from motor vehicle traffic by open space or a structural barrier.

Greenways primarily attract recreational users, but because they typically meander through a community and connect destinations, they also offer an excellent opportunity to function as non-motorized transportation routes. They sometimes offer a more direct route to destinations than the roadway network. For children, or any cyclist uncomfortable with sharing the roads with cars, trails may be the preferred facility. Greenways are an excellent training facility for increasing the skills to ride on the road (Picture: State of Franklin Multi-Use Trail).

Class II Facilities include bicycle lanes and shouldered bikeways. A bicycle lane is a portion of the roadway separated from conventional travel lanes with a stripe, and designated for exclusive or preferential use by bicyclists. They are one-way facilities placed on both sides of a street in order to carry bicyclists in the same direction as motor vehicle traffic. Bike lanes also help to increase the total capacity of roadways by segregating users. In addition to lane striping, pavement markings and signage identify bike lanes.

Shouldered bikeways are paved shoulders separated from travel lanes with a lane stripe, and are typical for rural roadways without curbs

and gutters. Pavement markings are not typically used on shouldered bikeways, since they can also be used for other functions, such as for vehicle breakdowns (Picture: bike lane on Boones Creek Road).

Class III Facilities include bike routes. On a bike route, bicyclists and motorists share the same travel lanes. Except in cases where wide outside lanes are provided, motorists will typically have to move into the adjacent lane in order to safely pass a bicyclist. Bike routes function well on local and minor collector streets, where traffic volumes and speeds are typically lower than on major collector and arterial streets. There are three types of shared roadways: Wide Outside Lanes (WOLs), Shared Signed Roadways (SSRs) and Local Streets (Picture: example of Wide Outside Lane).

On major collector and arterial streets, where severe physical constraints preclude bike lanes, WOLs are a desirable alternative. Because they provide less operating space than bike lanes, and are not designated for exclusive bicycle use, some cyclists will be uncomfortable using WOLs. However, WOLs allow most motor vehicles to pass bicyclists without weaving into the adjacent lane and provide a greater degree of comfort to cyclists than the typical 11-foot or 12-foot lane.

SSRs are arterial or collector streets where bicycle traffic or demand are high but bike lanes or wide outside lanes cannot be provided due to severe physical constraints. SSRs are posted with appropriate speed limits and rely on signage to encourage both drivers and cyclists to be alert for all roadway users. In many cases, SSRs are a temporary solution, and are applied until a design solution that incorporates more appropriate bicycle facilities can be implemented.

Local streets should be able to safely accommodate bicyclists without any special treatment. Signage may be used to identify a through-bike route that follows a local street. In cases where local streets carry more traffic at greater speeds than they were designed for, traffic calming techniques such as speed humps and pedestrian bulbs may be implemented to help ensure that bicycle and motor vehicle traffic operates compatibly.

End of trip facilities

Cyclists are often discouraged from using their bicycles as transportation because they have no place to park their bicycle at their destination. End of trip facilities are provisions which are intended to increase convenience and safety for the user. Types of end of trip facilities include bicycle parking and shower and changing facilities.

Bicycle parking can be addressed by the provision of bike racks or bike lockers. Bike racks come in a range of shapes, sizes, materials, and colors. Bike racks are intended to provide a short-term parking solution. While bicycles are intended to be locked to the rack, the possibility of theft or vandalism still exists. Bicycles often have to be partially dismantled (wheels, pump, light, etc.) and each part locked separately or taken with the rider in order to be completely secured when locked to a rack. Additionally, bicycles stored at outdoor racks are exposed to damage from inclement weather conditions.

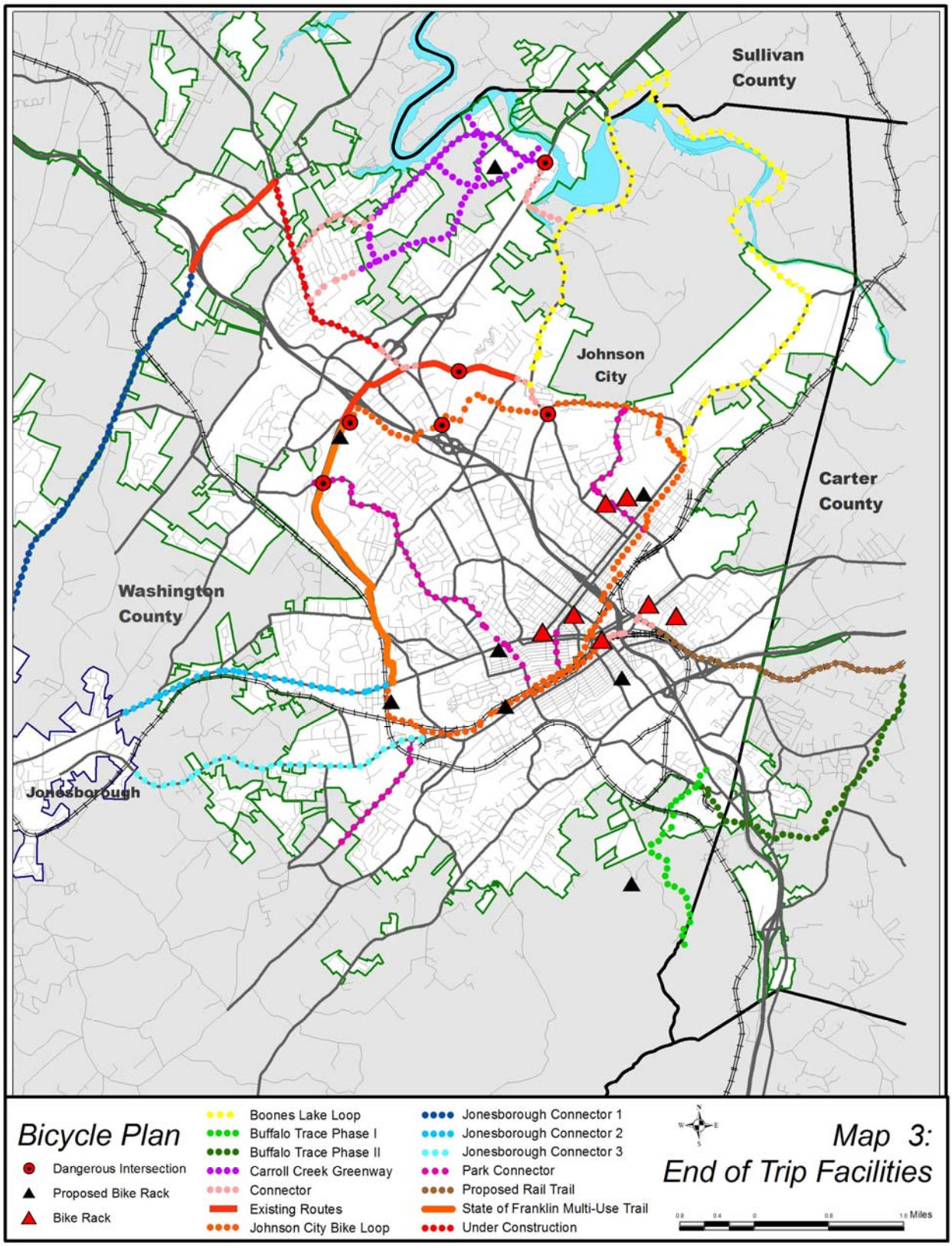
Another type of bicycle storage is the bike locker. Bike lockers are containers designed to store bicycles without dismantling. A rider can also store gear in the locker. The bicycle is completely enclosed and secure from impact. These types of facilities are recommended where parking is for longer periods.

Showers and changing facilities are especially important for riders commuting to work. Many commuters are discouraged from using their bicycles to travel to work due to the lack of these facilities. Many bicycle-friendly cities have included shower facilities in their commercial development codes. The codes are often based on location, square footage and/or number of employees.

End of Trip Facilities Recommendations

Bicycle parking is a critical component of the plan because it assures that cyclists will have a place to secure their bikes once they have reached a destination. It is recommended that bicycle parking be provided at public facilities, especially public facilities that will be in close proximity to identified bicycle routes. Over time, the city should develop bicycle parking requirements as a part of its development codes; however, until then, bicycle racks should be encouraged to be placed at strategic locations along bicycle routes.

Currently, identified in the Johnson City Zoning Ordinance in Article XI of the Parking Regulations, the city provides parking provisions to encourage new developments to add bicycle racks in parking lots. Under Section 11.2.6 “Parking requirements may be reduced per the following formula: one (1) space per one (1) bike locker, or one (1) space per ribbon rack provided parking reduction does not exceed ten (10) percent of the required total.” This provision will encourage developers to reduce the size of the parking lot. Reduction of parking and inclusion of bike racks will benefit the developer’s bottom line and encourage other modes of transportation.

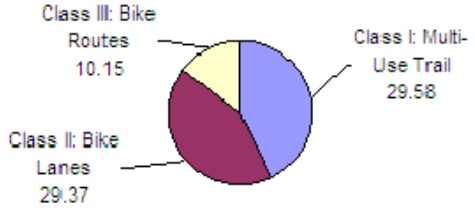

Sullivan County
Johnson City
Carter County
Washington County
Jonesborough
Bicycle Plan
Dangerous Intersection
Proposed Bike Rack
Bike Rack
Boones Lake Loop
Buffalo Trace Phase I
Buffalo Trace Phase II
Carroll Creek Greenway
Connector
Existing Routes
Johnson City Bike Loop
Jonesborough Connector 1
Jonesborough Connector 2
Jonesborough Connector 3
Park Connector
Proposed Rail Trail
State of Franklin Multi-Use Trail
Under Construction
Map 3:
End of Trip Facilities
Miles

The Bicycle Facility Network

The recommended bicycle facilities network illustrated on Map 4 totals 69.1 miles. The proposed network is made up of the following facility types:

- Class I: Multi-Use Paths – 29.58 miles
- Class II: Bike Lanes – 29.37 miles
- Class III: Bike Routes – 10.15 miles

Figure 3: Distribution of Recommended Bicycle Facilities (miles)

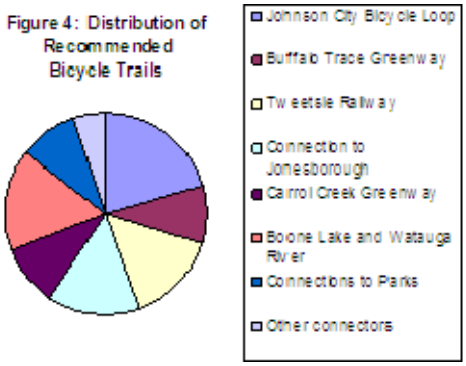


Source: Johnson City Planning Department

The plan consists of bicycling facilities that connect many destinations and land uses. These routes provide north-south and east-west links throughout the city and provide regional connections. The major focus of the plan will be the development of the Johnson City Bicycle Loop. The primary purpose of the loop is to create a complete connection around Johnson City that is useable for transportation purposes and that will aid in connecting future bicycle facilities.

The remaining proposed bicycle facilities are connections to destinations, links inside the loop, and connections to parks or recreational uses that are all joined to the Johnson City Bicycle Loop.

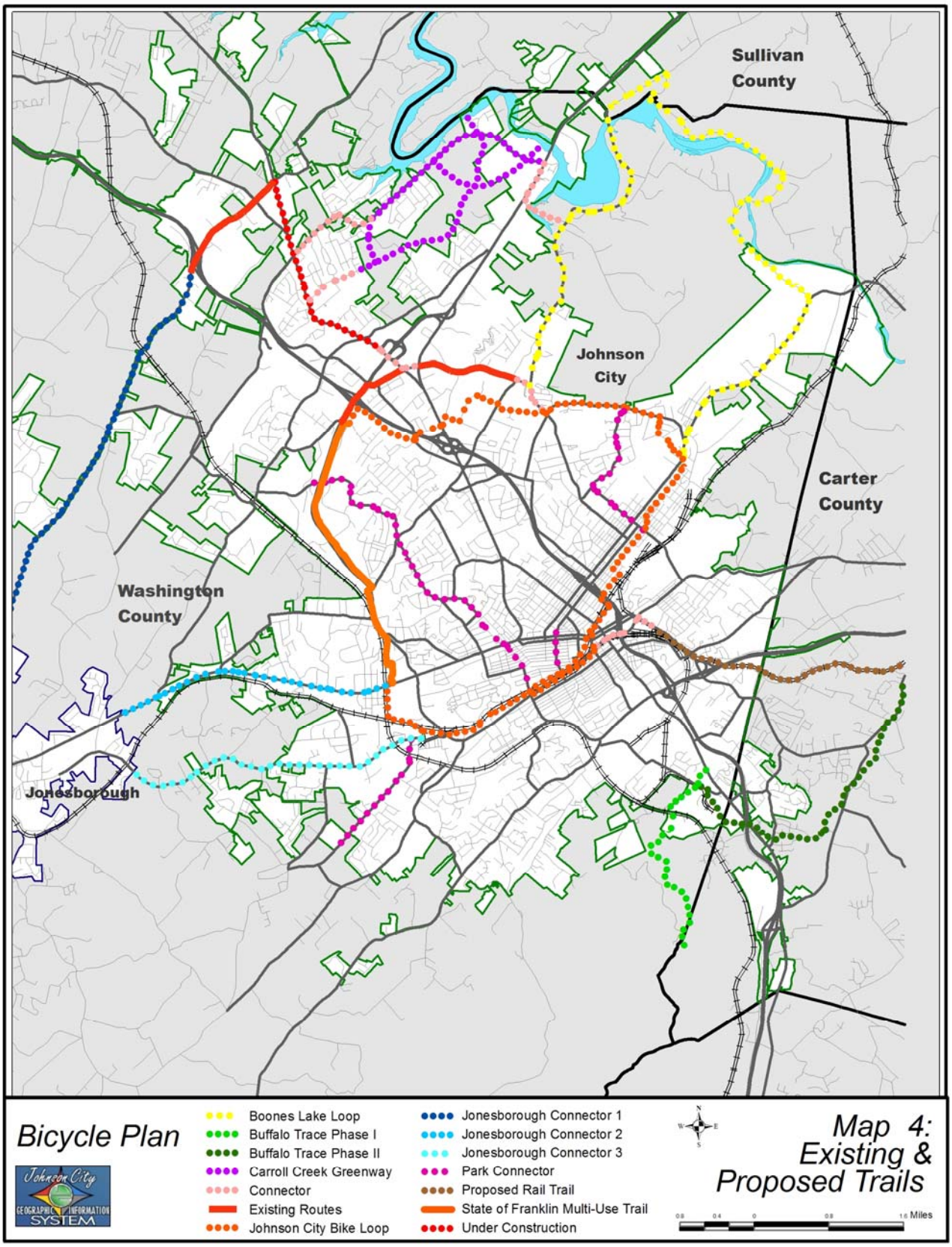
Figure 4: Distribution of Recommended Bicycle Trails



Source: Johnson City Planning Department

Bicycle facilities provide transportation and recreation routes for all types of users. Some of these facilities are constructed upon existing trails and connections. In general, the identified corridors were selected because they are located within the central city which has the land development patterns and densities that most strongly support bicycle transportation. Specific corridors were selected, based on the following criteria:

- They provide connectivity between major origins and destinations, such as downtown Johnson City, ETSU, Med Tech corridor, and other destinations;
- They are corridors on which concentrations of attractors are located;
- They are direct routes; and
- They extend in each major direction from downtown Johnson City.


Sullivan County
Johnson City
Carter County
Washington County
Jonesborough
Bicycle Plan
Johnson City GEOGRAPHIC INFORMATION SYSTEM
Boones Lake Loop
Buffalo Trace Phase I
Buffalo Trace Phase II
Carroll Creek Greenway
Connector
Existing Routes
Johnson City Bike Loop
Jonesborough Connector 1
Jonesborough Connector 2
Jonesborough Connector 3
Park Connector
Proposed Rail Trail
State of Franklin Multi-Use Trail
Under Construction
N
W
E
S
Map 4: Existing & Proposed Trails
0.8 0.4 0 0.8 1.6 Miles

GOAL, OBJECTIVES, AND POLICIES

The most important step in developing any plan is to clearly identify what are the desired goals and objectives to be accomplished.

Goal

SAFELY INCREASE THE LEVEL OF BICYCLING AND WALKING WITHIN THE CITY FOR RECREATIONAL TRIPS AND FOR DESTINATION-ORIENTED TRIPS.

Objectives

1. Create a network of bikeways and greenways capable of supporting multiple users for transportation and recreation opportunities. This includes connections for bikeways and pedestrians in new subdivisions (where feasible).
2. Provide for safe non-motorized transportation on existing streets.
3. Incorporate bikeways and sidewalks into the design of all new and reconstructed roads along with the appropriate signage.
4. Connect all areas of the city to high-use areas and destination points with safe bikeways and greenways.
5. Eliminate barriers to non-motorized transportation and recreation—barriers include intersections which can be mitigated with crosswalks, signals, and sensors.
6. Connect Johnson City bikeways and greenways with existing and future routes in the region.
7. Create a bikeway loop for non-motorized transportation and recreation around Johnson City.
8. Incorporate bicycle facilities into the design and renovation of all new and existing city parks—bike facilities at parks should include parking facilities.
9. Create a comprehensive bicycle network that links parks in Johnson City.
10. Provide secure storage facilities at destination points—bike parking included in all new city buildings.
11. Provide adequate landscaping around greenways for improved aesthetic appearance.

Education, Safety, & Public Awareness

12. Develop public information programs to promote the awareness and use of a bikeway and greenway network.
13. Promote the safe operation of bicycles and vehicles—share the road campaign.

14. Provide educational programs for all school levels and the public at large to increase the safety of bicycling and walking.

15. Promote increased respect between and proper use by motorized and non-motorized users of roads, bikeways, and greenways—share the road campaign.

16. Increase protection for individuals on bikeways and greenways through lighting improvements and increased signage.

Participation

17. Enlist the help of individuals, businesses, and civic clubs in the development, promotion, and maintenance of bikeways and greenways.

18. Promote tourist use of the bikeway and greenway network—brochures/guides to hotels, Chamber of Commerce, and display racks at restaurants.

19. Promote family use of the bikeway and greenway network—send information/brochures to schools.

Environment

20. Establish a bikeway and greenway network that enhances the environment through reduced auto emissions, better storm water management, and land conservation—encourage trails in floodplains, and conservation areas.

21. Ensure perpetual maintenance of bikeways and greenways and related facilities.

Funding

22. Adequately fund the creation, maintenance, and expansion of a network of bikeways and greenways in Johnson City through all available public and private sources.

Policies

Policy 3.3.1: It is the policy of the city to retrofit designated existing streets to support safe, non-motorized transportation.

Policy 3.3.2: It is the policy of the city to incorporate safe and convenient bikeways into the design of all new and reconstructed collector and arterial streets within the city.

Policy 3.3.3: It is the policy of the city to ensure that its bikeway and greenway network connects high-use areas and destination points and is accessible to all areas of the city.

Policy 3.3.4: It is the policy of the city to utilize abandoned railroad tracks in the development of bicycle/pedestrian multi-use trails.

Policy 3.3.5: It is the policy of the city to eliminate barriers to non-motorized transportation and recreation.

Policy 3.3.6: It is the policy of the city to connect the city's bikeway and greenway network with routes throughout the region, both existing and future.

Policy 3.3.7: It is the policy of the city to develop a bicycle loop for non-motorized transportation and recreation around the city.

Policy 3.3.8: It is the policy of the city to incorporate bicycle facilities into the design and renovation of new and existing city parks.

Policy 3.3.9: It is the policy of the city to promote the safe operation of bicycles and motorized vehicles through educational programs for motorists and for all school children, with special consideration given to the program developed by the League of American Bicyclists.

Policy 3.3.10: It is the policy of the city to evaluate the economic impact of bikeway and greenway usage in the hopes that future funding sources can be identified and justified.

Policy 3.3.11: It is the policy of the city to ensure that signage is properly placed and maintained along all designated bikeway/greenway routes.

MAJOR THOROUGHFARE PLAN

The Major Thoroughfare Plan is the official statement of the Planning Commission and the Board of Commissioners regarding the city's major street system. The Major Thoroughfare Plan, Urban Growth and Services Element, and the Land Use Element constitute the foundation for development policies endorsed by the city. In addition, they form the basis for other, more specific Comprehensive Plan Elements dealing with such concerns as housing, parks, schools, and utilities.

The process of planning street improvements in Johnson City has evolved over the past 30 years. Today, it is common to utilize multiple planning tools to identify the proper type of improvement for an existing street or to develop the alignment for a new street. The balance between supporting and preserving the character of existing neighborhoods and guiding economic development within the business community must also be carefully observed. Two basic tools that can help keep this balance are transportation and land use planning. These two planning disciplines must be coordinated into a single process that will produce recommendations for transportation projects and proposed land use patterns that are compatible and support each other.

The four basic classifications of streets are: *local, collector, arterial, and freeways*. Each street type performs a different function. Efficient and safe operation of the street system requires that specific facilities be designed to serve the specific purpose within this classification of streets. Local streets, for example, should be designed to serve the adjacent land uses and arterial streets should be designed to move traffic throughout the city. It is important to design streets that allow traffic to move freely; however, it is equally important to design the street to be functional with the desired land use along the corridor.

Any approach used in the design of street improvements should include a component for community input. People who are most impacted by the project should have an opportunity to have input into what is designed. The Tennessee Department of Transportation (TDOT) has recently developed a process called Context Sensitive Solutions (CSS). CSS is a process that involves all stakeholders in developing a transportation facility that fits its physical setting. It is based on the following principles:

- Safety
- Accessibility and Mobility
- Community Values and Impacts
- Aesthetics and Scenic Preservation
- Natural and Human Environment

TDOT meets with all of the stakeholders before it begins its design. This allows them to balance the stakeholders' needs with the transportation objectives. The city should include a similar procedure in its project design process.

TRAFFIC GROWTH

As Johnson City's population continues to grow there will be an increased impact on the city's street system. Traffic counts provide a good indicator of how and where the city is growing. Four of the top five growth street segments were located in the northern area of the city. This is reflective of the growth in the north. Boones Creek Road recorded the greatest growth between 1985 and 2005 increasing from 3,560 average trips per day to 15,917 trips, an increase of over 347 percent. Segments of Carroll Creek Road also experienced growth of 276 percent as this former farm road is impacted by the new subdivisions which are developing along its corridor. Interstate 26, between Boones Creek Road and Suncrest Dr. (SR-75) has also experienced tremendous growth (179 percent) due to the residential growth in the northern part of the city and due to the increase in interstate traffic created by the opening of I-26 between Ashville, NC and the Tennessee state line.

Table 7. Growth Segments, 1985-2005

Station #	Location	Trips/day 2005	Trips/day 1995	Trips/day 1985	% Change 20 Years
101	Boones Creek Rd Between Christian Church & I-26	15,917	8,577	3,560	+347.11%
130	Carroll Creek Rd Between Oliver & Bristol Highway	3,460	1,806	920	+276.09%
129	Carroll Creek Rd Between North Roan and Bradford	6,590	3,711	2,290	+187.77%
111	I-26 Between Boones Creek & Bobby Hicks Hwy	45,449	32,798	16,270	+179.34%
158	West Lakeview Between Oakland & Parkwood	4,070	2,934	1,860	+118.82%

Source: Tennessee Department of Transportation

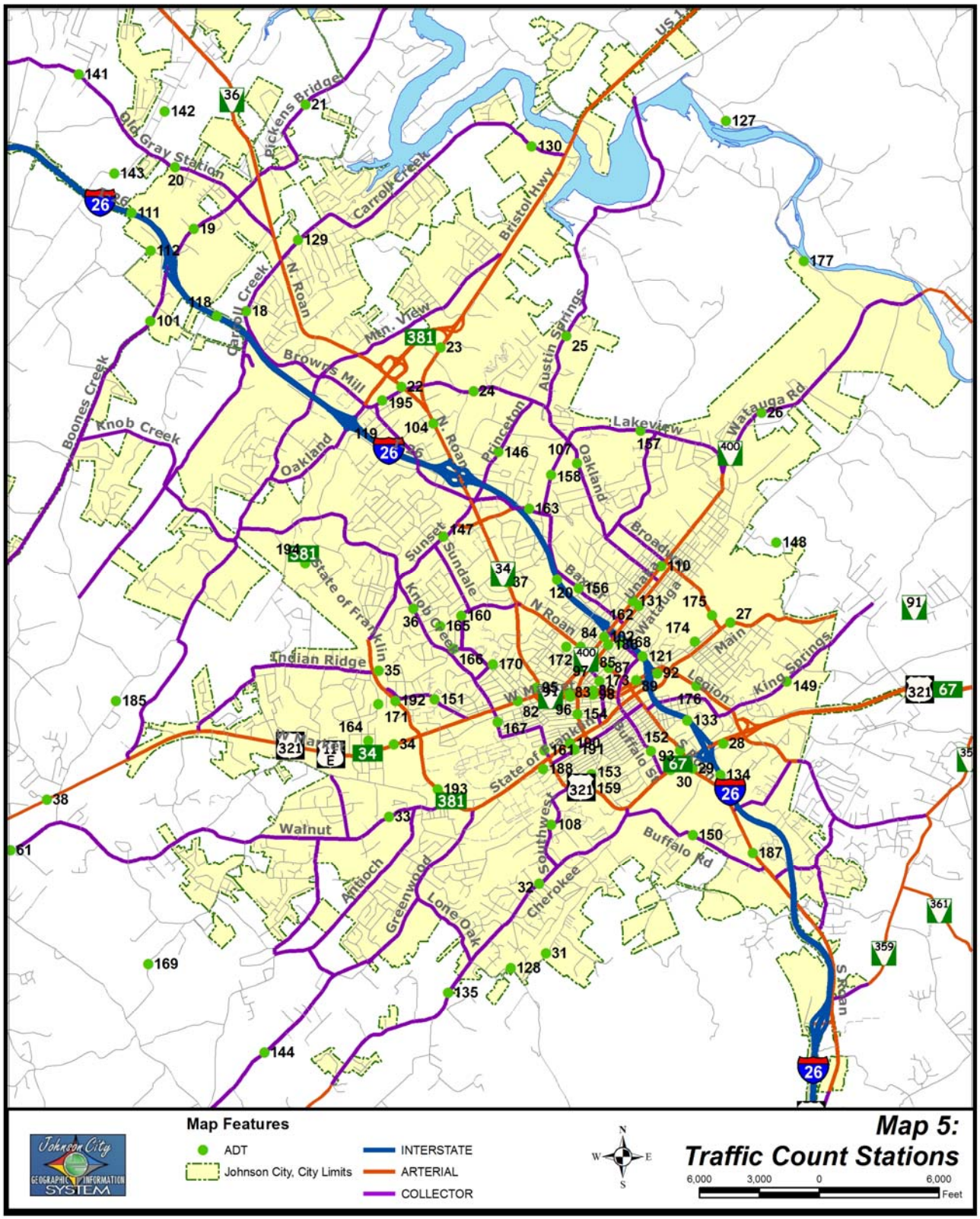
Not all of Johnson City's road segments experienced growth. In fact, several street segments actually lost traffic volume as land use and traffic patterns change. Traffic along East Main Street, east of Broadway has declined significantly (42.91 percent). This is primarily due to the construction of the Elizabethan Highway (SR 321) and motorists changing their driving pattern to utilize this improved roadway. Traffic along South Roan Street has also experienced reductions in traffic volume and this is also primarily due to changing traffic patterns caused by the opening of a new section of I-26 (formerly US 23) in the mid to late 1980s.

Table 8. Declining Segments, 1985-2005

Station #	Location	Trips/day 2005	Trips/day 1995	Trips/day 1985	% Change 20 Years
27	Main St Between Broadway & Topeka (SR-91)	9,397	9,648	16,460	-42.91%
151	Indian Ridge Rd Between Carter & Lincoln	1,860	2,900	2,890	-35.64%
93	South Roan St Between Highland & University Parkway	6,780	8,791	8,920	-23.99%
110	East Unaka Ave Between Center & Broadway (SR-400)	5,860	5,219	7,710	-23.99%
29	South Roan Between University Parkway & Lafe Cox	14,460	11,387	17,470	-17.23%

Source: Tennessee Department of Transportation

Map 5. Traffic Count Stations



Commuter Traffic Flow

Approximately 21,000 commuters travel into Washington County to work every day. Of this total, 9,688 commuters travel from Carter County and 7,171 commuters travel from Sullivan County. Approximately, 10,000 Washington County residents travel to work outside of the county each day. Of this, 7,211 residents travel to Sullivan County and 1,217 residents travel to Carter County. (See Table 9)

Table 9. Tri-Cities Region County-by-County Commuter Flow, 2000

	Place of Work							
Residence	Carter County	Hawkins County	Sullivan County	Unicoi County	Washington County, TN	Scott County	Washington County, VA	Other
Carter Co., TN	10,899	24	1,860	414	9,688	0	123	2,035
Hawkins Co, TN	39	11,434	5,953	8	741	179	42	3,771
Sullivan Co., TN	921	1,494	48,100	83	7,171	4,233	6,763	2,111
Unicoi County, TN	244	14	370	4,042	2,320	0	10	472
Washington Co., TN	1,217	174	7,211	933	37,367	301	29	198
Scott Co., VA	0	314	3,625	11	352	3,589	239	935
Washington Co., VA	47	2	2,471	0	240	40	13,844	3,262

Source: Census Transportation Planning Package 2000

Description of Levels of Service (LOS)[14]

Levels of service represent reasonable ranges of traffic volumes based on three critical flow variables: speed, density, and service flow rate. General descriptions of operating conditions for each of the levels of service are as follows:

LOS A describes primarily free-flow operations. Average operating speeds at the free-flow speed generally prevail. Vehicles are almost completely unimpeded in their ability to maneuver within the traffic stream. Even at the maximum density for LOS A, the average spacing between vehicles is about 528 feet, or 26 car lengths, which affords the motorist with a high level of physical and psychological comfort. The effects of incidents or point breakdowns are easily absorbed at this level.

LOS B also represents reasonably free flow, and speeds at the free-flow speed are generally maintained. The lowest average spacing between vehicles is about 330 feet, or 18 car lengths. The ability to maneuver within the traffic stream is only slightly restricted, and the general level of physical and psychological comfort provided to drivers

[14] Highway Capacity Manual, 2000

remains high. The effects of minor incidents and point breakdowns are still easily absorbed, though local deterioration in service may be more severe than LOS A.

LOS C provides for flow with speeds still at or near the free flow speed of the freeway. Freedom to maneuver within the traffic stream is noticeably restricted at LOS C, and lane changes require more vigilance on the part of the driver. Minimum average spacing is in the range of 220 feet, or 11 car lengths. Minor incidents are absorbed, but the local deterioration in service will be substantial. Queues may be expected to form behind any significant blockage. The driver now experiences a noticeable increase in tension because of the additional vigilance required for safe operation.

LOS D is the level at which speeds begin to decline slightly with increasing flows. In this range, density begins to deteriorate somewhat more quickly with increasing flow. Freedom to maneuver within the traffic stream is more noticeably limited, and the driver experiences reduced physical and psychological comfort levels. Even minor incidents can be expected to create queuing, because the traffic stream has little space to absorb disruptions. At the limit, vehicles are spaced at about 165 feet, or nine car lengths.

LOS E describes operation at maximum capacity. Operations in this level are volatile, because there are virtually no useable gaps in the traffic stream. Vehicles are spaced at approximately six car lengths, leaving little room to maneuver within the traffic stream. Vehicles entering from a ramp or a vehicle changing lanes, can cause following vehicles to give way to admit the vehicle. This can establish a disruption wave that continues throughout the upstream traffic flow. At capacity, the traffic flow has no ability to dissipate even the most minor disruptions, and any incident can be expected to produce an extensive queuing. Maneuverability within the traffic stream is extremely limited, and the level of physical and psychological comfort afforded the driver is extremely poor.

LOS F describes breakdowns in vehicular flow. Such conditions generally exist within queues forming behind breakdown points. Such breakdowns occur for a number of reasons:

a. Traffic incidents cause a temporary reduction in the capacity of a short segment, such that the number of vehicles arriving at the point is greater than the number of vehicles that can traverse it.
b. Recurring points of congestion exist, such as merge or weaving areas, where the number of vehicles arriving is greater than the number of vehicles discharged.
c. In forecasting situations, any location presents a problem when the projected peak hour (or other) flow rate exceeds the estimated capacity of the location.

PRIORITIES

The Johnson City Metropolitan Transportation Planning Organization (MTPO), as part of its long-range transportation planning process, contracted with Wilbur Smith Transportation Engineers to develop its traffic-modeling program (TransCad). TransCAD is a GIS based transportation modeling program that uses future land use projections, projected residential densities, and carrying capacities to project future traffic volumes. This allows the MTPO and the city to anticipate and plan for needed road projects before the service level of the roadway begins to fail.

Locally-Funded

Based on the results of this computing modeling, knowledge about current growth trends, and road projects identified as necessary for economic development, the following has been identified as a list of top priorities for locally-funded projects:

Phase I (2007- 2012)

1. **Tennessee Street Extension from Lamont Street to John Exum Parkway**. Completing this .32 mile, 4-lane collector street will improve traffic throughout the area of the city by providing another north/south connection which will further improve the overall street network and help alleviate traffic congestion along State of Franklin Road. The 2007 estimated cost of construction is $6 million ($500,000 funded in FY 2007).

2. **Sunset Drive.** Improve Sunset Drive from Knob Creek Road to North Roan Street to a 5-lane road with sidewalks. The 2007 estimated cost of construction is $2 million ($500,000 funded in FY 2007).

3. **Indian Ridge Road/State of Franklin Road Intersection.** Reconstruct this intersection to better accommodate traffic flow. Without any improvements, this section of roadway is expected to operate at a Level of Service E by the year 2030. The 2007 estimated cost of construction is $3 million.

4. **Knob Creek Road Overpass**. Improve Knob Creek Road to five lanes from State of Franklin Road to Redstone Road. Construct a bridge over the railroad to better

facilitate traffic flow. The 2007 estimated cost of construction is $12 million ($4.2 million funded through federal appropriations).

5. **Lone Oak Road Extension**. Extend Lone Oak Road 1.7 miles from Greenwood Drive to West Market Street using Carter Sell Road. This would provide another north/south connection and improve the area street network. The estimated 2007 cost of construction is $13 million.

6. **Swadley Road from Plymouth Road to the Milligan Highway**. Improve the roadway to better accommodate existing traffic volumes. The 2007 estimated cost of construction is $1 million.

7. **Hopper Road Extension**. Extend Hopper Road from Indian Ridge Road to Claude Simmons in order to improve the street network and provide better access to the north. Indian Ridge Road is already experiencing severe traffic congestion at peak times and this improvement should help alleviate this congestion. The 2007 estimated cost of construction is $2 million.

8. **East Oakland Avenue**. Widen East Oakland Avenue from Princeton Road to Unaka Avenue to two or three lanes with sidewalks. Without road improvements, segments of this roadway are expected to operate at a Level of Service E by the year 2030. The 2007 estimated cost of construction is $3 million.

9. **East Main Street/Broadway Avenue Intersection.** Reconstruct this intersection to better accommodate traffic flow. The 2007 estimated cost of construction is $500,000.

10. **West Walnut Street/State of Franklin Road Intersection.** Reconstruct this intersection to better accommodate traffic flow. Without any improvements, this intersection is expected to operate at a Level of Service F. The 2007 estimated cost of construction is $1 million.

11. **Highland Church Road.** Improve this roadway by realigning with Knob Creek Road and upgrading by widening and adding sidewalks to Haretown Road. The 2007 estimated cost of construction is $4 million.

12. **Milligan Highway**. Improve Milligan Highway from SR-67 to the city limits. The 2007 estimated cost of construction is $2.5 million.

Phase II. (2013-2020)

13. **Lone Oak Road from Cherokee to Greenwood Drive.** Improve two lanes with sidewalks and turn lanes at intersections to facilitate traffic and improve safety. The 2007 estimated cost of construction is $3 million.

14. **Indian Ridge Road from Baldridge Drive to State of Franklin Road**. Improve two lanes to improve safety. The 2007 estimated cost of construction is $2 million.

15. **Carroll Creek Road**. Reconstruct Carroll Creek Road from Browns Mill Road four miles to the Bristol Highway to an improved 2-lane divided/undivided roadway with sidewalks. There are segments of road that have experienced over 200 percent growth in traffic volume over the past ten years and this growth is expected to continue as this corridor continues to develop. The 2007 estimated cost of construction is $20 million.

16. **West Walnut Street**. Upgrade roadway, primarily the intersections from State of Franklin Road to the city limits. The 2007 estimated cost of construction is $1 million.

17. **Knob Creek Road.** Improve the 1.65-mile section of roadway from the proposed railroad overpass near Redstone Road to Boones Creek Road. This is necessary to improve hazardous conditions and better accommodate future traffic flow. Improve this roadway to four lanes with a median, bike lanes, and a sidewalk. The 2007 estimated cost of construction is $9 million.

18. **West Mountainview Road.** Widen pavement and improve this existing 2-lane, 1.8- mile road from North Roan Street to Knob Creek Road. Without any improvements, segments of this roadway are expected to operate at a Level of Service E and F by the year 2030. The 2007 estimated cost of construction is $5 million.

Economic Development Initiatives

The timing of these road projects are dependent upon the city's growth or the impact from major commercial or industrial developments. In these instances, the developer can be expected to fund some or all of the road improvements or the proposed development is expected to generate sufficient revenue through property and sales tax to justify the improvements.

West Oakland Avenue. Widen West Oakland Avenue from Hanover Road to Knob Creek Road to five lanes with sidewalks. Without any improvements, this segment of road is projected to have significant congestion by the year 2030. This project is also viewed as needed for economic development of the surrounding area.

Innovation Park Drive. Construct a street from McKinley Road to West Market Street through the proposed Innovation Park. This would be an economic development incentive to help develop the med-tech corridor middle anchor. The estimated 2007 cost of construction is $3 million.

Mall Street Improvements and realignment. The Mall, beginning the construction of a 300,000 square-foot expansion, is expected to experience an increase in traffic. The traffic circulation around The Mall will need to be improved to accommodate this increase ($500,000 funded in FY 2007).

Browns Mill Road Extension. Extend Browns Mill Road .9 miles from Carroll Creek Road to Boones Creek Road. Construct a non-residential street with two lanes, a sidewalk, and multi-purpose trail. This project is viewed as a catalyst for economic development in the Boones Creek area and would provide a link in the development of a frontage road system along I-26.

West Walnut Street from Buffalo Street to University Parkway. This would include primarily streetscaping and sidewalks to help encourage redevelopment along this corridor.

State of Franklin Frontage Roads. Construct a pair of frontage roads. These roads would connect Med-Tech Parkway to Oakdell Court on the east and Market Place Boulevard and Sunset Drive on the west and provide access to several land-locked parcels.

Maranatha Way Extension. Extend Maranatha Way .9 miles from West Mountainview Road to Carroll Creek Road to provide another north/south connector street paralleling I-26.

Chase Drive/Sam's Club From Chase Drive to West Mountainview Road. Construct a non-residential street with two lanes, a sidewalk, and multi-purpose trail.

State and Federal Priorities

In addition to the locally-funded projects, the following is a proposed list of state and federal roadway priorities:

State-Funded Priorities

1. **North Roan Street/Kingsport Highway from Boones Creek Road to Bobby Hicks Highway (SR 75).** In order to accommodate the projected traffic growth, expand this 4.1-mile section of roadway to four lanes with a center turning lane. Without any improvements, this roadway is expected to operate at a Level of Service F by the year 2030.

2. **Bristol Highway from High Point Drive to SR 381**. Widen to five lanes in order to have a continuous 5-lane roadway which would facilitate traffic flow.

3. **Veterans Administration Access Road.** Construct a new entrance into the VA from the intersection of West Market Street and Indian Ridge Road. The proposed road would be two lanes with sidewalks along both sides.

4. **SR-75**. In order to accommodate the projected traffic growth, expand this 4.1-mile roadway to four lanes with a center turning lane from the Kingsport Highway SR-36 to the Tri-Cities Regional Airport. Without any improvements, this roadway is expected to operate at a Level of Service F by the year 2030.

5. **Triangle Intersection (North Roan Street, Browns Mill Road, Princeton Road, Broyles Drive).** Realign intersection to provide greater separation with the traffic signals and improve traffic flow. Without improvement this segment of road is expected to operate at a Level of Service F in 2030.

6. **Watauga Road from Broadway east to the city limits**. In 2030, sections of this road are expected to operate between a Level of Service E and F. Improving this 3.65-mile section of roadway is also necessary to accommodate existing and projected commercial/industrial traffic.

7. **Boones Creek Road (SR 354) from I-26 to Jonesborough's city limits.** Improve this 6.3-mile roadway to four lanes with a median, bike lanes, and a sidewalk. Sections of this roadway have experienced growth of traffic volumes of over 300 percent over the past ten years, and without improvements, major segments of this roadway are expected to operate at a Level of Service F by the year 2030.

8. **Okolona Road Realignment.** In order to improve traffic flow and to facilitate economic development realign the intersection of Okolona Road with the I-26 off ramp at Exit 28.

Federally-Funded Priorities

9. **Interstate 26 from University Parkway to the Sullivan County line**. Widen to six lanes to better accommodate anticipated traffic growth. . Without any improvements, the interstate was projected by Wilbur Smith to operate between a Level of Service E and F by the year 2030.

Boones Creek/I-26 Interchange Improvements. This rural interchange needs to be upgraded in order to handle the commercial traffic developing around the interchange. Without any improvements, this interchange is expected to operate at a Level of Service F by the year 2030.

Suncrest Drive/I-26 Interchange Improvements. This rural interchange needs to be upgraded in order to better accommodate the traffic developing around the interchange. Without any improvements, this interchange is expected to operate at a Level of Service F by the year 2030.

University Parkway/I-26 Interchange. Reconstruct the interchange to an urban diamond or free flow clover leaf intersection to accommodate existing and future traffic. Without any improvements, this interchange is expected to operate at a Level of Service F by the year 2030.

Downtown/State of Franklin Road Interchange. Relocate the current Main Street/Market Street interchange to align with State of Franklin Road. This will improve traffic flow through the downtown.

Ford Creek Road/I-26 Interchange. In order to facilitate the development of industrial land along Ford Creek Road and to help alleviate traffic generated by such development construct a full interchange.

OTHER LONG-TERM IMPROVEMENTS

The following is a list of public and private road improvements necessary to correct hazardous conditions, alleviate existing and future traffic problems, improve the street network, and to meet long-term growth needs. The timing of these projects is dependent upon from the impacts of development along these roadways.

South Roan Street. Widen South Roan Street to three lanes with sidewalks 2.4 miles from the railroad overpass to the city limits.

Buffalo Road. Widen Buffalo Road from Lafe Cox Drive to South Roan Street to better accommodate existing traffic volumes.

I-26 Frontage Road. Construct a frontage road paralleling I-26 from Ford Creek Road to Ford Lane.

I-26 Frontage Road. Construct a frontage road paralleling I-26 from Suncrest Drive to Ford Old Stage Road. Construct a non-residential street with two lanes, a sidewalk, and multi-purpose trail.

Hopper Road Improvement. Reconstruct Hopper Road from West Market Street to Indian Ridge Road to an improved 2-lane road with sidewalks.

McInturff Lane. Extend McInturff Lane to connect with the new Hopper Road extension.

Timberlake Road. Reconstruct Timberlake Road from the Bristol Highway to Carroll Creek Road to improve hazardous conditions and improve traffic flow.

Claude Simmons Road from Knob Creek Road to Market Street and Headtown Road from Claude Simmons Road to Market Street (Jackson Blvd.). Improve the two lane road to address traffic and safety

College Heights Drive/Seminole Drive. Widen pavement and improve this existing 2-lane roadway to include sidewalks on one side.

Pickens Bridge Road/Piney Flats Road. Improve Pickens Bridge Road from North Roan Street to the Bristol Highway. Improve Piney Flats Road from the Bristol Highway to Watauga Road. This would create a beltway from North Roan Street to Watauga Road which would better accommodate traffic in this developing area and create an improved street network.

OTHER NEEDED IMPROVEMENTS

The following is a list of public and private road improvements necessary to correct hazardous conditions, to alleviate existing traffic problems, and to meet future growth needs.

1. **North State of Franklin Road (SR 381) from I-26 to Sunset Drive**. Improve the traffic management system by installing improved signalization and fiber optic upgrades.

2. **Knob Creek Road/Underpass**. Improve Knob Creek Road from State of Franklin Road to Claude Simmons Road. Reconstruct railroad tunnel or build a bridge over railway to facilitate traffic flow.

3. **West Market Street from John Exum Parkway west to the city limits**. Improve the traffic management system by installing improved signalization and fiber optic upgrades. Without improvements, major segments of this roadway are expected to operate at a Level of Service F by the year 2030.

4. **Boones Creek Road (SR 354) from I-26 to Jonesborough's city limits.** Improve this 6.3-mile roadway to four lanes with a median, bike lanes, and a sidewalk. Sections of this roadway have experienced growth of traffic volumes of over 300 percent over the past ten years, and without improvements major segments of this roadway are expected to operate at a Level of Service F by the year 2030.

5. **State of Franklin Road Frontage Roads**. Construct a pair of frontage roads. These roads would connect Med-Tech Parkway to Oakdell Court on the east and Market Place Boulevard and Sunset Drive on the west and provide access to several land-locked parcels.

6. **Downtown Loop.** Install landscape medians and on-street parking along the Downtown Loop from State of Franklin Road .3 miles to North Roan Street.

7. **Fairridge Road Tunnel Replacement**. Reconstruct railroad tunnel to facilitate traffic flow in this developing area and to better accommodate fire safety vehicles.

8. **Carroll Creek Road Tunnel Replacement**. Reconstruct railroad tunnel to facilitate traffic flow in this developing area and to better accommodate fire safety vehicles.

9. **Plymouth Road.** Widen Plymouth Road from Rocky Top Road to Pilgrim Court to two or three lanes with sidewalks.

10. **Old Gray Station Road.** Widen pavement and improve hazardous intersection from Bobby Hicks Highway to North Roan Street.

11. **Shadden Road**. Widen pavement and improve hazardous intersection from Suncrest Drive to Highland Church Road.

12. **Hopper Road Improvement.** Reconstruct Hopper Road from West Market Street to Indian Ridge Road to an improved 2-lane road with sidewalks.

13. **Cherokee Road from Lone Oak Road southwest to the city limits**. Improve roadway to better accommodate existing and projected traffic volumes.

14. **Greenwood Drive from Jack Vest to Lone Oak Road.** Improve to 2 lanes with turn lanes at intersections and major developments

15. **Main Street from State of Franklin Road to Iris Glen**. Improve to 2 lanes with turn lanes at intersections and reconstruct the Broadway intersection to improve safety and traffic flow.

GOAL, POLICIES, AND ACTIONS

GOAL

PROMOTE SAFE AND EFFICIENT TRAFFIC FLOW IN AND AROUND JOHNSON CITY

POLICIES, AND ACTIONS

Policy 3.4.1: It is the policy of the city to classify streets according to their function so that streets are designed according to their intended use.

Policy 3.4.2: It is the policy of the city to create a street network to better disperse traffic throughout the city. This network shall consist of freeways, arterials, collectors, and major local streets.

Policy 3.4.3: It is the policy of the city to construct and maintain an arterial street system to improve major cross-town traffic flow and the flow into and out of the major commercial corridors.

Policy 3.4.4: It is the policy of the city to construct and maintain a collector street system to provide improved access within major residential areas and to the arterial street system.

Policy 3.4.5: It is the policy of the city to construct and maintain a highway network to improve traffic circulation in and through the city and region.

Policy 3.4.6: It is the policy of the city to construct and maintain a residential street system designed to promote safety and convenience for those living along these streets.

Policy 3.4.7: It is the policy of the city to require future arterial and collector streets to be designed with crosswalks and sidewalks for pedestrian use and safety.

Policy 3.4.8: It is the policy of the city to identify hazardous street segments or intersections, rank them in priority for improvement, and provide improvements within the limits of financial resources.

Policy 3.4.9: It is the policy of the city to establish criteria identifying the location and design of private drives and public streets.

Policy 3.4.10: It is the policy of the city to participate in a context sensitive solution process to involve the public in the design of new roads or the major road redesign or improvement of existing roads in order to ensure a high quality and safe roadway which meets the desires of the community.

Policy 3.4.11: It is the policy of the city to review site plans and subdivision plats to ensure logical street extensions through the provision of street stubs.

Policy 3.4.12: It is the policy of the city to protect the capacity of major roadways by controlling access.

Actions

- Regulate the number of curb cuts to properties along collector and arterial streets in order to protect the street's function and safety.
- Require the construction of de-acceleration lanes to enter multi-family, commercial, and industrial properties along collector and arterial streets.

Policy 3.4.13: It is the policy of the city to construct sidewalks along new streets and when major improvements occur.

Actions

- Construct new sidewalks as part of any major street improvement.
- Require sidewalks as part of all new street construction projects.

Policy 3.4.14: It is the policy of the city to maintain continual coordination between the Transportation Element and other elements of the Comprehensive Plan to aid in proper planning, and coordinated capital improvements programming.

Policy 3.4.15: It is the policy of the city to monitor traffic volumes, levels of service, safety, and land platting on an on-going basis in order to anticipate needed improvements to the local transportation system.

Policy 3.4.16: It is the policy of the city to maintain close communication with county, regional, state, and neighboring local units of government in order to promote roadway system continuity and uniformity across and beyond its boundaries.

Policy 3.4.17: It is the policy of the city to work closely with the Johnson City Metropolitan Transportation Planning Organization to secure and coordinate the allocation of state and federal funding in the area.

Policy 3.4.17: It is the policy of the city to investigate the development and implementation of impact fees to help defray the cost of needed traffic improvements.