

CHAPTER FOUR INFRASTRUCTURE

Water resources have become a more critical issue for the region in recent years. The need for water and wastewater services has increased with the gains in the region's population and business base. The First Tennessee Development District is very active in expanding and maintaining the infrastructure needs in the region through grant writing and project administration. A majority of the projects have been in the water and sewer infrastructure area. From 1989 through 2016, the District has assisted communities with 616 projects totaling \$194,054,312.

WATER RESOURCES

ASSESSMENT OF WATER SOURCES

Public water systems provided potable water to 85.0% of the region's population. Ensuring that there are adequate water sources in the future and extending the water systems when feasible are of high importance going forward.

Northeast Tennessee has experienced years of significant drought and record wet seasons in the past fifteen years. Many utilities and residents have experienced springs or wells with decreased production or going dry for periods of time.

Rivers are increasingly being viewed as a good public water source due to larger water flows that can meet the long-term needs of the region. Still, a well or spring system can be very effective in meeting water needs.

River sources, because they are a higher volume of water, are less affected by drought as would a well or spring. However, river sources usually have more turbidity and points of surface water influence. Rivers are perceived as a less preferred drinking option by the public when compared to a well or spring. In reality, depending on the level of treatment and with new technology to treat water, a river can be an excellent source. Approximately 63% of the region's population using public water is served primarily by a river source.

The region has adequate river sources of water with the Holston, Watauga, and Nolichucky rivers. Large customer utilities such as Bristol, First Utility District of Hawkins County, Greeneville, Johnson City, and Kingsport have water sources located on rivers. Bristol-Bluff City Utility District,

Jonesborough and the Watauga River Regional Water Authority also have rivers as their water sources. In addition, many smaller utilities purchase water from larger utilities using a river source.

While river sources provide many benefits, there are excellent water systems in the region that meet their needs with wells or springs. Erwin Utilities has operated a multiple well system successfully for a number of years. The advantage of a well system with adequate flows is that less treatment and associated costs are required if the well is a true groundwater source. A disadvantage is that well production decreases over time and replacement wells need to be put into service. Several utilities with fewer than 1,000 users find that wells and spring sources meet their needs adequately for the short and long-term.

A recent occurrence is that the Sneedville Utility District has developed a high volume new water source in Treadway that will provide enough water to meet needs for the foreseeable future. Capacity issues at an existing spring and turbidity issues at the water intake on the Clinch River led to the development of the Treadway source.

There are various water processing procedures (physical, biological, and/or chemical) to purify, modify and improve water quality. These steps can include a single device or multi-stage treatment steps to reduce and remove both suspended and dissolved solids to meet general or water quality standards required by the end user. Most water treatment plants in the region use conventional filtration to remove small particles. A conventional mixed media filter can include a mixture of sand, gravel, anthracite coal and activated carbon.

Technologies such as membrane filtration and reverse osmosis have become more economically feasible. The advantage of these filtration methods is that they can remove smaller particles than conventional methods. The Lakeview Utility District in Hawkins County has two membrane filtration plants. First Utility District of Hawkins County and the Watauga River Regional Water Authority (WRRWA) water treatment plant all use microfiltration.

Disinfection is the application of energy or chemicals to inactivate pathogenic (disease producing) bacteria cysts, and other micro-organisms to make water biologically safe. Disinfection may involve the use of chemicals such as chlorine and peroxide, or physical processes such as distillation, ultra-violet light, or ozonation. Utilities in the region use either chlorine, peroxide or bleach as a disinfectant. As chlorine has been classified as a hazardous material, many smaller utilities have recently switched to bleach as they lack

the capability to properly handle chlorine. The use of non-chemical methods such as ultra-violet light is becoming more common. Another non-chemical option, ozonation, is not being used in this region.

Table “Four A” provides information on each water system in the region including population served, design capacity, average daily pumpage, peak daily pumpage, and distribution storage.

ASSESSMENT OF WATER SYSTEMS

Maintenance of water systems is a continuous process for each utility. As water lines age, repairs and line replacement are a necessity in order to keep water loss rates and the quantity of water produced at an acceptable level. Still, a few utilities in the region have water loss rates above forty percent, which is an indication of older lines and/or poor maintenance.

Reduction of water loss is becoming more important as several utilities are experiencing average daily pumpage greater than seventy percent of design capacity. A way to extend the usefulness of a water source is to decrease water demand through reduction in the rate of water loss. Many utilities are replacing aging galvanized lines that are corroding and coloring the water. In addition, some utilities are replacing older asbestos-cement lines that are beyond their useful life. The State of Tennessee, Utility Management Review Board has guidelines requiring utilities to keep water loss below 25%. If the water loss is above 25%, a utility must go before the board and present a plan to reduce water loss under 25%.

Several utilities have made significant progress in the past five years in reducing water loss. A majority of the water utilities in the region used less water than five years ago. Utilities have annual line replacement programs and are more aggressive in finding and repairing water leaks. The cost of equipment to find leaks has dropped significantly in recent years and is affordable to many utilities.

Another issue facing a few utilities is storage capacities being less than average daily demand. This measure is an indicator that additional water storage is needed. However, in the varied topography of Northeast Tennessee, the issue is less about storage and more about not having the stored water available in the correct water zones. Thus, part of a system could run out of water due to a major water line break, even though there is sufficient storage in other parts of the system that cannot be drawn upon.

REGULATION OF WATER SYSTEMS

Utilities have seen increased regulations of water sources and water systems from a federal level. The Environmental Protection Agency (EPA) has developed national drinking water standards. The regulations of 1996 required filtration on almost all spring sites. The 1996 regulations also required more water quality testing. New regulations have also been implemented and have subsequently become more stringent. These regulations required lower turbidity, further testing for more items such as radon and arsenic, and better treatment of water.

Increased testing and stricter water treatment filtration requirements are making it more difficult for smaller utilities to meet state and federal guidelines. As a result, utilities are looking at ways to work together cooperatively. In addition, the formation of a new utility district is extremely difficult due to state and federal guidelines. Thus, areas requiring potable water are having to rely on existing utilities to provide service. With limited availability of federal funds to address water issues, funding for a project is very competitive. A project that address multiple utility needs is preferred over a project that addresses the needs of one utility.

Security of water systems has become more of an issue with water systems in the aftermath of events of September 11, 2001. Currently utilities in Tennessee are completing vulnerability assessment. Many utilities have implemented security plans and procedures that better integrate utilities with police and Emergency-911 personnel.

Telemetry systems or SCADA (Supervisory Control and Data Acquisition) system assist with monitoring and security of water systems. A telemetry system is a radio frequency or phone line system where a central control panel will monitor multiple locations. Remote sites such as pump stations, raw water pumps and water tanks are equipped with signaling devices. The control panel will check the remote sites one at a time on a pre-programmed interval. A failure is triggered by an event such as when a pump does not start or when the amps exceed the motor capacity. Without SCADA, water and wastewater departments do daily route inspections or rely on people to report an overflowing pump station or sewage backing up into a home. Most utilities in the region are using SCADA technology.

Other security measures include pressure sensitive devices on ladders located on water storage tanks, motion detectors and flood lights, alarms, and real-time video cameras.

WATER RESOURCES FOR ECONOMIC DEVELOPMENT

The availability of adequate water flow and pressure in certain communities influences economic development. For example, a warehouse distribution company with high water pressure and flow requirements for fire protection will rule out locating in a community that cannot meet these requirements. In addition, communities need to plan for the future and provide developable sites with adequate infrastructure. Each community has different issues regarding the availability of adequate industrial land and adequate infrastructure.

WATER SERVICE

In 2016, 85.0 percent of the housing units in the First Tennessee Development District were served by public water (Table Four A).

The region as a whole has been doing a good job of extending water lines to areas of need. Still, there is additional need, especially in light of the problems with individual wells and springs going dry due to a drought or becoming contaminated.

A major factor limiting water line extensions is population density. When a utility looks at a line extension project, the revenue the project brings in should come close to covering the expense of providing water, interest expense on any loans, and depreciation. Thus extending a water line a mile to serve only 10 homes is not feasible even with a high percentage of the funds being grant.

Another cost is depreciation. When a water line is extended, the cost of the line is depreciated (expensed) over a 30-40 year period. Thus a water line has additional costs to consider beside the cost of water and maintenance.

The percent of the population on public water by county is as follows:

	Customers on <u>Water</u>	2016 <u>Population</u>	% Population <u>on Public Water</u>
Carter County	46,848	56,502	82.9%
Greene County	60,971	68,615	88.9%
Hancock County	2,215	6,577	33.7%
Hawkins County	42,960	56,563	76.0%
Johnson County	12,247	17,754	69.0%
Sullivan County	140,856	156,667	89.9%
Unicoi County	14,615	17,719	82.4%

Washington Co.	110,836	127,440	87.0%
FTDD	431,548	507,837	85.0%

Source: TDEC Water System Data Sheets, Contact with utilities, and FTDD data.

Sullivan County had the highest percent of its housing units on public water with 89.9 percent followed by Greene County with 89.9 percent and Washington County with 87.0 percent. Both Sullivan and Washington counties are more urban and the population density makes the extension of water lines more feasible.

Hancock County had the lowest percent of its housing units on public water with 33.7 percent followed by Johnson County at 67.1 percent. Hancock and Johnson County had the lowest population per square mile in the region and mountainous terrain. Extending new water lines is difficult in these situations due to cost per household. Hancock County, through the Sneedville Utility District, has addressed water capacity issues through development of a significant water source in Treadway. Sneedville Utility District has completed three line extension projects in recent years.

Water line extension projects are completed for several reasons. A community or utility may extend a water line to an industrial or commercial area. Water lines to residential areas are extended to replace wells or springs. Public water offers protection from bacteria contamination that is often found in a well or spring. Many homeowner wells in the region will test positive for some bacteria contamination unless an adequate and maintained filtration and disinfection system is in place.

The region has had increasing problems with e-coli bacteria in wells and springs. E-coli bacteria is a specific coliform bacteria and can be dangerous in that in high amounts it can cause serious illness.

High levels of certain minerals in water can also cause odor and taste problems. More importantly, health problems can result. Common mineral problems to test for in our area include iron, calcium (lime), sulfur, and manganese. Iron contamination is common in Johnson and Carter County. Sulfur and calcium contamination is widespread throughout the region.

Well and spring systems that go dry can present a hardship to residents. Due to periodic droughts, this problem has become more extensive.

Current water line projects that the District assisted include:

- Rocky Fork in Unicoi County by Erwin Utilities
- Glen Hills Utility District in Greene County, Phase IV

Water line extension projects completed in the past few years include:

- Glen Hills Utility District in Greene County, Phase III
- Senaker Lane in Sullivan County by the City of Bristol
- Treadway in Hancock County (Phases I & II) by Sneedville UD
- Alanthus Hill in Hancock County by Lee Co. (VA) PSA.
- Duck Creek in Hancock County by Sneedville Utility District
- Beech Creek Water Line Extension in Hawkins County
- Lady Lane Water Line Extension in Washington County

WASTEWATER RESOURCES

WASTEWATER TREATMENT PLANTS

Wastewater resources in the region impact economic development in a similar way to water resources. A community with a wastewater plant that can adequately handle industrial waste products at a lower cost has an advantage in attracting new business and industry. Several wastewater plants in the region were constructed for residential waste and would require either significant upgrades to handle industrial waste or a level of pre-treatment by an industry that would be cost prohibitive.

All wastewater plants are operated under discharge guidelines. The National Pollutant Discharge Elimination System (NPDES) permit gives the volume and discharge content limits that a wastewater facility can discharge into a body of water. Violations of the community's NPDES permit are grounds for fines. Chronic violations can result in a correction order from the Tennessee Department of Environment and Conservation (TDEC) and a moratorium on new connections.

Wastewater treatment plants in the region vary in their ability to provide adequate wastewater treatment and meet state and federal guidelines. The advantage of discharging into a river is that it is a large body of water and wastewater can readily dilute without severely impacting water life. The NPDES permit limits are usually less strict on a river. Usually large systems discharge into a river. Smaller systems ideally discharge into a river, but because of geography and cost considerations, this is not always feasible. Johnson City, Kingsport, Bristol, Elizabethton, Jonesborough, Greeneville, Rogersville, Church Hill, Sneedville and Erwin discharge into rivers.

Smaller wastewater systems without access to a river discharge into streams or creeks. The disadvantage of discharging into a smaller body of water is that permit limits are stricter. Systems located on smaller streams such as Baileyton, Mosheim, Mount Carmel, and Mountain City have less margin for error in meeting permit requirements as these systems discharge into a small stream. Several systems discharge wastewater into streams listed on the 303 (d) impaired stream list. Thus, secondary and potentially tertiary treatment is required of the wastewater, which results in higher costs.

Several sewer systems are connected to larger wastewater systems that can adequately treat wastewater. Bluff City is connected to the Bristol sewer system. The Town of Unicoi has its wastewater treated by the Town of Erwin. Bulls Gap is connected to Mosheim. Surgoinsville has its wastewater treated by Church Hill.

Two new wastewater systems came online in recent years. Surgoinsville added a system that serves the downtown area and two schools. The Surgoinsville system discharges into the Church Hill system. Tusculum has developed a decentralized wastewater treatment plant.

Table Four B lists the design capacity, average daily demand, number of hookups, and estimated residents served for each wastewater system.

WASTEWATER SYSTEMS

Wastewater systems that strive to maintain their sewer lines and pump stations adequately also meet state and federal requirements more easily. Well-maintained systems have less likelihood of having by-passes of wastewater treatment due to a heavy rain event. A heavy rain event can increase the flow at a wastewater treatment plant 4-5 times normal flow if the system is poorly maintained.

Historically, many wastewater systems have addressed operations and maintenance issues as they occurred instead of taking a proactive approach. Federal guidelines are intended to change this approach. Capacity, management, operation, and maintenance (CMOM) is a program of the U.S. Environmental Protection Agency (EPA) to have wastewater systems to comprehensively operate their treatment plants and maintain their lines so as to best utilize wastewater infrastructure.

Many utilities prefer to install gravity sewer lines wherever feasible in order to reduce long-term maintenance to the system. Due to the hilly terrain of the region, pump stations are required to connect a gravity system in one

drainage basin to another. Erwin is a community that has a drainage basin that has been ideal for gravity sewer.

Force mains have been installed in several communities in the region. The advantage of force mains is lower installation costs. The disadvantage is that a service or grinder pump must be installed and maintained at each home or business. Force mains are adequate where the terrain dictates that a gravity system is not feasible or where there is a remote location without customers along the line route. Households located at elevations below a wastewater treatment plant also require a force main or a combination of a gravity system and force main system.

Several communities have wastewater systems that are primarily force main and pump systems. These include Baileyton, Bulls Gap, Mount Carmel, Mosheim, and Surgoinsville. Cost and to some extent terrain have dictated to a large extent that these systems use primarily force mains with a grinder pump at each home. However, some of these systems were designed to install force mains instead of gravity systems in order to lower the initial cost. Another reason to install force mains is that the pressurized system should have minimal infiltration and inflow.

Water can enter a gravity wastewater system through other means than normal flow. This additional flow can be significant to a system and impact its ability to adequately treat wastewater.

Inflow results from storm or surface water that may enter the sanitary sewer through roof leaders, clean-outs, foundation drains, sump pumps and cellars. Stormwater, a source of inflow, may also enter through older connections between the sanitary sewer and storm sewers and through defective manhole covers and seals. Inflow can also occur as rainwater follows the pipe trench around the sewer line back to the wastewater treatment plant.

Infiltration is storm or surface water that enters a sanitary sewer system from the ground through means such as defective pipes, pipe joints, damaged lateral connections or manhole walls. Infiltration is most often related to a high groundwater table level, but can also be influenced by storms and leaking water mains.

Several utilities in the region have older sewer lines that have not been properly maintained over the years. Many systems also have lines that were not properly installed by a subdivision developer. As a result, these utilities are having to complete extensive line rehabilitation. Several sewer systems in the region have completed a major sewer line rehabilitation project in the past

two years. Unfortunately, several systems have a long way to go to address the extent of the problem. While one part of the system is repaired, oftentimes the inflow issues move to another part of the system that is in need of repair. Multiple rehab projects are often required to significantly reduce infiltration and inflow.

Smaller systems with a limited number of customers to share the costs have a more difficult time performing maintenance of their system. This problem is due in part to their desire not to increase already high sewer rates as compared to larger communities. Grant funding is very important to these systems.

SEWER SERVICE

An area with high population density and small lot sizes will typically have trouble with septic tank systems after 15-20 years. The life cycle of a septic tank will vary by type of tank, soil type, water table, amount of wastewater discharge, and amount of rock in the area. Failing septic tanks can present odor and health problems.

The soils of the region vary with regard to adequate percolation of soils for septic tanks. Sullivan County and Hawkins County have the most difficulty with lots passing a percolation test. The karst geology of the region permits effluent from failing septic tanks to enter the groundwater more easily. This problem is part of the reason that e-coli bacteria contaminates private drinking water wells and springs.

Industrial and commercial businesses can generate more wastewater and therefore prefer being on a public sewer system. Manufacturers especially want to be on sewer service so that wastewater can be properly treated off-site instead of risking inappropriate wastewater being placed in an on-site septic system.

The region had 40.7 percent of its population on public sewer systems in 2016. The percent of the population on public sewer by county is as follows:

	Customers on <u>Sewer</u>	2016 <u>Population</u>	% Population <u>on Public Sewer</u>
Carter County	14,100	56,502	25.0%
Greene County	18,842	68,615	27.5%
Hancock County	1,172	6,577	17.8%
Hawkins County	17,611	56,563	31.1%
Johnson County	1,694	17,754	9.5%

Sullivan County	75,330	156,667	48.1%
Unicoi County	7,397	17,719	41.7%
Washington Co.	70,553	127,440	55.4%
FTDD	206,699	507,837	40.7%

Source: Contact with utilities and FTDD data.

Johnson County had the lowest percentage of its population on public sewer with 9.5 percent followed by Hancock County at 17.8 percent. Hancock and Johnson County had the lowest population per square mile in the region. Mountainous terrain in these counties limits the extension of sewer lines due to feasibility. In addition, utilities in these counties had to address issues with the capacity of its wastewater treatment plant and infiltration and inflow problems into existing lines.

Washington County had the highest percentage of its population on sewer at 55.4 percent. Sullivan County had the second highest percent of its population on public sewer at 48.1 percent.

The District assisted the following communities with sewer line extensions in recent years;

- Erwin Utilities
- The Town of Surgoinsville
- The City of Tusculum
- Washington Co. and the Town of Jonesborough (Crockett High School)

AIRPORTS

Northeast Tennessee is served by four general aviation airports and one commercial airport. The Tri-Cities Regional Airport has commercial services to several major airport hubs. The Tri-Cities Regional Airport is also designated as a Foreign Trade Zone and has a separate air cargo facility. The Tri-Cities Regional Airport recently changed to an authority from public ownership, which allows it more flexibility to manage its business in a timely manner. The airport is in the process of developing an aviation business park.

AIRPORT STATISTICS

Name	Runway Length	Elevation
Elizabethton Municipal	4,529'	1585'

Greeneville-Greene County Municipal	6,302'	1608'
Hawkins County	3,502'	1255'
Johnson City	3,000'	1550'
Johnson County	4,500'	2240'
Tri-Cities Regional Airport		
First Runway	8,000'	1519'
Second Runway	4,447'	1519'

Source: Airports in Tennessee. www.airportdata.com (Accessed 5/23/17).

INDUSTRIAL PARKS

Available business and industrial land is a key factor to future development of the manufacturing sector in the region. Several counties are in critical need of new property to market their county. Other counties will be facing a critical land shortage in the next five years if land issues are not addressed in the near term.

Business and industrial properties are marketed by local economic development organizations and by the Northeast Tennessee Valley Regional Industrial Development Association (NTVRIDA). The NTVRIDA is a partnership of local economic development boards, the Tennessee Valley Authority, local power boards, and the State of Tennessee.

There are currently 24 listed industrial sites in Northeast Tennessee. These industrial sites range from 2 available acres to 340 acres. The ownership of the industrial parks ranges from public ownership to optioned land to private ownership.

While most sites in the region can be marketed to many types of firms, there are limitations. Infrastructure ranges from full utilities to limited utilities. Some industrial parks target manufacturing and distribution firms while other business parks have a mix of tenants in the data processing, medical support services, and business services. The acreage in these industrial parks may have constraints due to topography, utility limitations, or limited acreage of the site. Several industrial parks are established sites with several firms already located in the industrial park. Other industrial sites have no tenants and are privately held.

A list of the industrial parks and sites by county is part of Table Four C. Counties in the region are facing different issues regarding industrial land. For example, some counties have limited industrial sites available at this time and are pursuing sites for new industrial parks. Other counties have an inventory of industrial sites for the next few years, but have to address long-term needs. Finding new and affordable industrial land in several counties is difficult as urbanization of some counties is driving up land cost. The terrain of the region presents an additional challenge when evaluating industrial sites.

ROADS

Northeast Tennessee has interstates 81 and 26 dissecting the region. Being near a major interstate is a common business location factor. Most of the region has close access with the exception of Hancock and Johnson counties. The U.S. and State highway system is fairly well defined in the region, but upgrades and new routes are a continual need. While Tennessee is one of the better rated transportation networks in the U.S., road and bridge maintenance is becoming more important as the transportation infrastructure ages. A major issue in highway maintenance and construction is that the cost of asphalt has increased significantly over the past ten years. So the rising paving cost is “not my fault or your fault, but the asphalt”.

Four regional transportation planning organizations exist in the region. These organizations provide a process that addresses the transportation needs of the region. The process requires that the transportation planning organizations work with local, state and federal agencies and the general public to develop a transportation program.

Johnson City, Kingsport and Bristol are designated as metropolitan transportation organizations. The First Tennessee Rural Planning Organization serves the rural areas.

The Johnson City Metropolitan Transportation Planning Organization (MTPO) serves the area that includes Elizabethton, Jonesborough, Johnson City and part of the Town of Unicoi, as well as the urbanized areas of Carter and Washington counties.

Kingsport MTPO serves Kingsport, Mt Carmel, Church Hill, Weber City, Gate City, and portions of Sullivan County, Hawkins County, Washington County, and Scott County, Virginia.

Bristol MTPO serves the City of Bristol, Tennessee, the City of Bristol Virginia, Bluff City, Tennessee, and certain surrounding areas of Sullivan County, Tennessee, and Washington County, Virginia.

The First Tennessee Development District Rural Planning Organization serves all of Greene, Hancock and Johnson Counties and the parts of Carter, Hawkins, Sullivan, Unicoi and Washington counties not served by the MTPO organizations.

Each of these organizations has a process of priority ranking road projects.

PLANNING

Most communities in the region have zoning and planning commissions. Some larger communities have their own staff while smaller communities use the planning staff of the First Tennessee Development District.

Planning staffs are responsible for professional planning work and are capable of preparing various community plans, annexation studies, working with and advising local officials (including planning commissions, boards of zoning appeals, design review commissions, and legislative bodies) on planning issues or problems. These organizations provide mapping using Geographic Information Systems (GIS).

Sixteen local governments are entered into planning advisory contracts with the First Tennessee Development District including:

3 Counties and 13 Municipalities

Carter County; Watauga, Elizabethton

Baileyton, Mosheim, Tusculum

Hawkins County; Bulls Gap, Church Hill, Rogersville, Surgoinsville

Mountain City

Bluff City

Unicoi County; Unicoi (town), Erwin

New annexation and de-annexation laws could potentially impact the region's economic development. Some communities will focus more on development within existing corporate boundaries due as potentially annexed residents have more leverage in being or not being annexed.

ENVIRONMENTAL MANAGEMENT PROGRAMS

Opportunities in the region include continued **solid waste planning** so that the region meets the needs of its citizens and businesses. Adequate landfill space in the long-term is critical to the support of economic and community development. The District provides guidance to local governments for solid waste planning along with assistance with State grants.

The District also works with the Ozone Action Partnership that focuses on air quality issues. The District assists community organizations with watershed management plans.

BROADBAND

Communications infrastructure in the region is considered excellent in the metropolitan areas. Some of the services offered include:

- One + gigabit fiber service available in the Bristol TN Essential Services and Erwin Utilities service areas. Spectrum is offering the service in Kingsport.
- Redundant Fiber Optics Cable
- Asynchronous Transfer Mode
- SONET Ring (Self healing OC-12, OC-48) – offering ultra-high bandwidth speeds
- DSL, Cable Internet, ISDN
- Multi-carrier local telecom, digital and analog wireless service

While excellent service is available in metropolitan areas, many rural areas are lacking broadband services. Mobile internet is filling in some of the gaps as this service continues to expand in the region. Still, rural area education and work-at-home opportunities are impacted by the availability of good service.

The District is working with Erwin Utilities on an Appalachian Regional Commission funded project to serve the rural areas of Temple Hill & Bumpus Cove.

ELECTRICITY

Electricity is supplied by the municipal and cooperative distributors of the Tennessee Valley Authority (TVA) and by American Electric Power. Electric distributors in the region include:

- American Electric Power
- Bristol TN Essential Services
- Elizabethton Electric System
- Erwin Utilities
- French Broad Electric Membership Corporation
- Greeneville Light & Power
- Holston Electric Cooperative
- Johnson City Power Authority
- Mountain Electric Cooperative
- Powell Valley Electric Cooperative

NATURAL GAS #

Atmos Energy is the largest natural gas supplier in the U.S. and is the major supplier to the region. The region has three public gas utilities: Hawkins County Gas Utility, Powell Valley Gas Utility District and Unicoi County Gas Utility District.

PUBLIC RECREATION LANDS

The region has a solid ecotourism base. Five State Parks are in the area including Davy Crockett, Roan Mountain, Sycamore Shoals, Warriors Path and the newest State Park, Rocky Fork. These lands combined with the Cherokee National Forest, and municipal parks such as Bays Mountain, Buffalo Mountain, and Steele Creek give the region a solid ecotourism base. Other more recent developments include the Doe Mountain Recreation Area in Johnson County, the Tweetsie Trail in Johnson City and Elizabethton, and the Pinnacle Fire Tower Trail in Unicoi County.

Many municipalities in the region have solid linear trail networks including Elizabethton, Greeneville, Tusculum, Sneedville, Mountain City, Kingsport, Bristol, Erwin, and Johnson City and Jonesborough.

These lands maintain the scenic beauty of the area and protect habitats for plants and wildlife. Recreation opportunities will exist within the area. In an era of losing thousands of acres of land nationally to development, a trend of preserving land for the future is a positive development. These efforts could not have happened without the cooperation of local, state and federal government and agencies such as the Nature Conservancy and the Conservation Fund.

Several communities in the region have excellent local park systems. The District assists communities with grant writing and project administration for programs including Local Parks Recreation Fund, Recreation Trails Program, Transportation Alternatives, and TDOT Multi-Modal.

Strategic Findings and Analysis

Strategic Finding 5. Upgrade Water & Sewer Infrastructure. Water and wastewater infrastructure provides the opportunity for economic and community development through having the right kind of infrastructure at the right place. The natural environment is kept cleaner when wastewater is properly disposed of and not allowed to continue in a situation where failing septic systems are affecting ground and surface water. Improving health care is tied to having healthy drinking water and not being exposed to improperly treated wastewater.

Increased regulatory requirements and rising construction costs combined with greater difficulty in obtaining funding has created an opportunity for the region to cooperate on projects on a regional scale. The need for proper maintenance of the aging water and sewer infrastructure needs to be brought to the forefront as a regional issue.

Strategic Finding 6. Public Land for Economic Development. A threat to the region's manufacturing base is the lack of available land in some counties to meet the long-term needs of the region in developing businesses in faster growing industries.

The Northeast Tennessee region recognizes that manufacturing is a strength of the region because manufacturing business owners are innovative, and the labor force is highly productive in this sector. Economic development efforts continue to direct resources toward growth industries that provide well-paying jobs. The region realizes that manufacturing will not be an employment growth sector in the next ten years.

Sullivan County has three Select Tennessee Certified Sites including Partnership Park II, Bristol Business Park, and Aerospace Park 1. Hawkins County has one

Select Tennessee Certified Site, Technology Park II at Holston Army Ammunition Plant. Several sites have received funding for grading of pad ready sites from the State and/or TVA. The sites include Washington County, Sullivan County and Town of Erwin. A regional effort is ongoing to complete the additional grading of the Aerospace Park 1 site at the Tri-Cities Airport.

Strategic Finding 7. Better Utilize Transportation Network for Economic and Community Development. Potential threats include an increase of traffic resulting in more accidents and congestion. In addition, more traffic increases pollution and ozone levels, a concern for the region. However, the emphasis building new power plants using natural gas west of the region has contributed to the region being in compliance with ozone standards.

Tennessee passed the Improve Act in 2017 that raises gas and diesel taxes and will provide \$350 million annually for the State highway fund as well as local government roads and bridges.

Transportation has benefited from the region being within 600 miles of 70 percent of the U.S. population. The region is ideally suited for companies serving points east of the Mississippi River. The region is traversed by Interstate 26 and Interstate 81.

The transportation network will present the region with opportunities to develop manufacturing, distribution, and transportation related businesses. Increased traffic will provide additional tourism opportunities. The Gray Fossil Site & Museum is located near an interstate and is an example of a public sector education and tourism effort led by East Tennessee State University. The facility is currently undergoing an expansion.

Because the region is in an ideal location for **distribution**, the development of the Greater Tri-Cities Foreign Trade Zone and Air Cargo Center at the Tri-Cities Regional Airport are two opportunities for the region to enhance its transportation sector. The Tri-Cities Regional Airport is continually making improvements to its facility.

Rural areas of the region continue to struggle with the losses in traditional job sectors such as manufacturing and agriculture. The lack of adequate transportation infrastructure in some of these rural areas further complicates the situation. However, rural areas often have a lifestyle attractive to retirees and entrepreneurs who can make a living less determined by location. In order to support these individuals, adequate telecommunication and broadband systems are required.

The regional effort to promote **tourism** on a regional level is coordinated through the Northeast Tennessee Tourism Association. Specific examples of regional tourism promotion include the Bristol Motor Speedway, a storytelling focused theme and the Birthplace of County Music Alliance (BCMA). The transportation network is

important to tourism as a lot of our area tourism is based on day trips around the region.

Renovation of downtown historic areas is becoming increasingly important to the region's tourism sector. Many downtowns have seen a resurgence in the past decade as residents and visitors are looking for a unique experience when shopping, dining, or seeking entertainment. Downtown businesses often deliver unique experiences. The Development District has assisted the development of downtown areas through managing downtown loan programs in Johnson City, Greeneville and Erwin.

The region usually ranks favorably in **quality of life** studies and is considered by many to be a good place to visit and live. The cost of living in the region compares favorably to the nation. A well maintained transportation network without a lot of congestion contributes to this quality of life.

Strategic Finding 8. Expand and Upgrade Broadband and Telecommunications Network. The manner in which the region addresses opportunities in the telecommunications sector will impact the region's ability to create jobs. The region can fall behind other areas or it can close the gap. Public sector and education efforts can impact this trend.

Telecommunications is a continually changing field that impacts the region's ability to create and attract jobs. While the telecommunications infrastructure and service in the Tri-Cities area is considered adequate, rural areas often lack basic telecommunications infrastructure. The capability of the region's businesses to offer telecommunication services is mixed, with some excellent companies, yet gaps in services when compared to other areas.

Telecommunications infrastructure is very important to economic development within the region. Companies such as Advance Call Center Technologies, AT&T Wireless, and Citi Group are major employers in the region and rely on up-to-date infrastructure. In addition, existing sectors including health care, business services, education, and manufacturing benefit from improved infrastructure.

A trend toward a greater reliance on mobile technology and less on fixed computer and phone services has changed the telecommunications mix in future years. The expansion of 3G and 4G service into rural areas has made this technology accessible to a larger part of the region's population.

A threat to the region's economy is security. Efforts to improve the security of the region are being led by the emergency management/civil defense agencies of the region with the aid of telecommunications technology.

Strategic Finding 9. Enhance Environmental Assets. Finding a way to maintain these views and waterways for future generations while accommodating development will be a challenge.

The Northeast Tennessee region benefits from a **four-season climate, scenic mountains, water resources**, and a **good system of trails and parks**. These attributes contribute to the region's **quality of life** being attractive.

Weaknesses in the region include **poor land use planning** in certain areas, **wastewater systems** that have not kept up with population growth, and **limited funding** to address infrastructure and environmental issues.

Several efforts are ongoing to enhance environmental assets including construction of a water line extension to Rocky Fork State Park, the State's newest park. Also, a visitor center is funded and in the planning stages. A road and infrastructure in the park is in the planning stage. Trail system development is ongoing at Doe Mountain Recreation Area, Erwin, Kingsport, Mountain City, and Unicoi.

Strategic Finding 10. Downtown Revitalization. Economic development is returning to several downtown areas in the region and bringing jobs and residents to these areas. While infrastructure is present, it is often several decades old and ill suited to support development. Johnson City and Bristol are completing major flood control/downtown park projects that are spurring investment. Five downtown areas in the region are certified as "Tennessee Main Street Communities" by TECD. These include Bristol, Greeneville, Jonesborough, Kingsport and Rogersville. Two downtown areas are "Tennessee Downtown" communities including Erwin and Mountain City.

Downtowns are expanding their impact through hosting Farmers Market, festivals, concert series, and downtown event nights to draw in visitors and have a noticeable economic impact. Larger events include Rhythm and Roots in Bristol, the Apple Festival in Erwin, the Covered Bridge Festival in Elizabethton, the Iris Festival in Greeneville, the Little Chicago and Blue Plum Festivals in Johnson City, Fun Fest in Kingsport, the Sunflower Festival in Mountain City, Heritage Days in Rogersville, and the Fall Festival in Sneedville.

**TABLE FOUR A
WATER SYSTEM INFORMATION**

Data Year	System (Data Year)	Population Served	Design Capacity (MGD)	Average Daily Pumpage (MGD) **	Peak Daily Pumpage (MGD) **	Distrib. Storage (MG)
	CARTER COUNTY					
2017	Elizabethton	25,047	6.55	4.64	6.38	6.98
2016	First UD of Carter Co.	7,544	1.49	0.77	1.13	2.51
2016	Hampton UD	3,615	1.50	0.63	0.94	0.80
2015	Peters Hollow	140	0.06	0.02	0.03	0.02
2016	Roan Mtn. UD	870	0.69	0.10	0.19	0.46
2016	Siam UD	2,541	Prc. (1)	0.17	0.33	0.20
2016	South Elizabethton UD	5,181	Prc. (2)	0.47	0.53	0.85
2015	WRRWA	410	2.16	1.11	1.54	2.17
	Adjustment *	1,500				
	Carter Co. Totals	46,848	12.45	7.91	11.07	13.99
	GREENE COUNTY					
2016	Chuckey UD	9,981	Prc. (3)	0.97	1.34	1.50
2016	Cross Anchor UD	7,478	Prc. (4)	0.64	1.17	0.95
2016	Glen Hills UD	12,900	Prc. (5)	1.08	1.54	2.02
2015	Greeneville Water & Light Comm.	15,027	16.0	8.60	11.92	6.69
2015	Mosheim UD	1,845	Prc. (6)	0.20	0.83	0.50
2016	N. Greene UD	4,881	0.72	0.52	0.82	1.16
2015	Old Knox Hwy. UD	8,859	Prc. (7)	1.02	1.79	1.67
	Adjustment*	0		-3.91	- 6.67	
	Greene Co. Totals	60,971	16.72	9.12	12.74	14.49
	HANCOCK CO.					
2016	Sneedville UD	2,215	1.15	0.18	0.37	0.50
	HAWKINS CO.					
2016	First UD of Hawkins County	18,630	5.96	2.20	3.20	3.813
2015	Lakeview UD	3,830	0.66	0.22	0.47	0.66
2016	Mid-Hawkins Co. UD	634	0.16	0.03	0.06	0.11
2017	Mooresburg UD	1,526	0.17	0.15	0.27	0.25
2017	New Canton UD	513	Prc. (8)	0.03	0.08	0.00
2015	Persia UD	4,483	0.81	0.25	0.39	0.87
2015	Rogersville	8,487	2.0	1.05	2.64	2.60
2015	Surgoinsville UD	2,357	0.34/ Prc. (9)	0.28	0.64	1.19
	Adjustment *	2,500		-0.17	-0.75	
	Hawkins Co. Tot.	42,960	10.10	4.04	7.00	9.49

Data Year	System	Population Served	Design Capacity (MGD)	Average Daily Pumpage (MGD) **	Peak Daily Pumpage (MGD) **	Distrib. Storage (MG)
	JOHNSON CO.					
2015	Brownlow UD	450	0.65	0.03	0.05	0.00
2016	Carderview UD	1,072	0.10	0.04	0.08	0.16
2017	Cold Springs UD	885	0.78	0.05	0.11	0.30
2017	Mountain City	10,140	2.66	1.58	2.66	3.84
	Adjustment *	-300				
	Johnson Co. Tot.	12,247	4.19	1.70	2.90	4.30
	SULLIVAN CO.					
2015	Bloomington UD	11,753	1.84	1.00	1.28	1.37
2015	Blountville UD	12,419	Prc. (11)	1.07	1.56	1.24
2016	Bluff City	2,496	0.27	0.24	0.34	0.30
2016	Bristol	29,362	10.10	5.91	8.78	10.45
2015	Bristol-Bluff City UD	5,475	2.40	1.22	1.65	2.0
2015	Holston UD	2,455	Prc. (12)	0.19	0.63	0.21
2016	Intermont UD	1,173	Prc. (13)	0.09	0.38	0.43
2016	Jacobs Cr. Job Corps.	300	0.08	0.15	0.59	0.10
2015	Kingsport	72,057	29.95	15.12	17.49	16.64
2016	South Bristol / Weaver Pike UD	5,366	Prc. (14)	0.63	1.14	1.00
	Adjustment *	-2,000		-1.98	-3.71	
	Sullivan Co. Totals	140,856	44.64	23.64	30.13	33.74
	UNICOI COUNTY					
2017	Erwin Utilities	10,400	4.65	1.47	2.74	2.62
2016	Unicoi UD	3,915	Prc. (15)	0.41	0.63	0.87
	Adjustment *	300		-0.41	-0.63	
	Unicoi Co. Totals	14,615	4.65	1.47	2.74	3.49
	WASHINGTON CO.					
2017	Johnson City	90,800	28.70	16.06	20.44	15.16
2015	Jonesborough	24,036	4.40	3.26	3.67	5.04
	Adjustment*	-4,000				
	Wash. Co. Totals	110,836	33.10	19.32	24.11	20.20
	FTDD TOTAL	431,548	130.22	67.38	91.06	97.14

SOURCE: TDEC PUBLIC WATER SYSTEM DATA. FTDD INFORMATION, CENSUS DATA, AND UTILITY INFORMATION.

* Customer adjustments have been made for utility districts that serve two counties or for residential facilities, and updated census information:

- Carter County residents are also served by the City of Johnson City and the Carderview Utility District.

- Hawkins County residents are also served by the City of Kingsport and Russellville-Whitesburg Utility District.
- Johnson County. A deduction is made as the Carderview Utility District has customers in Carter County.
- Sullivan County residents are also served by the City of Johnson City and Washington County Service Authority. A deduction is made as the City of Kingsport serves Hawkins County and Washington County residents.
- Uncoi County residents are also served by the City of Johnson City.
- Washington County. The City of Johnson City also serves Carter County, Sullivan County and Unicoi County. The City of Kingsport serves a portion of Washington County.

Water systems that purchase water from another system are not included in the average daily demand and peak daily demand numbers in order to avoid redundancy. In addition, several utility districts have a primary source, but purchase water from other utility districts on an as needed basis.

- (1) Siam Utility District purchases water from the WRRWA.
- (2) South Elizabethton UD purchases water from the WRRWA
- (3) Chuckey purchases water from Greeneville Water Commission and Jonesborough.
- (4) Cross Anchor UD purchases water from Greeneville Water Commission.
- (5) Glen Hills UD purchases water from Greeneville Water Commission.
- (6) Mosheim UD purchases water from Greeneville Water Commission.
- (7) Old Knox UD purchases water from Greeneville Water Commission.
- (8) New Canton UD purchases water from First UD of Hawkins Co.
- (9) Surgoinsville UD produces water and purchases water from First UD and Rogersville.
- (10) Dry Run UD. merged with the Town of Mountain City in 2016.
- (11) Blountville UD. purchases water from the City of Bristol and Bristol-Bluff City.
- (12) Holston U.D. purchases water from the City of Bristol & S. Bristol-Weaver Pike UD.
- (13) Intermont UD. purchases water from the City of Bristol.
- (14) South Bristol-Weaver Pike UD. purchases water from the City of Bristol and Bristol-Bluff City UD.
- (15) Unicoi UD purchases water from Erwin & Johnson City.

**TABLE FOUR B
FIRST TENNESSEE DEVELOPMENT DISTRICT
WASTEWATER TREATMENT PLANTS & SYSTEMS**

Community	Design Capacity (MGD) *	Average Daily Flow (MGD)	Number of Res. Hookups	Est. # of Residential Persons Served
CARTER CO.				
Elizabethton	3.50	2.26	5,823	12,600
Adjustment **			625	1,500
Carter Co. Total	3.50	2.26	6,448	14,100
GREENE CO.				
Baileyton	0.20	0.05	244	447
Greeneville	7.00	4.01	5,956	14,566
Mosheim	0.98	0.60	1,603	3,779
Tusculum	0.03	0.05	20	50
Greene Co. Total	8.21	4.71	7,823	18,842
HANCOCK CO.				
Sneedville	0.16	0.30	712	1,172
Hancock Co. Total				1,172
HAWKINS CO.				
Bulls Gap	Connected to Mosheim		378	690
Church Hill	2.50	0.60	2,429	5,344
Mount Carmel	0.47	0.29	1,947	4,251
Rogersville	2.00	1.30	2,449	4,260
Surgoinsville	Connected to Church Hill		236	566
Adjustment **			1,190	2,500
Hawkins Co. Total	4.97	2.19	8,629	17,611
JOHNSON CO.				
Mountain City	3.00	1.08	934	1,694
SULLIVAN CO.				
Bluff City	Connected to Bristol		493	1,390
Bristol TN ***	15.00	10.30	10,078	23,840
Kingsport	12.40	8.50	22,000	51,100
Adjustment **			-476	- 1,000
Sullivan Co. Total	27.40	18.80	32,095	75,330

Community *	Design Capacity (MGD) **	Average Daily Demand (MGD)	Number of Hookups ***	Est. # of Residential Persons Served
UNICOI COUNTY				
Erwin	7.00	1.90	3,356	7,397
Unicoi	Connected to Erwin			
Unicoi Co. Total	7.00	1.90	3,356	7,397
WASHINGTON CO.				
Johnson City	26.00	13.10	25,033	68,253
Jonesborough	1.00	0.50	3,000	6,300
Adjustment **			-1,905	-4,000
Washington Total	27.00	13.60	26,128	70,553
DISTRICT	81.24	44.84	86.125	206,699

The period covered by the data was usually a twelve-month period, but varied in some instances.

* Mechanical design capacity, listed in this column, is the amount of flow the wastewater treatment plant can process on a given day. Several wastewater treatment plants have a hydraulic design capacity higher than the mechanical design capacity. Hydraulic design capacity is higher due to surge basins and equalization basins that can hold flow during a rain event for processing at a later time. For example, Rogersville has a mechanical design capacity of 1.3 MGD and a hydraulic design capacity of 2.0 MGD.

** Customer adjustments have been made for utility districts that serve two counties or for residential facilities, and updated census information:

- Carter County residents are also served by the City of Johnson City.
- Hawkins County residents are also served by the City of Kingsport.
- Sullivan County residents are also served by the City of Johnson City.
- The City of Johnson City also serves Carter County and Sullivan County.

*** The Bristol TN wastewater treatment plant serves Virginia customers, which are excluded from the hookup and person served totals.

**TABLE FOUR C
INDUSTRIAL PARKS AND INDUSTRIAL SITES**

<u>Industrial Park</u>	----- Acres -----		<u>Ownership</u>
	<u>Min. Size</u>	<u>Max. Size</u>	
Carter County (None Listed)			
Greene County			
Andrew Johnson Highway Site	25	25	Private
Baileyton Site	270	270	Private
Elk Creek Industrial Park	5	60	Private
Fortner Site	60	60	Public
Hardin Industrial Park, Ph. II	5	20	Public
James Kirk Site	285	285	Private
Shepard Property	19	19	Private
Tweed Property	30	30	Private
West Greene	340	340	Private
Hancock County			
Hancock County Industrial Park	5	32	Public
Hawkins County			
Phipps Bend Industrial District	5	250	Public
Johnson County			
Johnson County Industrial Park	4	40	Public
Sullivan County			
Aviation Park I	5	27	Public
Bailey Property	10	85	Private
Bristol Business Park	5	83	Public
Bristol Industrial Park	100	100	Public
Bristol Weaver Pk. Partnership Park II	10	204	Private
Gateway Commerce Park	5	60	Public
Partnership One Park	108	108	Public
NE TN Business Park	5	150	Public
Tri-County Industrial Park	41	41	Public
Unicoi County			
Dry Creek Site	19	19	Public
Washington County			
Washington County Industrial Park	2	92	Public
Woodlyn Road Site	20	47	Private

SOURCE: Tennessee Valley Authority (5/23/17). www.tvasites.com