



VII. Utility Services



Public Water System

Water Use

The Town of Bluefield is presently served by a community-wide water system, which has been constructed over the past 100 years. The system currently has approximately 2,300 connections, including residential, commercial, industrial, and municipal customers. The population that the systems serves is estimated at 6,350. The system has one industrial user that utilize in excess of 1,000,000 gallons per month.



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The average water production over the past year has been 914,500 gallons per day (gpd). Water is available from Bluefield Valley Water Works Company and the Tazewell County Public Service Authority in the case of an emergency or power outage at the treatment plant. The permitted treatment capacity of the plant is 1,500,000 gpd. While the non-residential customers comprise less than 1% of the total number of users in the system, their actual water use is approximately 45% of the total water production with much of this water used by major customers such as Aramark. This factor is very important in analyzing the water system and planning future improvements.

The average water production at the treatment plant over the past year was approximately 914,500 gpd. The Town of Bluefield reviews water production and consumption monthly. In 2014, the average unaccountable water was 14.5% of production.

To improve accountability of water in the system, the Town has undertaken several measures. A meter replacement program was initiated which replaces approximately 5 percent of the meters on an annual basis. This will result in all meters being replaced within a twenty year timeframe. The Town has also started checking the calibration of our major (commercial) water meters. Approximately once each month the water plant operators also conduct a "drawdown" test of the distribution system to check for leaks or abnormal water demands. During this test, the water plant pumps are shut off, and the drawdown in each of the Town's tanks is recorded for a 2 to 4 hour period during the night (1am – 5am), when system demands are minimal.



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The Town purchased its own leak detection equipment from Fluid Conservations Systems in 2008. This has helped lower the average annual water loss from 32% in 2007 to 14.5% in 2014. water loss has been below 10% in many years since 2008. Efforts continue to identify accountability problems. These efforts have lead to the Town requiring the two mobile home parks, where the customers were served through individual meters to pay for the replacement of the mains and turn them over to the Town. In one instance, the Town determined through the use of check meters on the main that it was losing between 50,000 and 125,000 gallons of water in a given month. In 2000, the Town also replaced all of the 2-inch meters on the system and had the meters for the largest users calibrated to minimize the amount of water loss. The Town has partnered with the Tazewell County PSA, the Town of Richlands, and the Town of Tazewell on a regional leak detection program. This program creates a jointly funded tool for conducting leak detection in area wide water systems. The agreement includes the purchase of state of the art leak detection equipment to be used in this program. It is anticipated that this joint effort will result in improved accountability for all of the participating communities.

The Town has been working to increase the accountability of the water system and reduce the number of leaks in a system that is over 100 years old. The town has purchased two devices called L Mic for Town crews to detect leaks in the water system. This has assisted in detecting many leaks and increased accountability in the system.

Supply and Treatment

The Town of Bluefield currently draws raw water from the Bluestone River. Water is also available from neighboring Dill Spring but is not drawn from on a daily basis. Water is treated at a single 1.5 Million gpd treatment plant that was constructed in 1960. Pumps located at the treatment plant then pump the treated water into the distribution system. Recently the town drilled new water wells to enhance the Town's water supply.



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The Bluestone River forms approximately 12 miles west of Bluefield, Virginia and has a drainage area of about 26 square miles above the Town limits. The average flow recorded at a gauging station below Bluefield is about 40 cubic feet per second (cfs), while the minimum recorded low flow was 5 cfs. Maximum flows have approached or exceeded 1,650 cfs and have resulted in major flooding throughout the Town. Based upon historic data, the permitted safe yield of drinking water that can be taken from the Bluestone River is 1.5 mgd or 2.3 cfs. The Town is in the process of developing 3 wells on Town owned property. The total yield of the 3 wells was 0.737 MGD with the Virginia Department of Health Office of Drinking Water rating the wells at a safe yield of 0.409 MGD. The 3 wells will allow the Town to increase the water treatment plant capacity up to 1.909 MGD.



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Water quality of the Bluestone River is generally good with turbidity during precipitation being the major concern at the water treatment plant. Future development within the relatively small Bluestone drainage basin could have a significant effect on the quality of the river. It is imperative that proper sanitary practices be followed to prevent contamination of the Town's water supply. In general, the soils and underlying geology of this area will not support the long-term use of septic tank/soil absorption systems. As development occurs, it will become necessary to install sanitary sewer to assure that water quality in the river be maintained at an acceptable level. With the location of several light industries upstream from the Town's raw water intake, runoff and drainage become increasingly important. A concerted effort should be made to prevent the future contamination of the river from any source.

Dill Springs is located approximately six-tenths of a mile southwest of the water treatment plant at the foot of East River Mountain. There is an 8-inch cast iron pipe running from these springs to the water treatment plant. The estimated capacity of this pipe flowing unobstructed is 0.9 mgd. The fluctuation in flow from these springs is unknown, but the firm of Anderson & Associates measured the flow in January 1996 to be approximately 1.4 mgd with 0.17 mgd entering the 8-inch pipe to the plant and the rest overflowing. Currently the Dill Spring flows into the Bluestone River and is blended with the river water before reaching the raw water intake.

Renovations in 2007 allowed the water treatment plant to become more modern and efficient. Both filters were completely rebuilt with new media, valves, and actuators. New high service pumps were installed so that water could be pumped into the new Hickory Hills storage tank. A complete SCADA system was installed along with more continuous monitoring equipment for chlorine and turbidity. The new SCADA system allows for monitoring and control of almost all plant operations. As of May 2015 the plant has been tied for #1 in the state for settled and filtered water quality for 7 years in a row. The Town has also received the "Water System of the Year" Award from the Virginia Rural Water Association for 6 of the last 7 years.



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Storage

The tank located in the Double Gates area has a capacity of 521,000 gallons, was constructed in 1975, and was rehabilitated in 1999. The rehabilitation included painting inside and out and improvements to bring the tank up to current codes and regulations. This welded steel tank has an overflow elevation of 2,892.5 feet and is filled by a booster pump station located on Mountain Lane adjacent to the Charlotte facility. The water level in this tank is monitored continuously and transmitted to the SCADA system located at the water treatment plant. The operator then controls the pumps manually to fill the tank as required.

In August of 2007 the Hickory Hills storage tank went on line. The tank has a storage capacity of 1,000,000 gallons of water and a 12 inch line to connect with existing lines throughout the town. Tank levels are monitored and recorded by the SCADA system at the water treatment plant. The elevation of the tank is + - 2,740 feet and an overflow of 2,770 feet. This was the completion of the Phase 1C of the Water System Capital Improvement Project.

Currently Phase 2 of the Water System Capital Improvement Project is under engineering review. There is potential for the construction of a second 1,000,000 ground storage tank adjacent to the Industrial Park and Graham Recreation Park. Also included in this phase would be an interconnection from the new tank back to the West Graham end of the system. The final portion of this phase will be the construction of improvements that will allow the Town to draw and treat water from Wright's Valley Creek to increase the production capacity of the system to 2.5 mgd.



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Distribution System

The existing water distribution system consists of approximately 25.5 miles of pipe ranging in size from 3/4 to 12 inch. Pipe materials vary from heavy wall, pit cast iron, to small thin wall PVC and polyethylene used in some newer lines. The oldest pipe still in use is an eight-inch cast iron line running from the water plant to the downtown tank, which was installed in 1896. This pipe, as well as most of the larger mains, appears to be in good condition. Concerns about the future condition of some of these lines are due in part to their age.

● The Water Capital Improvement has reduced the need for booster pumps across town. Previously nine booster pump stations had been installed to boost service to certain pressure zones. At this time the only two booster pumps are in service area Kersey and Brierwood.

● One pressure-reducing valve allows water in the highest-pressure level to serve as storage for the lower service areas around Sedgewood. Individual pressure-reducing valves are used extensively throughout the system to protect houses in areas of extremely high pressure.

● The Double Gates pressure zone consists of the Double Gates area and the Bluefield Industrial Park. The tank's water elevations through residual pressure controls the pressures in this service area. Pumps are used to maintain a hydraulic gradient of 2,705 feet. In addition, water can be back fed from the North View pressure zone through a pressure-reducing valve located at the Kersey booster pump station.



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The valve is presently set at 60 per square inch, which corresponds to a hydraulic gradient of about 2,690 feet. The critical minimum pressure occurs within this subsystem when the Kersey booster pump is pumping water to the Double Gates tank. At some homes in Sedgewood where service pressures are marginal during normal operation, complete loss of pressure would occur when the pump was operating. In 2001, the Town installed a new 8" feed line to improve pressures in the higher elevation portions of Sedgewood. This line bypasses the pressure reducing valve on Quail and feeds these areas directly off of the Double Gates tank.

The third or upper level of the system is known as the North View Pressure level and is located on the south edge of Town. This pressure level is supplied by the Double Gates tank, which has an overflow elevation of 2,892.5 feet. This system serves the higher portions of Sedgewood and the new development of Briewood above the Fincastle Country Club Golf Course. Water is pumped into this system and thus, to the Double Gates tank by the Kersey booster station. The Town now sells water to the Tazewell County Public Service Authority for its Falls Mills Water System at a rate of up to 0.075 MGD.

Fire Service

The adequacy of the existing distribution system to supply water for fire fighting has improved with the Capital Improvement Plans throughout the Town. In most of the developed areas, static pressures are good and range from 62 to 197 psi. The Town expects the Capital Improvement Plan to greatly increase the adequacy for fire fighting. The Town has adopted a Fire Protection Policy Program.



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The goals of the program are 250 gpm for residential and small individual commercial units, 350 gpm for large commercial and industrial units, and 500 gpm for units with gas pumps. These goals are set with the understanding that 20 psi will be maintained throughout all points of the distribution system.

Operation and Maintenance

Maintenance of any water system, no matter how complex, is essential to insure proper operation and good service to all customers. During previous studies, it was observed that the water system had not been adequately maintained in the past. The lack of maintenance on equipment may have saved a little money in annual operating costs, but these savings cannot compare with the capital expenditures required to replace broken and malfunctioning equipment. In addition to costs to the Town, there are also the costs to the community, both tangible and intangible, which may result from disruption of water service for any period of time. A well-known example of this is the past inconvenience of low pressure to customers in Sedgewood which has been addressed.

Since 1998, the Town has become more aggressive in the maintenance of the water system. It has stopped using small galvanized lines to serve residential neighborhoods and it has begun to replace problem lines with adequately sized lines that also allow for improved fire protection in neighborhoods. Equipment and training have improved which allow crews to take on larger and more complex projects.



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The Town has detailed maps showing the locations of water lines and valves throughout the town. A valve atlas started by Mr. Lambert (a former town engineer) has been completed and expanded. Although these maps are not 100% accurate, they at least provide the Town with a starting point from which they can start keeping records. The Town has just completed having all known facilities in the water distribution system digitized and incorporated into our GIS system. This will allow the Town to have all information in a centralized data location being updated very easily, as it is installed. As part of the Capital Improvement Plan, many of the valves and lines have been field located and verified. This has resulted in more accurate system modeling, and improved knowledge of the system and its operations.

Improvements

In August of 2001, the Town completed a Comprehensive Water Capital Improvement Plan. Implementation of this plan began in 2002, and will be accomplished in two phases. Phase 1 involved the construction of a new 12-inch main from the water plant to a new 1,000,000 gallon storage tank located above Hickory Hills. The new tank is constructed with an overflow elevation of 2,770 feet. By increasing the tank elevation to this level, fire flow problems will be addressed. The new tank will also allow for the removal of several small pump stations that currently serve higher elevations.



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Also included in Phase 1 was the replacement or relocation of water lines from the new tank to the existing 10-inch line that currently serves the downtown area. Filter upgrades and pump replacements at the water plant allow for faster water processing and more efficient pumps will allow the plant to shut down for more frequent intervals which has never been possible in the past. The existing downtown tanks have been taken out of service and have been demolished.

Phase 2 of the project will involve the construction of a new 1,000,000 gallon tank above the Industrial Park, a line to feed this tank, and additional improvements to the water plant.

When completed, the water system will have 2 pressure zones, and will be able to provide adequate fire flows anywhere in town without dropping pressures below 20 psi at the higher elevations.

Accomplishing this will result in higher pressures at the lower elevations on the system. This will lead to the failure of several older inadequate lines. These lines will be replaced as they fail. Pressure reducing valves were made available to customers in the lower elevations to protect their plumbing from the increased pressure.



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Public Sanitary System

General

In 1936 the Town of Bluefield entered into an agreement with the City of Bluefield, West Virginia to form the Bluefield Sanitary Board. The Board is made up of three members from the City of Bluefield and has two members that represent the Town of Bluefield. The Board is responsible for the treatment of sanitary sewage and its transportation from the Town of Bluefield and the City of Bluefield to the treatment plant.

Collection System

The Bluefield Sanitary Board maintains the sanitary sewer collection system in Bluefield. The system serves the majority of Town plus several businesses along US 460 west of corporate limits. Within the corporate limits there are no pump stations and gravity flow is used in all areas. There is one pump station that serves the Deerfield subdivision just west of town.

The existing sewer lines range in size from 4 to 42 inches in diameter, and most are constructed of clay pipe. Manholes vary in construction, with most of the older manholes constructed of brick. Some newer manholes have been constructed using pre-cast concrete sections, concrete block, and in quite a few places, corrugated metal pipe.



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Treatment

The Westside Waste Water Treatment Plant is located on the Bluestone River about 0.2 miles north of the Bluefield town limits. This plant is permitted for 5.3 mgd and currently treats an average of 2.8 mgd. The majority of the wastewater treated at this facility originates in Bluefield, West Virginia.

Sewer Franchise Ordinance

This ordinance is an agreement that extends and amends the franchise and easement agreement adopted February 11, 1974 between the Town and the Sanitary Board of Bluefield (an entity created by the City of Bluefield, WV) and the Sanitary Board of Bluefield, Inc.. (a Virginia corporation). The franchise expires in February of 2017. In the 1992 amended franchise, the Town agreed to turn over its sewage collection and interception system to the Sanitary Board for the term of the agreement. The Sanitary Board agreed to upgrade the 3.5 mgd sewage treatment plant to 5.3 mgd. Currently the Bluefield Sanitary Board and the Town of Bluefield are negotiating a new franchise agreement.

Expansion

The policy of the Bluefield Sanitary Board is they will not pay for future expansions and extensions. The Sanitary Board will however, operate and maintain those facilities until the end of the service agreement. This policy has limited the ability to provide service to developed areas that currently have septic systems.



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It leaves the Town and its citizens with the bill for capital improvements that are routinely handled by the Sanitary Board in other parts of their service area.

Improvements

At present, there are no major expansions needed on the system. Future developments will change this as undeveloped areas begin to see construction, and the Town looks to expand its boundaries into areas that are not currently served.

There remain areas within the Town that do not currently have sewage service. An example of such an area is to the east of Fincastle Country Club. Portions of Fairlane Drive and Meadow Lane do not have public sewer. There have been discussions with the Sanitary Board about the possibility of providing service, but it is conditioned on the property owners contributing to the cost of the extension.

Solid Waste Management Collection

The Town of Bluefield provides solid waste collection services to all residents and most businesses within the corporate limits. Residential garbage is collected curbside weekly. Commercial collection is done either curbside for smaller offices, or through the use of dumpsters. Larger businesses are collected as often as four times per week.



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Residential customers are charged a set fee per month for garbage collection. Commercial rates vary depending on the size of the container and the frequency of collection. Commercial customers are also charged a rental fee each month on the dumpster.

The Town presently employs six men for refuse collection and has three garbage trucks. All are rear-loading packers that can handle residential waste and dumpsters. The present operation consists of two three man crews with one truck operating as a spare or for special collection. The crews handle both residential and commercial collections.

Disposal

Solid wastes from the Town are disposed of in the Tazewell County sanitary landfill. The landfill is operated by Tazewell County and is located ten miles west of Bluefield on U.S. Route 19. The landfill accepts items from the Town at no cost.

Special Projects

During most of the year, the Town does special pick-ups of large items for its citizens. The minimum charge is \$10, and the average charge is \$20 per dump truck load. The Town also conducts special collection efforts to assist individuals and neighborhoods with cleanup projects. During the Spring the Town offers one free pickup of household items and during the Fall the Town offers free leaf pickup.



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Generally a week is designated when the Town will make special pickups of brush and large household items without charge. This practice should be continued and possibly expanded in the future. Making the free collection available periodically can save the Town the expense of having to clean up items dumped along the roadsides.

The Town has a wood chipper it uses to dispose of brush and tree trimming throughout the town. A fee of \$25 per hour is charged for this service. The Town should establish brush collection schedules so residents will know when to have brush ready for pickup.

Recycling

The Town is the only municipality in the County that offers a free residential recycling program. Every Tuesday town crews collect newspaper, plastics, and card board from residential neighborhoods. These materials are taken to recycling centers to save the natural resources and allow these items to be reused and not placed in the Tazewell County Landfill. The major obstacle to recycling in the region is the lack of large recycling collection centers that can process the materials. This forces the small collection areas to transfer the recyclables approximately 2 hours away before being processed for sale to manufacturers.



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Stormwater & Drainage

Background and Existing Facilities



There are several river and streams that pass through the town of Bluefield starting with the Bluestone River entering the Town on the western end and joining with Whitney Branch and Beaver Pond Creek. Beaver Pond Creek enters Bluefield, Virginia from Bluefield, West Virginia at Leatherwood Lane and is joined by Whitney Branch in the Downtown Business District. Once these rivers and streams combine they form the Bluestone River and become a tributary of the New River.

Although the Bluestone River is the largest of the streams entering the Town, Beaver Pond Creek probably effects the downtown area the most because it flows through the central business district. The natural drainage way of Beaver Pond Creek has been improved by the destruction of several buildings, including the old Town Hall. The stream once flowed under these buildings through a series of box culverts and discharged at the Norfolk and Southern Railroad underpass. Whitney Branch also flows through a box culvert for approximately 950 feet before joining Beaver Pond Creek. The creek has now been widened and the intersection of Whitney Branch and Beaver Pond Creek has been redesigned to allow for a more natural flow, and the banks have been stabilized by the construction of a continuous block wall.



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Flooding

The Town of Bluefield has been subjected to many floods in its history. Major flooding occurs in the downtown area during periods of intense rainfall. The greatest cause of both major and minor flooding within the Town of Bluefield is the obstruction of the drainage ways with either naturally occurring obstructions or by debris within these drainage ways. Minor flooding results from the accumulation of silt and debris in storm sewers and drainage ditches. Strict enforcement of the Town's Stormwater Ordinance and Regulations will help reduce the impact of some of the heavy rainfall events. Major flooding is caused by the inadequacy of the existing drainage system. A large portion of the floodwater is forced to travel overland to reach the natural channel of Beaver Pond Creek.





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Previous Studies

The engineering firm of Anderson & Associates previously studied the Town's storm drainage problems in 1979. Several recommendations were made and a number were acted upon. Storm inlets and culverts were cleaned and made to function hydraulically. A new railroad overpass was constructed at Route 102. Other recommendations which should be analyzed in the future to minimize flooding are larger culverts in the downtown area and a detention pond on Beaver Pond Creek just east of College Avenue. The recommendation of turning Walnut Street into a drainage way was carried out during a FEMA Project with the removal of numerous residential structures. The Town is performing a stormwater analysis of the entire town. This plan is to include all of the drainage problems, how they are caused, and how to alleviate these problems.

Management

In 2001, the Town adopted Article III Chapter 62 Town Code of Ordinances. This section regulates stormwater water management and outlines the standard guidelines in which future development must follow. The Municipal Guidance document was adopted in April of 2002 and also sets standards for future development concerning stormwater.



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The Town is addressing these issues and will continue to apply for grants, enforce Article III Chapter 62 of the Town of Bluefield Code of Ordinances, and continue analyzing problems and solutions to stormwater issues.

The Tazewell County Comprehensive Plan has proposed the development of a Tazewell County Conservation Council to coordinate conservation, outdoor recreation, and public land initiatives. One of the council's functions would be to publicize the availability of legal tools such as conservation easements. Another function would be to explore ways to promote watershed protection, wise and sustainable water use, and flood damage protection. A joint effort between the Town of Bluefield and this council could develop a stormwater management plan applicable for the entire county.

The 1998 Virginia General Assembly passed legislation that allows local governments to provide additional protection of their waters without incurring out-of-pocket expenses. Localities can now grant tax incentives to encourage landowners to protect wetlands, riparian buffers, and to develop erosion control structures. All of these would have a positive impact on water quality. In addition, the Town could apply for Water Quality Improvement Funds from the Virginia Department of Conservation and Recreation for reimbursement.



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Improvements

The Town is in the process of developing a Comprehensive Stormwater Capital Improvement Plan. This plan will give the Town the basis for the development of any new drainage structures, and plans for improvements to the existing structures. Therefore in the interim, proper maintenance and cleaning of existing drainage structures are performed on a regular basis until a full plan can be developed.

Floodplain

Because the Town is flood prone, and had 2 flood events occur between July 2001 and May 2002, a third in November 2003, and a fourth in June 2004, a serious look is being taken at putting into place an effective program for the mitigation of flood hazards. Grant funds have been secured to develop an All Hazards Mitigation Plan that will meet the State mandated requirements for pre-disaster planning. This plan should be a starting point to begin implementing meaningful changes in flood prone areas.

The Town received grant funds through the Federal Emergency Management Administration in 2003 to address the removal of flood hazards in the downtown area. Currently the Town Hall has been removed along with seven other downtown buildings. As the Town moves forward on these projects, time and effort must be spent in identifying and planning for the alteration of the downtown area and how that might impact the future of the community.



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Drainage Areas by Political Subdivision

Total			8.88		100	
Whitney Branch						
			Area (sq. mile)		Percent of Total	
Town of Bluefield			0.40		21	
Tazewell County			0.00		0	
City of Bluefield, WV			150		79	
Mercer County, WV			0.00		0	
Total			190		100	
Wright's Valley Creek						
			Area (sq. mile)		Percent of Total	
Town of Bluefield			0.34		4	
Tazewell County			8.06		96	
City of Bluefield, WV			0.00		0	
Mercer County, WV			0.00		0	
Total			8.40		100	
Bluestone River	(Direct Drainage - excluding Study Areas B & C)					
			Area (sq. mile)		Percent of Total	
Town of Bluefield			2.48		14	
Tazewell County			14.89		86	
City of Bluefield, WV			0.00		0	
Mercer County, WV			0.00		0	
Total			17.37		100	
Portion of Total Drainage Areas Within the Town of Bluefield:					(7.61/36.55)	20.8%



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Electrical Service

Electrical Service is provided by Appalachian Power Company, a subsidiary of the American Electric Power Company. The utility tax is based on usage at 0.01614 per KWatts. The Town has a franchise agreement that regulates the utility within the Town.

Natural Gas & Propane Service

Natural Gas is provided by Bluefield Gas a subsidiary of RGC Resources. There are several providers in the area for propane.

Telephone Service

Local telephone service is provided by Verizon Communications.

Local Media

Bluefield is currently covered in all areas by a wide range of local media. In television, WVVA and Fox 59 News cover most local news and events. The Tazewell County Free Press and Bluefield Daily Telegraph cover news and stories by way of the Newspaper. There are numerous radio stations throughout the area, both AM and FM.