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Funding Received from Rural Development.

Project Title: New River Valley Water Technical Assistance Program (Water Supply Planning and Technical Assistance) – Phase 2

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Executive Summary

This plan represents two years worth of research and analysis conducted in the New River Valley. It examines the preliminary financial, engineering, and political feasibility associated with implementing a regional water supply system. The proposed water supply system discussed in this document seeks to interconnect existing water sources systems in the area north of I-81 and to develop water transmission infrastructure in the area south of I-81. The demand and cost analysis illustrate that the project is feasible. This plan finds that it is possible to produce water in a regional water supply system for as little $1.48 as to as high as $1.93 per 1,000 gallons. In either case, this cost to produce 1,000 gallons is less than what many individual water systems incur.

In order to operate and maintain a regional water source system an organizational structure is necessary. Many representatives from around the region have provided input and feedback in laying the initial pieces of that organizational structure. To date a Policy Committee has reviewed cost analyses and proposed regional water supply system models. In addition, the Policy Committee has begun to look at the formation of Virginia's New River Valley Regional Water Authority. The Committee has reviewed draft articles of incorporation and by-laws and held several discussions regarding participation.

The next steps associated with the plan involve defining who the regional water players are and then based on who plays, what the regional water supply system looks like. To assist in these efforts the Staff (the New River Valley Planning District Commission, the Institute for Policy Outreach at Virginia Tech, and the Center for Geospatial Technology at Virginia Tech) hopes to meet with each localities public service authority and/or board of supervisors/city council by February of 2006. In addition, funding has been secured through Rural Development to hire an engineering firm to examine the feasibility of a regional water supply system.

INTRODUCTION

Within the New River Valley there exists an abundance of water resources. However the existing systems to distribute these resources to households and businesses are either unconnected or under connected. This report seeks to assist the localities that the New River Valley Planning District Commission (NRVPDC) serves (Floyd, Giles, Montgomery, and Pulaski County, and the City of Radford) in the development of a region wide plan to best tap into the water resources of the area.

Further impetus for this study are the recent water regulations passed by the State of Virginia that require all localities to develop and adopt a water supply plan. The plan, which can be developed at the local and/or regional level, will include elements such as

- A description of existing water sources, existing water uses, and existing water resource conditions.
- An assessment of projected water demand for the next 30-50 years
- A description of water management actions including drought response, contingency plans and other water demand management information

At a minimum, the combination of this report and the Year 1 Water Supply Plan will assist localities in the identification of water resources, water users, and water demand projections. It is the hope of the NRVPDC that the regional water supply planning efforts will result in the development of a document that meets the state water regulation requirements and can subsequently be adopted by each locality.

From infrastructure to policy and from rate fees to the management of transmission systems, water planning provides many opportunities for collaboration and cooperation. This report presents information, models, analyses, and recommendations that seek to improve the design and integration of water supply systems in the New River Valley.

Figure 1: New River Basin

Source: National Committee for the New River .
Image: New River Valley Watershed <ncnr.org>

Location

The New River Valley Planning District Commission serves the counties and towns of Floyd, Giles, Montgomery, and the City of Radford. Major portions of all the localities are within the New River Valley Watershed.

Background

In 2004, the New River Valley Development Corporation (NRVDC) with assistance from Virginia Tech's Institute for Policy Outreach (IPO) and the New River Valley Planning District Commission developed Phase I of the New River Valley Water Supply Plan. The Phase I Plan, hereafter referred to as the Year I Plan, examined the current water needs, estimated future water needs, and provided preliminary alternatives to meet the current and future water needs of the New River Valley. The Year I Plan specifically focused on the potential for water providers to share water depending on excess production and demand, both now and in the future.

The Year I Study produced the following conclusions and recommendations

- There is sufficient water available in the New River Valley region to supply most of the Region.
- Major public water providers in the New River Valley are either not connected or are under connected and cannot share water resources, even in an emergency.
- It is hydraulically feasible to interconnect existing systems in the NRV. In addition the placement of additional tanks throughout the region would greatly increase the availability of public water.
- Some localities in the New River Valley have excess water capacity while other localities are in need of water, especially when future economic development and population growth in the New River Valley is taken into consideration.

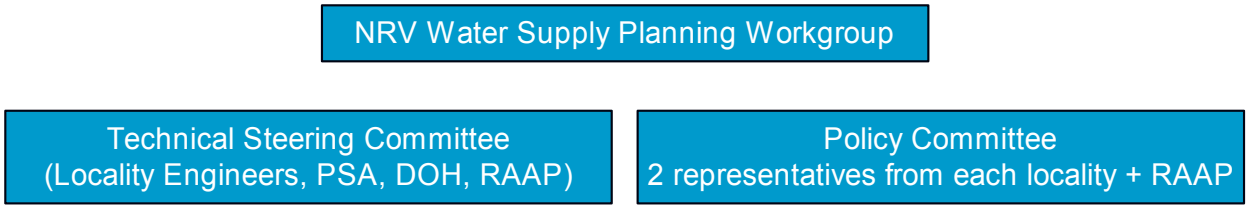
- Establish a regional water authority to develop and plan interconnections, share water supplies, set rates, and provide operate and maintain regional water lines.

- Demand and interest for interconnections is currently highest among localities in the northern and western portions of the planning district.

Planning Process

For the purposes of continuity, the planning process used in Year 1 was carried forward into Year 2. The technical steering committee continued to provide input regarding data collected and models presented, while the policy committee worked on the formation of a regional water authority. At certain points throughout the year these committees would meet in a joint sessions to discuss relevant topics.

Figure 2: Water Supply Planning Model



The Year 2 Regional Water Supply Plan builds on the above recommendations and expands on the information collected and disseminated in Year 1. The planning process focused on three related objectives in Year 2.

1) Continue to gain a better understanding of water issues in the New River Valley;

2) Develop a region wide water supply model that shows preliminary locations for new water lines to connect existing systems incorporating the area south of I-81;

3) Continue to develop a regional water supply system that promotes coordination and collaboration among localities, and work toward the formation of a Regional Water Authority with an emphasis on collaboration between Giles County, Pulaski County, City of Radford, Montgomery County, and the Town of Pulaski.

Year 2 planning also consisted of efforts to continue technical assistance and/or grant writing assistance related to water projects being undertaken by various localities. The above objectives will be addressed in turn.

OBJECTIVE 1: WATER ISSUES IN THE NEW RIVER VALLEY

The Year 1 Regional Water Supply Plan examined water production, treatment, and demand projections for each public water system in the New River Valley (see Appendix 1 for individual system summary). In addition, the Year 1 Study examined the availability of emergency storage based on demand and design.

Several pieces of data were collected as part of the Year 2 Regional Water Supply Plan. Specifically, localities in the New River Valley provided information to assist in the identification of large scale water users and small scale water systems. The Year 2 Study also examined conservation as it relates to water supply planning in the New River basin.

Large Scale Water Users

For the purpose of this study, large scale water users are those defined by the Code of Virginia 9VAC25-200-30. The code states that reporting is required by

> Every user withdrawing groundwater or surface water in Virginia including the Potomac River abutting Virginia whose average daily withdrawal during any single month exceeds 10,000 gallons per day. Reportable withdrawals include, but are not limited to, those for public water supply, manufacturing, mining, commercial, institutional, livestock watering, artificial fish culture, and steam-electric power generation uses.

Additionally, the NRVPDC contacted public water providers to determine what portion of public water was being used for residential, commercial/industrial, manufacturing. This data was hard to collect for the region. Many localities reported on private systems rather than on users within the public water system who consume more than 300,000 gallons per month. State regulations requiring all localities to develop a water plan are expected to be signed into law in the fall of 2005. As the region moves towards the development of a water plan in response to these regulations, staff, officials, and representatives are hopeful that this data will become more readily available.

Small Scale Water Systems

Rural communities and small subdivisions sometimes rely on small water systems to meet their daily water needs. In the New River Valley many such systems exist. The systems range in size serving anywhere from 10 people to 1,000 people. In 2003, the total population in the New River Valley, estimated by the Weldon Cooper Center, was approximately 165,300. Data collected from the major water providers in the region indicated that in 2003 112,150 people were served by public systems. This indicates that 53,150 people rely on individual wells and/or small scale water systems.

Many of the small scale water systems are in need of repair and/or replacing. In fact, several localities have begun taking the small scale systems off line and hooking the communities up to the larger public water system. This process in turn creates more of a demand on the existing systems.

Future Water Supply Planning Considerations

Figure 3: Map of The New River Watershed

Base from U.S. Geological Survey digital data, 1:2,000,000, 1992 and National Park Service digital data, 1:24,000, 1996

The abundance of ground and surface water is one of the New River Valley's significant resources. The New River Basin covers 3,070 square miles (8% of Virginia's total land area) and is the least densely populated of Virginia's major river basins. The New River flows North to form the Kanawa River, a tributary of the Ohio River which empties into the Gulf of Mexico drainage basin.

Water Availability

As reported in the New River Water Supply Plan prepared by the State Water Control Board "it is noteworthy that the New River in Virginia has the highest base flow per unit of drainage area to be found in any major tributary in the Ohio River Basin and the highest in Virginia.' Most of the factors affecting movement of water in the hydraulic cycle have some influence upon base flow of a stream, but the ground water phase of

the cycle is the predominant factor" (page 1-5). The study notes that most wells in the New River Valley produce 30 gallons per minute with some wells yielding as much as 100 gallons per minute. The New River is capable of supplying 3.2 billion gallons per day during an average flow and 467 million gallons per day during drought flow. Claytor Lake and several small reservoirs provide over 5,000 acres of surface water.

Agriculture remains a livelihood for many of the region's citizens in the Virginia portion of the New River Basin. However, the growth of Virginia Polytechnic Institute and State University and Radford University and the development of several research centers have brought prominence to Virginia's New River Valley as an education and technology corridor. Although the development, growth, and industrial use of the Virginia portion of the New River Basin have not yet taxed the natural environment's ability to maintain and regenerate itself, careful management of natural resources will be critical to maintaining a successful balance between technological and economic development and resource conservation in the near future.

Current Population Growth

The heaviest concentration of development has occurred in the Virginia portion of the basin. Since 1980, the New River Valley has experienced steady population growth. Total population increased from 141,343 in 1980 to 152,680 in 1990 to 165,146 in 2000, a steady growth rate of eight percent every ten years over the twenty-year period. Table 1 provides population data for jurisdictions in the New River Valley and Virginia.

Current Changes in Land Use

Many of the counties and municipalities within and adjacent to the New River Basin have undergone considerable change in development patterns in recent decades. An increase in the use of natural resources necessarily accompanies increases in urban population as seen in the North Carolina and Virginia portions of the New River Basin. Urban development alters land use patterns, stormwater drainage, stream water quality, and water demand. As urbanization continues in and around the municipalities of the New River Basin, an increase in water usage is expected.

Land use in Virginia's New River Valley is similar to land use within the remainder of the Commonwealth. Approximately 62-percent of land is forested in the basin and over 98-percent of the forested land is harvested timberland. A significant land use change has involved residential, commercial, and industrial development, including associated infrastructure. Development has converted thousands of acres of previously pervious soils to hard surface, impervious conditions. With these current growth rates and changes in land use, considerations in water supply planning should incorporate protections for the New River's water quality through a variety of approaches.

(Source: http://www.nrrevalliance.org/demographics/data08.php#4)

Future Population Projections

Based upon the US Census 2000 population, projected population figures in the New River Valley are forecasted to continue to increase through the year 2040. Projections show that by the year 2040, 189,288 people will reside in the region, an increase of 14.6% or 24,142 people from 2000. Average daily water demand for water systems in the North Carolina portion of the New River Basin are expected to increase over 50-percent by the year 2020. Similar demands for water supply are expected in Virginia. Projections show that by the year 2030, 212,833 people will reside in Virginia's New River Valley, an increase of 36-percent from 1997. Future water supply planning for the New River is important given these pressures ahead.

Water Resources Problems in Virginia

Critical issues within the Virginia portion of the New River Basin include flooding, regional water supply and wastewater treatment, in-stream water quality, aquatic habitat degradation, and rapid sedimentation that is in-filling mainstem lakes and smothering benthic organisms in some stream reaches. The major flooding problem in the Virginia portion of the New River Basin is located on the campus of the Virginia Polytechnic Institute and State University (VPI), in Blacksburg, VA. Major flood events have occurred in 1975, 85, and 92. The 1992 flood (estimated at 10-year event) caused over $4.5 million in damages to campus buildings and facilities.

Significant sedimentation is occurring in Claytor, Byllesby and Buck Lakes. The upper portions of the lakes have captured entrained sediments from the New River and have aggraded. Sedimentation has smothered benthic habitat, reduced water depths and fisheries habitat, and increased boating hazards. Some aggraded areas also collect stumps and snags transported downstream during extreme flow events. The continued deposition of sediment degrades fisheries, wildlife and recreational functions and values at the three lakes.

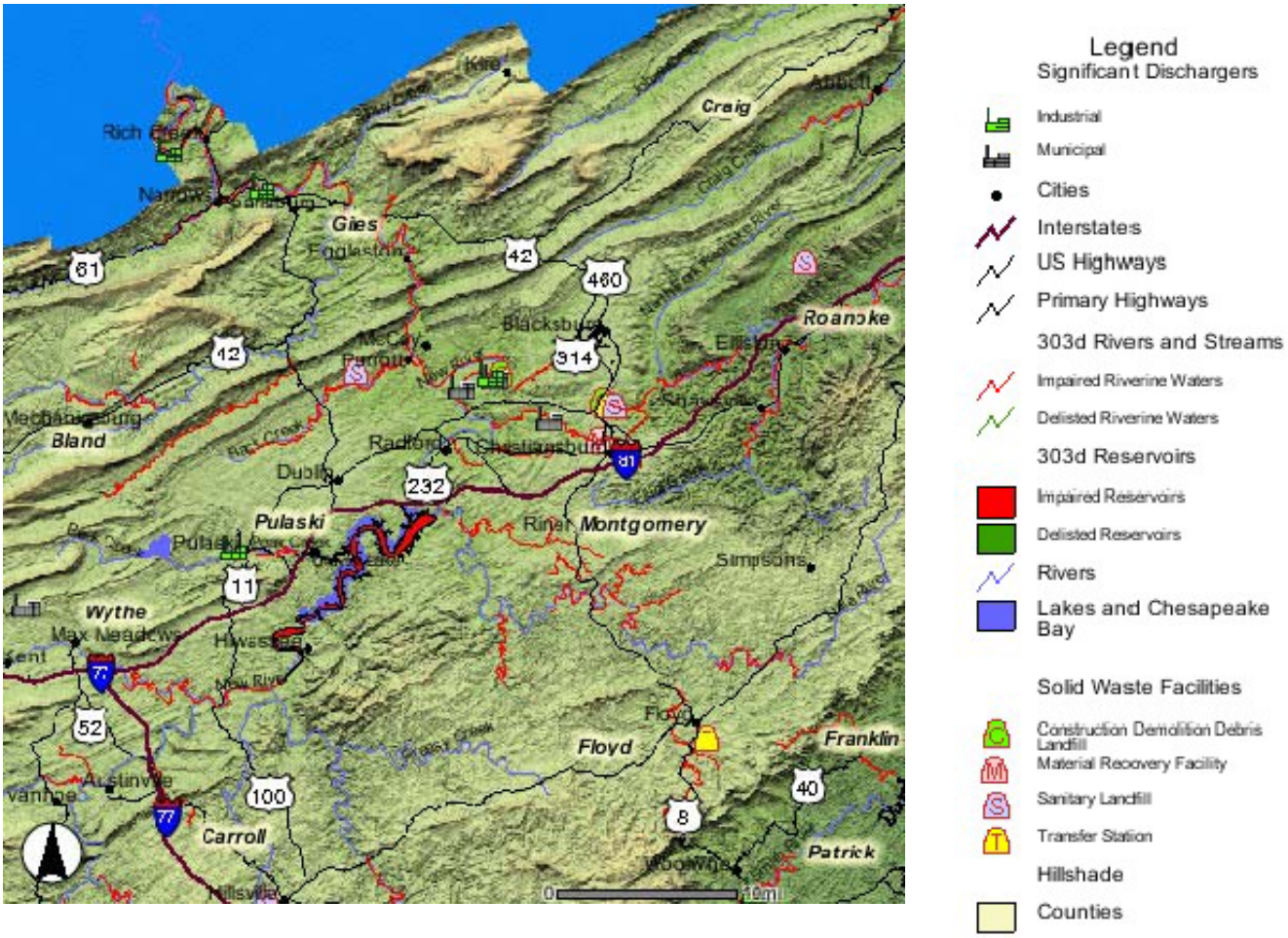
Because of geology and soils conditions, the region relies primarily on surface water sources for potable water, and effective on-site wastewater treatment is limited by shallow soils. Development of a regional water system in Grayson, Carroll and Wythe Counties is a critical regional need. As well as developing alternate water sources for regional water supplies. These withdraws need to be considered while planning for downstream supplies.

Acid mine drainage is emanating from a number of abandoned mine lands along the New River, contributing to aquatic habitat degradation. As in the North Carolina portion of the basin, point and non-point source pollution from mining and agricultural activities has resulted in localized instances of EPA listed streams and accelerated erosion and sedimentation in a number of locations. EPA listed streams in the Virginia portion of the New River Basin are shown on the following map. Establishing regional solutions to these critical needs is essential to protecting the basin's water resources.

In addition, the Virginia Dept. Of Environmental Quality has a fish consumption advisory for the New River due to the level of PCB's found in fish tissue in 2000. It is suspected that the contaminate is from non-point source pollution.

Figure 4: Map of Impaired Rivers and Streams in the New River Valley

(Map was generated from Va. DEQ ARCIMS Server.)



Expected Future Conditions

Under expected future conditions, localized areas in the New River Basin will continue to be subject to flooding, and will incur increased damages as a result of increased runoff due to new development. Localized flooding at concentrated damage areas will continue to occur, and emergency service costs will increase as citizens are caught unaware of impending floods. Green infrastructure and hazard mitigation planning should be an integral part in a comprehensive water supply plan.

In addition to short-term flooding events, the New River Valley has been subjected to periodic drought conditions, the most current one being alleviated slightly in the winter of 2004. Periodic drought events are still of concern with the projected population growth rates for the area. Economic development efforts such as the American Heritage Rivers Program and Dept. Of Conservation and Recreation Blueways Program are dependent on flow rates for the recreational aspects of the New River. Currently flow rates for the New River are less than the suggested minimum according to the American Whitewater Organization (For example, suggested recreation flow rate is 2000 cfs for the Claytor Lake to VA/WV State Line and it currently is running at 1170 cfs as of 9/24/2005, as a result of drought conditions). An overall assessment of future industries (e.g. the bottling plants in Wythe County) and existing industries (e.g. Radford Arsenal Plant) in the New River Valley should also be considered relative to other development efforts centered on recreation in future water supply planning.

Drought conditions not only affect the quantity of water but the quality of water. Examples of potential strategies for the New River Valley that may be considered in water supply planning are the reallocation and reduction of water use, incentives in the water supply plan that reward conservation efforts such as rain gardens, gray water use, land conservation as strategies to reduce consumption of water.

Degradation of the structure and function of the New River Basin's ecosystem will continue without focused restoration efforts that address resource extraction, agricultural runoff, streambank erosion, sedimentation, and riparian and aquatic habitat degradation problems.

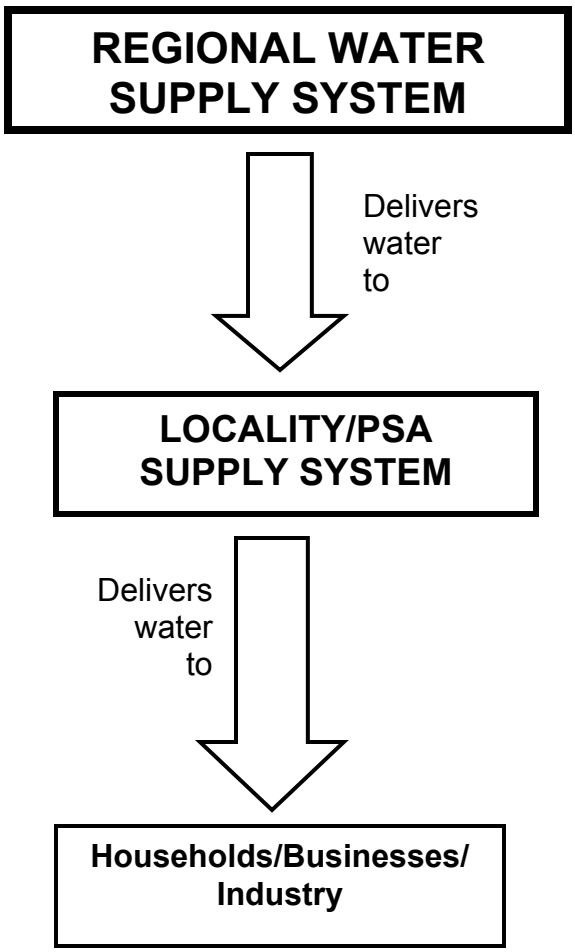
Chronic stresses will continue to reduce specie diversity and abundance. The lack of a comprehensive basin-wide plan for management and preservation of water and land related resources will limit the effectiveness of both regulatory and grassroots efforts to foster restoration of the New River Basin.

The need for regional solutions to the basin's water supply and wastewater treatment needs will become increasingly critical in the future due to the expanding economy and population of the study area. The lack of regional solutions will also negatively affect in-stream water quality throughout the basin.

OBJECTIVE 2. DEVELOP A REGION WIDE WATER SUPPLY MODEL

The development of a regional water supply system model occurred over two years. The first year examined the area in the region north of I-81 and the second year examined the area south of I-81. Together the portions of the model provide a conceptual system that has the potential to serve the majority of the population in the New River Valley. The regional water system addresses two main issues: under connected systems in the northern part of the region and underserved populations in the southern portion of the region. The intent of the Regional Water Supply System, which is reflected in the design of the model (both North and South of I-81), is to connect existing water sources, provide reliability and security, and increase available capacity. Figure 2 illustrates how the model envisions water transport from the regional water supply system to the end user.

Figure 5: Regional Water Supply System Delivery Method



Regional Water Supply Model: Year 1 (North I-81)

The Year 1 Water Study focused on the development of a water supply model in response to the under connected water systems in the northern part of the New River Valley. Geographically this portion of the regional water system model is referred to as North of I-81 and includes Giles County, the City of Radford, northern Pulaski, the Town of Pulaski, northern Montgomery County, and the Radford Army Ammunition Plan (RFAAP).

Justification

Current water supply and future demand estimates indicate that the geography examined in the Year 1 Study, while under connected, have the most urgent need for interconnections among existing water distribution systems. Specifically, the Year 1 Study identified Pulaski and Giles Counties as having "Priority Interconnection Needs" and the City of Radford was identified as a water provider along with the Pulaski Town and County sources.

Pulaski County has new extensions coming online (approximately 825) in the next couple of years and several large residential developments planned. In addition, the Commerce Park, while currently unoccupied, will create a draw on Pulaski County's existing water system once occupied. If the occupant requires substantial water resources the strain on Pulaski County's system would be even greater. The factors combined indicate that Pulaski County's water production capacity may approach 80% in the next couple of years.

Giles County's need for interconnection is slightly different than Pulaski County's. Currently, Giles County does not have an affordable alternative water supply source. The interconnection of systems in Giles County to the larger regional water supply system is one potential method to remedy this issue.

The City of Radford water treatment plant has the potential to provide the area north of I-81 (and beyond) with ample water. The Year 1 Study reported that the City of Radford has 4-6 million gallons excess capacity.

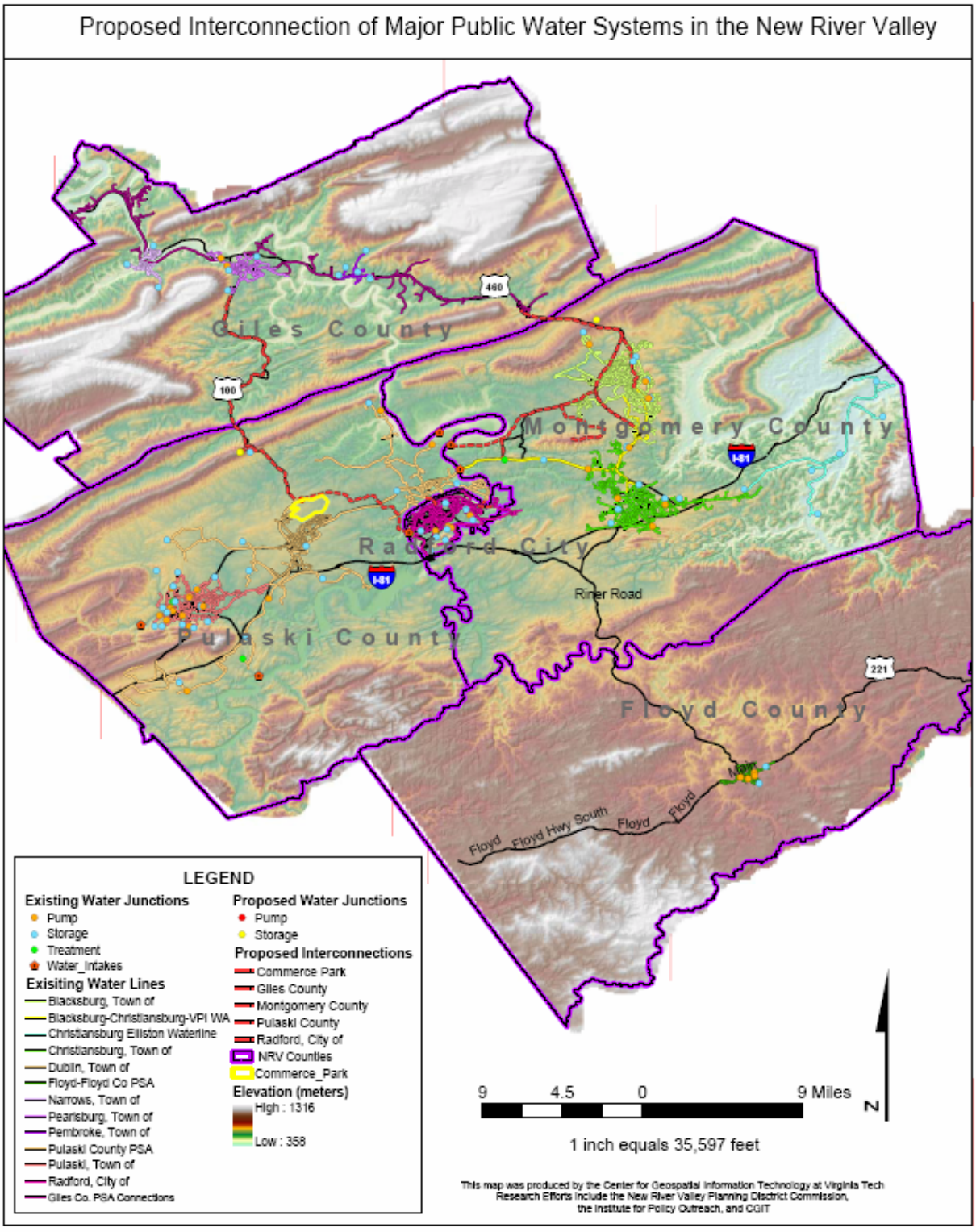
Model Design (North of I-81)

Based on data collected at policy and technical committee meetings, the Center for Geospatial Information Technology (CGIT) at Virginia Tech developed two water supply models for the area north of I-81. First CGIT modeled the interconnections of all major water systems (Giles County, City of Radford, Town of Pulaski, northern Pulaski and Montgomery

County, RFAAP). The second model examined the areas identified as having priority interconnection needs and used the City of Radford as the major water provider.

As the Year 2 study progressed it became apparent that the interconnections of all water distribution systems North of I-81 was not financially and politically feasible. Therefore, the year one model that examined priority interconnections was used to explore system requirements, cost, and feasibility (See Figure 6: Model North of I-81).

Figure 6: MODEL NORTH OF I-81



The proposed interconnections in this phase of the model include:

Table 1: Interconnections

Interconnection	Approximate Feet	Systems Interconnected
From the City of Radford to Commerce Park (Route 100, Dublin)	37,100	Radford to Pulaski PSA
From Commerce Park to Cloyd's Mountain	26,600	Pulaski PSA to next interconnection (see below)
From Cloyd's Mountain to Town of Pearisburg	38,000	Cloyd's Mountain to Giles PSA

Table 2: Proposed storage:

Tank Location	Size
Cloyd's Mountain	1,500,000 gallons
Commerce Park (Route 100, Dublin)	1,000,000

In the proposed water supply model, each of the interconnections serves an unmet or potentially unmet need in the region. As illustrated in the Year 1 Water Supply Study, the City of Radford has approximately 6 million gallons of excess production capacity. The proposed interconnection from the City of Radford to the Commerce Park provides a source of water for potential clients at the Commerce Park and additional capacity for the Pulaski PSA. Within Pulaski County, several residential neighborhoods are planned for development over the next several years so, the extra capacity delivered to Pulaski County's PSA will help support the future residential growth planned in Pulaski County. The combined connections from the Commerce Park to Cloyd's Mountain and from Cloyd's Mountain to the Town of Pearisburg propose to expand the Giles County PSA's water system into the western portion of the County along Route 100.

In the design of the water model, a 1.5 million gallon water tank has been placed on the top of Cloyd's Mountain. The strategic location of this tank allows for water distribution into both Giles and Pulaski Counties. The storage tank also helps the system meet the fire flow and daily demand requirements as set forth by the Virginia Department of Health.

The interconnection from Cloyd's Mountain to the Town of Pearisburg is intended to hook into the existing Giles County PSA system in Pearisburg. Since the Giles County PSA system then follows Route 460 to Newport this creates a potential opportunity for the Regional Water Supply System to inter link the Montgomery County and Giles County water supply systems.

A connection between Giles County and Montgomery County is not proposed in the first phase of the model, however in the future this connection may provide significant benefit to Montgomery County. The connection between the Giles and Montgomery County Water Supply Systems in conjunction with a strategically placed storage tank would provide water capacity to ensure fire flow at Pandapas Pond in the Jefferson National Forest.

In summary, the proposed water model for the area north of I-81 interconnects the City of Radford, Pulaski County, Pulaski Town, and Giles County water supply systems. In addition, the model proposed additional storage either at the Commerce Park (Route 100, Dublin) or at the top of Cloyd's Mountain. A possible future connection exists between Giles and Montgomery County which would increase the interconnection among water systems in the New River Valley.

Regional Water Supply Model: Year 2 (South of I-81)

The Year 2 Water Study focused on the development of a water supply model in response to the un-served populations in southern Pulaski and Montgomery Counties and the County of Floyd. Geographically this portion of the regional water system model is referred to as South of I-81.

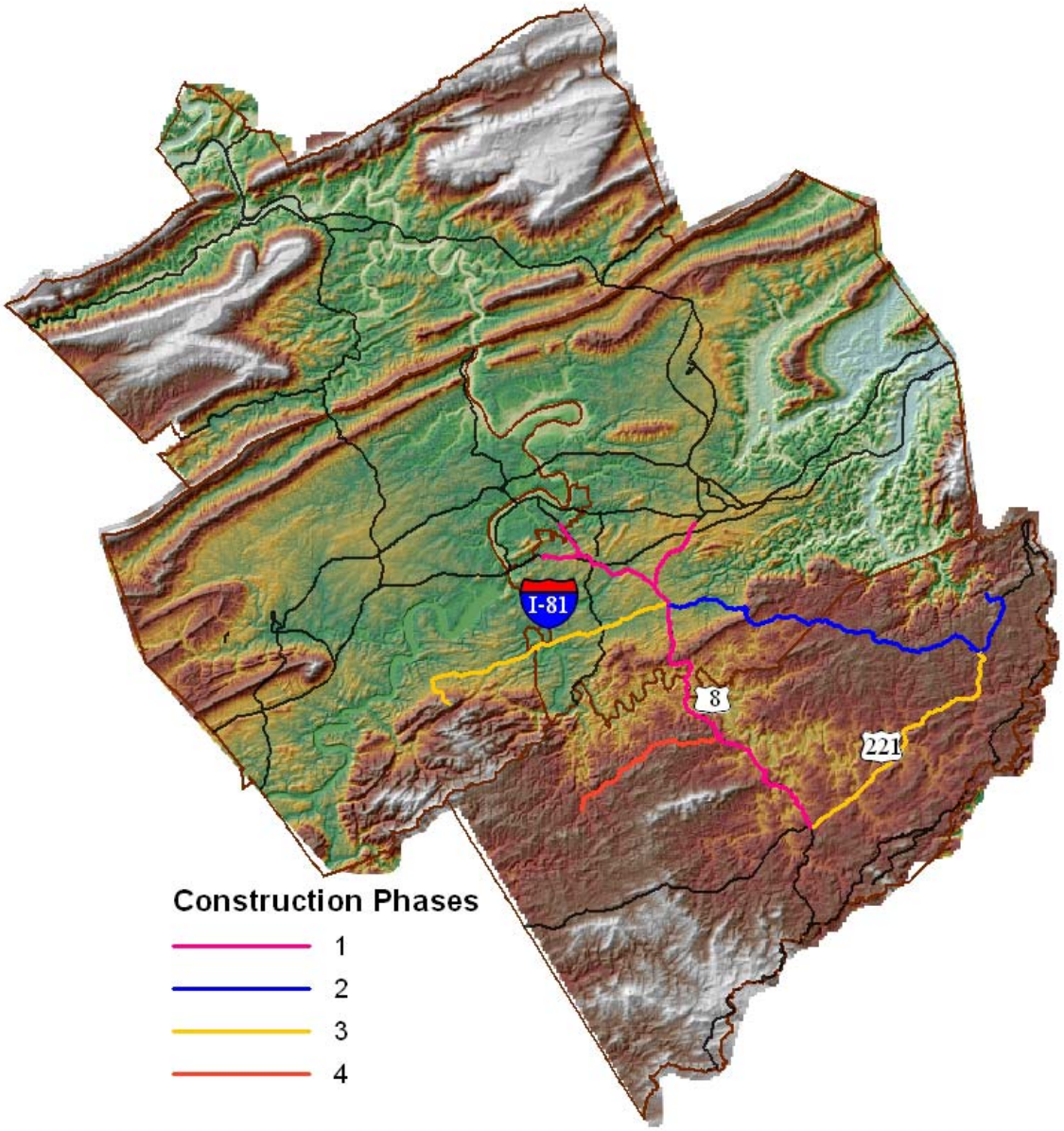
Justification

In the Year 1 Water Study, Floyd County was identified as primarily relying on private wells that could not adequately support the population growth, especially in times of drought. The Floyd County/Floyd PSA operates a small water supply system, but this primarily provides public water to Town and adjacent residents. Another hurdle facing Floyd County is that they do not have a source of water readily available, which limits the County's options in regards to installing public water infrastructure.

Model Design (South of I-81)

As noted above the main impetus for the expansion of the Regional Water Supply System into the area south of I-81 is to create a water infrastructure in the portions of the region that are underserved or unserved. Since no water source exists south of I-81 it is proposed to utilize the City of Radford's treatment plant and their extra production capacity as the main water source in the proposed water distribution model. The south of I-81 portion of the Regional Water Distribution model was designed in phases rather than with an emphasis on interconnecting existing water supply systems (See Figure 7: Model South of I-81). The proposed model for south of I-81 includes four construction phases and the placement of 4 water tanks.

Figure 7: MODEL SOUTH OF I-81



Map produced by the Center for Geospatial Information Technology at Virginia Tech. Research efforts include the New River Valley Planning Distrcit Commission, Institute for Policy Outreach at Virgnia Tech, and CGIT

Table 3: Proposed Construction Phases

Phase	Approximate Feet
From the City of Radford to the Town of Floyd including an extension into the Riner area of Montgomery County	47,298
From Riner to Check	35,166
From Riner to Southern Pulaski County and from the Town of Floyd to Check	44,620
From Alum Ridge to Willis	14,422

Table 4: Proposed Tank Locations

Location	Tank Size (In gallons)
Radford	1,000,000
Check	500,000
Riner	500,000
Pulaski	500,000

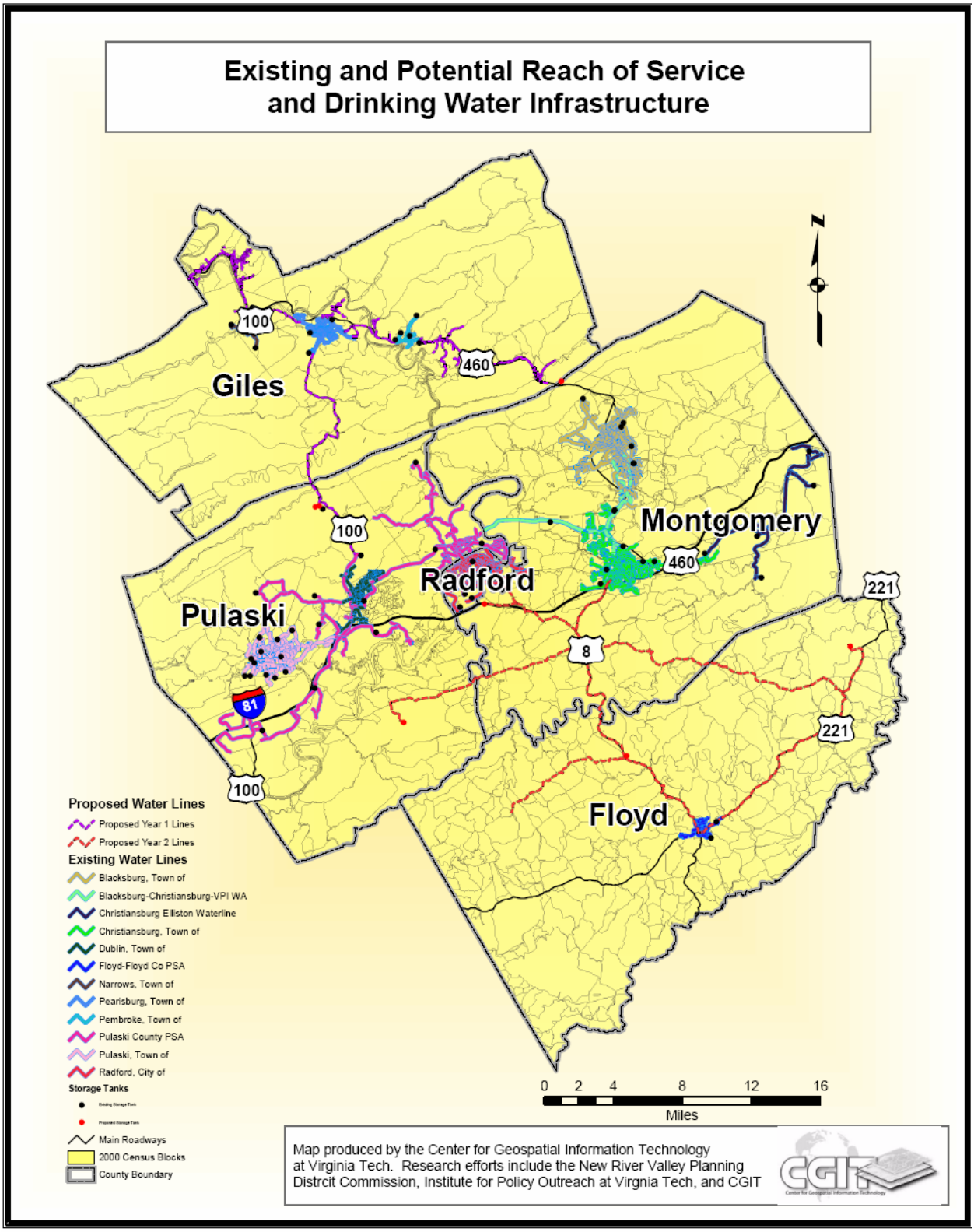
In the Year 2 Water Supply Model, the tanks were placed in locations which will see an increase in population over the next twenty years. The water lines which are meant to feed the tanks were placed along major roads to facilitate maintenance and access. In the southern portion of the New River Valley the terrain does not lend itself naturally to the development of a water system. As a result, the Year 2 Water Supply model includes the location of several pumps and pressure reducing valves. The utilization of these in the design of the system ensures that adequate water is available and that water pressure did not exceed 100 psi at the junctions in the system.

Regional Water Supply Model: Production Capability, Population Projections and Demand Analysis

The Regional Water Supply Model is an assimilation of the Year 1 and Year 2 water supply models (see Figure 8: Regional Water Supply Model). This model has the potential to supply water to the majority of the New River Valley's population and industry both now and twenty years into the future. As part of the feasibility analysis, the New River Valley Planning District Commission and the Institute for Policy Outreach at Virginia Tech examined the

potential water production capability of the regional water supply system and future demand on the regional water supply system.

Figure 8: Regional Water Supply Model



Production Capability

The proposed interconnection of the water treatment systems in the Year 1 water supply model provides enough water capacity to supply the entire region. The regional water supply model proposes using the production plants currently owned and operated by the City of Radford, Pulaski County PSA, and the Town of Pulaski to provide the regional system with water. The daily water volume associated with each locality's water system listed in Table 5 was weighted against the system's maximum daily capacity (80% of total daily production capability). The difference between daily volume and daily maximum capacity illustrated that these systems possess underutilized water capacity. The table below summarizes the underutilized water capacity available at each system that would potentially be integrated into the regional water system in the New River Valley.

Table 5: Capacity Analysis

System	2003 Daily Production	Daily Capacity	Excess Capacity
City of Radford	2,000,000 (2004 Data)	8,000,000	6,000,000
Pulaski County	2,080,000	3,350,000	1,270,000
Pulaski Town	1,810,000	4,000,000	2,190,000
Total	**5,890,000**	**15,350,000**	**9,460,000**

The capacity analysis indicates that the total excess capacity available among these three systems equals 9,460,000 million gallons per day. The regional water supply model proposes to interconnect these three systems and lay the transmission lines necessary to transport the water to existing systems and, in the case of the area south of I-81, provide the initial foundation for a water supply system. The total daily capacity of the three systems combined (15,350,000 gallons/day) is enough water to serve the current population and industrial needs of the New River Valley. Furthermore, based on population projections at the county and regional level the current 9,460,000 gallons of water/day is sufficient to meet the needs of the proposed water supply system for the next 30 years. A more detailed population analysis is presented below.

When making water projections into the future it is hard to account for industrial, business, and other uses beyond residential. To account for this, the proposed regional water

supply system has examined alternatives that create extra water capacity, however they are not incorporated into the proposed model at this point in time.

> ***Alternative 1:*** The Radford Army Ammunition Plant (RFAAP) has a water production system that is currently offline, but has a water withdraw permit for 10 million gallons/day. With a little modernization this system could be brought online as a major water producer in the New River Valley. The regional water supply model has examined interconnecting the Pulaski System to the RFAAP, which would allow for the extra capacity at the RFAAP to be distributed into the regional water distribution system.
>
> ***Alternative 2:*** Currently the Blacksburg, Christiansburg, VPI (BCVPI) PSA has an excess capacity of 6 million gallons/day. The BCVPI water supply system has not been integrated into the proposed regional supply system. If, in the future, the BCVPI system was interconnected with the proposed regional water supply model the excess water capacity could be used region wide.

At this point the regional population and industrial demand and projection is not sufficient enough to warrant the utilization of alternatives in the proposed regional water supply system.

Population Projections

The Virginia Tech IPO, CGIT, and the NRVPDC examined population to understand the demand placed on the proposed regional water supply system both now and in the future. Population growth was examined using census data and the Virginia Employment Commission (VEC) State Demographer Projections. Since population projections are based on variable factors (birth rates, death rates, move in and move outs) four growth scenarios are presented below to illustrate potential population changes in the New River Valley over the next 25 years.

Table 6: Virginia Employment Commission: State Demographer Projections

Locality	2000	2010	2020	2030
Floyd County	13,874	15,800	17,199	18,500
Giles County	16,657	16,800	17,100	17,400
Montgomery County	83,629	90,800	97,900	105,000
Pulaski County	35,127	34,200	34,000	34,000
City of Radford	15,859	15,700	15,700	15,700
Total	**165,146**	**173,300**	**181,899**	**190,600**

Table 7: US Census 2000 Data: Projected Growth Rate 3% Every 10 Years

Locality	2000	2010	2020	2030
Floyd County	13,874	14,290	14,719	15,160
Giles County	16,657	17,157	17,671	18,202
Montgomery County	83,629	86,138	88,722	91,384
Pulaski County	35,127	36,181	37,266	38,384
City of Radford	15,859	16,335	16,825	17,330
Total	**165,146**	**170,100**	**175,203**	**180,459**

Table 8: US Census 2000 Data: Projected Growth Rate 5% Every 10 Years

Locality	2000	2010	2020	2030
Floyd County	13,874	14,568	15,296	16,061
Giles County	16,657	17,490	18,364	19,283
Montgomery County	83,629	87,810	92,201	96,811
Pulaski County	35,127	36,883	38,728	40,664
City of Radford	15,859	16,652	17,485	18,359
Total	**165,146**	**173,403**	**182,073**	**191,177**

Table 9: US Census 2000 Data: Projected Growth Rate 7.5% Every 10 Years

Locality	2000	2010	2020	2030
Floyd County	13,874	14,915	16,033	17,236
Giles County	16,657	17,906	19,249	20,693
Montgomery County	83,629	89,901	96,644	103,892
Pulaski County	35,127	37,762	40,594	43,638
City of Radford	15,859	17,048	18,327	19,702
Total	**165,146**	**177,532**	**190,847**	**205,160**

Table 10: Regional Population Analysis

Projection Method	2000	2010	2020	2030
VEC	165,146	173,300	181,899	190,600
2000 Census @ 3%	165,146	170,100	175,203	180,459
2000 Census @ 5%	165,146	173,403	182,073	191,177
2000 Census @ 7.5%	165,146	177,532	190,847	205,160

Since the demand analysis presented below only examines population growth and does not take into account changes in industrial, agricultural, and/or manufacturing water use (with the exception of the Commerce Park) the high population estimates (2000 Census Data @ 7.5%) will be utilized.

Demand Analysis

The next step in exploring the feasibility of the regional water supply system is to evaluate the demand placed on the overall system. The capacity analysis illustrated that the current water availability, once existing systems are interconnected, equals 9,460,000 gallons per day. In order for the proposed system interconnections to be feasible, sufficient demand on the system must be demonstrated. The following assumptions were made during the demand analysis:

1) The Commerce Park will utilize 1,000,000 gallons/day once it is occupied. It is expected to be occupied by 2010.

2) A baseline figure of 300,000 gallons/day will be added to the demand on the proposed system. This figure is to account for industrial, agricultural, and/or manufacturing water use (assumes 30 users in the NRV who consume more than 10,000 gallons/day).

3) Since the proposed regional water supply model does not interconnect BCVPI water system it will be assumed in the demand analysis that only 32% of the population (27,109 persons based on 2000 census) in the County are being served. This will hold constant through the population projections (i.e. in 2030 only 32% of the total population will be integrated into the analysis).

4) In Montgomery County 42% of the population in unincorporated areas (11,386 people) is connected to public water systems. For the purpose of this study it is assumed that growth will occur more frequently in areas where public services are available, and as a result by 2010 55% of the population in unincorporated areas and by 2020 75% of the population in unincorporated areas will be connected to a public water system.

5) In the City of Radford 100% of the population is connected to public water and this number is expected to stay constant into the future.

6) In Giles and Pulaski County approximately 60% of the population is connected to either the Giles County PSA or the Pulaski County PSA. It is assumed that by 2020 75% of the population will be hooked up to the public water system.

7) In Floyd County only 7% of the population is served by public water. It is assumed that with the implementation of the proposed regional water supply system 20% of the population will utilize public water by 2020 and 35% of the population will utilize public water by 2030.

The tables on the following page illustrate the projected number of people within each locality and across the region who will connect to public water, over time, based on the assumptions outlined above.

Public Water Connections Based on Population Projections By Locality

Table 11:
Virginia Employment Commission: State Demographer Projections

	Total Population 2000	Population connected to public water 2000	Total Population 2010	Population connected to public water 2010	Total Population 2020	Population connected to public water 2020	Total Population 2030	Population connected to public water 2030
Floyd County	13,874	971	15,800	1,106	17,199	3,440	18,500	6,475
Giles County	16,657	9,994	16,800	10,080	17,100	12,825	17,400	13,050
Montgomery County	83,629	11,386	90,800	15,981	97,900	23,496	105,000	25,200
Pulaski County	35,127	21,076	34,200	20,520	34,000	25,500	34,000	25,500
City of Radford	15,859	15,859	15,700	15,700	15,700	15,700	15,700	15,700
Total	**165,146**	**59,287**	**173,300**	**63,387**	**181,899**	**80,961**	**190,600**	**85,925**

Table 12:
2000 Census Data at 3% Growth Every 10 Years

	Total Population 2000	Population connected to public water 2000	Total Population 2010	Population connected to public water 2010	Total Population 2020	Population connected to public water 2020	Total Population 2030	Population connected to public water 2030
Floyd County	13,874	971	14,290	1,000	14,719	2,944	15,160	5,306
Giles County	16,657	9,994	17,157	10,294	17,671	13,254	18,202	13,651
Montgomery County	83,629	11,386	86,138	15,160	88,722	21,293	91,384	21,932
Pulaski County	35,127	21,076	36,181	21,708	37,266	27,950	38,384	28,788
City of Radford	15,859	15,859	16,335	16,335	16,825	16,825	17,330	17,330
Total	**165,146**	**59,287**	**170,100**	**64,498**	**175,203**	**82,265**	**180,459**	**87,007**

Table 13:
2000 Census Data at 5% Growth Every 10 Years

	Total Population 2000	Population connected to public water 2000	Total Population 2010	Population connected to public water 2010	Total Population 2020	Population connected to public water 2020	Total Population 2030	Population connected to public water 2030
Floyd County	13,874	971	14,568	1,020	15,296	3,059	16,061	5,621
Giles County	16,657	9,994	17,490	10,494	18,364	13,773	19,283	14,462
Montgomery County	83,629	11,386	87,810	15,455	92,201	22,128	96,811	23,235
Pulaski County	35,127	21,076	36,883	22,130	38,728	29,046	40,664	30,498
City of Radford	15,859	15,859	16,652	16,652	17,485	17,485	18,359	18,359
Total	**165,146**	**59,287**	**173,403**	**65,750**	**182,073**	**85,491**	**191,177**	**92,175**

Table 14:
2000 Census Data at 7.5% Growth Every 10 Years

	Total Population 2000	Population connected to public water 2000	Total Population 2010	Population connected to public water 2010	Total Population 2020	Population connected to public water 2020	Total Population 2030	Population connected to public water 2030
Floyd County	13,874	971	14,915	1,044	16,033	3,207	17,236	6,032
Giles County	16,657	9,994	17,906	10,744	19,249	14,437	20,693	15,520
Montgomery County	83,629	11,386	89,901	15,823	96,644	23,195	103,892	24,934
Pulaski County	35,127	21,076	37,762	22,657	40,594	30,445	43,638	32,729
City of Radford	15,859	15,859	17,048	17,048	18,327	18,327	19,702	19,702
Total	**165,146**	**59,287**	**177,532**	**67,316**	**190,847**	**89,610**	**205,160**	**98,916**

The table below summarizes the number of public water connections based on population predictions for the New River Valley.

Table 15: Projected Number of Public Water Connections Based on Population Projections

Method	2000	2010	2020	2030
VEC	59,287	63,387	80,961	85,925
2000 Census @ 3%	59,287	64,498	82,265	87,007
2000 Census @ 5%	59,287	65,750	85,491	92,175
2000 Census @ 7.5%	59,287	67,316	89,610	98,916

The next step in the demand analysis is to examine current water usage statistics. The following daily water usage statistics were collected as part of the Year 1 Water Supply Study:

Table 16: Gallons of Water Consumed/Person/Day

System*	Average Gallons/Person/Day
Floyd-Floyd County PSA	126 gpd**
Giles County PSA	115 gpd
Montgomery County PSA	73 gpd
Pulaski County PSA	99 gpd
City of Radford	80 gpd
Regional Average	99 gpd

*Numbers based on existing connections to the system as reported by system operators
**gpd=Gallons per Day

In addition to the data collected as part of the Year 1 Water Supply Plan, an article by Huston et al. (2004) published in the *USGS Circular* entitled, Estimated Use of Water in the United States in 2000, provides estimates of public water use at the state level. The following data for Virginia was obtained from the online article:

Table 17: USGS: Estimated Water Use in the United States 2000: Virginia Data

Total Population	Total Population Served by Public Water	Percent of Population Served by Public Water	Total Public Water Supply Withdrawals (gallons)	Average Gallons Per Day Per Person
7,680.000	5,310,000	75%	720,000,000	136 gpd

Source: USGS Circular. http://water.usgs.gov/pubs/circ/2004/circ1268/htdocs/table05.html

For the purpose of the remainder of the demand analysis the daily average demand (99 gpd) collected as part of the Year 1 Water Supply Study will serve as the low demand number, the estimates from the USGS article will form the high end demand analysis (138 gpd), and for the purposes of analysis 120 gpd will be utilized to calculate a mid-range analysis.

Table 18: Demand Analysis Rates

High	136 gpd
Medium	120 gpd
Low	99 gpd

The demand analysis explores how much water consumption potential exists in the New River Valley based on population projections then examines whether or not the proposed regional water supply system has the proper design specifications to meet this need. In addition, the demand analysis examines how different growth scenarios weigh against the capacity available in the proposed regional water supply system. Two of the main reasons that a demand analysis is conducted are to a) ensure that enough excess capacity is available at the regional level based on the proposed interconnections and b) ensure that the demand on the proposed system is great enough to warrant developing the proposed interconnections.

A low, medium, and high growth scenario in terms of water consumption per person was run against the projected public water connections derived from population growth estimates. Below are the results.

Table 19: Gallons of Water per Day Based on Projected Public Water Connections*

Method	Low				Medium				High			
	2000	2010	2020	2030	2000	2010	2020	2030	2000	2010	2020	2030
VEC	5,869,413	6,275,313	8,015,139	8,506,575	7,114,440	7,606,440	9,715,320	10,311,000	8,063,032	8,620,632	11,010,696	11,685,800
2000 Census @ 3%	5,869,413	6,385,302	8,144,235	8,613,693	7,114,440	7,739,760	9,871,800	10,440,840	8,063,032	8,771,728	11,188,040	11,832,952
2000 Census @ 5%	5,869,413	6,509,250	8,463,609	9,125,325	7,114,440	7,890,000	10,258,920	11,061,000	8,063,032	8,942,000	11,626,776	12,535,800
2000 Census @ 7.5%	5,869,413	6,664,284	8,871,390	9,792,684	7,114,440	8,077,920	10,753,200	11,869,920	8,063,032	9,154,976	12,186,960	13,452,576

*Numbers shown represent gallons per day. Calculations used as follows:

Low = Number of Projected Public Water Connections x 98 gallons/day

Medium = Number of Projected Public Water Connections x 120 gallons/day

High = Number of Projected Public Water Connections x 136 gallons/day

Summary

The regional water supply model proposes to interconnect the Pulaski County PSA, Pulaski Town PSA, and the City of Radford's water supply systems. The model proposes that by interconnecting these three systems and then laying distribution lines throughout the region that public water would be accessible to most of the population. In 2003 the three systems which are proposed to be interconnected had a daily production capacity of 15,350,000 gallons. Based on the demand analysis presented above, this is enough water capacity to serve the projected number of public water connections in 2030 (13,452,576 gallons/day). Furthermore there is still enough capacity within these three systems to allow for the 1,000,000 gallons/day at the Commerce Park and additional 300,000 gallons/day of industrial, manufacturing and/or agricultural use.

The total predicted demand in the New River Valley in 2030 equals 14,752,576 gallons/day. Since this number is approaching the 15,350,000 gallons/day available at the three systems that are proposed to be interconnected, the alternatives to expand the capacity of the regional water supply system presented earlier should be considered in the future.

OBJECTIVE 3: FORMATION OF A REGIONALWATER AUTHORITY

As the Year 2 Regional Water Supply Plan research progressed it became apparent that the models developed in Year 1 and Year 2, which proposed the sharing of responsibility for treatment capacity, transmission of water, and storage capacity, are a feasible project. However, in order to achieve the benefits of a regional water supply system an organizational structure must be established that allows localities to participate in a win/win environment.

Building on the recommendation from the Year 1 Water Supply Plan, a main objective of the Year 2 Water Supply Plan was to take steps toward the formation of a Regional Water Authority. This process was multifaceted during Year 2. The technical and policy committee met on a regular basis to discuss the refinement of a project area, the costs associated with constructing the proposed regional water supply models, and the benefits of regional cooperation as they relate to the formation of a regional water authority in the New River Valley.

Project Area

Discussion at many of the initial policy meetings in the beginning of Year 2 focused on defining a project area. While the Year 1 study proposed many interconnections of systems in the northern portion of the New River Valley, it was the consensus of the Policy Committee that not all of the interconnections modeled were feasible for political, cost, and access reasons. As a result of discussions at the Policy Committee meetings, it was determined that the interconnections from 1) The City of Radford to the Commerce Park (Route 100, Dublin); 2)The Commerce Park to Cloyd's Mountain; and 3) Cloyd's Mountain to Town of Pearisburg would form the initial project to be undertaken by the proposed Regional Water Authority. The three interconnections were chosen because the modeling done in Year 1 and the discussion among the group indicated that these were the most need interconnections based on water supply and demand.

As Year 2 progressed the Policy Committee relied on the expertise of the "staff" (NRVPDC, IPO, CGIT) to determine a geographical project scope for the area south of I-81. The staff based its recommendations on population predictions and existing services in the area south of I-81. The main project has been discussed in previous sections. The policy committee agrees that the model presented in the earlier sections is the ideal project. However, as the staff and policy committee began to look at project costs it was determined that it would be beneficial

to re-evaluate the project scope south of I-81 and look for potential cost saving alternatives. The maps pictured below demonstrate the alternatives developed by the staff and presented to the Policy Committee. To date the Policy Committee is still in discussions over which project to implement south of I-81.

Figure 9: South of I-81 Construction Scenarios

Source: CGIT at Virginia Tech

Cost Analysis

Another issue that the Technical and Policy Committee began to look at in Year 2 was costs. This was an essential task because as discussions regarding the formation of a Regional Water Authority arose one of the most frequently asked questions at meetings was "How much will this cost?" In response to that question, staff worked in conjunction with localities to develop a cost estimate for the proposed project. Cost elements include cost of production, construction of distribution lines, and acquisition of existing treatment plants.

The affordability of the proposed regional supply system is dependent upon the volume of water being supplied and the demand placed on the system. Earlier sections demonstrated that there is currently sufficient water capacity and that future growth will create sufficient water demand to make the implementation of a regional water supply system feasible. The key principle, economies of scale, influences the feasibility of the proposed regional water supply system. To begin addressing economies of scale the cost analysis first examines the current cost of production at each system affected by the proposed regional supply system and the current volumes of water produced at each system.

Table 20: Current Water Rates

	Cost per 1,000 gallons	Daily Volume	Daily Cost [(Daily Volume/1000)* Cost per 1,000 gal.)]
Floyd	$3.05	113,886	$347.35
Giles	$2.00	1,049,917	$2,099.83
Montgomery	$4.78	809,174	$3,867.85
Pulaski	$1.62	2,076,968	$3,364.69
Pulaski Town	$1.97	1,813,560	$3,572.71
Radford	$1.25	2,000,000	$2,500.00
Total	**$14.67**	**$7,863,505.00**	**$15,752.44**

Average Cost per 1,000/gallons = $2.45

Table 21: Current Water Volumes

	Daily Volume	Annual Volume	Annual Volume (In 1,000s of gallons)
Giles	1,049,917	383,219,705	383,219.7
Montgomery	350,000	127,750,000	127,750.0
Pulaski	2,076,968	758,093,320	758,093.3
Pulaski Town	1,813,560	661,949,400	661,949.4
Radford	2,000,000	730,000,000	730,000.0
Phase II	0	0.0	0.0
Total	**7,290,445**	**2,661,012,425**	**2,661,012**

Data revealed that on average it costs $2.45 to produce 1,000 gallons of water among the systems that may be interconnected. In addition, the average daily volume among these systems equals 7,290,445 gallons. The two key points gleaned from these facts are:

1) Water in the proposed regional water supply system must be able to be produced for less than $2.00 per 1,000 gallons

2) Based on a capacity of approximately 15,000,000 gallons/day (interconnecting Pulaski County, Pulaski Town, and City of Radford systems) there is sufficient water to meet the needs of the current and future populations.

Next, the cost analysis examined the acquisition of water treatment plants and construction of storage tanks and distribution lines (interconnections). For the distribution line cost several calculations are presented. For the purpose of the analysis the staff has chosen to use $90 per foot of pipe with 30% soft costs. In addition, since the Policy Committee has not selected an official project for the area south of I-81 several cost scenarios are presented. The acquisition costs, storage tank costs, and distribution line cost establish the total projected construction costs.

Table 22: Acquisition of Water Treatment Plants

Location	Cost
Pulaski County	$4,500,000.00
City of Radford	$12,000,000.00
Town of Pulaski	$1,500,000.00
Total	**$18,000,000.00**

Table 23: Construction of Storage

	Location	Size (in Gallons)	Cost	Soft Costs @ 30%	Total Cost
North I-81	Cloyds Mtn.	1,500,000	$900,000	270,000	$1,170,000
	Tank 2	1,500,000	$900,000	270,000	$1,170,000
	Sub-Total North I-81	3,000,000	$1,800,000	540,000	$2,340,000
South I-81	Check (Daniels/610)	500,000	$600,000	180,000	$780,000
	Riner (Rt. 8)	500,000	$600,000	180,000	$780,000
	Radford (Rt. 177)	1,000,000	$1,200,000	360,000	$1,560,000
	Pulaski Graysontown Rd)	500,000	$600,000	180,000	$780,000
	Sub-Total South I-81	2,500,000	$3,000,000	900,000	$3,900,000
	Total	**5,500,000**	**$4,800,000**	**1,440,000**	**6,240,000**

Proposed Interconnections

Table 24:
Proposed Interconnection Cost
South of I-81 Scenario 1

	Interconnection	Length	Cost @ $65 per foot	Cost at $90 per foot	Cost @ $103 per foot	Soft Costs @ 30% $65 per foot	Soft Costs @ 30% $90 per foot	Soft Costs @30% $103 per foot	Total Cost @ $65 per foot	Total Cost @ $90 per foot	Total Cost @ $103 per foot
North I-81	Cloyd Mtn - P'burg	19,000	$1,235,000	$1,710,000	$1,957,000	$370,500	$513,000	$587,100	$1,605,500	$2,223,000	$2,544,100
	Radford - Commerce Pk.	37,100	$2,411,500	$3,339,000	$3,821,300	$723,450	$1,001,700	$1,146,390	$3,134,950	$4,340,700	$4,967,690
	Commerce Pk - Cloyd Mtn	26,800	$1,729,000	$2,394,000	$2,739,800	$518,700	$718,200	$821,940	$2,247,700	$3,112,200	$3,561,740
									$0	$0	$0
	Sub-Total North I-81	**82,700**	**$5,375,500.00**	**$7,443,000.00**	**$8,518,100.00**	**$1,612,650.00**	**$2,232,900.00**	**$2,555,430.00**	**$6,988,150.00**	**$9,675,900.00**	**$11,073,530.00**
South I-81 Scenario 1	Southern Pulaski - Town of Floyd	47,298	$3,074,370	$4,256,820	$4,871,694	$922,311	$1,277,046	$1,461,508	$3,996,681	$5,533,866	$6,333,202
	Riner - Check	35,166	$2,285,790	$3,164,940	$3,622,098	$685,737	$949,482	$1,086,629	$2,971,527	$4,114,422	$4,708,727
	Riner - Indian Valley & Town of Floyd -Check	44,620	$2,900,300	$4,015,800	$4,595,860	$870,090	$1,204,740	$1,378,758	$3,770,390	$5,220,540	$5,974,618
	Town of Floyd - Willis	14,422	$937,430	$1,297,980	$1,485,486	$281,229	$389,394	$445,640	$1,218,659	$1,687,374	$1,931,106
	Sub-Total South I-81	**141,506**	**$9,197,890**	**$12,735,540**	**$14,575,118**	**$2,759,367**	**$3,820,662**	**$4,372,535**	**$11,957,257**	**$16,556,202**	**$18,947,653**
	Total North & South I-81	**224,206**	**14,573,390**	**20,178,540**	**23,093,218**	**4,372,017**	**6,053,562**	**6,927,965**	**18,945,407**	**26,232,102**	**30,021,183**

Proposed Interconnections

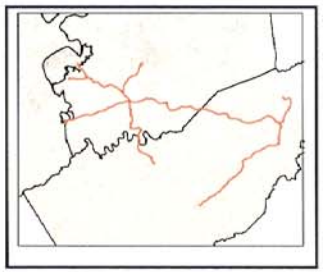


Table 25:
Proposed Interconnection Cost
South of I-81 Scenario 2

	Interconnection	Length	Cost @ $65 per foot	Cost at $90 per foot	Cost @ $103 per foot	Soft Costs @ 30% $65 per foot	Soft Costs @ 30% $90 per foot	Soft Costs @30% $103 per foot	Total Cost @ $65 per foot	Total Cost @ $90 per foot	Total Cost @ $103 per foot
North I-81	Cloyd Mtn - P'burg	19,000	$1,235,000	$1,710,000	$1,957,000	$370,500	$513,000	$587,100	$1,605,500	$2,223,000	$2,544,100
	Radford - Commerce Pk.	37,100	$2,411,500	$3,339,000	$3,821,300	$723,450	$1,001,700	$1,146,390	$3,134,950	$4,340,700	$4,967,690
	Commerce Pk - Cloyd Mtn	26,600	$1,729,000	$2,394,000	$2,739,800	$518,700	$718,200	$821,940	$2,247,700	$3,112,200	$3,561,740
									$0	$0	$0
	Sub-Total North I-81	**82,700**	**$5,375,500.00**	**$7,443,000.00**	**$8,518,100.00**	**$1,612,650.00**	**$2,232,900.00**	**$2,555,430.00**	**$6,988,150.00**	**$9,675,900.00**	**$11,073,530.00**
South I-81 Scenario 2	Southern Pulaski - Town of Floyd	35,760	$2,324,400	$3,218,400	$3,683,280	$697,320	$965,520	$1,104,984	$3,021,720	$4,183,920	$4,788,264
	Riner - Check	35,166	$2,285,790	$3,164,940	$3,622,098	$685,737	$949,482	$1,086,629	$2,971,527	$4,114,422	$4,708,727
	Riner - Indian Valley & Town of Floyd -Check	32,851	$2,135,315	$2,956,590	$3,383,653	$640,595	$886,977	$1,015,096	$2,775,910	$3,843,567	$4,398,749
	Town of Floyd - Willis	0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	Sub-Total South I-81	**103,777**	**$6,745,505**	**$9,339,930**	**$10,689,031**	**$2,023,652**	**$2,801,979**	**$3,206,709**	**$8,769,157**	**$12,141,909**	**$13,895,740**
	Total North & South I-81	**186,477**	**$12,121,005**	**$16,782,930**	**$19,207,131**	**$3,636,302**	**$5,034,879**	**$5,762,139**	**$15,757,307**	**$21,817,809**	**$24,969,270**

Table 26:
Proposed Interconnection Cost
South of I-81 Scenario 3

	Interconnection	Length	Cost @ $65 per foot	Cost at $90 per foot	Cost @ $103 per foot	Soft Costs @ 30% $65 per foot	Soft Costs @ 30% $90 per foot	Soft Costs @30% $103 per foot	Total Cost @ $65 per foot	Total Cost @ $90 per foot	Total Cost @ $103 per foot
North I-81	Cloyd Mtn - P'burg	19,000	$1,235,000	$1,710,000	$1,957,000	$370,500	$513,000	$587,100	$1,605,500	$2,223,000	$2,544,100
	Radford - Commerce Pk.	37,100	$2,411,500	$3,339,000	$3,821,300	$723,450	$1,001,700	$1,146,390	$3,134,950	$4,340,700	$4,967,690
	Commerce Pk - Cloyd Mtn	26,600	$1,729,000	$2,394,000	$2,739,800	$518,700	$718,200	$821,940	$2,247,700	$3,112,200	$3,561,740
									$0	$0	$0
	Sub-Total North I-81	**82,700**	**$5,375,500.00**	**$7,443,000.00**	**$8,518,100.00**	**$1,612,650.00**	**$2,232,900.00**	**$2,555,430.00**	**$6,988,150.00**	**$9,675,900.00**	**$11,073,530.00**
South I-81	Southern Pulaski - Town of Floyd	47,298	$3,074,370	$4,256,820	$4,871,694	$922,311	$1,277,046	$1,461,508	$3,996,681	$5,533,866	$6,333,202
	Riner - Check	35,166	$2,285,790	$3,164,940	$3,622,098	$685,737	$949,482	$1,086,629	$2,971,527	$4,114,422	$4,708,727
Scenario 3	Riner - Indian Valley & Town of Floyd -Check	32,851	$2,135,315	$2,956,590	$3,383,653	$640,595	$886,977	$1,015,096	$2,775,910	$3,843,567	$4,398,749
	Town of Floyd - Willis	0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	Sub-Total South I-81	**115,315**	**$7,495,475**	**$10,378,350**	**$11,877,445**	**$2,248,643**	**$3,113,505**	**$3,563,234**	**$9,744,118**	**$13,491,855**	**$15,440,679**
	Total North & South I-81	**198,015**	**$12,870,975**	**$17,821,350**	**$20,395,545**	**$3,861,293**	**$5,346,405**	**$6,118,664**	**$16,732,268**	**$23,167,755**	**$26,514,209**

Table 27: Total Construction Costs

Construction (North I-81)			
	Cost	**Cost**	**Cost**
Plant Acquisition	$18,000,000.00	$18,000,000.00	$18,000,000.00
Storage Tanks	$2,340,000.00	$2,340,000.00	$2,340,000.00
Interconncetions @ $90/foot	$9,675,900.00	$9,675,900.00	$9,675,900.00
Sub-Total	**$30,015,900.00**	**$30,015,900.00**	**$30,015,900.00**
Construction (South I-81)	**Scenario 1 Cost**	**Scenario 2 Cost**	**Scenario 3 Cost**
Plant Acquisition	$0.00	$0.00	$0.00
Storage Tanks	$3,900,000.00	$3,900,000.00	$3,900,000.00
Interconncetions @ $90/foot	$16,556,202.00	$12,141,909.00	$13,491,855.00
Sub-Total	**$20,456,202.00**	**$16,041,909.00**	**$17,391,855.00**
Total	**$50,472,102.00**	**$46,057,809.00**	**$47,407,755.00**

Construction for the total project ranges from $47.4 million to $50.4 million, depending on which cost scenario is implemented south of I-81. Next, the staff translated the total project cost (infrastructure/debt service $47.4 million to $50.4 million) and projected operating expenses (O&M) into costs per production of 1,000 gallons of water.

Operating Expenses were calculated based on volume estimates. Using current water volume numbers, the projected operating and maintenance cost per 1,000 gallons of water equals $1.00.

Annual Operating Costs Calculation

O&M = [Projected Annual Volume of Water (In 1000's of Gallons) x $.80] + $.20

In this cost analysis the cost of O&M per 1,000 gallons of water is held constant at $1.00.

Infrastructure and debt service was calculated based on a 40 year loan with an annual interest rate of 4.75%. The annual payment varied with project cost. The infrastructure debt service portion of the cost to produce 1,000 gallons of water will decrease as daily demand increases. This is based on the principle that as demand on the water supply system increases the volume of water produced will increase, and as a result the share of debt service per 1,000 gallons of water is reduced.

For example, if the regional water supply system was implemented according to Scenario 1 (all of Floyd County; project cost $50,472,102) the current annual repayment on a 40 year loan equals $2,820,933.36. At the current daily volume used in portions of Floyd, Giles, Pulaski, and the City of Radford (see Table 21) it costs $1.06 per 1,000 gallons. Therefore, on the assumption of holding O&M constant at $1.00 per 1,000 gallons, the total cost to produce 1,000 gallons of water (O&M + Infrastructure/Debt Service) equals $2.06 per 1,000 gallons of water.

Now modify the example to create extra demand as a result of a water supply system in Floyd County. Again, using Scenario 1, demand projections indicate that potentially 6,032 persons would utilize public water in 2030. Since there are currently 971 people being served by the Floyd-Floyd County PSA, the total population being served by new connections in 2030 equals 5,061. At the medium consumption rate of 120gpd, this would create an additional daily demand on the proposed regional water supply system of 607,302 gallons/day. The debt service on 1,000 gallons of water decreases to $.98, and the total cost to produce 1,000 gallons of water decreases to $1.98.

As discussed earlier in the demand assumptions, it is expected that the Commerce Park will be occupied in the near future and will potentially require a significant amount of water on a daily basis. Based on this assumption, projected demand in Floyd, and the projected growth across the region, the staff assumed an additional daily demand of 1,000,000 gallons. This lowers the infrastructure/debt service cost to $.93 and the total construction cost to $1.93.

Cost to produce 1,000 gallons of water was run for each of the project scenarios. Additional cost analyses were run based on each scenario receiving a $20 million grant from Rural Development. The results of these analyses are presented on the following page.

Current Rate Calculations

	Cost per 1,000 gallons	Daily Volume	Daily Cost [(Daily Volume/1000)* Cost per 1,000 gal.)]
Floyd	$3.05	113,886	$347.35
Giles	$2.00	1,049,917	$2,099.83
Montgomery	$4.78	809,174	$3,867.85
Pulaski	$1.62	2,076,968	$3,364.69
Pulaski Town	$1.97	1,813,560	$3,572.71
Radford	$1.25	2,000,000	$2,500.00
Total	**$14.67**	**$7,863,505.00**	**$15,752.44**
Average Cost per 1,000/gallons	$2.45		

Regional Cooperation

The final section of Objective 3 examines the organizational structure that is needed to implement a regional water supply system. The staff has recommended to the Policy Committee that a regional water authority should be created to oversee the treatment of water, transmission of water, and storage of water related to a regional water supply system. To assist in the effort the staff have developed and revised, with input from the Policy Committee, draft Articles of Incorporation and a draft user agreement. These documents can be found in Appendices 2 and 3. In the documents that support the formation of a Regional Water Authority, the following assumptions were followed.

- The organization needs to be an authority to allow all of the participants an equal voice in decision making.
- The authority must own all of the treatment capacity, transmission facilities, and system storage tanks in order that the costs of water are provided to each member at a uniform rate.
- Authority must have commitments from each of the members to purchase water.
- Authority size must be kept at a minimum.
- Cost of water must be equally charged.

At the most recent Policy Committee meeting it was determined that a critical next step in this project is to determine who has an interest in potentially forming a Regional Water Authority. To assist in that effort staff will be meeting with Public Service Authorities (PSA) and the localities' governing boards to discuss this project and the next steps. It is the hope of the Policy Committee and Staff that by February all of the governing boards and PSA's will have provided valuable feedback regarding how the project should move forward from the local perspective.

NEXT STEPS

As the Year 2 study wraps up the Policy Committee and Staff are poised to continue work into the third year of the regional water supply study. Toward that end, the two groups have brainstormed the next steps that this project will address in its third year.

1) Formalize who will continue to participate in the regional water supply plan steering committee

   This committee will be charged with identifying what regional water supply system project is feasible based on costs, politics, and interest.

2) Evaluate elements of initial construction of the regional water supply system.

   Efforts have begun by Virginia's First (a regional economic development authority) to examine the engineering feasibility associated with connecting the City of Radford to the Commerce Park. The preliminary engineering report is expected to be completed in the next few months. These plans will support the feasibility of the interconnection from the City of Radford to the Commerce Park as described in the north of I-81 model.

3) Engineering review for project area north and south of I-81.
   Funding for this task has been awarded to the New River Valley Development Corporation from Rural Development. Once the presentations have been made to the PSA's and governing boards (by February) and a steering committee has been established they will be charged with working with an engineering firm to affirm the feasibility of the proposed regional water supply system. It is important to note that the system as proposed in this document may change based on the input received throughout the region.

4) Consideration of Virginia's New River Valley Water Supply Authority
   a. Toward the end of Year 3 it is the hope of the Staff and the Policy Committee that the Steering Committee is one step closer to becoming a formalized regional water authority.

5) Seek funding for regional water supply system
   a. Once a project has been affirmed by engineers it is the hope that there is the will in the Region to seek funding for the implementation of the project.

APPENDIX 1:

SUMMARY OF INDIVIDUAL WATER SUPPLY SYSTEMS

A. Floyd-Floyd County Public Service Authority

The Floyd-Floyd County PSA serves the Town of Floyd and some surrounding county residents and businesses, totaling 900 water system users. The PSA collects its' water via five wells with a total system capacity of 164,000 Gallons Per Day (gpd). Eighty percent capacity for this system is 131,200 gpd. Currently this system is operating at 69% capacity (113,719 gpd), not including extensions made in 2003. The Virginia Department of Health requires water service providers to make capacity upgrades when production reaches 80%, which means this PSA is nearing an expansion requirement.

B. Giles County Public Service Authority

The Giles County PSA serves Pearisburg, Pembroke, Narrows, Rich Creek, Glen Lyn and some surrounding unincorporated areas, totaling 8,760 water system users. The PSA's water source is a system of wells with a capacity of 2.0 Million Gallons Per Day (MGD). Eighty percent capacity for this system is 1.6 MGD. Currently the system is operating at just over 50% capacity (1.01 MGD). A total of 348 connections are planned off of three extensions, Eggleston Community, Route 100 South, and Shute Hollow. According to historical data, 80% system capacity could be reached in the year 2016, however, this projection is based on typical development patterns and does not consider a supply needed for potential industrial users.

Further, the Giles County PSA has a significant problem with water loss. The Town of Pearisburg is estimated to experience 50% water loss, while Rich Creek and Glen Lyn lose around 30%, and Narrows loses 27%. According to the Virginia Department of Health, the Environmental Protection Agency will require them to regulate water loses greater than 30% on a given system. This could be significant for Pearisburg, Rich Creek, Glen Lyn, and possibly Narrows.

C. Montgomery County Public Service Authority

The Montgomery County PSA serves the unincorporated areas within the county, totaling 11,300 water system users. The PSA operates 10 unconnected systems, 4 of which are wells and are susceptible to contamination due to specific land use activities. The PSA has a 2.41 MGD capacity when combining all 10 systems and it is providing 825,000 gpd, which means the

overall system is operating at 34% capacity. However, each system has its own capacity and expansion decisions must be made accordingly. For instance, the system serving Rhiner is operating at 71% capacity and the PSA should consider the expansion needs for this area in the near future. Due to the disconnect between the individual systems and their locations, the PSA must purchase water from the City of Radford, Town of Blacksburg, Town of Christiansburg, and the Radford Army Ammunition Plant to serve portions of their users.

Another issue confronting the Montgomery PSA is population growth. The Montgomery County Comprehensive Plan projects 3,000 to 4,200 new homes will be built in the County by the year 2025. Depending on where the new growth locates (municipal fringes and along route 177), the individual system providing service to these areas should be reviewed.

D. Pulaski County Public Service Authority

The Pulaski County PSA serves the county residents and wholesales water to the Town of Dublin, totaling 21,027 water system users. Claytor Lake serves as the water source for the PSA and has ability to produce 3.35 MGD while the average production is 2.08 MGD, roughly 62% capacity. The PSA also purchases 350,000 gpd from Radford Army Ammunition Plant (RFAAP). Between two development projects, Pulaski County is anticipating upwards of 800 new water users before the year 2010. Also, the New River Valley Commerce Park is expanding and could require 500,000 gpd. This project has the potential to further increase the County population.

Water system expansion for Pulaski County PSA must be made when the system reaches 2.68 MGD. The historical trends indicate this capacity will not be reached until 2015. However, recent land development patterns indicate a significant amount of growth for this county compared to previous years; therefore expansion should be considered much earlier.

E. Town of Pulaski Public Service Authority

The Town of Pulaski PSA serves the town residents and some county residents close to town limits, totaling 11,330 water system users. Peak Creek along with Gatewood and Hogan reservoirs serve as the water source for the PSA with a maximum capacity of 4.0 MGD. The average production is 1.81 MGD, 45 % capacity. The demand for water in this PSA declined following the closing of traditional manufacturing facilities. The Town of Pulaski's water

treatment plant is connected to the County PSA treatment facility and can be operated as such under emergency circumstances. Expansion for this PSA is not likely until after 2030 when the average production rate should reach 2.25 MGD.

F. City of Radford Public Service Authority

The City of Radford PSA serves the City residents (16,400), businesses and sells water to the Montgomery PSA. The New River is the water source for the PSA with the capacity to produce 8 MGD while they are currently producing 2.2 MGD, 27% capacity. The City of Radford lost a major industrial water consumer when Intermet-Lynchburg Foundry closed in 2003. However, the future development indicates high water demand. The City's Comprehensive Plan anticipates 500 new residential units by 2010. Further, the Commerce Park is expected to consume 1.9 MGD in Phase 1 of their development, and Phase 2 calls for an additional 1.5 MGD. Lastly, the future housing demand along Route 177 in Montgomery County may require the Montgomery County PSA to purchase more water from the City of Radford PSA. Based on future development plans, demand could increase 3.8 MGD, totaling 6.0 MGD and therefore would still have surplus capacity. Water treatment expansion is required when 6.4 MGD of production is reached.

G. Blacksburg/Christiansburg/VPI Water Authority (BCVPI)

The BCVPI Water Authority serves the Town of Blacksburg, Town of Christiansburg, and the campus of Virginia Tech. Blacksburg serves a population of 26,200 while Christiansburg serves 17,500. BCVPI Water Authority uses the New River as its water source and has the capacity to treat 12 MGD. During 2003, Blacksburg purchased 3.7 MGD, Christiansburg purchased 1.17 MGD, and Virginia Tech purchased 2.44 MGD, totaling 7.31 MGD of production, 60% capacity. Future expansion of the BCVPI Water Treatment Plant is not anticipated before 2030.

H. Radford Army Ammunition Plant (RFAAP)

The RFAAP supplies water internally to Alliant Tech Systems and provides water to Montgomery and Pulaski Counties. The New River serves as the water source with a system capacity to treat 82 MGD. Currently 1.4-1.7 MGD is being consumed on site and .26 MGD is

being sold to Montgomery County PSA. This system has the potential to serve a tremendous amount of users, particularly those in the projected growth areas of Prices Fork, Brush Mountain/Preston Forest, Mt. Zion/Brooksfield Rd, Walton Rd and possibly altering the source for the Plum Creek service area (Montgomery County PSA) are all likely future scenarios for the abundant water capacity.

APPENDIX 2:

DRAFT ARTICLES OF INCORPORATION

ARTICLES OF INCORPORATION OF THE NEW RIVER VALLEY REGIONAL WATER SUPPLY AUTHORITY

The Board of Supervisors, City Council and Town Councils of the following jurisdictions have by concurrent resolution adopted the following Articles of Incorporation of the New River Valley Regional Water Supply Authority, pursuant to the Virginia Water and Waste Authorities Act (Chapter 51, Title 15.2 of the 1950 Code of Virginia, as amended) ("Act").

ARTICLE I

Name and Address

The name of the Authority shall be the New River Valley Regional Water Supply Authority and the address of its principal office is 6580 Valley Center Drive; Radford, Virginia 24141. The location of the principal office may be changed by the concurrence of three-fourths of the AUTHORITY members present at the regular meeting, provided that the clerk of the governing body of each member governmental subdivision has been notified of the contemplated relocation in writing at least thirty days before such meeting.

ARTICLE II

Creating Jurisdictions

The names of the incorporating political subdivisions are County of Pulaski, City of Radford, Town of Pulaski, County of Montgomery, and Giles County Public Service Authority. The incorporating political subdivisions, hereby acknowledge, covenant, and agree that these Articles of Incorporation shall not be further amended or changed without the express approval by ordinance of each of the governing bodies of each of the incorporating political subdivisions.

None of the following actions shall be taken or permitted to occur by the Board of the Authority without the affirmative vote of a majority of the members from each incorporating political subdivision of the Board of the Authority:

(1). The inclusion of additional political subdivisions outside of the New River Valley Planning District on the Authority;

(2). Additional agreement with other political subdivisions, entities, or persons, for the bulk sale of surplus water;

ARTICLE III

Members and Terms of Office

The Board of the Authority shall consist of one representative of each of the participating jurisdictions. The term of office of New River Valley Water Supply Authority ("Authority") representatives shall be for four years. Members may serve additional terms as appointed by their governing body. Each member shall also have an alternate who will be given the power to vote on Authority matters in the absence of the member.

The terms of office of each of the initial members shall begin on the date of issuance of a certificate of incorporation by the State Corporation Commission. If the Authority should authorize a political subdivision to withdraw its membership from the Authority, the term of any board member appointed to the Authority from such political subdivision shall be terminated immediately.

Vacancies on the Board shall be filled for the unexpired term in the same manner as the original appointment was made.

Each member of the Board shall have one equal vote in all matters before the Authority.

The names, addresses, and terms of office of the initial members of the Board of the New River Valley Regional Water Supply Authority ("Authority") are as follows:

(INSERT NAMES)

ARTICLE IV

Purpose

The purposes for which the Authority is to be formed are to exercise all the powers granted to the Authority by law in order to acquire, finance, construct, operate, manage and maintain

a water supply system(s) and related facilities pursuant to the Virginia Water and Waste Authorities Act, Chapter 51, Title 15.2 of the 1950 Code of Virginia, as amended ("Act"). The Authority shall have all of the rights, powers, and duties of an authority under the Act.

The initial purpose of the Authority is to serve as a broker of water supplies among the participants in the Authority. As a part of this purpose, the Authority will utilize the *New River Valley Regional Water Supply Plan* developed by the New River Valley Planning District Commission in order to evaluate the requirements of interconnecting water supplies. In addition, the Authority will continue the evaluation of the economies of accepting responsibility for the ownership and operation of the various water supply systems.

It is not practicable to set forth herein information regarding preliminary estimates of capital costs, proposals for specific projects to be undertaken, or initial rates for the proposed projects.

ARTICLE V

Authority Service Area

The Authority shall serve the City of Radford, Giles County, Montgomery County, Pulaski County, and the Town of Pulaski, and to the extent permitted by the Act and by the terms of these Articles and the New River Valley Regional Water Supply Authority Member's Participation Agreement, such other pubic or private entities as the Authority may determine upon the terms and conditions established pursuant to such contracts,

ARTICLE VI

Financial Audits

The Authority shall cause an annual audit of its books and records to be made by the State Auditor of Public Accounts or by an independent certified public accountant at the end of each fiscal year and a certified copy thereof to be filed promptly with the governing body of each of the incorporating political subdivisions.

IN WITNESS THEREOF, the participating political subdivisions have caused this document to be executed by their duly authorized officials.

GILES COUNTY PUBLIC SERVICE AUTHORITY

By_____

COUNTY OF MONTGOMERY

By_____

COUNTY OF PULASKI

By_____

CITY OF RADFORD

By_____

TOWN OF PULASKI

By_____

APPENDIX 3:

DRAFT USER AGREEMENT

Virginia's New River Valley Regional Water Supply Authority and NRV Localities WATER SUPPLY AGREEMENT

THIS OPERATING AGREEMENT, dated _____, 200_ (the "Agreement"), is made among the CITY OF RADFORD, VIRGINIA, a political subdivision of the Commonwealth of Virginia (hereinafter known as "Radford"), the COUNTY OF MONTGOMERY, VIRGINIA, a political subdivision of the Commonwealth of Virginia (hereinafter known as "Montgomery Co."), the COUNTY OF PULASKI, VIRGINIA, a political subdivision of the Commonwealth of Virginia (hereinafter known as "Pulaski Co."), the GILES County PUBLIC SERVICE AUTHORITY, a public body politic and corporate of the Commonwealth of Virginia (hereinafter known as "Giles PSA"), and the TOWN OF PULASKI, VIRGINIA, a political subdivision of the Commonwealth of Virginia (hereinafter known as "Pulaski Town"), and others,

WITNESSETH:

WHEREAS, a recent drought and the need to ensure long-term supply of water in the New River Valley has focused the need for a regional approach to the provision of water supply services;

WHEREAS, after extensive discussions, representatives of Radford, Montgomery Co., Pulaski Co., Giles PSA, and Pulaski Town have concluded ….

WHEREAS, the Virginia Water and Waste Authorities Act, Title 15.2, Chapter 51, §§15.2-5100, et seq., Code of Virginia (the "Act"), provides full authority for Radford, Montgomery Co., Pulaski Co., Giles PSA, and Pulaski Town to create an independent authority that would be responsible for the supply and treatment of water;

WHEREAS, Radford, Montgomery Co., Pulaski Co., Giles PSA, and Pulaski Town have created the ***Virginia's*** **New River Valley Regional Water Supply Authority** (the "Authority"), guided by the following principles:

1. The Authority shall be the principle supplier of domestic water.
2. In establishing and operating the Authority:
    a. All parties would have equal representation on the Authority's governing body.
    b. All parties shall be charged equal rates for the purchase of water.

WHEREAS, in incorporating the Authority, Radford, Montgomery Co., Pulaski Co., Giles PSA, and Pulaski Town agreed that the purposes for which the authority was created are to exercise all powers granted the Authority to acquire, finance, construct, operate, manage and maintain a fully integrated water supply system pursuant to the Act;

WHEREAS, Radford, Montgomery Co., Pulaski Co., Giles PSA, and Pulaski Town have agreed the initial principle office of the authority will be at 6580 Valley Center Drive, Radford, Virginia 24141;

WHEREAS, Localities have agreed on a Phase I Water Supply System, to include treatment, transmission and supply storage (the "System");

WHEREAS, the Authority agrees to provide the System and to operate the System for the benefit of the Localities and their distribution agencies in providing domestic water to citizens, businesses and other users in Radford, Montgomery Co., Pulaski Co., Giles PSA, and Pulaski Town and elsewhere;

WHEREAS, Radford, Montgomery Co., Pulaski Co., Giles PSA, and Pulaski Town collectively agree that at anytime, the membership of the Authority can be increased by unanimous vote of creating jurisdictions;

WHEREAS, Radford, Montgomery Co., Pulaski Co., Giles PSA, and Pulaski Town collectively agree that at anytime, additional phases may be added to the System by majority vote of representatives of the members.

NOW THEREFORE, in consideration of the foregoing and the representations, warranties, and agreements contained herein, Radford, Montgomery Co., Pulaski Co., Giles PSA, and Pulaski Town collectively agree as follows:

ARTICLE I
DEFINITIONS

Section 1.1 Definitions

The following words and terms have the following meanings unless the context otherwise requires:

" *ADD IN ANY ADDITIONAL ITEMS THAT NEED TO BE DEFINED* "

ARTICLE II
PHASE I –SYSTEM ESTABLISHMENT

Section 2.1 Establishment of System

(a) *Water transmission lines – from Radford to Cloyd's Mountain*

(b) *Water Treatment Capacity – (Radford, Pulaski Co. and negotiations with Giles PSA*)

(c) *Supply Storage – 3 million storage on Cloyd's Mountain*

Section 2.2 Assumed Liabilities

Section 2.3 Locality Compensation

Section 2.4 Additional (Future) Phases

By agreement of all Localities, the expansion of the service area may include areas south of Interstate 81 and any other areas, as may be desirable.

ARTICLE III
REPRESENTATIONS AND WARRENTIES OF THE LOCALITIES

The Localities represent and warrant to the Authority the following as of the date of this Agreement except as otherwise provided:

Section 3.1 Authority Relative to this Agreement

Section 3.2 Non-Contravention

Section 3.3 No Litigation

There are no actions, suits, claims, investigations or proceedings (legal, administrative, or arbitrative) pending, or to the best of Localities' knowledge threatened, whether at law or in equity and whether civil or criminal in nature, before any court, arbitrator, or any governmental department, commission, agency or instrumentality which would have a

material adverse affect upon (i) any license, grant, assignment, franchise, right-of-way, easement, or right reasonably necessary for the ownership and operation of the System; or (ii) the ability of each locality to perform its obligations under this Agreement. Furthermore, there are no existing judgments, orders or decrees of any such court, arbitrator, governmental department, commission, agency or other instrumentality which have or would have a material adverse effect as described in the previous sentence.

Section 3.4 Consents and Approvals

Other than as contemplated herein, no notice, consent, approval, waiver or other action of any kind is required to be obtained by the Localities by virtue of the execution hereof by the Localities or in connection with the consummation of any of the transactions contemplated herein.

Section 3.5 Licenses and Permits: Compliance with Laws

The Localities have obtained and hold all licenses, certificates, permits, franchises, approvals and rights from appropriate federal, state or other public authorities required to own and operate the System and to conduct its business as such business is now being conducted and for the services it provides. The Localities agree to cooperate with the Authority in transferring all permits necessary for the operation of the System to the Authority.

Section 3.6 Personal Property(?)

(a) Motor vehicles (water plant vehicles,…)

(b) Equipment (office furniture, Back-hoes, etc…)

Section 3.7 Title to Real Property

I. The Localities will, as part of the sale of the System to the Authority, convey the parcels of Real Property described in Exhibits ___ (*from section 2.1*). The Localities will convey this property by Special Warranty Deed, subject to any and all encumbrances and easements of record.

II. The Localities will, as a part of the sale of the System to the Authority, assign to the Authority their rights to use all water easements of record in connection to the System.

III. (*ADD ANY ADDITIONAL NECESSARY RIGHTS RESERVED BY ANY OR ALL OF THE LOCALITIES*)

Section 3.8 No Violations of Law

To the best of the Localities' knowledge, their participation in this Agreement does not cause a violation of any federal, state or local law, statute, rule, regulation or ordinance related to or in any way connected with matters contained in this Agreement.

Section 3.9 All Assets

The Localities represent and warrant that they are conveying to the Authority all of the assets of the System owned by the Localities which are currently used for the operation and maintenance of the System, except as otherwise specifically agreed to by all parties.

Section 3.10 Past Water Agreements

(*Describe the agreements currently in place, Pulaski/Radford, Radford/Mont. Co, etc*)

(*Terminate as of* _____)

(Authority will accept existing water supply agreements with non-member suppliers on an individual basis)

ARTICLE IV

REPRESENTATIONS AND WARRANTIES OF THE AUTHORITY

The Authority represents and warrants to the Localities the following as of the date of this Agreement, except as otherwise provided:

Section 4.1 Authority Relative to this Agreement

The Authority has the power and authority to execute and deliver this Agreement, to carry out its duties and obligations under this Agreement and to consummate the transactions contemplated hereby. The execution and delivery of this Agreement by the Authority and the consummation by the Authority of the transactions contemplated hereby have been duly authorized by the Authority's governing body. No other proceedings on the part of the Authority are necessary to authorize this Agreement and the transactions contemplated herein.