TABLE OF CONTENTS

TABLES

9.0 WATER SOURCE ALTERNATIVES EVALUATION

9.1 Introduction

Overall the WPPDC region is considered to be a water rich region. As discussed in the Statement of Need (Section 8.0), the WPPDC region is projected to experience a water supply surplus of approximately 15.2 MGD by the year 2060 based on projected demands and the total existing public community water system capacities for each locality. However, Henry County and the Town of Gretna are projected to experience a water supply deficit by 2060 or before based on current (2010) projected demands. Both Henry County and the Town of Gretna are currently addressing the pending shortages as discussed below.

The HCPSA is currently working to increase their permitted withdrawal capacity on the Upper Smith River, which will eliminate the projected deficit.

It is important to note that this Plan should be considered a living document; therefore, future updates to the list of water supply alternatives may include new alternatives that have not been identified in this version of the Plan (October 2010).

9.2 Henry County

9.2.1 River or Stream Intake/WTP Alternatives

Henry County and the HCPSA owns and operates the Upper Smith River WTP located near the Philpott Reservoir. Henry County owns the Upper Smith River WTP, raw water pump station, and raw water intake. The HCPSA owns all other system components (e.g., water pipes, tanks, booster pump stations, etc.). The Upper Smith River WTP receives raw water from an intake located on the Upper Smith River, located approximately 3.7 miles south of the Philpott Reservoir. The current rated design capacity of the Upper Smith River WTP is 4.0 MGD.

The HCPSA is currently working with VDEQ to increase the permit capacity from 4.0 MGD to 6.0 MGD, which will eliminate the current (2010) projected water supply deficit of 0.19 MGD by 2060. Based on an increased permit capacity of 6.0 MGD, Henry County is projected to experience a surplus of approximately 1.81 MGD by 2060.

9.3 Town of Gretna

The Town of Gretna has recognized the need for additional raw water capacity or an alternate water supply over the last 30 years. This need became more apparent when the existing Georges Creek Reservoir nearly went dry during the drought of 2002. In order to maintain service during the drought of 2002, the Town of Gretna constructed a temporary raw water pipeline from an unnamed tributary of Whitethorn Creek to the Georges Creek Reservoir, which allowed the Town to maintain water service.

Following the drought of 2002, the regional VDH Office of Drinking Water (ODW) in Danville determined that the safe yield of the Georges Creek Reservoir was approximately 0.18 MGD, which is significantly less than the permit capacity of 0.432 MGD. As a result, the ODW reduced the permit capacity and requested the Town of Gretna develop an alternate water supply.

On June 11, 2008, the Town of Gretna entered into a Consent Order with VDH, which gives the Town until June 1, 2012 to develop a water supply alternative or the ODW will permanently reduce the Town's design capacity.

A Preliminary Engineering Report (PER) was recently completed by Peed & Bortz, LLC and evaluated six alternatives to increase the Town of Gretna's raw water supply. The Whitethorn Creek Intake alternative was recommended.

In May 2010, Peed & Bortz, LLC, on behalf of the Town of Gretna, submitted a permit application for new or expanded minor surface water withdrawals to the VDEQ. The permit application re-evaluated the "No Action" and "Whitethorn Creek" alternatives discussed in the PER, disregarded four alternatives that were not recommended in the PER, and identified two new alternatives. A summary of the alternatives evaluated by Peed & Bortz, LLC in the VDEQ permit application is discussed below.

9.3.1 No Action Alternative

The No Action alternative assumes no improvements will be made and the Town of Gretna will continue to be served by the existing Georges Creek Reservoir. This alternative formed the basis against which all other alternatives were measured.

The No Action alternative is not a viable option for the following reasons:

- Town of Gretna's raw water supply will remain at approximately 0.18 MGD;
- Existing Georges Creek Reservoir will continue to be an inadequate water supply;
- Risk of system failure during periods of drought will continue and likely increase over time;
- Town residents quality of life will be limited and prevent water extensions within the Town and interconnections with Pittsylvania County; and
- Town will not comply with VDH Consent Order, which will result in reduction in permit capacity.

9.3.2 River or Stream Intake Alternatives

This alternative will consist of a new raw water intake on Whitethorn Creek and a pipeline to the Georges Creek Reservoir. This alternative will act as a supplemental water supply to the Georges Creek Reservoir.

The Whitethorn Creek intake will consist of an intake structure, pump station, valve vault, and building. The intake structure will be placed in an existing pool on Whitethorn Creek approximately 250 feet upstream of the Route 903 Bridge. A 10-inch raw water line will convey water to the pump station. Two submersible raw water pumps (each rated at 300 gpm) will be installed in a wet well located on the north bank. Only one pump will operate at a time. The pumps will be manually controlled by the plant operator.

When the Georges Creek Reservoir is less than full pond, the plant operator will determine the instantaneous Whitethorn Creek flow using gauging equipment and operate one raw water pump at no more than 10% of the instantaneous flow. This operation will repeat daily until the Georges Creek Reservoir is full. Frequency and duration of the pump operations will vary depending on climate and stream flow conditions.

Based on the permit capacity of 0.432 MGD, the intake pumps would have operated for approximately 81 days for varying durations had this alternative had been in place during the drought of 2002.

9.3.3 Interconnection Alternatives

Town of Gretna – Town of Hurt

An interconnection with the Town of Hurt assumes treated water will be purchased from the Town of Hurt and conveyed to the Town of Gretna through a 12-inch water pipeline along secondary roads between the two towns, which would pass through Motley area and serve approximately 300 Pittsylvania County customers. This alternative would require a pump station and 500,000 gallon storage tank. This alternative also assumes that the Town of Gretna will only purchase water from the Town of Hurt on an "as needed" basis when the existing Georges Creek Reservoir source cannot meet the Town's demand.

The Town of Hurt currently purchases approximately 100,000 gpd of water from the Town of AltaVista in Campbell County. The current water purchase agreement allows a maximum of 200,000 gpd to be purchased. This alternative would require modifications to the existing water purchase agreement between the Town of Hurt and the Town of Altavista to increase purchase contract limits and would ultimately reduce the permitted capacity available to the Town of Altavista and surrounding communities.

Town of Gretna – Town of Chatham/PCSA

An interconnection with the Town of Chatham and PCSA assumes treated water is purchased by the PCSA from the Town of Chatham and resold to the Town of Gretna. It also assumes that the Town of Gretna will purchase treated water on an "as needed" basis when the existing Georges Creek Reservoir source cannot meet the Town's demand.

The buy/sell arrangement through the PCSA was assumed for this interconnection alternative because the Town of Chatham does not have sufficient capacity to sell water to the Town of Gretna; however, the PCSA does have sufficient capacity to sell water to the Town of Gretna. The Town of Chatham may be impacted because their distribution network may not have sufficient capacity to transmit 250,000 gpd of water north to the Town of Gretna.

This alternative assumes the Town of Gretna will connect to the PCSA water system at the proposed agricultural center on Route 29. This project is currently in the preliminary design

phase and will consist of a booster pump station at the Medical Center Tank, a 500,000 gallon elevated storage tank near Whittles, and two water pipelines running north to the proposed agricultural center. This alternative will also serve approximately 35 Pittsylvania County customers who currently are not served by public water supply.

9.3.4 Alternatives Analysis Evaluation

The four alternatives were evaluated based on the following criteria: purpose and need, availability, interconnectivity, cost, safe yield, threatened and endangered species, wetlands and streams, in-stream flow, and water quality. Each alternative (except cost) was given equal ranking points between 0 and 10 with zero being poor and 10 being excellent. Cost was given a total of 20 ranking points because it significantly impacts the Town of Gretna water users. A summary the alternative analysis evaluation rating completed by Peed & Bortz, LLC is presented below in Table 9.3.4.

Based on the alternatives analysis evaluation, the Whitethorn Creek alternative ranks the highest of the alternatives considered. As discussed above, Peed & Bortz, LLC, on behalf of the Town of Gretna, submitted a permit application for new or expanded minor surface water withdrawals to the VDEQ in May 2010.

Table 9.3.4: Town of Gretna Alternatives Analysis Evaluation Ratings

Criteria	**Alternative**			
	No Action	**Whitethorn Creek**	**Interconnection Town of Hurt**	**Interconnection Town of Chatham/ PCSA**
Purpose & Need	0	10	10	10
Availability	0	10	8	8
Interconnectivity	0	5	10	10
Cost	20	18	0	6
Safe Yield	0	10	8	8
T&E Species	0	10	6	10
Wetlands & Streams	10	10	8	9
In Stream Flow	10	7	9	8
Water Quality	10	10	10	10
TOTAL	**50**	**90**	**69**	**79**

9.4 Regional Alternatives

The WPPDC region is considered water rich. Most localities within the WPPDC region have obtained secure sources, or are purchasing water from other regions (Town of Hurt) in an effort to meet supply demands. Interconnection possibilities with other localities within or outside the region in an effort to share capacity surpluses with other localities will be important when considering options for water supply in the future if needed. In addition, reuse and recycling and water demand management as water supply alternatives are discussed below.

9.4.1 Reuse and Recycling

A current trend in reducing potable water demands includes the reuse of treated wastewater effluent for non-potable uses, such as irrigation and industrial process water. In the WPPDC, various treatment plants exist which treat a large portion of the wastewater from the surrounding communities. Conceptually it makes sense to utilize the treated effluent from these WWTPs at local facilities. To date, the opportunities to utilize effluent have been very limited. It will be beneficial to explore future opportunities, since the use of effluent can offset the need to expand water source, treatment or distribution facilities.

9.4.2 Water Demand Management

Water conservation is the conscious effort by a utility, business or individual to save water. Every gallon of water not used is one less to be stored, treated, and distributed. It also may represent one less gallon that must be heated for washing or bathing, thus saving energy costs, or one less gallon of water that must pass through some form of wastewater treatment before it is returned to the environment. Normal conservation practices can provide long-term benefits by permanently reducing water demands during normal operating conditions.

As discussed in Section 6.0, the WPPDC members have adopted numerous water conservation measures, including the following:

- Adjustment of standard operating procedures to improve water conservation;
- Installation of low-flow and/or no-flow fixtures in their facilities and/or government buildings and facilities;
- Provided “yard taps” to their customers for purchase, so that customers can track their outdoor water use;

- Implementation of educational programs to address water conservation through reduction of use;
- Water conservation rate structures that encourage reduction of water use by increasing water rates with increasing water usage;
- Incentive programs to customers that retrofit or replace older fixtures and appliances to reduce water use;
- Leak detection and repair programs with regularly scheduled water audits;
- Replacement of aging water distribution pipes; and
- Implementation of practices or policies to track unauthorized connections.

Greater water conservation in the region could be achieved if all of the WPPDC members implemented the measures listed above, as well as other water conservation measures, such as "smart" irrigation systems, outdoor water use allocation calculations (to support a conservation rate structure), or informative billing.

As discussed in Section 8.0, Henry County and the Town of Gretna are expected to experience a water supply deficit by the year 2060. The water demand management actions listed above and described in more detail in Section 6.0 will likely provide additional water savings for each jurisdiction. An estimated volume of water saved from implementation of water demand management actions is not available at this time.