Source Water Protection Plan GREEN VALLEY GLENWOOD PSD -BULLTAIL

PWSID WV3302813

Mercer County

April 2016

Prepared by:

Tetra Tech, Inc. 803 Quarrier Street, Suite 400 Charleston, WV 25314

In cooperation with Green Valley Glenwood PSD



This page is intentionally blank.

John Beckman
Preparer's Name
Source Water Specialist
Title of Preparer
Tetra Tech, Inc.
Name of Contractor(s)/Consultant(s)
I certify the information in the source water protection plan is complete and accurate to the best of my
knowledge.
Signature of responsible party or designee authorized to sign for water utility:
Signature of responsible party or designee authorized to sign for water utility:
Man. Min II.
MARTY MARIOTT: Print Name of Authorizing Signatory (see instructions):
Figure Name of Authorizing Signatory (see Instructions):
GRANDRAL MANINGOR
Title of Authorizing Signatory:
04/11/2011
Date of Submission (mm/dd/yyyy):

This page is intentionally blank.



TABLE OF CONTENTS

1.0 PURPOSE	1
1.1 What are the benefits of preparing a Source Water Protection Plan?	1
2.0 BACKGROUND: WV SOURCE WATER ASSESSMENT AND PROTECTION PROGRAM	2
3.0 STATE REGULATORY REQUIREMENTS	3
4.0 SYSTEM INFORMATION	4
5.0 WATER TREATMENT AND STORAGE	5
6.0 DELINEATIONS	7
7.0 PROTECTION TEAM	9
8.0 POTENTIAL SOURCES OF SIGNIFICANT CONTAMINATION	11
8.1 Confidentiality of PSSCs	11
8.2 Local and Regional PSSCs	11
8.3 Prioritization of Threats and Management Strategies	
9.0 IMPLEMENTATION PLAN FOR MANAGEMENT STRATEGIES	14
10.0 EDUCATION AND OUTREACH STRATEGIES	18
11.0 CONTINGENCY PLAN	21
11.1 Response Networks and Communication	21
11.2 Operation During Loss of Power	22
11.3 Future Water Supply Needs	23
11.4 Water Loss Calculation	
11.5 Early Warning Monitoring System	25
12.0 SINGLE SOURCE FEASIBILITY STUDY	
13.0 COMMUNICATION PLAN	28
14.0 EMERGENCY RESPONSE	29
15.0 CONCLUSION	30



LIST OF TABLES

Table 1. Population Served by Green Valley Glenwood PSD - Bulltail	4
Table 2. Green Valley Glenwood PSD - Bulltail Water Treatment Information	5
Table 3. Green Valley Glenwood PSD - Bulltail Surface Water Sources	6
Table 4. Green Valley Glenwood PSD - Bulltail Groundwater Sources	6
Table 5. Watershed Delineation Information	7
Table 6. Protection Team Member and Contact Information	10
Table 7. Locally Identified Potential Sources of Significant Contamination	12
Table 8. Priority PSSCs or Critical Areas	15
Table 9. Priority PSSC Management Strategies	16
Table 10. Education and Outreach Implementation Plan	19
Table 11. Green Valley Glenwood PSD - Bulltail Water Shortage Response Capability	21
Table 12. Generator Capacity	22
Table 13. Future Water Supply Needs for Green Valley Glenwood PSD - Bulltail	23
Table 14. Water Loss Information	24
Table 15. Early Warning Monitoring System Capabilities	25

APPENDICES

Appendix A. Figures

Appendix B. Early Warning Monitoring System Forms

Appendix C. Communication Plan Template

Appendix D. Single Source Feasibility Study

Appendix E. Supporting Documentation

SOURCE WATER PROGRAM ACRONYMS

AST Aboveground Storage Tank

BMP Best Management Practices

ERP Emergency Response Plan

GWUDI Ground Water Under the Direct Influence of Surface Water

LEPC Local Emergency Planning Committee

OEHS/EED Office of Environmental Health Services/Environmental Engineering Division

PE Professional Engineer

PSSCs Potential Source of Significant Contamination

PWSU Public Water System Utility

RAIN River Alert Information Network

RPDC Regional Planning and Development Council

SDWA Safe Drinking Water Act

SWAP Source Water Assessment and Protection

SWAPP Source Water Assessment and Protection Program

SWP Source Water Protection

SWPP Source Water Protection Plan

WARN Water/Wastewater Agency Response Network

WHPA Wellhead Protection Area

WHPP Wellhead Protection Program
WSDA Watershed Delineation Area

WVBPH West Virginia Bureau for Public Health

WVDEP West Virginia Department of Environmental Protection

WVDHHR West Virginia Department of Health and Human Resources

WVDHSEM West Virginia Division of Homeland Security and Emergency Management

ZCC Zone of Critical Concern

ZPC Zone of Peripheral Concern



1.0 PURPOSE

The goal of the West Virginia Bureau of Public Health (WVBPH) source water assessment and protection (SWAP) program is to prevent degradation of source waters which may preclude present and future uses of drinking water supplies to provide safe water in sufficient quantity to users. The most efficient way to accomplish this goal is to encourage and oversee source water protection on a local level. Many aspects of source water protection may be best addressed by engaging local stakeholders.

The intent of this document is to describe what Green Valley Glenwood PSD - Bulltail has done, is currently doing, and plans to do to protect its source of drinking water. Although this water system treats the water to meet federal and state drinking water standards, conventional treatment does not fully eradicate all potential contaminants and treatment that goes beyond conventional methods is often very expensive. By completing this plan, Green Valley Glenwood PSD - Bulltail acknowledges that implementing measures to minimize and mitigate contamination can be a relatively economical way to help ensure the safety of the drinking water.

1.1 WHAT ARE THE BENEFITS OF PREPARING A SOURCE WATER PROTECTION PLAN?

- Fulfilling the requirement for the public water utilities to complete or update their source water protection plan.
- Identifying and prioritizing potential threats to the source of drinking water; and establishing strategies to minimize the threats.
- Planning for emergency response to incidents that compromise the water supply by contamination or depletion, including how the public, state, and local agencies will be informed.
- Planning for future expansion and development, including establishing secondary sources of water.
- Ensuring conditions to provide the safest and highest quality drinking water to customers at the lowest possible cost.
- Providing more opportunities for funding to improve infrastructure, purchase land in the protection area, and other improvements to the intake or source water protection areas.

2.0 BACKGROUND: WV SOURCE WATER ASSESSMENT AND PROTECTION PROGRAM

Since 1974, the federal Safe Drinking Water Act (SDWA) has set minimum standards on the construction, operation, and quality of water provided by public water systems. In 1986, Congress amended the SDWA. A portion of those amendments were designed to protect the source water contribution areas around ground water supply wells. This program eventually became known as the Wellhead Protection Program (WHPP). The purpose of the WHPP is to prevent pollution of the source water supplying the wells.

The Safe Drinking Water Act Amendments of 1996 expanded the concept of wellhead protection to include surface water sources under the umbrella term of Source Water Protection. The amendments encourage states to establish SWAP programs to protect all public drinking water supplies. As part of this initiative states must explain how protection areas for each public water system will be delineated, how potential contaminant sources will be inventoried, and how susceptibility ratings will be established.

In 1999, the WVBPH published the West Virginia Source Water Assessment and Protection Program, which was endorsed by the United States Environmental Protection Agency. Over the next few years, WVBPH staff completed an assessment (i.e., delineation, inventory and susceptibility analysis) for all of West Virginia's public water systems. Each public water system was sent a copy of its assessment report. Information regarding assessment reports for Green Valley Glenwood PSD - Bulltail can be found in **Table 1**.

3.0 STATE REGULATORY REQUIREMENTS

On June 6, 2014, §16 1 2 and §16 1 9a of the Code of West Virginia, 1931,was reenacted and amended by adding three new sections, designated §16 1 9c, §16 1 9d and §16-1-9e. The changes to the code outlines specific requirements for public water utilities that draw water from a surface water source or a surface water influenced groundwater source.

Under the amended and new codes each existing public water utility using surface water or ground water influenced by surface water as a source must have completed or updated a source water protection plan by July 1, 2016, and must continue to update their plan every three years. Existing source water protection plans have been developed for many public water utilities in the past. If available, these plans were reviewed and considered in the development of this updated plan. Any new water system established after July 1, 2016 must submit a source water protection plan before they start to operate. A new plan is also required when there is a significant change in the potential sources of significant contamination (PSSC) within the zone of critical concern (ZCC).

The code also requires that public water utilities include details regarding PSSCs, protection measures, system capacities, contingency plans, and communication plans. Before a plan can be approved, the local health department and public will be invited to contribute information for consideration. In some instances, public water utilities may be asked to conduct independent studies of the source water protection area and specific threats to gain additional information.

3

4.0 SYSTEM INFORMATION

Green Valley Glenwood PSD - Bulltail is classified as a state regulated public utility and operates a community public water system. A community public water system is a system that regularly supplies drinking water from its own sources to at least 15 service connections used by year round residents of the area or regularly serves 25 or more people throughout the entire year. For purposes of this source water protection plan, community public water systems are also referred to as public water utilities. Information on the population served by this utility is presented in Table 1 below.

Table 1. Population Served by Green Valley Glenwood PSD - Bulltail

Administrative office location:			2387 Maple Acres Road, Princeton WV 24739			
Is the system a public utility, according to the Public Service Commission rule?			Yes. Note: the Bulltail facility will be removed from service when it is no longer needed pending the completion of a new intake on Dan Hale Reservoir and expansion of the water plant at Glenwood. The lake will continue to function as a flood control structure.			
Date of Most Recent Source Water Assessment Report:			April 2003			
Date of Most Rece	Date of Most Recent Source Water Protection Plan:			May 2011		
Populatio	on served directly:	1,708				
	System Name		PWSID Number	Population		
Bulk Water Purchaser Systems:	1973		-	-		
Total Population Served by the Utility:			1,708			
Does the utility have multiple source water protection areas (SWPAs)?			No			
How many SWPAs does the utility have?			1			

April 2016 4



5.0 WATER TREATMENT AND STORAGE

As required, Green Valley Glenwood PSD - Bulltail has assessed their system (e.g., treatment capacity, storage capacity, unaccounted for water, contingency plans) to evaluate their ability to provide drinking water and protect public health. **Table 2** contains information on the water treatment methods and capacity of the utility. Information about the surface sources from which Green Valley Glenwood PSD - Bulltail draws water can be found in **Table 3**. If the utility draws water from any groundwater sources to blend with the surface water the information about these ground water sources can be found in **Table 4**.

Table 2. Green Valley Glenwood PSD - Bulltail Water Treatment Information

Water Treatment Processes (List All Processes in Order)	Coagulation, sedimentation, flocculation, filtration, chlorination, and fluoridation
Current Treatment Capacity (gal/day)	576,000 *
Current Average Production (gal/day)	176,000
Maximum Quantity Treated and Produced (gal)	250,000
Minimum Quantity Treated and Produced (gal)	140,000
Average Hours of Operation	8.5 hours/day
Maximum Hours of Operation in One Day	24 hours/day
Minimum Hours of Operation in One Day	0 hours/day
Number of Storage Tanks Maintained	2 storage tanks 1 booster station
Total Gallons of Treated Water Storage (gal)	503,000
Total Gallons of Raw Water Storage (gal)	96,000,560

^{*}This information was taken from the Source Water Protection Contingency Plan for Green Valley Glenwood PSD – Bulltail Water System, August 2015.

5



Table 3. Green Valley Glenwood PSD - Bulltail Surface Water Sources

Intake Name	SDWIS#	Local Name	Describe Intake	Name of Water Source	Date Constructed / Modified	Frequency of Use (Primary/ Backup/ Emergency)	Activity Status (Active/ Inactive)
James Bailey Reservoir	IN001	James Bailey Reservoir	Gravity feed with screens to raw water pump	James Bailey Reservoir	1950s	Primary	Active

Table 4. Green Valley Glenwood PSD - Bulltail Groundwater Sources

	Does the utility blend with groundwater?							No	
Well/Spring Name	SDWIS #	Local Name	Date Constructed/ Modified	Completion Report Available (Yes/No)	Well Depth (ft)	Casing Depth (ft)	Grout (Yes/No)	Frequency of Use (Primary/ Backup/ Emergency)	Activity Status (Active/ Inactive)
N/A									

6

6.0 DELINEATIONS

For surface water systems, delineation is the process used to identify and map the drainage basin that supplies water to a surface water intake. This area is generally referred to as the source water protection area (SWPA). All surface waters are susceptible to contamination because they are exposed at the surface and lack a protective barrier from contamination. Accidental spills, releases, sudden precipitation events that result in overland runoff, or storm sewer discharges can allow pollutants to readily enter the source water and potentially contaminate the drinking water at the intake. The SWPA for surface water is distinguished as a Watershed Delineation Area (WSDA) for planning purposes; and the Zone of Peripheral Concern (ZPC) and Zone of Critical Concern (ZCC) are defined for regulatory purposes.

The WSDA includes the entire watershed area upstream of the intake to the boundary of the State of West Virginia border, or a topographic boundary. The ZCC for a public surface water supply is a corridor along streams within the watershed that warrants more detailed scrutiny due to its proximity to the surface water intake and the intake's susceptibility to potential contaminants within that corridor. The ZCC is determined using a mathematical model that accounts for stream flows, gradient and area topography. The length of the ZCC is based on a five-hour time-of-travel of water in the streams to the water intake, plus an additional one-quarter mile below the water intake. The width of the zone of critical concern is 1,000 feet measured horizontally from each bank of the principal stream and five hundred feet measured horizontally from each bank of the tributaries draining into the principal stream. Ohio River ZCC delineations are based on ORSANCO guidance and extend 25 miles above the intake. Ohio River ZCC delineations are based on ORSANCO guidance and extend 25 miles above the intake. The Ohio River ZCC delineations include 1,320 feet (1/4 mile) measured from the bank of the main stem of the Ohio River and 500 feet on tributary.

The ZPC for a public surface water supply source and for a public surface water influenced groundwater supply source is a corridor along streams within a watershed that warrants scrutiny due to its proximity to the surface water intake and the intake's susceptibility to potential contaminants within that corridor. The ZPC is determined using a mathematical model that accounts for stream flows, gradient and area topography. The length of the zone of peripheral concern is based on an additional five-hour time-of-travel of water in the streams beyond the perimeter of the zone of critical concern, which creates a protection zone of ten hours above the water intake. The width of the zone of peripheral concern is one thousand feet measured horizontally from each bank of the principal stream and five hundred feet measured horizontally from each bank of the tributaries draining into the principal stream.

For groundwater supplies there are two types of SWPA delineations: 1) wellhead delineations and 2) conjunctive delineations, which are developed for supplies identified as groundwater under the direct influence of surface water, or GWUDIs. A wellhead protection area is determined to be the area contributing to the recharge of the groundwater source (well or spring), within a five year time of travel. A conjunctive delineation combines a wellhead protection area for the hydrogeologic recharge and a connected surface area contributing to the wellhead.

Information and maps of the WSDA, ZCC, ZPC and Wellhead Protection Area for this public water supply were provided to the utility and are attached to this report. See **Appendix A. Figures**. Other information about the WSDA is shown in **Table 5**.

Table 5. Watershed Delineation Information

Size of WSDA (Indicate units)	711 acres
River Watershed Name (8-digit HUC)	Upper New River - 05050002



7 April 2016

Size of Zone of Critical Concern (Acres)	464 acres
Size of Zone of Peripheral Concern (Acres) (Include ZCC area)	464 acres
Method of Delineation for Groundwater Sources	N/A
Area of Wellhead Protection Area (Acres)	N/A

7.0 PROTECTION TEAM

One important step in preparing a source water protection plan is to organize a source water protection team who will help develop and implement the plan. The legislative rule requires that water utilities make every effort to inform and engage the public, local government, local emergency planners, the local health department and affected residents at all levels of the development of the protection plan. WVBPH recommends that the water utility invite representatives from these organizations to join the protection team, which will ensure that they are given an opportunity to contribute in all aspects of source water protection plan development. Public water utilities should document their efforts to engage representatives and provide an explanation if any local stakeholder is unable to participate. In addition, other local stakeholders may be invited to participate on the team or contribute information to be considered. These individuals may be emergency response personnel, local decision makers, business and industry representatives, land owners (of land in the protection area), and additional concerned citizens.

The administrative contact for Green Valley Glenwood PSD is responsible for assembling the protection team and ensuring that members are provided the opportunity to contribute to the development of the plan. The acting members of the Protection Team are listed in **Table 6.**

The role of the protection team members will be to contribute information to the development of the source water protection plan, review draft plans and make recommendations to ensure accuracy and completeness, and when possible contribute to implementation and maintenance of the protection plan. The protection team members are chosen as trusted representatives of the community served by the water utility and may be designated to access confidential data that contains details about the local potential sources of significant contamination. The input of the protection team will be carefully considered by the water utility when making final decisions relative to the documentation and implementation of the source water protection plan.

Green Valley Glenwood PSD will be responsible for updating the source water protection plan and rely upon input from the protection team and the public to better inform their decisions. To find out how you can become involved as a participant or contributor, visit the utility website or call the utility phone number, which are provided in **Table 6.**

9



Table 6. Protection Team Member and Contact Information

Name	Representing	Title	Phone Number	Email
Marty Mariotti	General Manager- Green Valley/Glenwood PSD	Utility Administrative Contact/Manager	304-325-6832	mmgmpsd@citlink.net
Doug Taylor	Green Valley/Glenwood PSD	Plant Manager	304-425-5678	doug_taylor70@hotmail.com
Tim Farley	Mercer County Emergency Services	Emergency Management Director		mercountyOEM@hotmail.com
David Thompson	Green Valley Fire Department	Fire Chief		-
Carl Carter Mercer County Health Department		Sanitarian	304-324-8367	Carl.T.Carter@wv.gov
Date of first p	protection Team Meeting		September 17, 2015	
(public, local government local health department)	m and engage local stakeholders ment, local emergency planners, ent, and affected residents) and f recommended stakeholders:	regularly scheduled PSD boar notice posted at the PSD of advance of the meeting date	rd meeting. The public fice and in a newspape	e PSD office concurrent with a was invited to attend through a er advertisement published in urce water protection plan was from the attendees.

8.0 POTENTIAL SOURCES OF SIGNIFICANT CONTAMINATION

Source water protection plans should provide a complete and comprehensive list of the potential sources of significant contamination (PSSC) contained within the ZCC based upon information obtained from the WVBPH, working in cooperation with the West Virginia Department of Environmental Protection (WVDEP) and the West Virginia Division of Homeland Security and Emergency Management (WVDHSEM). A facility or activity is listed as a PSSC if it has the potential to release a contaminant that could potentially impact a nearby public water supply, and it does not necessarily indicate that any release has occurred.

The list of PSSCs located in the SWPA is organized into two types: 1) SWAP PSSCs, and 2) Regulated Data. SWAP PSSCs are those that have been collected and verified by the WVBPH SWAP program during previous field investigations to form the source water assessment reports and source water protection plans. Regulated PSSCs are derived from federal and state regulated databases, and may include data from WVDEP, US Environmental Protection Agency, WVDHSEM, and from state data sources.

8.1 CONFIDENTIALITY OF PSSCS

A list of the PSSCs contained within the ZCC should be included in the source water protection plan. However, the exact location, characteristics and approximate quantities of contaminants shall only be made known to one or more designees of the public water utility and maintained in a confidential manner. In the event of a chemical spill, release or other related emergency, information pertaining to the contaminant shall be immediately disseminated to any emergency responders reporting to the site. The designees for Green Valley Glenwood – Bulltail are identified in the communication planning section of the source water protection plan.

PSSC data from some agencies (ex. WVDHSEM, WVDEP, etc.) may be restricted due to the sensitive nature of the data. Locational data will be provided to the public water utility. However, to obtain specific details regarding contaminants, (such as information included on Tier II reports), water utilities should contact the local emergency planning commission or agencies, directly. While the maps and lists of the PSSCs and regulated sites are to be maintained in a confidential manner, these data are provided in **Appendix A. Figures** for internal review and planning uses only.

8.2 LOCAL AND REGIONAL PSSCS

For the purposes of this source water protection plan, local PSSCs are those that are identified by local stakeholders in addition to the PSSCs lists distributed by the WVBPH and other agencies. Local stakeholders may identify local PSSCs for two main reasons. The first is that it is possible that threats exist from unregulated sources and land uses that have not already been inventoried and do not appear in regulated databases. For this reason each public water utility should investigate their protection area for local PSSCs. A PSSC inventory should identify all contaminant sources and land uses in the delineated ZCC. The second reason local PSSCs are identified is because public water utilities may consider expanding the PSSC inventory effort outside of the ZCC into the ZPC and WSDA if necessary to properly identify all threats that could impact the drinking water source. As the utility considers threats in the watershed they may consider collaborating with upstream communities to identify and manage regional PSSCs.

When conducting local and regional PSSC inventories, utilities should consider that some sources may be obvious like above ground storage tanks, landfills, livestock confinement areas, highway or railroad right of ways, and sewage treatment facilities. Others are harder to locate like abandoned cesspools, underground tanks, French drains, dry wells, or old dumps and mines.

The Green Valley Glenwood PSD reviewed intake locations and the delineated SWPAs to verify the existence of PSSCs provided by the WVBPH and identify new PSSCs. If possible, locations of regulated sites within the SWPA were confirmed. Information on any new or updated PSSCs identified by Green Valley Glenwood PSD and not already appearing in datasets from the WVBPH can be found in **Table 7**.



11 April 2016

Table 7. Locally Identified Potential Sources of Significant Contamination

PSSC Number	Map Code	Site Name	Site Description	Relative Risk Score	Comments
N/A	-	-	-	-	-

8.3 PRIORITIZATION OF THREATS AND MANAGEMENT STRATEGIES

Once the utility has identified local concerns, they must develop a management plan that identifies specific activities that will be pursued by the public water utility in cooperation and concert with the WVBPH, local health departments, local emergency responders, LEPC and other agencies and organizations to protect the source water from contamination threats.

Depending on the number identified, it may not be feasible to develop management strategies for all of the PSSCs in the SWPA. The identified PSSCs can be prioritized by potential threat to water quality, proximity to the intake(s), and local concern. The highest priority PSSCs can be addressed first in the initial management plan. Lower ranked PSSCs can be addressed in the future as time and resources allow. To assess the threat to the source water, water systems should consider confidential information about each PSSC. This information may be obtained from state or local emergency planning agencies, Tier II reports, facility owner, facility groundwater protection plans, spill prevention response plans, results of field investigations, etc.

In addition to identifying and prioritizing PSSCs within the SWPA, local source water concerns may also focus on critical areas. For the purposes of this source water protection plan, a critical area is defined as an area that is identified by local stakeholders and can lie within or outside of the ZCC. Critical areas may contain one or more PSSCs which would require immediate response to address a potential incident that could impact the source water.

A list of priority PSSCs was selected and ranked by the Green Valley Glenwood PSD Protection Team. This list reflects the concerns of this specific utility and may contain PSSCs not previously identified and not within the ZCC or ZPC. **Table 8** contains a description of why each critical area or PSSC is considered a threat and what management strategies the utility is either currently using or could use in the future to address each threat.



9.0 IMPLEMENTATION PLAN FOR MANAGEMENT STRATEGIES

Green Valley Glenwood PSD reviewed the recommended strategies listed in their previous source water protection plan, to consider if any of them should be adopted and incorporated in this updated plan. **Table 9** provides a brief statement summarizing the status of the recommended strategies. **Table 9** also lists strategies from a previous plan that are being incorporated in this plan update.

When considering source management strategies and education and outreach strategies, this utility has considered how and when the strategies will be implemented. The initial step in implementation is to discuss responsible parties and timelines to implement the strategies. The water utility, working in conjunction with the Protection Team members, can determine the best process for completing activities within the projected time periods. Additional meetings may be needed during the initial effort to complete activities, after which the Protection Team should consider meeting annually to review and update the Source Water Protection Plan. A system of regular updates should be included in every implementation plan.

Proposed commitments and schedules may change, but should be well documented and reported to the local stakeholders. If possible, utilities should include cost estimates for strategies to better plan for implementation and possible funding opportunities. Green Valley Glenwood PSD has developed an implementation plan for priority concerns listed in **Table 8**. The responsible team member, timeline, and potential cost of each strategy are presented in **Table 9**. Note: Because timelines may change, future plan updates should describe the status of each strategy and explain the lack of progress.

Table 8. Priority PSSCs or Critical Areas

PSSC or Critical Area	Priority Number	Reason for Concern
Recreational Uses of Reservoir	1	James P. Bailey Lake is a fishing lake open to the public, stocked and operated by WV Division of Natural Resources (WVDNR). Solid waste from fishermen may contaminate the surface waters. Previously, the reservoir was an illegal dump site until a local caretaker was appointed that restricts access during non-fishing hours. Illegal ice fishing during winter trout stocking season is an ongoing concern. Only bank fishing is permitted because the ice that forms is too thin to safely support fishermen. PSD staff and after hours security will report illegal ice fishing to local law enforcement.
Public Wastewater System	2	A public wastewater system serves the residences and businesses in the watershed. The sewer line extends through the watershed and up to the county Airport. A sewer lift station is located just upstream of the lake. Accidental releases or line breaks may allow untreated sewage to contaminate the surface water source. Untreated sewage contains total coliform, particularly <i>E. coli</i> , along with other bacteria and parasites that may have a negative effect on human health if treatment processes are not adjusted to address the contamination. The lift station is operated by the Green Valley Glenwood PSD. The lift station is fairly new and is in good repair. Staff check the lift station daily to make sure it is functioning properly. The PSD has procedures in place to prevent and minimize the impact of a potential sewage overflow.
Equipment Repair and Storage	3	According to base topographic mapping CAF Transport and High Country are located on the boundary of the watershed. Re-grading to create construction sites may result in shifting storm water runoff into the watershed. Stormwater runoff from parking lots and equipment repair and storage areas may contain oils and other automotive fluids that could contaminate water resources.
Concentrated Residential Area.	4	The land use inside the watershed is mainly forested with residences along the lake and headwaters. Residents' activities in and outside of their home, such as handling and disposal of paints, thinners, cleaners, and automotive fluids, application of fertilizers and pesticides, use of potable water to irrigate, etc. can impact the surface water.



15 April 2016

PSSC or Critical Area	Priority Number	Reason for Concern
King Coal Highway	5	Current plans for the highway show it being constructed immediately downstream of the source water reservoir. There is also a sediment structure planned in the area. It is unclear when this route will be constructed and what the final design at the source will be. Construction could impact the source. The stretch of proposed highway is still in the planning phase. The proposed route would cross below the reservoir and would be unlikely to affect water quality.

Table 9. Priority PSSC Management Strategies

PSSC or Critical Area	Management Activity	Responsible Protection Team Member	Status/ Schedule	Comments	Estimated Cost
Previous Plan Status	There were 5 management strategies recommended in the existing plan. One of these strategies has been accomplished. Four of these are ongoing or continue to be a concern. These are incorporated in this plan update and listed below.	-	-	-	-
Source Water Protection Area	The utility is required to update the Source Water Protection Plan at least every 3 years and continue to monitor any ongoing or new activities that occur in the watershed.	Green Valley Glenwood PSD Protection Team	Ongoing every 3 years. Next update in 2018	-	-
Equipment Repair and Storage	Further investigate the storm water runoff and ask facilities to utilize BMPs if it is determined that their activities could contaminate the surface water source.	PSD board member or staff and/or operator	As needed		Minimal costs associated with staff time.
	Note: Depending upon their activities, the facility may be required to obtain an NPDES permit and maintain a Groundwater Protection Plan. Ask that they comply with state regulations that protect both ground and surface water resources.			-	

	Public Wastewater System	Waste water system staff operators are aware of the vulnerability of the source to the pump station. Any activity at this station is monitored closely and incidents become high priority.	PSD board member or staff and/or operator	Ongoing	-	Minimal costs associated with staff time.
	Recreational Uses of Reservoir	Continue to coordinate with WVDNR and local caretaker to provide protection and maintenance of James P. Bailey Lake, thus protecting the source.	PSD board member or staff and/or operator	Ongoing	-	Minimal costs associated with staff time.
•	Concentrated Residential Area	Raise residents' awareness of the source water. Note: Refer to the Education and Outreach Strategies below for activities that can be used.	PSD board member or staff and/or operator	As needed	-	See below.

10.0 EDUCATION AND OUTREACH STRATEGIES

The goal of education and outreach is to raise awareness of the need to protect drinking water supplies and build support for implementation strategies. Education and outreach activities will also ensure that affected citizens and other local stakeholders are kept informed and provided an opportunity to contribute to the development of the source water protection plan. Green Valley Glenwood PSD - Bulltail has created an Education and Outreach plan that describes activities it has either already implemented or could implement in the future to keep the local community involved in protecting their source of drinking water. This information can be found in **Table 10**.

Table 10. Education and Outreach Implementation Plan

Education and Outreach Strategy	Description of Activity	Responsible Protection Team Member	Status/Schedule	Comments	Estimated Cost
Consumer Confidence Report	Include info on source water protection plan in CCR. Note: This would be in addition to required Source Water Assessment information, including source of water and susceptibility to contamination. CCR is now published online on PSD website.	PSD board member or staff and/or operator	Annually	-	CCR required by SDWA, included in annual budget.
Brochures, pamphlets, and letters	Send public letters and/or brochures to educate on what they can do to protect and conserve source water. Note: Brochure is included in Appendix E. Funding may be available through the grant program. Development of other outreach material may be delegated to a volunteer with appropriate skills.	PSD board member or staff and/or operator	When resources become available.	-	Cost in brochure printing and mailing.
	There are no plans to produce a brochure other than the CCR. Additional information could be added to the PSD website if needed. A URL for the PSD website is printed on monthly bills that are mailed to customers.				
School Curricula	Coordinate with educators to include source water protection information in school curricula.	PSD board member or staff and/or operator	When resources become available.	-	Minimal costs. Would require time to coordinate,
TETRA TECH	Note: Operator will initiate effort, locate the appropriate individuals in school	40			visit classroom

	and/or on local school board. Can provide websites with free education materials to promote source water protection and conservation. Also operator may visit school or invite students for a plant tour to tie in with classroom materials.				and provide tour.
Plant Tours	Conduct plant tours for emergency responders, students, and interest groups.	PWS operator and staff	Ongoing – as requested	There are no schools near the Bulltail facility. Plant tours occur regularly at the Glenwood facility nearby.	Minimal cost associated with operator's time.
Emergency Planning and Coordination	Participate in Emergency Planning and Coordination.	PWS operator and staff	Ongoing and continuing annually	-	Cost associated with participation in training activities.
Partner with Watershed Association	Partner with Watershed Association. Note: Watershed Associations have monthly meeting and conduct public outreach on a yearly basis.	PWS operator and staff	Monthly/ annually	There are no watershed associations for streams in Mercer County.	Cost associated with participation in activities.
Public Meeting	Conduct Public Meeting.	PWS operator and staff	In future if needed.	The PSD conducts regular business meetings at 1 pm on the 2 nd and 4 th Thursdays of each month. These meetings are open to the public.	Minimal cost related to operator time.

11.0 CONTINGENCY PLAN

The goal of contingency planning is to identify and document how the utility will prepare for and respond to any drinking water shortages or emergencies that may occur due to short and long term water interruption, or incidents of spill or contamination. During contingency planning, utilities should examine their capacity to protect their intake, treatment, and distribution system from contamination. They should also review their ability to use alternative sources and minimize water loss, as well as their ability to operate during power outages. In addition, utilities should report the feasibility of establishing an early warning monitoring system and meeting future water demands.

Isolating or diverting any possible contaminant from the intake for a public water system is an important strategy in the event of an emergency. One commonly used method of diverting contaminants from an intake is establishing booms around the intake. This can be effective, but only for contaminants that float on the surface of the water. Alternatively, utilities can choose to pump floating contaminants from the water or chemically neutralize the contaminant before it enters the treatment facility.

Public utilities using surface sources should be able to close the intake by one means or another. However, depending upon the system, methods for doing so could vary greatly and include closing valves, lowering hatches or gates, raising the intake piping out of the water, or shutting down pumps. Systems should have plans in place in advance as to the best method to protect the intake and treatment facility. Utilities may benefit from turning off pumps and, if possible, closing the intake opening to prevent contaminants from entering the piping leading to the pumps. Utilities should also have a plan in place to sample raw water to identify the movement of a contaminant plume and allow for maximum pumping time before shutting down an intake (See Early Warning Monitoring System). The amount of time that an intake can remain closed depends on the water infrastructure and should be determined by the utility before an emergency occurs. The longer an intake can remain closed in such a case, the better.

Raw and treated water storage capacity also becomes extremely important in the event of such an emergency. Storage capacity can directly determine how effectively a water system can respond to a contamination event and how long an intake can remain closed. Information regarding the water shortage response capability of Green Valley Glenwood PSD - Bulltail is provided in **Table 11**.

11.1 RESPONSE NETWORKS AND COMMUNICATION

Statewide initiatives for emergency response, including source water related incidents, are being developed. These include the West Virginia Water/Wastewater Agency Response Network (WV WARN, see http://www.wvwarn.org/) and the Rural Water Association Emergency Response Team (see http://www.wvrwa.org/). Green Valley Glenwood PSD - Bulltail has analyzed its ability to effectively respond to emergencies and this information is also provided in **Table 11**.

Table 11. Green Valley Glenwood PSD - Bulltail Water Shortage Response Capability

Can the utility isolate or divert contamination from the intake or groundwater supply?	No	
Describe the utility's capability to isolate or divert potential contaminants:	N/A	
Can the utility switch to an alternative water source or intake that can supply full capacity at any time?	Yes	
Describe in detail the utility's capability to switch to an alternative source:	The District's Bulltail Water System can switch to th WVAWC Bluefield System and the Glenwood WTF by closing gate valves.	



21 April 2016

Can the utility close the water intake to prevent contamination from entering the water supply?	Yes	
How long can the intake stay closed?	The intake can stay closed as long as WVAWC Bluefield or Glenwood water treatment systems car supply water. (See Note Below)	
Describe the process to close the intake:	Gate Valves are Closed	
Describe the treated water storage capacity of the water system:	The District's has two (2) storage tanks totaling 503,000 gallons of treated water storage.	
Is the utility a member of WVRWA Emergency Response Team?	Yes	
Is the utility a member of WV-WARN?	Yes	
List any other mutual aid agreements to provide or receive assistance in the event of an emergency:	Interconnection with WVAWC Bluefield System and Glenwood WTP	

Information for this table was taken from the Source Water Protection Contingency Plan prepared by The Thrasher Group. The complete report is provided as Appendix D.

11.2 OPERATION DURING LOSS OF POWER

Green Valley Glenwood PSD - Bulltail analyzed its ability to operate effectively during a loss of power. This involved ensuring a means to supply water through treatment, storage, and distribution without creating a public health emergency. Information regarding the utility's capacity for operation during power outages is summarized in **Table 12**.

Table 12. Generator Capacity

What is the type and capacity of the generator needed to operate during a loss of power?	50 KW portable for booster stations.		
Can the utility connect to generator at intake/wellhead? If yes, select a scenario that best describes system.	No, the generator would need to be able to connect to a quick connect.		
Can the utility connect to generator at treatment facility? If yes, select a scenario that best describes system.	No, the treatment facility will be decommissioned		
Can the utility connect to a generator in distribution system? If yes, select a scenario that best describes system.	No. 50 kW generator for the booster stations with a quick connect power connections to provide power service.		
Does the utility have adequate fuel on hand for the generator?	No		
	Gallons Hours		

April 2016 22 TETRA TECH

What is your on-hand fuel storage and how long will it last operating at full capacity?		N/A		N/A	
Supp		olier		Phone Number	
Provide a list of suppliers that could	Generator	Caterpillar			(304) 949-6400
provide generators and fuel in the event of an emergency:	Generator	Cummins RT Rogers		(304) 769-1012	
,	Fuel			(304) 466-1733	
Does the utility test the generator(s) periodically?		N/A			
Does the utility routinely maintain the generator?		N/A			
If no scenario describing the ability to connect to generator matches the utility's system or if utility does not have ability to connect to a generator, describe plans to respond to power outages:		N/A		4	

Information for this table was taken from the Source Water Protection Contingency Plan prepared by The Thrasher Group. The complete report is provided as Appendix D.

11.3 FUTURE WATER SUPPLY NEEDS

When planning for potential emergencies and developing contingency plans, a utility needs to not only consider their current demands for treated water but also account for likely future needs. This could mean expanding current intake sources or developing new ones in the near future. This can be an expensive and time consuming process, and any water utility should take this into account when determining emergency preparedness. Green Valley Glenwood PSD - Bulltail has analyzed its ability to meet future water demands at current capacity, and this information is included in **Table 13**.

Table 13. Future Water Supply Needs for Green Valley Glenwood PSD - Bulltail

Is the utility able to meet water demands with the current production capacity over the next 5 years? If so, explain how you plan to do so.	The Bulltail WTP will be decommissioned and the Glenwood WTP will serve the customers.
If not, describe the circumstances and plans to increase production capacity:	N/A

11.4 WATER LOSS CALCULATION

In any public water system there is a certain percentage of the total treated water that does not reach the customer. Some of this water is used in treatment plant processes such as back washing filters or flushing piping, but there is usually at least a small percentage that goes unaccounted for. To measure and report on this unaccounted for water, a public utility must use the method described in the Public Service Commission's rule,

Rules for the Government of Water Utilities, 150CSR7, section 5.6. The rule defines unaccounted for water as the volume of water introduced into the distribution system less all metered usage and all known non-metered usage which can be estimated with reasonable accuracy.

To further clarify, metered usages are most often those that are distributed to customers. Non-metered usages that are being estimated include usage by fire departments for fires or training, un-metered bulk sells, flushing to maintain the distribution system, and water used for backwashing filters and cleaning settling basins. By totaling the known metered and non-metered uses the utility calculates unaccounted for water. Note: To complete annual reports submitted to the PSC, utilities typically account for known water main breaks by estimating the amount of water lost. However, for the purposes of the source water protection plan, any water lost due to leaks, even if the system is aware of how much water is lost at a main break, is not considered a use. Water lost through leaks and main breaks cannot be controlled during a water shortages or other emergencies and should be included in the calculation of percentage of water loss for purposes of the source water protection plan. The data in **Table 14** is taken from the most recently submitted Green Valley Glenwood PSD - Bulltail PSC Annual Report.

Table 14. Water Loss Information

Total Water Pumped (gal)			64,240,000	
Total Water Purchased (gal)			0	
Total Water Pu	mped and Purchased (gal)		64,240,000	
	Mains, Plants, Filters, Flus	shing, etc.	0	
Water Loss Accounted for Except Main Leaks	Fire Department	t	0	
(gal)	Back Washing		0	
	Blowing Settling Ba	sins	0	
Total Water Loss Accounted For Except Main Leaks			0	
Water Sol	d- Total Gallons (gal)		45,747,150	
Unaccounte	ed For Lost Water (gal)		0	
Water lost	from main leaks (gal)		0	
Total gallons of Unaccounted for Lost Water and Water Lost from Main Leaks (gal)			18,492,850	
Total Percent Unaccounted For Water and Water Lost from Main Leaks (gal)		28.78%		
If total percentage of Unaccounted for Water is greater than 15%, please describe any measures that could be taken to correct this problem:		inspections and replacement of older lines has been conducted.		

April 2016 24 TETRA TECH

This information was taken from the 2014 Public Service Commission Annual Report for Green Valley Glenwood PSD - Bulltail

11.5 EARLY WARNING MONITORING SYSTEM

Public water utilities are required to provide an examination of the technical and economic feasibility of implementing an early warning monitoring system. Implementing an early warning monitoring system may be approached in different ways depending upon the water utility's resources and threats to the source water. A utility may install a continuous monitoring system that will provide real time information regarding water quality conditions. This would require utilities to analyze the data to establish what condition is indicative of a contamination event. Continuous monitoring will provide results for a predetermined set of parameters. The more parameters that are being monitored, the more sophisticated the monitoring equipment will need to be. When establishing a continuous monitoring system, the utility should consider the logistics of placing and maintaining the equipment, and receiving output data from the equipment.

Alternately, or in addition, a utility may also pull periodic grab samples on a regular basis, or in case of a reported incident. The grab samples may be analyzed for specific contaminants. A utility should examine their PSSCs to determine what chemical contaminants could pose a threat to the water source. If possible, the utility should plan in advance how those contaminants will be detected. Consideration should be given to where samples will be collected, the preservations and hold times for samples, available laboratories to analyze samples, and costs associated with the sampling event. Regardless of the type of monitoring (continuous or grab), utilities should collect samples for their source throughout the year to better understand the baseline water quality conditions and natural seasonal fluctuations. Establishing a baseline will help determine if changes in the water quality are indicative of a contamination event and inform the needed response.

Every utility should establish a system or process for receiving or detecting chemical threats with sufficient time to respond to protect the treatment facility and public health. All approaches to receiving and responding to an early warning should incorporate communication with facility owners and operators that pose a threat to the water quality, with state and local emergency response agencies, with surrounding water utilities, and with the public. Communication plays an important role in knowing how to interpret data and how to respond.

Green Valley Glenwood PSD - Bulltail has analyzed its ability to monitor for and detect potential contaminants that could impact its source water. Information regarding this utility's early warning monitoring system capabilities is provided in **Table 15** and in **Appendix B**.

Table 15. Early Warning Monitoring System Capabilities

Does your system currently receive from a state agency, neighboring emergency responders, or othe from whom do you receive	water system, local r facilities? If yes,	Yes; The Green Valley Glenwood PSD Water System receives spill notifications from the WV Health Department	
Are you aware of any facilities, la areas within your protection area contaminants could be release	as where chemical	No	
Are you prepared to detect potential contaminants if notified of a spill?		Yes	
List laboratories (and contact		Laboratories	
information) on whom you would rely to analyze water		е	Contact
samples in case of a reported spill.	REI Consultants		(304) 255-2500
op	WV Office of La	ab Services	(304) 558-3530



Do you have an understanding of baseline or normal conditions for your source water quality that accounts for seasonal fluctuations?		Yes
Does your utility currently monitor raw water (through continuous monitoring or periodic grab samples) at the surface water intake or from a groundwater source on a regular basis?		No
Provide or estimate the capital and O&M costs for your current or proposed early warning system or upgraded system.	Monitoring System	Hach sc1000 (B-2)
	Capital	\$50,000.00
	Yearly O & M	\$750.00
Do you serve more than 100,000 customers? If so, please describe the methods you use to monitor at the same technical levels utilized by ORSANCO.		N/A

Information for this table was taken from the Source Water Protection Contingency Plan prepared by The Thrasher Group. The complete report is provided as Appendix D.

12.0 SINGLE SOURCE FEASIBILITY STUDY

If a public utility's water treatment plant is supplied by a single—source intake in a surface water source or a surface water influenced source of supply, the submitted source water protection plan must also include an examination and analysis of the technical and economic feasibility of alternative sources of water to provide continued safe and reliable public water service in the event that its primary source of supply is detrimentally affected by contamination, release, spill event or other reason. These alternatives may include a secondary intake, two days of additional raw or treated water storage, an interconnection with neighboring systems, or other options identified on a local level. Note: a suitable secondary intake would be required to draw water supplies from a substantially different location or water source.

To accomplish this requirement, utilities should examine all existing or possible alternatives and rank them by their technical, economic, and environmental feasibility. To have a consistent and complete method for ranking alternatives, WVBPH has developed a feasibility study guide. This guide provides several criteria to consider for each category, organized in a Feasibility Study Matrix. By completing the Feasibility Study Matrix, utilities will demonstrate the process used to examine the feasibility of each alternative and document scores that compare the alternatives. The Feasibility Study matrix and summary of the results are presented in an alternatives feasibility study attached as **Appendix D**.



13.0 COMMUNICATION PLAN

Green Valley Glenwood PSD has also developed a Communication Plan that documents the manner in which the public water utility, working in concert with state and local emergency response agencies, shall notify the local health agencies and the public of the initial spill or contamination event and provide updated information related to any contamination or impairment of the system's drinking water supply. The initial notification to the public will occur in any event no later than thirty minutes after the public water system becomes aware of the spill, release, or potential contamination of the public water system. A copy of the source water protection plan and the Communication Plan has been provided to the local fire department. Green Valley Glenwood PSD will update the Communication Plan as needed to ensure contact information is up to date.

Procedures should be in place to effectively react to the kinds of catastrophic spills that can reasonably be predicted at the source location or within the SWPA. The chain-of-command, notification procedures and response actions should be known by all water system employees.

The WVBPH has developed a recommended communication plan template that provides a tiered incident communication process to provide a universal system of alert levels to utilities and water system managers. The comprehensive Communication Plan for Green Valley Glenwood PSD - Bulltail is attached as **Appendix C** for internal review and planning purposes only.

The West Virginia Department of Environmental Protection is capable of providing expertise and assistance related to prevention, containment, and clean-up of chemical spills. The West Virginia Department of Environmental Protection Emergency Response 24-hour Phone is 1-800-642-3074. The West Virginia Department of Environmental Protection also operates an upstream distance estimator that can be used to determine the distance from a spill site to the closest public water supply surface water intake.

14.0 EMERGENCY RESPONSE

A public water utility must be prepared for any number of emergency scenarios and events that would require immediate response. It is imperative that information about key contacts, emergency services, and downstream water systems be posted and readily available in the event of an emergency. Elements of this source water protection plan, such as the contingency planning and communication plan, may contain similar information to the utility's emergency response plan. However, the emergency response plan is to be kept confidential and is not included in this source water protection plan. An Emergency Short Form is included in **Appendix C** to support the Communicate Plan by providing quick access to important information about emergency response and are to be used for internal review and planning purposes only.



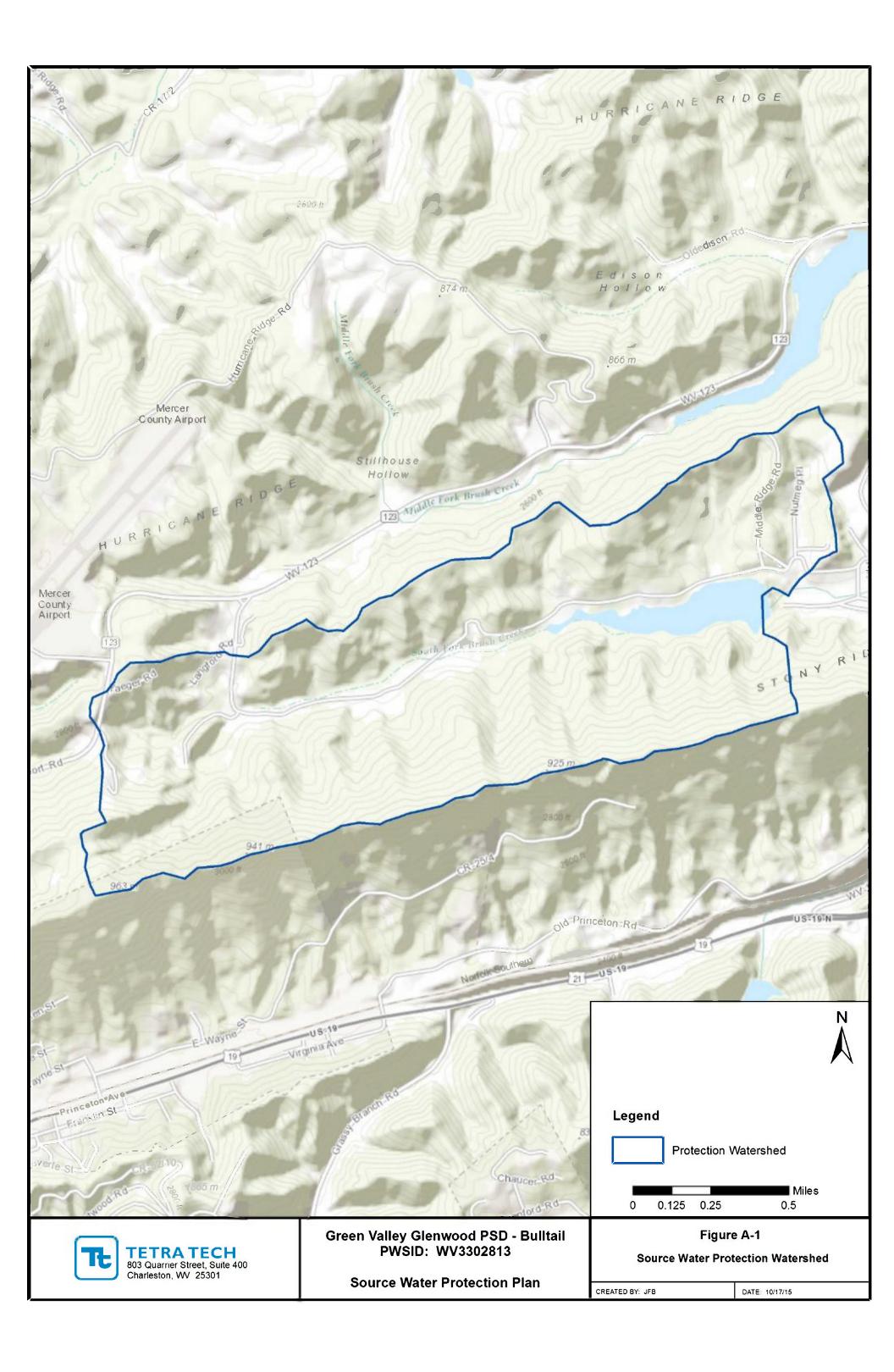
15.0 CONCLUSION

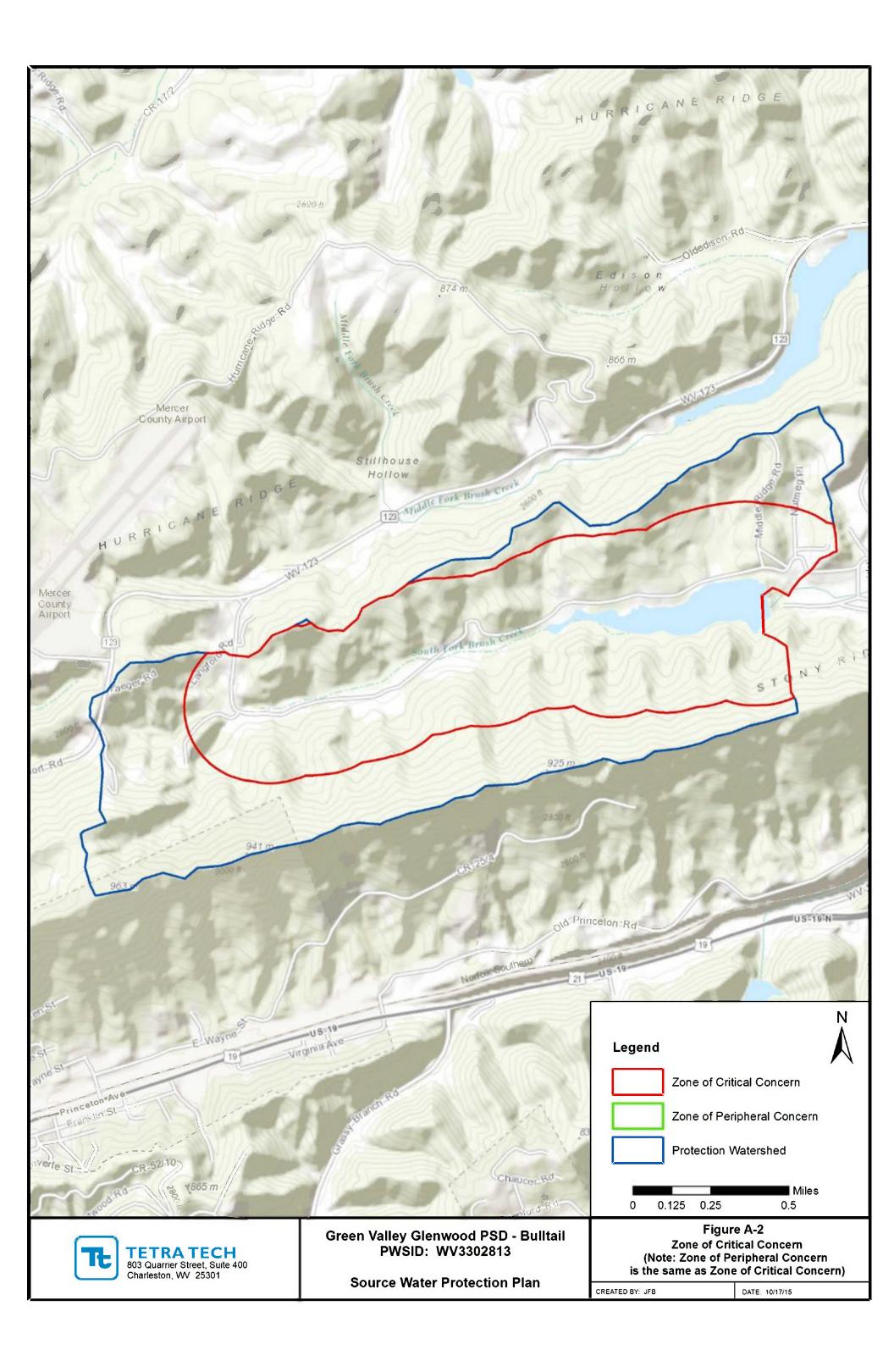
This report represents a detailed explanation of the required elements of Green Valley Glenwood PSD - Bulltail's Source Water Protection Plan. Any supporting documentation or other materials that the utility considers relevant to their plan can be found in **Appendix E**.

This source water protection plan is intended to help prepare community public water systems all over West Virginia to properly handle any emergencies that might compromise the quality of the system's source water supply. It is imperative that this plan is updated as often as necessary to reflect the changing circumstances within the water system. The protection team should continue to meet regularly and continue to engage the public whenever possible. Communities taking local responsibility for the quality of their source water is the most effective way to prevent contamination and protect a water system against contaminated drinking water. Community cooperation, sufficient preparation, and accurate monitoring are all critical components of this source water protection plan, and a multi-faceted approach is the only way to ensure that a system is as protected as possible against source water degradation.



APPENDIX A. FIGURES





Wellhead Protection Area (WHPA) Map

Green Valley Glenwood – Bulltail does not use groundwater

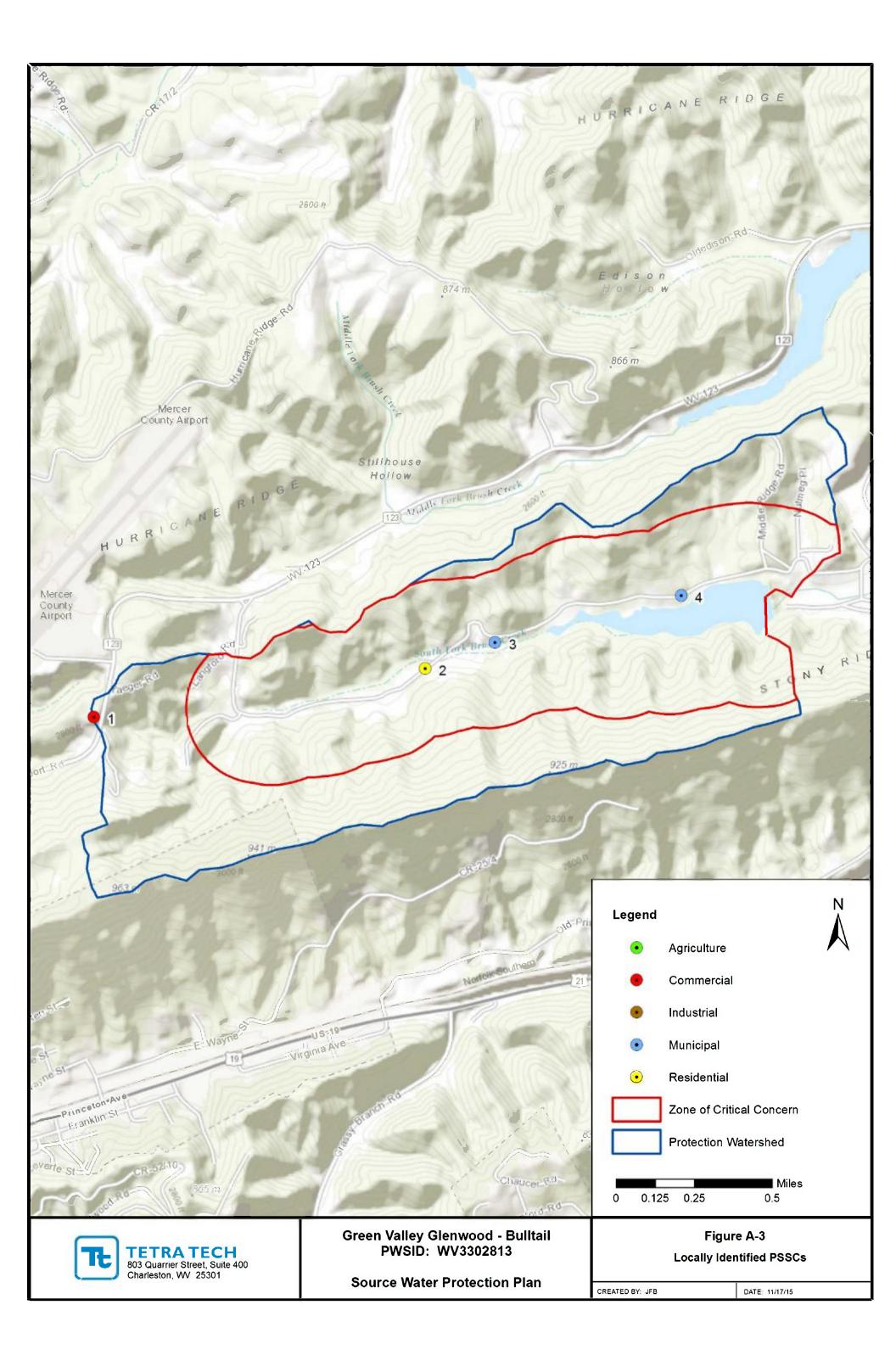


List of Locally Identified PSSCs

PSSC No.	Site Name	Site Description	Comments
1	Auto Repair Shops	Auto Repair Shop - Closed	Building remains, but does not appear to have been operated in recent years.
2	Residential Homes	Single Family Homes	Homes are served by sanitary sewer.
3	Sewer Lines	Sewage Lift Station	Operated by Green Valley Glenwood PSD.
4	Park lands	Public fishing access for bank fishing only with parking area	Parking areas have controlled access with security patrol at night.

April 2016 A-4

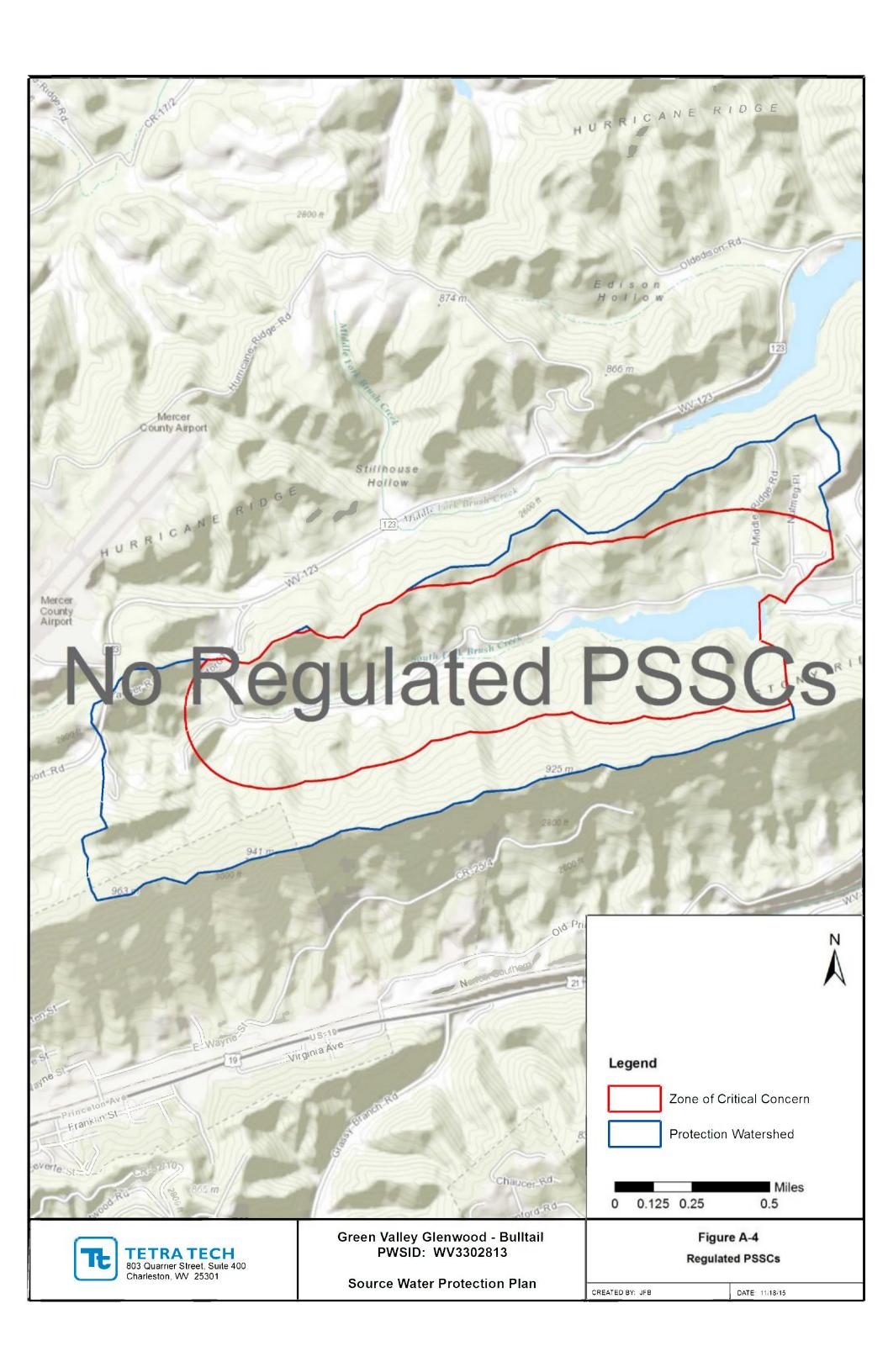




List of Regulated PSSCs

Green Valley Glenwood – Bulltail does not have regulated PSSCs





APPENDIX B. EARLY WARNING MONITORING SYSTEM FORMS

Select and Attach the Appropriate Form for Your System

Form A-Complete if you currently have an early warning monitoring system installed for a surface water source

Form B-If you do not currently have an early warning monitoring system installed for a surface water intake or are planning to upgrade or replace your current system, complete this form.

Form C-Complete if you currently have an early warning monitoring system for a groundwater source.

Form D- If you do not currently have an early warning monitoring system installed for a groundwater source or are planning to upgrade or replace your current system, complete this form.

Note: You may need to fill out and attach more than one form to your Protection Plan, depending on your current situation.



B-1 April 2016

Appendix B-Form B

Proposed Early Warning Monitoring System Worksheet- Surface Water Source

Describe the type of early warning detection equipment that could be installed, including the design.

The early warning detection equipment that could be installed includes a level controller, display module, back panel, level & trough along with conductivity, oil-in-water, ORP, and pH sensors.

Where would the equipment be located?

Early warning monitoring systems would be located on the raw water intake line where Glenwood Reservoir surface water would enter the laboratory in the water treatment facility.

What would the maintenance plan for the monitoring equipment entail?

The proposed maintenance plan for the monitoring equipment shall consist of annual cleaning and/or exchanging of the probe(s) for the controller. Periodic calibration of the unit may also be required.

Describe the proposed sampling plan at the monitoring site.

Sampling of water quality data occurs every fifteen (15) minutes. The Green Valley-Glenwood PSD Water System would need to retrieve data from the "History" of the controller data collector twice per month.

Describe the proposed procedures for data management and analysis.

Data management for the early warning monitoring system consists of data points (up to 500 points or approximately six months per probe) being recorded in the "History" of the controller data collector. To access the "History", the probe has to be plugged into the controller. Data is able to be removed via USB or through a local SCADA system.

B-2



APPENDIX C. COMMUNICATION PLAN TEMPLATE

Green Valley Glenwood PSD - Bulltail							
PWSID:WV3302813 District:Beckley, District 1							
Certified Operator: <u>Doug Taylor</u> Contact Phone Number: 304-425-5678							
Contact Fmoile Ndmber:doug_taylor70@hotmail.com							
Plan Developed On: February 2016 Plan Update:							

ACKNOWLEDGMENTS:

This plan was developed by Green Valley Glenwood PSD to meet certain requirements of the Source Water and Assessment Protection Program (SWAPP) and the Wellhead Protection Program (WHPP) for the State of West Virginia, as directed by the federal Safe Drinking Water Act (SDWA) and state laws and regulations.



TABLE OF CONTENTS

INTRODUCTION	1
TIERS REPORTING SYSTEM	
COMMUNICATION TEAM	
COMMUNICATION TEAM DUTIES	
INCIDENT / EVENT COMMUNICATION PROCEDURE	
TIERS FLOW CHART	
EMERGENCY SHORT FORMS	(
EMERGENCY CONTACT INFORMATION	9
PRESS RELEASE ATTACHMENTS	

INTRODUCTION

Legislative Rule 64CSR3 requires public water systems to develop a Communication Plan that documents how public water suppliers, working in concert with state and local emergency response agencies, shall notify state and local health agencies and the public in the event of a spill or contamination event that poses a potential threat to public health and safety. The plan must indicate how the public water supplier will provide updated information, with an initial notification to the public to occur no later than thirty minutes after the supplier becomes aware that the spill, release or potential contamination of the public water system poses a potential threat to public health and safety.

The public water system has responsibility to communicate to the public, as well as to state and local health agencies. This plan is intended to comply with the requirements of Legislative Rule 64CSR3, and other state and federal regulations.

TIERS REPORTING SYSTEM

This water system has elected to use the *Tiered Incident / Event Reporting System* (TIERS) for communicating with the public, agencies, the media, and other entities in the event of a spill or other incident that may threaten water quality. TIERS provides a multi-level notification framework, which escalates the communicated threat level commensurate with the drinking water system risks associated with a particular contamination incident or event. TIERS also includes a procedural flow chart illustrating key incident response communication functions and how they interface with overall event response / incident management actions. Finally, TIERS identifies the roles and responsibilities for key people involved in risk response, public notification, news media and other communication.

TIERS provides an easy-to-remember five-tiered **A-B-C-D-E** risk-based incident response communication format, as described below. Table 1 provides also associated risk levels.

- **A** = **A**nnouncement. The water system is issuing an announcement to the public and public agencies about an incident or event that may pose a threat to water quality. Additional information will be provided as it becomes available. As always, if water system customers notice anything unusual about their water, they should contact the water system
- **B** = **B**oil Water. A boil water advisory has been issued by the water system. Customers may use the water for showering, bathing, and other non-potable uses, but should boil water used for drinking or cooking.
- **C** = **C**annot Drink. The water system asks that users not drink or cook with the water at this time. Non-potable uses, such as showering, bathing, cleaning, and outdoor uses are not affected.
- **D** = **D**o Not Use. An incident or event has occurred affecting nearly all uses of the water. Do not use the water for drinking, cooking, showering, bathing, cleaning, or other tasks where water can come in contact with your skin. Water can be used for flushing commodes and fire protection.

E=**E**mergency. Water cannot be used for any reason.

Tier	Tier Category	Risk Level	Tier Summary	
A	A nnouncement	Low	The water system is issuing an announcement to the public and public agencies about an incident or event that could pose a threat to public health and safety. Additional information will be provided as it becomes available.	



В	B oil Water Advisory	Water system users are advised to boil any water to bused for drinking or cooking, due to possible microbia contamination. The system operator will notify users when the boil water advisory is lifted.			
С	C annot Drink	High	System users should not drink or cook with the water until further notice. The water can still be used for showering, bathing, cleaning, and other tasks.		
D	D o Not Use Very High		The water should only be used for flushing commodes and fire protection until further notice. More information on this notice will be provided as soon as it is available.		
E	Emergency	Extremely High	The water should not be used for any purpose until further notice. More information on this notice will be provided as soon as it is available.		

COMMUNICATION TEAM

The Communication Team for the water system is listed in the table below, along with key roles. In the event of a spill or other incident that may affect water quality, the water system spokesperson will provide initial information, until the team assembles (if necessary) to provide follow-up communication.

Water system communication team members, organizations, and roles.

Team Member Name	Organization	Phone	Email	Role
Marty Mariotti	Green Valley Glenwood PSD	304-325- 6832	mmgmpsd@citlink.net	Primary Spokesperson
Doug Taylor	Green Valley Glenwood PSD	304-425- 5678	doug_taylor70@hotmail.com	Secondary Spokesperson
				Member

In the event of a spill, release, or other incident that may threaten water quality, members of the team who are available will coordinate with the management staff of the local water supplier to:

- Collect information needed to investigate, analyze, and characterize the incident/event
- Provide information to the management staff, so they can decide how to respond
- Assist the management staff in handling event response and communication duties
- Coordinate fully and seamlessly with the management staff to ensure response effectiveness

TETRA TECH

COMMUNICATION TEAM DUTIES

The communication team will be responsible for working cooperatively with the management staff and state and local emergency response agencies to notify local health agencies and the public of the initial spill or contamination event. The team will also provide updated information related to any contamination or impairment of the source water supply or the system's drinking water supply.

According to Legislative Rule 64CSR3, the initial notification to the public will occur no later than thirty minutes after the public water system becomes aware that the spill, release or potential contamination of the public water system poses a potential threat to public health and safety.

As part of the group implementing the Source Water Protection Plan, team members are expected to be familiar with the plan, including incident/event response and communication tasks. Specifically, team members should:

- Be knowledgeable on elements of the Source Water Plan and Communication Plan
- Attend team meetings to ensure up-to-date knowledge of the system and its functions
- Participate in periodic exercises that "game out" incident response and communication tasks
- Help to educate local officials, the media, and others on source water protection
- Cooperate with water supplier efforts to coordinate incident response communication
- Be prepared to respond to requests for field investigations of reported incidents
- Not speak on behalf of the water supplier unless designated as the system's spokesperson

The primary spokesperson will be responsible for speaking on behalf of the water system to local agencies, the public, and the news media. The spokesperson should work with the management staff and the team to ensure that all communication is clear, accurate, timely, and consistent. The spokesperson may authorize and/or direct others to issue news releases or other information that has been approved by the system's management staff. The spokesperson is expected to be on call immediately when an incident or event which may threaten water quality occurs. The spokesperson will perform the following tasks in the event of a spill, release, or other event that threatens water quality:

- Announce which risk level (A, B, C, D, or E) will apply to the public notifications that are issued
- · Issue news releases, updates, and other information regarding the incident/event
- Use the news media, email, social media, and other appropriate information venues
- Ensure that news releases are sent to local health agencies and the public
- Respond to questions from the news media and others regarding the incident/event
- Appear at news conferences and interviews to explain incident response, etc.

INCIDENT / EVENT COMMUNICATION PROCEDURE

The flow chart in this section illustrates how the water system will respond when it receives a report that a spill, release, or other contamination event may have occurred. Key elements of the flow chart are described below.

Communication with agencies, the public, and the media during threat incidents

Upon initial notification of the incident/event, system managers and staff will collect information and verify the need for further investigation. Only properly trained personnel will perform onsite investigations if permitted by emergency responders. If further investigation is warranted, and the initial facts support it, the water system spokesperson will issue a public communication statement consistent with the threat level. In addition, water system personnel and partners will be dispatched to conduct reconnaissance, a threat assessment, and a threat characterization, if present. This work may include:

- Verification of the incident/event type (spill, release, etc.)
- Location of incident/event
- Type of material(s) involved in spill, release, etc.
- Quantity of material involved
- Potential of the material to move, migrate, or be transported



- Relevant time factor(s) in the risk assessment (e.g., downstream movement rate)
- Overall level of risk to water system, whether low, moderate, high, or very high
- Development of the initial risk characterization

As the flow chart indicates, several iterative cycles will occur after the initial threat assessment, including communication with local agencies and the public, further investigation of the incident, possible implementation of the water system's contingency plan, and eventual elimination of the threat and a return to normal operations. Communication activities during this period will include:

- The initial release (i.e., Announcement, Boil Water, Cannot Drink, Do Not Use, or Emergency)
 - Sent to local health agencies, the public, and the news media within 30 minutes
- Notification of the local water system's source water protection and communication teams
 - o If warranted by initial findings regarding the spill, release, or incident
- Notification of the WV Bureau of Public Health
 - As required
- Periodic information updates, as incident response information is received
- Updates to the applicable A-B-C-D-E advisory tier, as necessary

If time permits and the need arises, after the threat level is reduced, and operations return to normal, the water system staff, the communication and source water protection teams, and their partners will conduct a post-event review and assessment. The purpose of the review is to examine the response to the incident, relevant communication activities, and overall outcomes. Plans and procedures may be updated, altered, or adapted based on lessons learned through this process.



TIERS FLOW CHART

Public Water Supplier Becomes Aware of Incident or Event

Conduct initial assessment to determine if the incident/event poses a risk to public health and safety

Incident Poses Potential a Risk and **Requires Notification within 30 Minutes**

 Public water supplier must issue notification to the public and local health agencies within 30 minutes of determining that incident poses a risk to public health and safety

Incident Does Not Pose a Risk No Further Investigation Is Needed

- Does not require notification to the public and local health agencies in 30 minutes.
- Should notify that known incident does not pose a risk.

Activate Incident Response

 Deploy incident assessment personnel

Implement Contingency Plan if **Necessary**

• Replace/augment water source

Threat is Reduced or Eliminated- Communicate*

- Adapt as necessary
- Communicate*

Threat Assessment and Characterization

- Incident/event type (spill, release, etc.)
- Location of incident/event
- Material(s) involved in spill, release, etc.
- · Quantity of material
- Material movement/migration potential
- Time factor(s) in risk assessment
- Level of risk to water system o Low, moderate, high, very high
- Initial risk characterization
- Communicate*

- **Review Incident, Adapt Approach** • Incident response/investigation
 - Communication activities
 - Contingency operations

Return to Normal Operations

- Monitor any new developments
- Continue managing operations & source water protection program
- Communicate*

Threat Level Remains or Escalates-Communicate*

Communicate*

Constant communication with local agencies, public, and the media is critical throughout the entire process. The initial notification should include all pertinent information, depending on the TIERS level. Regular information updates should be provided. The A-B-C-D-E TIERS levels should be updated and explained as necessary.

EMERGENCY SHORT FORMS

Emergency Communication Information

		Name		Phone Number		Email		ail
Designated spokesperson:		Marty M	Mariotti 304-325-6832		32	mmgmpsd@citlink.net		citlink.net
Alternate spo	kesperson:	Doug T	ig Taylor 304-425-5678		doug_taylor70@hotmail.com			
Designated location to disseminate information to media:				-				
			Word of mouth		F	Posted notices		X
Methods of o		Door-to-door canvasing			Radio		х	
		Newspaper		Х		Other		X
Media	Naı	me -		Title		Phone lumber		Email
contacts:	N/	'A		-		-		-

Emergency Services Contacts

	Name	Emergency Phone	Alternate Phone	Email
Local Police	Mercer County Sheriff's Department	911	304-487-8384	-
Local Fire Department	Green Valley Glenwood Volunteer Fire Department	911	304-327-8375	-
Local Ambulance Service	Princeton Rescue Squad Incorporated Station 4	911	304-425-3914	-

TE TETRA TECH

Key Personnel

	Name	Title	Phone	Email
Key staff	Marty Mariotti	Utility Administrative Contact/Manager	304-325-6832	mmgmpsd@citlink.net
responsible for coordinating emergency response procedures?	Doug Taylor	Plant Manager	304-425-5678	doug_taylor70@hotma il.com
	John Poole	Outside Manager/Line Crew Manager		N/A
Staff responsible for keeping confidential	Marty Mariotti	Utility Administrative Contact/Manager	304-325-6832	mmgmpsd@citlink.net
PSSC information and releasing to emergency responders:	Doug Taylor	Plant Manager	304-425-5678	doug_taylor70@hotma il.com

Sensitive Populations

Major user/sensitive	Name	Emergency Phone	Alternate Phone
population notification:	N/A	-	•
	Name	Phone	Email
EED District Office Contact:	John Stafford	304-256-6666	John.PB.Stafford@ wv.gov



Are you planning on implementing the TIER system?					TIER System alrea	ady in pla	ace.
m Water Contacts: WVAW-Bluestone Plant			John 304-466-3365 Pentasuglia, Jr.				
Downstrea	Water S		Conta Name		Emergency Phone	A	Iternate Phone
OEHS Readiness Coordinator			an Von 304-356-4290 (main) Illen 304-550-5607 (cell)		,	warren.r.vondollen @wv.gov	
				A (Ar	nate-304-558-2981 (Office) fter Hours-304-558-2 nswering service will opriate individuals in emergency)	2981 notify	

Emergency Response Information

	Name		Phone	
List laboratories available to perform sample analysis in case of emergency:	REIC, Beaver WV office		1-800-999-0105 (Contact: Kathy Berry)	
Has the utility developed a detailed Emergency Response Plan in accordance with the Public Health Security Bioterrorism Preparedness and Response Pan Act of 2002?		Yes		
When was the Emergency Response Plan developed or last updated?			t	2014

EMERGENCY CONTACT INFORMATION

State Emergency Spill Notification 1-800-642-3074

1 000 042 3074

Office of Emergency Services

http://www.wvdhsem.gov/ Charleston, WV- (304) 558-5380

WV Bureau for Public Health Office of Environmental Health Services (OEHS)

www.wvdhhr.org/oehs

Readiness Coordinator- Warren Von Dollen

Phone; 304-356-4290 Cell; 304-550-5607

E-mail: warren.r.vondollen@wv.gov

Environmental Engineering Division Staff

Charleston, Central Office (304) 558-2981 Beckley, District 1 (304) 256-6666 St. Albans, District 2 (304) 722-0611 Kearneysville, District 4 (304) 725-9453 Wheeling, District 5 (304) 238-1145

Fairmont, District 6 (304) 368-2530

National Response Center - Chemical, Oil, & Chemical/Biological Terrorism

1-800-424-8802

WV State Fire Marshal's Office

1-800-233-3473

West Virginia State Police

1-304-746-2100

WV Watch - Report Suspicious Activity

1-866-989-2824

DEP Distance Calculator

http://tagis.dep.wv.gov/pswicheck/

C-9



PRESS RELEASE ATTACHMENTS

TIERS Levels A, B, C, D, and E

UTILITY ISSUED NOTICE – LEVEL A PUBLIC WATER SYSTEM ANNOUNCEMENT A WATER SYSTEM INVESTIGATION IS UNDERWAY

On at <u>:</u> AM/PM, th	ne	Water System began
investigating an incident that may affect	ct local water quality.	
The incident involves the following situ	uation at this location:	
There are no restrictions on water use	e at this time. As always, if wai	ter system customers notice
There are no restrictions on water use	at tino timo. Ao aiwayo, ii wai	ter system edatemers notice
anything unusual about their water – s	such as abnormal odors, color	rs, sheen, etc. – they should
contact the water system at		
At this time there is no need for concer	rn if you have consumed or u	sed the water.
Regular updates will be provided abou	ut this Announcement as wate	er system staff continue their
investigation. Again, there are no restr	rictions on water use at this tir	ne.
State Water System ID#	Nate Nistrih	nited.

UTILITY ISSUED NOTICE – LEVEL B BOIL WATER ADVISORY A BOIL WATER ADVISORY IS IN EFFECT

On at: am/pm, a water problem occurred causing contamination of you water. The areas that are affected are as follows:
□ Entire Water System or □ Other:
CONDITIONS INDICATE THERE IS A HIGH PROBABILITY THAT YOUR WATER IS CONTAMINATED. TESTING HAS NOT OCCURRED TO CONFIRM OR DENY THE PRESENCE OF CONTAMINATION IN YOUR WATER.
What should I do?
 DO NOT DRINK THE WATER WITHOUT BOILING IT FIRST. Bring all water to a bole let it boil for one minute, and let it cool before using, or use bottled water. Boiled or bottled water should be used for drinking, making ice, brushing teeth, washing dishes bathing, and food preparation until further notice. Boiling kills bacteria and other organisms in the water.
What happened?
The problem is related to
What is being done?
The water system is taking the following action:
What should a customer do if they have consumed or used the water?
We will inform you when you no longer need to boil your water. We anticipate resolving the problem within hours/days. For more information, please contact at at
General guidelines on ways to lessen the health risk are available from the EPA Safe Drinkin Water Hotline at 1 (800) 426-4791.
Please share this information others who use this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.
This notice was distributed by
State Water System ID# Date Distributed:



UTILITY ISSUED NOTICE – LEVEL C "CANNOT DRINK" WATER NOTIFICATION A LEVEL C WATER ADVISORY IS IN EFFECT

	at <u>:</u> am/ ne areas that are affecte	pm, a water problem occurred causing contamination of your ed are as follows:
		Other:
CONTAI		E IS A HIGH PROBABILITY THAT YOUR WATER IS AS NOT OCCURRED TO CONFIRM OR DENY THE ON IN YOUR WATER.
What sh	ould I do?	
		ATER. You can't drink the water, but you can use it for a-flushing, and other non-potable purposes.
		RIFY THE WATER. Do not drink the water, even if it is boiled. n suspected is not removed by boiling.
What ha	ppened?	
• T	he problem is related	to
What is	being done?	
• т	he water system is tal	king the following action:
		they have consumed or used the water?
We will in	nform you when the wat hours/days. For mor	ter is safe to drink. We anticipate resolving the problem within re information – or to report unusual water conditions such as
	ii odors, colors, sneen, e at	etc. – please contact at or
received	this notice directly (for eses). You can do this by	hers who use this water, especially those who may not have example, people in apartments, nursing homes, schools, and posting this notice in a public place or distributing copies by
State Wa	ater System ID#	Date Distributed:

UTILITY ISSUED NOTICE – LEVEL D "DO NOT USE" WATER NOTIFICATION A LEVEL D WATER ADVISORY IS IN EFFECT

	_ at <u> : </u>	n, a water problem occurred causing contamination of your are as follows:
		her:
CONTAMINA	TED. TESTING HAS	IS A HIGH PROBABILITY THAT YOUR WATER IS NOT OCCURRED TO CONFIRM OR DENY THE N IN YOUR WATER.
What should	I do?	
• DO NO	OT DRINK THE WAT	TER. The water is contaminated.
		ATHE IN THE WATER. You can't use the water for drinking, in be used for toilet flushing and firefighting.
		FY THE WATER. Do not use the water, even if it is boiled. suspected is not removed by boiling.
What happer	ned?	
• The p	roblem is related to)
What is being	g done?	
• The w	ater system is takii	ng the following action:
What should	a customer do if th	ney have consumed or used the water?
abnormal odd	ours/days. For more	r is safe to drink. We anticipate resolving the problem within information – or to report unusual water conditions such as c. – please contact or
received this	notice directly (for ex	rs who use this water, especially those who may not have cample, people in apartments, nursing homes, schools, and osting this notice in a public place or distributing copies by
This notice wa	as distributed by	
State Water S	System ID#	Date Distributed:



UTILITY ISSUED NOTICE – LEVEL E EMERGENCY WATER NOTIFICATION A LEVEL E WATER ADVISORY IS IN EFFECT

On at <u>:</u> am/pm, a water problem occurred causing contamination of your water. The areas that are affected are as follows:
□ Entire Water System or □ Other:
CONDITIONS INDICATE THERE IS A HIGH PROBABILITY THAT YOUR WATER IS CONTAMINATED. TESTING HAS NOT OCCURRED TO CONFIRM OR DENY THE PRESENCE OF CONTAMINATION IN YOUR WATER.
What should I do?
DO NOT DRINK THE WATER. The water is contaminated.
 DO NOT USE THE WATER FOR ANY PURPOSE! You can't use the water for drinking showering, or bathing, or any other use – not even for toilet flushing.
 BOILING WILL NOT PURIFY THE WATER. Do not use the water, even if it is boiled. The type of contamination suspected is not removed by boiling.
What happened?
The problem is related to
What is being done?
The water system is taking the following action:
What should a customer do if they have consumed or used the water?
_
We will inform you when the water is safe to drink. We anticipate resolving the problem within hours/days. For more information – or to report unusual water conditions such as abnormal odors, colors, sheen, etc. – please contact at or at
Please share this information others who use this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.
This notice was distributed by
State Water System ID# Date Distributed:

TETRA TECH

APPENDIX D. SINGLE SOURCE FEASIBILITY STUDY





Source Water Protection Contingency Plan Green Valley-Glenwood Public Service District - Bulltail Water System PWSID 3302813

Mercer County, WestVirginia August 2015

"This program is being presented with financial assistance as a grant from the West Virginia Department of Health and Human Resources."



Title of Preparer: Project Engineer Name of Contractor(s)/Consultant(s) (if used): The Thrasher Group, Inc. I certify the information in the source water protection plan is complete and accurate to the best of my knowledge. Signature of responsible party or designee authorized to sign for water utility: Print Name of Authorizing Signatory (see instructions): Title of Authorizing Signatory: Date of Submission (mm/dd/yyyy): 09/30/2015

TABLE OF CONTENTS

EXECUTIVE SUMMARY	1
PURPOSE	2
What are the benefits of preparing a Source Water Protection Plan?	3
BACKGROUND: WV SOURCE WATER ASSESSMENT AND PROTECTION PROGRAM	l 3
STATE REGULATORY REQUIREMENTS	3
SYSTEM INFORMATION	4
Table 1 – Population Served by the Green Valley-Glenwood PSD Bulltail Water System	5
WATER TREATMENT AND STORAGE	5
Table 2 – Green Valley-Glenwood PSD Bulltail Water System Water Treatment Information	6
Tble 3 – Green Valley-Glenwood PSD Bulltail Water System Surface Water Sources	7
Table 4 – Green Valley-Glenwood PSD Bulltail Water System Groundwater Sources	7
Response Networks and Communication	8
Table 5 – Green Valley-Glenwood PSD Bulltail Water System Water Shortage Response Capability	8
Operation During Loss of Power	9
Table 6 – Generator Capacity	9
Future Water Supply Needs	10
Table 7 – Future Water Supply Needs for the Green Valley-Glenwood PSD Bulltail Water System	11
Water Loss Calculation	11
Table 8 – Water Loss Information	12
Early Warning Monitoring System	13
Table 9 – Early Warning Monitoring System Capabilities	14
SINGLE SOURCE FEASIBILITY STUDY	15
CONCLUSION & RECOMMENDATION	15
APPENDIX A – EARLY WARNING MONITORING SYSTEM FORMS	17
APPENDIX B - FEASIBILITY STUDY MATRIX	50
APPENDIX C – ALTERNATIVES ANALYSIS	52
APPENDIX D – SUPPORTING DOCUMENTATION	58

EXECUTIVE SUMMARY

This Source Water Protection Contingency Plan is being developed for Green Valley-Glenwood PSD (District) Bulltail Water System, and is to be included as a portion of the complete Source Water Protection Plan being completed by other parties (per the West Virginia Bureau for Public Health).

The District's Bulltail Water System is a state regulated public utility and operates a public water system serving the areas of Glenwood, Ceres, Green Valley and Edison of Mercer County. The District's Bulltail Water Treatment system serves approximately 1,324 residential customers, and 74 commercial customers.

The water treatment facility for the District's Bulltail Water System obtains surface water from two (2) raw water intakes. The primary intake is on the James Bailey Reservoir with a backup intake on Glenwood Reservoir. The plant has a treatment capacity of 250,000 gallons per day and pumps approximately 8.5 hours per day on average. The facility currently produces an average of 176,000 gallons per day. The District's Bulltail Water System maintains two (2) treated water storage tanks totaling 503,000 gallons of treated water and does not have any raw water storage tanks. Currently, the District's Bulltail Water System is experiencing 28.78% unaccounted for water; however, the utility has conducted leak detection and made necessary repairs to reduce unaccounted for water. Bulltail Water System currently does not have a generator.

The District is currently implementing a project to upgrade its existing Glenwood Water Treatment Plant and increase capacity. Once the project is complete the Bulltail Water Treatment Plant will be decommissioned. The project is currently under review by the Public Service Commission (PSC).

Based on the evaluation, the Bulltail Water System currently has two alternative water sources in place in the event that the primary source is contaminated. Four (4) alternatives were evaluated in this Source Water Protection Contingency Plan.

Backup Intake

The District's Bulltail Water System currently uses the James Bailey Reservoir intake as their primary source of surface water and a secondary intake on the Glenwood Reservoir. This alternative was analyzed in the feasibility analysis.

Interconnection

The District's Bulltail Water System is currently interconnected with the Glenwood Water System and West Virginia American Water Company (WVAWC) Bluefield. The Glenwood water treatment plant has an average daily production of 550,000 gallons and maximum production rating of 876,000 gallons. The WVAWC Bluefield plant has and average daily production of 1,250,000 gallons with a maximum production rating of 2,000,000 gallons. The District's Bulltail water treatment plant has an average daily production of 176,000 gallons that is well within the current available capacity of Glenwood water treatment plant and WVAWC Bluefield water treatment plant. Thus the District's Bulltail water treatment plant can be fully reliant on either system.

Treated Water Storage

The District's Bulltail Water System currently has 503,000 gallons of treated water storage available. Senate Bill 373 requires two (2) days of storage based on maximum water produced. The District's Bulltail Water System Maximum water produced is 250,000 gallons based on twenty (24) hour period from April 2014 to April 2015. The District's has sufficient treated water storage in place to meet the requirements of the Senate Bill 373.

Raw Water Storage

The District's Bulltail Water System currently has 96,000,560 gallons of raw water storage available in James Bailey Reservoir. The minimum required is based on the maximum water produced during a twenty (24) hour period from April 2014 to April 2015. The maximum water produced in during that time is 250,000 gallons. With the James Bailey Reservoir having 96,000,560 gallons of storage the minimum required raw water storage is sufficient.

This Source Water Protection Contingency Plan describes in detail the aforementioned aspects of the District's Bulltail Water System, analyzes alternatives for sources of water supply, and compares alternatives in a feasibility matrix to determine the most suitable and feasible alternative for the District's Bulltail water system.

The District's Bulltail Water System currently has sufficient backup water sources in place in the event that the primary source is contaminated. It is recommended that the District's purchase a backup generator for use during loss of power. Further detail of the selection of this alternative is provided in the "Conclusion and Recommendation" section of this report.

PURPOSE

The goal of the West Virginia Bureau for Public Health (WV BPH) source water assessment and protection (SWAP) program is to prevent degradation of source waters which may preclude present and future uses of drinking water supplies to provide safe water in sufficient quantity to users. The most efficient way to accomplish this goal is to encourage and oversee source water protection on a local level. Every aspect of source water protection is best addressed by engaging local stakeholders.

The intent of this document is to describe what the District's Bulltail Water System has done, is currently doing, and plans to do to protect its source of drinking water. Although this water system treats the water to meet federal and state drinking water standards, conventional treatment does not fully eradicate all potential contaminants, and treatment that goes beyond conventional methods is often very expensive. By completing this plan, the District's Bulltail Water System acknowledges that implementing measures to prevent contamination can be a relatively economical way to help ensure the safety of the drinking water.

What are the benefits of preparing a Source Water Protection Plan?

- Fulfills the requirement for the public water utilities to complete or update their source water protection plan.
- Identifies and prioritizes potential threats to the source of drinking water; and establishes strategies to minimize the threats.
- Plans for emergency responses to incidents that compromise the water supply by contamination or depletion, including how the public, state, and local agencies will be informed.
- Plans for future expansion and development, including establishing secondary sources of water
- Ensures conditions to provide the safest and highest quality drinking water to customers at the lowest possible cost.
- Provides more opportunities for funding to improve infrastructure, purchase land in the protection area, and other improvements to the intake or source water protection areas.

BACKGROUND: WV SOURCE WATER ASSESSMENT AND PROTECTION PROGRAM

Since 1974, the federal Safe Drinking Water Act (SDWA) has set minimum standards on the construction, operation, and quality of water provided by public water systems. In 1986, Congress amended the SDWA. A portion of those amendments was designed to protect the source water contribution areas around groundwater supply wells. This program eventually became known as the Wellhead Protection Program (WHPP). The purpose of the WHPP is to prevent pollution of the source water supplying the wells.

The Safe Drinking Water Act Amendments of 1996 expanded the concept of wellhead protection to include surface water sources under the umbrella term of "Source Water Protection". The amendments encourage states to establish SWAP programs to protect all public drinking water supplies. As part of this initiative, states must explain how protection areas for each public water system will be delineated, how potential contaminant sources will be inventoried, and how susceptibility ratings will be established.

In 1999, the WVBPH published the West Virginia Source Water Assessment and Protection Program, which was endorsed by the United States Environmental Protection Agency. Over the next few years, WVBPH staff completed an assessment (i.e., delineation, inventory and susceptibility analysis) for all of West Virginia's public water systems. Each public water system was sent a copy of its assessment report. Information regarding assessment reports for the District's Bulltail Water System can be found in **Table 1**.

STATE REGULATORY REQUIREMENTS

On June 6, 2014, §16.1.2 and §16.1.9a of the Code of West Virginia (1931) was reenacted and amended by adding three new sections designated §16.1.9c, §16.1.9d and §16.1.9e. The changes to the code outline specific requirements for public water utilities that draw water from a surface water source or a groundwater source influenced by surface water (GUIDI).

Under the amended and new codes, each existing public water utility using surface water or ground water influenced by surface water as a source must have completed or updated a source water protection plan by July 1, 2016, and must continue to update their plan every three years. Existing source water protection plans have been developed for many public water utilities in the past. If available, these plans were reviewed and considered in the development of this updated contingency plan. Any new water system established after July 1, 2016 must submit a source water protection plan before they begin operation. A new plan is also required when there is a significant change in the potential sources of significant contamination (PSSC) within the zone of critical concern (ZCC).

The code also requires that public water utilities include details regarding PSSCs, protection measures, system capacities, contingency plans, and communication plans. Before a plan can be approved, the local health department and public will be invited to contribute information for consideration. In some instances, public water utilities may be asked to conduct independent studies of the source water protection area and specific threats to gain additional information.

SYSTEM INFORMATION

The District's Bulltail Water System is classified as a state regulated public utility and operates a public water system serving the areas of the Glenwood, Ceres, Green Valley and Edison of Mercer County. A public water system is defined as "any water supply or system which regularly supplies or offers to supply water for human consumption through pipes or other constructed conveyance, if serving at least an average of twenty-five individuals per day for at least sixty days per year, or which has at least fifteen service connections, and shall include i) any collection, treatment, storage and distribution facilities under the control of the owner or operator of the system and used primarily in connection with the system; and ii) any collection or pretreatment storage facilities not under such control which are used primarily in connection with the system." A public water utility is defined as "a public water system which is regulated by the West Virginia Public Service Commission." For purposes of this source water protection plan, public water systems are also referred to as public water utilities. Information on the population served by this utility is presented in **Table 1** below.

Table 1 – Population Served by the Green Valley-Glenwood PSD Bulltail Water System

Administrative office location:		P.O. Box 1518 Bluefield, West Virginia 24701			
Is the system a public utility, according to the Public Service Commission rule?		Public Utility PSD			
Date of Most Recent Source Water Assessment Report:		April 2003 By Bureau for Public Health			
Date of Most Recent Source Water Protection Plan:		April 2011			
Population served directly:		1,324 Residential; 74 Commercial; 1,398 Total			
Bulk Water Purchaser Systems:	System Name		PWSID Number	Population	
	N/A		N/A	N/A	
	N/A		N/A	N/A	
Total Population Served by the Utility:		3,411			
Does the utility have multiple source water protection areas (SWPAs)?		Yes			
How many SWPAs does the utility have?		Four; James Bailey Reservoir, Glenwood Reservoir, WVAWC Source and Glenwood Source			

WATER TREATMENT AND STORAGE

As required, the District's Bulltail Water System has assessed their system (e.g., treatment capacity, storage capacity, unaccounted for water, contingency plans) to evaluate their ability to provide drinking water and protect public health.

Table 2 contains information on the water treatment methods and capacity of the utility. Information about the surface water sources from which the District's Bulltail Water System draws water can be found in **Table 3**. If the utility draws water from any groundwater sources to blend with the surface water, the information about these ground water sources can be found in **Table 4**.

 $Table\ 2-Green\ Valley-Glenwood\ PSD\ Bulltail\ Water\ System\ Water\ Treatment\ Information$

Water Treatment Process (List in order)	Lake/Raw Water Source ↓ Aeration ↓ Sedimentation ↓ Filtration ↓ Clear Well ↓ High Service Pumps ↓ Tanks							
Current Treatment Capacity (gal/day)	576,000 GPD							
Current Average Production (gal/day)	176,000 GPD							
Maximum Quantity Treated and Produced (gal)	250,000 GPD							
Minimum Quantity Treated and Produced (gal)	140,000 GPD							
Average Hours of Operation	8.5 hours per day							
Maximum Hours of Operation in One Day	24 hours per day							
Minimum Hours of Operation in One Day	0 hours per day							
Number of Storage Tanks Maintained	2							
Total Gallons of Treated Water Storage (gal)	503,000 GAL							
Total Gallons of Raw Water Storage (gal)	96,000,560 GAL							

 $Table\ 3-Green\ Valley-Glenwood\ PSD\ Bulltail\ Water\ System\ Surface\ Water\ Sources$

Intake Name	SDWIS #	Local Name	Describe Intake	Name of Water Source	Date Constructed/ Modified	Frequency of Use (Primary/ Backup/ Emergency)	Activity Status (Active/ Inactive)
James Bailey Reservoir		James Bailey Reservoir	Gravity feed with screens to raw water pump	James Bailey Reservoir	1950's	Primary	Active
Glenwood Reservoir		Glenwood Reservoir	Gravity feed with screens to raw water pump	Glenwoods Reservoir	1970's	Backup	Active

 $Table\ 4-Green\ Valley-Glenwood\ PSD\ Bulltail\ Water\ System\ Groundwater\ Sources$

Does the utility bler	nd with groundwater?	No
-----------------------	----------------------	----

Response Networks and Communication

Statewide initiatives for emergency response, including source water related incidents, are being developed. These include the West Virginia Water/Wastewater Agency Response Network (WV WARN, see http://www.wvwarn.org/) and the Rural Water Association Emergency Response Team (see http://www.wvrwa.org/). The District's Bulltail Water System has analyzed its ability to effectively respond to emergencies and this information is provided in **Table 5**.

Table 5 – Green Valley-Glenwood PSD Bulltail Water System Water Shortage Response Capability

Can the utility isolate or divert contamination from the intake or groundwater supply?	No
Describe the utility's capability to isolate or divert potential contaminants:	N/A
Can the utility switch to an alternative water source or intake that can supply full capacity at any time?	Yes
Describe in detail the utility's capability to switch to an alternative source:	The District's Bulltail Water System can switch to the WVAWC Bluefield System and the Glenwood WTP by closing gate valves.
Can the utility close the water intake to prevent contamination from entering the water supply?	Yes
How long can the intake stay closed?	The intake can stay closed as long as WVAWC Bluefield or Glenwood water treatment systems can supply water. (See Note Below)
Describe the process to close the intake:	Gate Valves are Closed
Describe the treated water storage capacity of the water system:	The District's has two (2) storage tanks totaling 503,000 gallons of treated water storage.
Is the utility a member of WVRWA Emergency Response Team?	Yes
Is the utility a member of WV-WARN?	Yes
List any other mutual aid agreements to provide or receive assistance in the event of an emergency:	Interconnection with WVAWC Bluefield System and Glenwood WTP

Note: In the event the primary source is contaminated, it is recommended that the Utility evaluate the water storage on hand at that time and determine that the alternative source is sufficient to sustain the water system for the duration of shutdown.

It is suggested that, if the utility does not have the capability to divert contamination from the surface water intake, pre-cast concrete bases are constructed around the raw water intake to drop booms into the water and physically divert surface contaminants from entering the raw water intake.

Operation During Loss of Power

This utility analyzed and examined its ability to operate effectively during a loss of power. This involved ensuring a means to supply water through treatment, storage, and distribution without creating a public health emergency. Information regarding the utility's capacity for operation during power outages is shown in **Table 6**. The utility's standby capacity would have the capability to provide power to the system as if normal power conditions existed. The utility's emergency capacity would have the capability to provide power to only the essential equipment and treatment processes to provide water to the system. Information regarding the emergency generator capacity for each utility was calculated by the WV BPH and can be found in Appendix D, "Supporting Documentation".

Table 6 – Generator Capacity

What is the type and capacity of the generator needed to operate during a loss of power?	50 KW portable for booster stations.					
Can the utility connect to generator at intake/wellhead? If yes, select a scenario that best describes system.	No; the generator would need to be able to connect to a quick connect.					
Can the utility connect to generator at treatment facility? If yes, select a scenario that best describes system.	No, the treatment facility will be decommissioned					
Can the utility connect to a generator in distribution system? If yes, select a scenario that best describes system.	No; 50 kW generator for the booster stations with a quick connect power connections to provide power service.					
Does the utility have adequate fuel on hand for the generator?	No					
What is your on-hand fuel storage and	Gallons	Hours				
how long will it last operating at full capacity?	N/A	N/A				

Provide a list of		Supplier		Contact Name	Phone Number				
suppliers that could	Generator	Cate	erpillar	Walker-CAT	(304) 949-6400				
provide generators and fuel in the	Generator	Cur	mmins	Crosspoint	(304) 769-1012				
event of an emergency:	Fuel	RT	Rogers		(304) 466-1733				
emergency.	Fuel	1	N/A	N/A	N/A				
Does the utility test periodically?	the generato	r(s)	N/A						
Does the utility routinely maintain the generator?			N/A						
If no scenario descri connect to generator system or if utility d connect to a generat respond to power ou	matches the oes not have or, describe	e utility's ability to	N/A						

If a portable generator is available through the respective county's 911 or Emergency Center, it is assumed the generator is available **only** for the utility for which this source water protection contingency plan is prepared. If more than one utility in the county uses the portable generator during power outages, it is suggested that each utility procure a generator specifically to protect their system during a power outage.

Future Water Supply Needs

When planning for potential emergencies and developing contingency plans, a utility needs to not only consider their current demands for treated water but also account for likely future needs. This could mean expanding current intake sources or developing new ones in the near future. This can be an expensive and time consuming process, and any water utility should take this into account when determining emergency preparedness. District's Bulltail Water System has analyzed its ability to meet future water demands at current capacity and this information is included in **Table 7**.

Table 7 – Future Water Supply Needs for the Green Valley-Glenwood PSD Bulltail Water System

Is the utility able to meet water demands with the current production capacity over the next 5 years? If so, explain how you plan to do so.	The Bulltail WTP will be decommissioned and the Glenwood WTP will serve the customers.
If not, describe the circumstances and plans to increase production capacity:	N/A

Water Loss Calculation

In any public water system, there is a certain percentage of the total treated water that does not reach the customer distribution system. Some of this water is used in treatment plant processes such as backwashing filters or flushing piping, but there is usually at least a small percentage unaccounted. To measure and report on this unaccounted for water, a public utility must use the same method used in the Public Service Commission's rule, *Rules for the Government of Water Utilities*, 150CSR7, Section 5.6. The rule defines unaccounted for water as "the volume of water introduced into the distribution system less all metered usage and all known non-metered usage which can be estimated with reasonable accuracy."

To further clarify, metered usages are most often those that are distributed to customers. Non-metered usages estimated include water used by fire departments for fires or training, un-metered bulk sales, flushing to maintain the distribution system, backwashing filters, and cleaning settling basins. By totaling the metered and non-metered uses, the utility calculates unaccounted for water. Note: To complete annual reports submitted to the PSC, utilities typically account for known water main breaks by estimating the amount of water lost. However, for the purposes of the source water protection plan, any water lost due to leaks – even if the system is aware of how much water is lost at a main break – is not considered a use. Water lost through leaks and main breaks cannot be controlled during water shortages or other emergencies and should be included in the calculation of percentage of water loss for purposes of the source water protection plan. The data in Table 8 is taken from the most recently submitted District's Bulltail Water System PSC Annual Report.

Table 8 – Water Loss Information

Total Water Pump	ed (gal)	64,240,000			
Total Water Purch	ased (gal)	0			
Total Water Pump	ed and Purchased (gal)	64,240,000			
	Mains, Plants, Filters, Flushing, etc.	0			
Water Loss Accounted for	Fire Department	0			
Except Main Leaks (gal)	Back Washing	0			
	Blowing Settling Basins	0			
Total Water Loss A	Accounted For Except Main Leaks	0			
Water Sold- Total	Gallons (gal)	45,747,150			
Unaccounted For I	Lost Water (gal)	0			
Water lost from ma	ain leaks (gal)	0			
Total gallons of Un Lost from Main Le	accounted for Lost Water and Water aks (gal)	18,492,850			
Total Percent Unac from Main Leaks (ecounted For Water and Water Lost %)	28.78%			
•	of Unaccounted for Water is greater escribe any measures that could be is problem:	Increase inspections and replacemen of older lines has been conducted.			

Early Warning Monitoring System

Public water utilities are required to provide an examination of the technical and economic feasibility of implementing an early warning monitoring system. Implementing an early warning monitoring system may be approached in different ways depending upon the water utility's resources and threats to the source water. A utility may install a continuous monitoring system that will provide real-time information regarding water quality conditions. This would require utilities to analyze the data in order to establish what condition is indicative of a contamination event. Continuous monitoring will provide results for a predetermined set of parameters. The more parameters being monitored, the more sophisticated the monitoring equipment will be. When establishing a continuous monitoring system, the utility should consider the logistics of placing and maintaining the equipment and receiving output data from the equipment.

Alternately, or in addition, a utility may also pull periodic grab samples on a regular basis or in case of a reported incident. The grab samples may be analyzed for specific contaminants. A utility should examine their PSSCs to determine what chemical contaminants could pose a threat to the water source. If possible, the utility should plan in advance how those contaminants will be detected. Consideration should be given for where samples will be collected, the preservations and hold times for samples, available laboratories to analyze samples, and costs associated with the sampling event. Regardless of the type of monitoring (continuous or grab), utilities should collect samples for their source throughout the year to better understand the baseline water quality conditions and natural seasonal fluctuations. Having a baseline will help determine if changes in the water quality are indicative of a contamination event and inform the needed response.

Every utility should establish a system or process for receiving or detecting chemical threats with sufficient time to respond to protect the treatment facility and public health. All approaches to receiving and responding to an early warning should incorporate communication with facility owners and operators that pose a threat to the water quality, state and local emergency response agencies, surrounding water utilities, and the public. Communication plays an important role in knowing how to interpret data and how to respond.

The District's Bulltail Water System has analyzed its ability to monitor for and detect potential contaminants that could impact its source water. Information regarding this utility's early warning monitoring system capabilities can be found in **Table 9** and in **Appendix A**.

Table 9 – Early Warning Monitoring System Capabilities

Does your system currently reconcifications from a state agency water system, local emergency other facilities? If yes, from where the control of the contro	y, neighboring responders, or	Yes; The utility receives spill notifications from the WV Health Department						
Are you aware of any facilities, critical areas within your prote where chemical contaminants or released or spilled?	ection areas	No						
Are you prepared to detect pot contaminants if notified of a sp		Yes						
		Lal	orator	ries				
List laboratories (and contact information) on which you	Na	ame		Contact				
would rely to analyze water samples in case of a reported	REI Co	nsultants		(304) 255-2500				
spill.	WV Office o	f Lab Servic	es	(304) 558-3530				
Do you have an understanding normal conditions for your sou quality that accounts for season fluctuations?	rce water	Yes						
Does your utility currently more (through continuous monitoring grab samples) at the surface was from a groundwater source on basis?	g or periodic ater intake or	No						
Provide or estimate the capital		Capital		\$50,000.00				
costs for your current or propo warning system or upgraded sy		Yearly O&M		\$750.00				
Do you serve more than 100,00 so, please describe the methods monitor at the same technical l by ORSANCO.	you use to	No						
Note: Complete appropriate Early Warning Monitoring form for your system in Appendix A (Line 71). WVAWC maybe a viable option to expedite the testing of water samples.								

SINGLE SOURCE FEASIBILITY STUDY

If a public water utility's water supply plant is served by a single-source intake to a surface water source of supply or a surface water influenced source of supply, the submitted source water protection plan must also include an examination and analysis of the technical and economic feasibility of alternative sources of water to provide continued safe and reliable public water service in the event its primary source of supply is detrimentally affected by contamination, release, spill event or other reason. These alternatives may include a secondary intake, two days of raw or treated water storage, interconnections with neighboring systems, or other options identified on a local level. Note: a secondary intake would draw water supply from a substantially different location or water source.

In order to accomplish this requirement, utilities should examine all existing or possible alternatives and rank them by their technical, economic, and environmental feasibility. In order to have a consistent method for ranking alternatives, WV BPH has developed a feasibility study guide. This guide provides several criteria to consider for each category, organized in a scoring matrix. By completing the Feasibility Study, utilities will demonstrate the process used to examine the feasibility of each alternative. The Feasibility Study matrix is attached as **Appendix B**. Those alternatives that are ranked highest and deemed to be most feasible will then be the subject of a second, more in-depth, study to analyze the comparative costs, risks, and benefits of implementing each of the described alternatives. An alternatives analysis report providing these details is attached as **Appendix C**.

CONCLUSION & RECOMMENDATION

This report represents a detailed explanation of the required elements of the District's Bulltail Water System Source Water Protection Plan. Any supporting documentation or other materials that the utility considers relevant to their plan can be found in **Appendix D**.

This source water protection plan is intended to help prepare community public water systems all over West Virginia to properly handle any emergencies that might compromise the quality of the system's source water supply. It is imperative that this plan is updated as often as necessary to reflect the changing circumstances within the water system. The protection team should continue to meet regularly and continue to engage the public whenever possible. Communities taking local responsibility for the quality of their source water are the most effective way to prevent contamination and protect a water system against contaminated drinking water. Community cooperation, sufficient preparation, and accurate monitoring are all critical components of this source water protection plan, and a multi-faceted approach is the only way to ensure that a system is as protected as possible against source water degradation.

Based from the evaluation of the existing water system, the District's Bulltail water system has two alternative water sources that can fully sustain the water demands in the event the James Bailey Reservoir is contaminated. As shown in the Feasibility Matrix in Appendix B, the alternative with the highest final score of feasibility is the interconnection with Glenwood water treatment system. The District's has plans to decommission the Bulltail water treatment plant once the Glenwood water treatment plant is expanded. Since the Bulltail water treatment plant is

scheduled to be decommissioned. The recommendation is for the District's to purchase a 50 KW portable generator to operate booster stations during power outages. Further explanations of the costs are provided in Appendix D, "Supporting Documentation". The District's has plans to decommission the Bulltail Water Treatment Plant once the Glenwood Water treatment plant is expanded.

RECOMMENDED ALTERNATIVE COST ESTIMATE

1	LS	50 KW Portable Generator	\$ 45,200
		TOTAL =	\$ 45,200

ASSUMPTIONS: Water treatment plant will be decommissioned by 2018.

APPENDIX A -	FARIY	WARNING	MONITORING	CYCTEM	FORMS
ALLENDIV V	· LANLI			JIJIEN	runij

Select and Attach the Appropriate Form for Your System.

Form A - Complete if you currently have an early warning monitoring system installed for a surface water source.

Form B – If you do not currently have an early warning monitoring system installed for a surface water intake or plan to upgrade or replace your current system, complete this form.

Form C – Complete if you currently have an early warning monitoring system for a groundwater source.

Form \mathbf{D} – If you do not currently have an early warning monitoring system installed for a groundwater source or plan to upgrade or replace your current system, complete this form.

Note: You may need to fill out and attach more than one form to your Protection Plan, depending on your current situation.

Appendix A – Form B

Proposed Early Warning Monitoring System Worksheet- Surface

Describe the type of early warning detection equipment that could be installed, including the design.

The early warning detection equipment that could be installed includes a level controller, display module, back panel, level & trough (see cost estimate by Hach Company in Appendix D, "Supporting Documentation") along with conductivity, oil-in-water, ORP, and pH sensors.

Where would the equipment be located?

Early warning monitoring systems would be located on the raw water intake line where James Bailey Reservoir surface water would enter the laboratory in the water treatment facility.

What would the maintenance plan for the monitoring equipment entail?

The proposed maintenance plan for the monitoring equipment shall consist of annual cleaning and/or exchanging of the probe(s) for the controller. Periodic calibration of the unit may also be required.

Describe the proposed sampling plan at the monitoring site.

Sampling of water quality data occurs every fifteen (15) minutes. The Green Valley-Glenwood PSD Bulltail Water System would need to retrieve data from the "History" of the controller data collector twice per month.

Describe the proposed procedures for data management and analysis.

Data management for the early warning monitoring system consists of data points (up to 500 points or approximately six months per probe) being recorded in the "History" of the controller data collector. To access the "History", the probe has to be plugged into the controller. Data is able to be removed via USB or through a local SCADA system.

Literature related to the development and design of early warning systems is provided on the following pages. Courtesy of the American Water Works Association.

APPENDIX B - FEASIBILITY STUDY MATRIX

Feasibility Mat	trix		Gre	en Valley Bu	ılltail		PWSID:		WV3302813	3	Date:	6/30	2015	Comple	eted by:	Project Engineer - The Thrasher Group, Inc.				p, Inc.	
Alternative Strategy Description	Operation & Majo.		onomic Crite		Weighton	Permission	neting Flexibii.		chnical Crite		lest.	Weighten	Finurionmen.		Stakeholds.	/		Weighted Total	Final Score	Total Capital Cost	Comments
Backup Intake	3.0	3.0	6.0	100.0%	40.0%	3.0	3.0	3.0	3.0	12.0	100.0%	40.0%	3.0	3.0	3.0	9.0	100.0%	20.0%	100.0%		This alternative has already been constructed.
Interconnect	3.0	3.0	6.0	100.0%	40.0%	3.0	3.0	3.0	3.0	12.0	100.0%	40.0%	3.0	3.0	3.0	9.0	100.0%	20.0%	100.0%		This alternative has already been constructed.
Treated Water Storage	3.0	3.0	6.0	100.0%	40.0%	3.0	3.0	3.0	3.0	12.0	100.0%	40.0%	3.0	3.0	3.0	9.0	100.0%	20.0%	100.0%		Distirict meets the minimum required
Raw Water Storage	3.0	3.0	6.0	100.0%	40.0%	3.0	3.0	3.0	3.0	12.0	100.0%	40.0%	3.0	3.0	3.0	9.0	100.0%	20.0%	100.0%		Distirict meets the minimum required
Other (Specify)	0.0	0.0	0.0	0.0%	0.0%	0.0	0.0	0.0	0.0	0.0	0.0%	0.0%	0.0	0.0	0.0	0.0	0.0%	0.0%	0.0%		[INSERT COMMENTS FROM ALTERNATIVES ANALYSIS]

Scoring:

- 0 Not feasible. Criterion cannot be met by this alternative and removes the alternative from further consideration.
 - Feasible but difficult. Criterion represents a significant barrier to successful implementation but does not eliminate it from consideration.
- Feasible. Criterion can be met by the alternative.
- Very Feasible. Criterion can be easily met by the alternative.

APPENDIX C – ALTERNATIVES ANALYSIS

ANALYSIS OF ALTERNATIVES

The District's Water System currently has an alternative source of water supply and an existing interconnection. These existing alternatives were considered during the feasibility analysis. Additional detail is provided below.

1. Backup Intake

The District's surface water intake located on James Bailey Reservoir is currently the primary source of water supply. The Glenwood Reservoir is the backup intake which can fully sustain the water system's maximum demand. Thus, this alternative was be considered during the feasibility analysis.

2. Interconnection

The District's Bulltail Water System is currently interconnected with the Green Valley-Glenwood water treatment system and WVAWC Bluefield water treatment system. For the Green Valley-Glenwood and WVAWC Bluefield to provide water to the District's Bulltail Water System would require activating an existing booster station and opening gate valves.

On average, the District's Glenwood water treatment facility produces 550,000¹ gallons per day. The current treatment capacity of the treatment facility is 876,000² gallons per day. If the District's Bulltail Water System were to fully rely on the District's Glenwood water treatment facility for water supply, they would contribute an additional 176,000³ gallons per day on average.

Therefore, bringing the total amount of water treated at the Glenwood water treatment facility to:

$$550,000^{1} \text{ GPD} + 176,000^{3} \text{ GPD} = 726,000^{4} \text{ GPD}$$

The total treated amount of 726,000⁴ gallons per day is below the treatment capacity of 876,000² gallons per day. Therefore, the interconnection with Glenwood system can provided long term water supply to the Bulltail System.

On average, the WVAWC Bluefield water treatment facility produces 1,250,000¹ gallons per day. The current treatment capacity of the treatment facility is 2,000,000² gallons per day. If the District's Bulltail Water System were to fully rely on the WVAWC Bluefield treatment facility for water supply, they would contribute an additional 176,000³ gallons per day on average.

Therefore, bringing the total amount of water treated at the WVAWC Bluefield treatment facility to:

$$1,250,000^{1} \text{ GPD} + 176,000^{3} \text{ GPD} = 1,426,000^{4} \text{ GPD}$$

The total treated amount of 1,426,000⁴ gallons per day is below the treatment capacity of 2,000,000² gallons per day. Therefore, the interconnection with WVAWC Bluefield system can provided long term water supply to the Bulltail System.

3. Treated Water Storage

The District's Bulltail Water System treated water storage capacity for the system consists of two (2) water storage tanks totaling 503,000 gallons. On average, the water treatment facility produces 176,000 gallons per day. The maximum amount of water produced by the water treatment facility in a twenty-four (24) hour period from April 2014 to April 2015 was 250,000 gallons per day, according to monthly operating reports provided by the utility.

Senate Bill 373 requires utilities to maintain a minimum required treated storage capacity equal to two (2) days of system storage based on the plant's maximum level of production experienced within the past year. The minimum required treated water storage capacity for the system would be:

$$250,000$$
 gallons per day * 2 days = $500,000$ gallons

Therefore, the system currently meets the minimum required treated water storage capacity.

4. Raw Water Storage

The District's Water System raw water storage capacity for the system consists 94,000,560 gallons. The minimum required raw water storage capacity equal to two (2) days of system storage based on the plant's maximum level of production experienced within the past year.

The minimum required raw water storage capacity for the system would be:

$$250,000$$
 gallons per day $*2$ days = $500,000$ gallons

Therefore, the District's Bulltail Water System has adequate amount of raw water storage.

Feasibility Matrix	Green Valley Bulltail	PWSID: WV3302813 Date: 30-Jun-15 Completed by:				Project Engineer - The Thrasher Group, Inc.					
Criteria	Question	Backup Intake	Feasibility	Interconnect	Feasibility	Treated Water Storage	Feasibility	Raw Water Storage	Feasibility	Other (Specify)	Feasibility
	Economic Criteria										
What is the total current budget	What is the total current budget year cost to operate and maintain the PWSU (current budget year)?			\$1,124,039.00		\$1,124,039.00		\$1,124,039.00		\$1,124,039.00	
O and M Costs	Describe the major O&M cost requirements for the alternative?	Labor, power and materials for maintenance	3	Labor, power and materials for maintenance	3	Labor and materials for maintenance	3	Labor and materials for maintenance	3		0
	What is the incremental cost (\$/gal) to operate and maintain the alternative?	\$0.00	3	\$0.00	3	\$0.00	3	\$0.00	3	\$0.00	0
	Cost comparison of the incremental O&M cost to the current budgeted costs (%)	0.00%	3	0.00%	3	0.00%	3	0.00%	3	0.00%	0
	O and M-Feasibility Score		3.0		3.0		3.0		3.0		0.0
Describe the capita	al improvements required to implement the alternative.	Done		Done		Done		Done			
	What is the total capital cost for the alternative?	\$0.00	3	\$0.00	3	\$0.00	3	\$0.00	3	\$0.00	0
Capital Costs	What is the annualized capital cost to implement the alternative, including land and easement costs, convenience tap fees, etc. (\$/gal)	\$0.00	3	\$0.00	3	\$0.00	3	\$0.00	3	\$0.00	0
	Cost comparison of the alternatives annualized capital cost to the current budgeted costs (%)	0.00%	3	0.00%	3	0.00%	3	0.00%	3	0.00%	0
	Capital Cost-Feasibility Score		3.0		3.0		3.0		3.0		0.0
	Provide a listing of the expected permits required and the permitting agencies involved in their approval.	Done	3	Done	3	Done	3	Done	3		0
Permitting	What is the timeframe for permit approval for each permit?	Done	3	Done	3	Done	3	Done	3		0
	Describe the major requirements in obtaining the permits (environmental impact studies, public hearings, etc.)	Done	3	Done	3	Done	3	Done	3		0
	What is the likelihood of successfully obtaining the permits?	Good	3	Good	3	Good	3	Good	3		0
	Does the implementation of the alternative require regulatory exceptions or variances?	No	3	No	3	No	3	No	3		0
Permitting-Feasibility Score			3.0		3.0		3.0		3.0		0.0
Flexibility	Will the alternative be needed on a regular basis or only used intermittently?	Intermittently	3	Intermittently	3	Intermittently	3	Intermittently	3		0
	How will implementing the alternative affect the PWSU's current method of treating and delivering potable water including meeting Safe Drinking Water Act regulations? (ex. In the case of storage, will the alternative increase the likelihood of disinfection byproducts?)	No impact	3	No impact	3	No impact	3	No impact	3		0
Flexibility-Feasibility Score			3.0		3.0		3.0		3.0		0.0

Criteria	Question	Backup Intake	Feasibility	Interconnect	Feasibility	Treated Water Storage	Feasibility	Raw Water Storage	Feasibility	Other (Specify)	Feasibility
Resilience	Will the alternative provide any advantages or disadvantages to meeting seasonal changes in demand?	Yes	3	Yes	3	Yes	3	Yes	3		0
	How resistant will the alternative be to extreme weather conditions such as drought and flooding?	Drought may limit the availability of water.	3	Drought may limit the availability of water.	3	Drought may limit the availability of water.	3	Drought may limit the availability of water.	3		0
	Will the alternative be expandable to meet the growing needs of the service area?	Yes	3	Yes	3	Yes	3	Yes	3		0
	Resilience-Feasibility Score		3.0		3.0		3.0		3.0		0.0
Institutional Requirements	Identify any agreements or other legal instruments with governmental entities, private institutions or other PWSU required to implement the alternative.	None	3	An agreement with WVAWC will be required.	3	None	3	None	3		0
	Are any development/planning restrictions in place that can act as a barrier to the implementation of the alternative.	No	3	No	3	No	3	No	3		0
	Identify potential land acquisitions and easements requirements.	Easements (permanent and temporary) may be required for the construction of the intake line.	3	Easements (permanent and temporary) may be required for the construction of the interconnection.	3	Property acquisition would be required for the tank.	3	Property acquisition would be required for the tank.	3		0
Instit	utional Requirements-Feasibility Score		3.0		3.0		3.0		3.0		0.0
	Environmental Criteria										
Environmental Impacts	Identify any environmentally protected areas or habitats that might be impacted by the alternative.	None are known.	3	None are known.	3	None are known.	3	None are known.	3		0
Env	vironmental Impacts-Feasibility Score		3.0		3.0		3.0		3.0		0.0
Aesthetic Impacts	Identify any visual or noise issues caused by the alternative that may affect local land uses?	Done	3	Done	3	Done	3	Done	3		0
	Identify any mitigation measures that will be required to address aesthetic impacts?	Done	3	Done	3	Done	3	Done	3		0
	Aesthetic Impacts-Feasibility Score		3.0		3.0		3.0		3.0		0.0
	Identify the potential stakeholders affected by the alternative.	Done	3	Done	3	Done	3	Done	3		0
Stakeholder Issues	Identify the potential issues with stakeholders for and against the alternative.	Done	3	Done	3	Done	3	Done	3		0
	Will stakeholder concerns represent a significant barrier to implementation (or assistance) of the alternative?	No	3	No	3	No	3	No	3		0
S	takeholder Issues-Feasibility Score		3.0		3.0		3.0		3.0		0.0
Comments		This alternative has already been constructed.		This alternative has already been constructed.		Distirict meets the minimum required.		Distirict meets the minimum required		This alternative has already been constructed. OR No comment	

Matrix Explanation

The alternative analysis matrix evaluates the utility's ability to implement each of the additional sources outlined. Alternative sources are evaluated for economic, technical and environmental feasibility. The matrix uses a 0-3 rating system, with 3 being very feasible and 0 being not feasible. Each category has sub questions to develop an average for the alternative. Once all areas are evaluated, a final feasibility score is given for each of the alternatives for use in determining which option will best suit the utility needs.

Economic factors evaluated in the matrix include all information needed to fund the alternative source. The matrix considers the current utility budget available per the latest (2014) annual report, operation and maintenance costs for each alternative, and the capital needed to construct each alternative. Supporting documentation is included in Appendix D of the report which provides a breakdown of costs for each alternative that are used as capital costs in the matrix. The economic feasibility of each alternative is compared on a cost per gallon ratio. This ratio is determined by dividing the capital cost of the improvements by the total number of gallons of water produced per year. An average of the economic feasibility factors is then calculated and entered into the overall feasibility matrix found in Appendix B.

Technical criteria evaluated include permitting, flexibility, institutional and resilience factors. Permitting costs are included in all supporting documentation for each alternative source. The permitting factors included the permits that would be needed to construct the alternative source for the utility. An additional environmental factor is the feasibly of obtaining each permit. Permits were rated from 3 to 0 based on the difficulty of obtaining the permits for the project. Depending on the project area, some permits may be very difficult and costly to obtain. Flexibility factors evaluate the ability of the alternative to be used as a permanent source of water or if it can only be used on a temporary basis. The intake and interconnections can be used as both temporary and permanent sources. The alternatives' ability to help the utility during seasonal or population increases is also evaluated in the resilience factors. The alternatives that can produce additional water were rated as 3, or very feasible. Additional criteria evaluated are easements and right of ways that will need to be acquired to construct the alternative source. For interconnections and intakes right of way would be needed to lay the new waterline. The feasibility of attaining the right of way was evaluated. All technical criteria was averaged and also entered into the feasibility summary in Appendix B.

Environmental aspects for each alternative include impacts, aesthetics and stakeholders. Environmental impacts included any areas in the proposed alternative source area that are protected. Areas that are protected would have a low feasibility because the impacts could be large if the project were constructed. Aesthetics factors were noise, visual impacts and mitigation measures that could affect the projects feasibility. The aesthetic factors relate to the stakeholders factors. The stakeholders' portion of the environmental criteria involves the community and their acceptance of the new source alternative and the structures that will be constructed.

APPENDIX D - SUPPORTING DOCUMENTATION

Generator Quote

Description	Quantity
50kW Portable Generator	
Sound attenuated, white powder coated lockable enclosure	
Roof mounted, single point lift	
Cooling system rated for 120° F (50° C) ambient	
Complete engine fluid containment reservoir	
Shore power (120 VAC) - No breakers in shore power connection.	
Single phase convenience receptacles	
Distribution panel with L1, L2, L3 neutral and ground	1
Main line shunt trip type circuit breaker	1
Auto start-stop with remote contacts	
Over current sensing	
3 available auxiliary connections	
Multiple voltage selector switch (480/277 or 208/120 VAC/3 phase or 240/120	
VAC/ 1 phase	
Barrel lug connection	
Cam lock distribution panel	
Total Cost	\$45,200.00



David Rollins

Cummins Crosspoint, LLC
Phone: (304) 769-1012 x 8321

Mobile: (304) 389-3766 Fax: (304) 769-1022

APPENDIX E. SUPPORTING DOCUMENTATION

Green Valley Glenwood PSD - Glenwood and Bulltail

February 29, 2016, 1:30 pm, PSD office, Maple Acres Road, Princeton.

Regularly scheduled PSD Board Meeting open to public, advertised in newspaper beforehand

Attendees:

- Marty Mariotti, General Manager
- John Poole, Field Manager
- James Carter, Board Member
- Greg Wimmer, Board Member
- Jimmy W. Welch, Board Member
- John Parsons, Wastewater Treatment Plant Chief Operator
- John Beckman, Tetra Tech

Introduced source water protection timeline as it relates to Green Valley Glenwood PSD. Mentioned 2014 Charleston Water Crisis and new regulations that followed. Discussed contents of new, updated plan, including contingency plan, PSSC maps, and communication sections.

Summarized primary threats to existing intakes. Vehicle accident on Route 20 could affect Glenwood Lake. Canada geese are a long term problem for bacteria. Fishing access and sewer lift station are threats to Bulltail intake, but increased security and good management have reduced those risks.

Discussed schedule to decommission Bulltail. Intake at Bulltail will be retained as a backup in the near future. New intake at Dan Hale Reservoir and water plant expansions are out to bid at this time. Glenwood Lake intake would be retained as a backup indefinitely.

Discussed how to comply with new requirement to inform public 30 minutes after discovering a problem with source water. Board member James Carter requested specific guidance from the DHHR concerning new rules on public notification. Boil water alerts currently go through county health department. Health department alerts media. Discussed possibility of implementing cell phone text message system, voice and text enabled phone tree, or social media such as Facebook to broadcast alerts.

Discussed preventable nature of Charleston Water Crisis and current lead contamination of drinking water in Flint, Michigan.

Green Valley Glenwood PSD is in a good position to deal with a source water crisis. When the new intake on Dan Hale is complete, they will have three intakes on different bodies of water, plus an emergency interconnection with Bluefield WVAMC.

