FOR PUBLIC RELEASE

Source Water Protection Plan
Corporation Of Shepherdstown

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Jefferson County

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In cooperation with Corporation Of Shepherdstown

WV Bureau for Public Health, Source Water Assessment and Protection Program

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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
SWPA	Source Water Protection Area
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 Corporation Of Shepherdstown 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, Corporation Of Shepherdstown 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 Corporation Of Shepherdstown 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.

4.0 SYSTEM INFORMATION

CORPORATION OF SHEPHERDSTOWN 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 CORPORATION OF SHEPHERDSTOWN

Administrative office location:	104 North King Street, Shepherdstown, JEFFERSON, WV, 25443		
Is the system a public utility, according to the Public Service Commission rule?	Yes		
Date of Most Recent Source Water Assessment Report:	11/1/2003		
Date of Most Recent Source Water Protection Plan:	7/1/2019		
Population served directly:	4300		
Bulk Water Purchaser Systems:	System Name	PWSID Number	Population
Total Population Served by the Utility:	4300		
Does utility have multiple Source Water Protection Areas(SWPAs)?	Yes		
How many SWPAs does the utility have?	[redacted]		

5.0 WATER TREATMENT AND STORAGE

As required, Corporation Of Shepherdstown 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 Corporation Of Shepherdstown 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. Corporation Of Shepherdstown Water Treatment Information

Default Facility	
Water treatment processes (in order of occurrence) includes:	Raw Water Intake, Aeration, Ferric, Hydrogen Peroxide & DelPac, Flash Mixing, Flocculation, Sedimentation, Mixed Media Filters, Chlorination & Fluoridation, Clear Well, High Service Pumps, Distribution System
The treatment capacity is approximately (GPD):	1,000,000
Current average production is approximately (GPD):	675,343
Maximum gallons of water treated and produced at that plant in one day during the past year was:	1,095,900
Minimum gallons of water treated and produced at that plant in one day during the past year was:	250,900
Plant is operated an average of hours a day:	14
Maximum number of hours of operation in one day at that plant during the past year was:	23
Minimum number of hours of operation in one day at that plant during the past year was:	5
How many storage tank(s) are maintained on systems distrbution system:	[redacted]
Total gallons of treated water storage:	[redacted]
Total gallons of raw water storage (GALs):	[redacted]

Table 3. Corporation Of Shepherdstown Surface Water Sources

Intake Name	Facility #	Local Name	Describe Intake	State Id Code	Date Constructed / Modified	Frequency of Use (Primary / Backup / Emergency)	Activity Status (Active/Inactive)
INTAKE-TOWN RUN	[redacted]		No actual intake - Town Run has been used as a backup intake in the past, however, an intake structure has not been constructed as of this time.	[redacted]		Emergency	Active
INTAKE-POTOMAC RIVER	[redacted]	INTAKE #1	Perforated pipe (16”) which gravity flows through screen into raw water pump station.	[redacted]	1/1/1974	Permanent	Active

Table 4. Corporation Of Shepherdstown Ground Water Sources

Well/Spring Name	Facility #	Local Name	Date Constructed / Modified	Completion Report Available (Yes/No)	Well Depth (ft)	Casting Depth (ft)	Grout (Yes/No)	Frequency of Use (Primary / Backup / Emergency)	Activity Status (Active/Inactive)

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 warrant 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. 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 a 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

Intake Name	Town Run
Size of WSDA (Square Miles)	3
River Watershed Name (8-digit HUC)	Conococheague-Opequon - 02070004
Size of Zone of Critical Concern (Acres)	567
Size of Zone of Peripheral Concern (Acres) (Include ZCC area)	0
Do you blend with ground water	No
Do you have an intake or well/spring missing from the list?	No
Intake Name	Potomac River
Size of WSDA (Square Miles)	5956
River Watershed Name (8-digit HUC)	Conococheague-Opequon - 02070004
Size of Zone of Critical Concern (Acres)	5484
Size of Zone of Peripheral Concern (Acres) (Include ZCC area)	8351
Do you blend with ground water	No
Do you have an intake or well/spring missing from the list?	No

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 Corporation Of Shepherdstown 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 PSSCs. 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.

Corporation Of Shepherdstown 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**.

Table 6. Protection Team Member and Contact Information

Name	Representing	Title	Phone Number	Email
[redacted]	Corporation Of Shepherdstown	Public Works Director	[redacted]	[redacted]
[redacted]	Corporation Of Shepherdstown	Chief Water Operator	[redacted]	[redacted]
	Corporation Of Shepherdstown			
	Corporation Of Shepherdstown			
[redacted]	Corporation Of Shepherdstown	Public Works Director	[redacted]	[redacted]
[redacted]	Corporation Of Shepherdstown	Town Clerk	[redacted]	[redacted]
[redacted]	Corporation of Shepherdstown	Recorder	[redacted]	[redacted]
[redacted]	Corporation of Shepherdstown			
Date of First Protection Team Meeting:		Protection Team Meeting was held Tuesday, April 26, 2016 at Corporation Of Shepherdstown. Meeting minutes attached in Appendix E.		
Efforts made to inform and engage local stakeholders (public, local government, local emergency planners, local health department, and affected residents) and explain absence of recommended stakeholders		Shepherdstown Water participated in the Safe Water for West Virginia forum hosted by the West Virginia Rivers Coalition on May 12, 2016. John Brady, Shepherdstown Water and Sewer Board member, was also invited to participate on the protection team, but was unable to attend the April 26 protection team meeting. PUBLIC MEETING JUNE 27, 2019 1:00 PM SHEPHERDSTOWN TOWN HALL		

8.0 POTENTIAL SOURCES OF SIGNIFICANT CONTAMINATION

Source water protection plans should provide a complete and comprehensive list of the PSSCs 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 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. 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 Corporation Of Shepherdstown 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 in Tier II reports), water utilities should contact the local emergency planning commission (LEPC) 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 Corporation Of Shepherdstown 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 Corporation Of Shepherdstown and not already appearing in datasets from the WVBPH can be found in .**Table 7**.

Table 7. Locally Identified potential Sources of Significant Contamination

Please see Appendix A to view this information.

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 these priority PSSCs was selected and ranked by the Corporation Of Shepherdstown 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

Corporation Of Shepherdstown 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 establish 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. Corporation Of Shepherdstown 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
Zone of Critical Concern for the Potomac River and Town Run intakes (critical area)	1	The ZCC warrants detailed scrutiny due to its proximity to the surface water intake and the intake's susceptibility to potential contaminants within that corridor. The Shepherdstown Water Department ZCC has been 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. The width of the ZCC is 1,000 feet measured horizontally from each bank of the principal stream and 500 feet measured horizontally from each bank of the tributaries draining into the principal stream.
Septic systems	2	The aerial review of the Shepherdstown ZCC located 295 homes that are not supplied by the city sewer and are assumed to manage their own septic system. A review of the Town Run ZCC located an additional 56 homes not served by city sewer. While the relative risk of an individual septic system is low, due to the large number of septic systems in the area, these collectively should be considered as a potential source of contamination.
Dumping/contamination of Town Run	3	Town Run is the backup water supply for the Shepherdstown Water Department. This small creek starts as a spring just outside of Shepherdstown and flows through a park, neighborhoods, and the town of Shepherdstown. Due to the small size, improper management of household chemicals, purposeful dumping of chemicals, or poor or nonworking septic systems can easily contaminate this small stream.
All contaminants during power outages	4	Backup generators
Any contaminant during an emergency situation	5	n/a
Potomac River	6	Participate in Potomac River Drinking Water Source Protection Partnership
Shepherd College	7	Communication with PCS and Facility Owners

Cress Creek Golf Course	8	Communication with PCS and facility owners

Table 9. Priority PSSC Management Strategies

PSSC or Critical Area	Management Activity	Responsible Protection Team Member	Status / Schedule	Comments	Estimated Cost
Cress Creek Golf Course	Shepherdstown Water Department will communicate with facility owners the need for them to properly dispose of oil and other automobile products, ask them to follow regulations and institute BMPs to contain and clean up spills, and ask that the facilities consider the source water in planning and implementing BMPs. The utility will work with the owner or operator of the Cress Creek Golf Course to implement an Integrated Pest Management System (IPM) and ensure the use of BMPs. For more information on developing an IPM, visit: http://www.epa.gov/opp00001/factsheets/ipm.htm. The utility will also work with the county extension service, the Soil and Water Conservation District, and/or the Natural Resource Conservation Service to provide copies of fact sheets covering BMPs for nutrient management, pesticide use, pest management, waste oil disposal, safe chemical handling, and/or safe chemical storage. A letter template that can be used to initiate a	Shepherdstown Water Department	Ongoing		Minimal.

Table 9. Priority PSSC Management Strategies

PSSC or Critical Area	Management Activity	Responsible Protection Team Member	Status / Schedule	Comments	Estimated Cost
	conversation with the facility is included in Appendix E.				
All contaminants during power outages	In the event of a power outage that affects the water treatment plant, Shepherdstown Water Department will need another source of power. Shepherdstown Water Department has access to generators that can be used should the treatment plant lose power. The utility has plans to obtain backup generators as part of long-term plans.	Shepherdstown Water Department	Not Started		Moderate

Table 9. Priority PSSC Management Strategies

PSSC or Critical Area	Management Activity	Responsible Protection Team Member	Status / Schedule	Comments	Estimated Cost
Shepherd College	Shepherdstown Water Department will communicate with facility owners the need for them to properly dispose of oil and other automobile products, ask them to follow regulations and institute Best Management Practices (BMPs) to contain and clean up spills, and ask that the facilities consider the source water in planning and implementing BMPs. The system will monitor compliance with state environmental regulations and review permits held by the facility, like stormwater management plans for parking lots and roads. A letter template that can be used to initiate a conversation with the facility is included in Appendix E.	Shepherdstown Water Department	Ongoing		Minimal
Any contaminant during an emergency situation	Develop Emergency Reponses Plan Shepherdstown Water Department has prepared a formal Emergency Response Plan (ERP). It will be kept up and followed. Information on creating and updating the ERP can be found here: http://www.nesc.wvu.edu/plan_ahead4.cfm	Shepherdstown Water Department	Ongoing		None

Table 9. Priority PSSC Management Strategies

PSSC or Critical Area	Management Activity	Responsible Protection Team Member	Status / Schedule	Comments	Estimated Cost
Any contaminant during an emergency situation	Emergency planning and coordination Shepherdstown Water Department will connect with local fire departments and County Emergency Services on a regular basis. The emergency response agencies will be informed of the extent of the ZCC. This will ensure that all the agencies are in constant communication with one another and prepared in the event of an emergency.	Shepherdstown Water Department	Ongoing		None
Any contaminant during an emergency situation	Participation in Statewide Initiatives Statewide initiatives for emergency response, including source water related incidents, are being developed. These include the West Virginia Water/Wastewater Agency Response Network (WVWARN, see http:i/www.wvwam.org/) and the Rural Water Association Emergency Response Team (link: http://www.wvrwa.org/). Shepherdstown Water participates in the Rural Water Association.	Shepherdstown Water Department	Ongoing		Minimal

Table 9. Priority PSSC Management Strategies

PSSC or Critical Area	Management Activity	Responsible Protection Team Member	Status / Schedule	Comments	Estimated Cost
Potomac River	The Potomac River Drinking Water Source Protection Partnership is a network of water suppliers and government agencies focused on protecting sources of drinking water in the Potomac River Basin.	Shepherdstown Water Department	Ongoing		Minimal

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. Corporation Of Shepherdstown 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
Public meeting	Shepherdstown Water Department has participated in a West Virginia Rivers Coalition informational meeting with local residents about source water protection efforts during 2016. They will also discuss source water protection efforts at a Water Board meeting.	Shepherdstown Water Department	Ongoing	West Virginia Rivers Coalition Event was held May 12, 2016. The Water Board meeting will be held during a regularly scheduled meeting.	Minimal
Consumer Confidence Report	Shepherdstown Water Department publishes a Consumer Confidence Report (CCR) annually, as required by the Safe Drinking Water Act. The CCR is available to all water customers. The CCR describes the source water for the system, the levels of contaminants in the source water, the EPA safe contaminant levels, and information about Cryptosporidium. The system will also include information about their source water protection program.	Shepherdstown Water Department	Ongoing	The following paragraph or similar paragraph will be included in the CCR: Shepherdstown Water Department is committed to protecting its drinking water sources. The drinking water for Shepherdstown is sourced from the Potomac River. We updated our Source Water Protection Plan (SWPP) in 2016, based on the requirements of Senate Bill 373. The SWPP includes physical actions to protect the drinking water sources such as ensuring that the source spring is secured, and planning actions such as creating an emergency response plan. It also includes an assessment of potential sources of contamination. The SWPPs were developed by the Water Department in collaboration with a local source water protection team, and with the involvement of the public. Please contact Shepherdstown Water Department to learn more about source water protection.	Minimal

Table 10. Education and Outreach Implementation Plan

Education and Outreach Strategy	Description of Activity	Responsible Protection Team Member	Status / Schedule	Comments	Estimated Cost
Information about pharmaceuticals	Shepherdstown Water Department will provide information on its website on pharmaceuticals and how to properly dispose of them. The system will collaborate with the Sheriff's Department to share information about opportunities for pharmaceutical disposal in the area.	City of Shepherdstown website administrator, Sheriff's Department	Ongoing	The Shepherdstown Sheriff's Office manages a drop box for pharmaceutical disposal at the city building and will help advertise this to the community. Additional information that can be shared with the public can be found at: http://www.nesc.wvu.edu/waterwedrink/education.cfm	Minimal
Brochures, pamphlets and letters, media outreach	Shepherdstown Water Department will post information about source water protection on the City of Shepherdstown's website and will provide source water protection information on other social media outlets. This information will alert the public of the need for source water protection and conservation. Information will also include proper handling and disposal of household chemicals and proper septic system maintenance.	City of Shepherdstown website administrator	Ongoing	The links below provide educational materials that can be distributed: http://water.epa.gov/infrastructure/drinkingwater/sourcewater/protection/citizeninvolvementinsourcewaterprotection.cfm http://www2.epa.gov/sites/production/files/2014-06/documents/growthwater.pdf http://www.nesc.wvu.edu/pdf/WW/publications/pipline/PL_Su08.pdf http://www.epa.gov/owm/septic/pubs/homeowner_guide_long.pdf	Minimal

Table 10. Education and Outreach Implementation Plan

Education and Outreach Strategy	Description of Activity	Responsible Protection Team Member	Status / Schedule	Comments	Estimated Cost
Communication with PCS and Facility Owners	Shepherdstown Water Department will communicate with PCS owners and regulated facility owners, explain that they are operating within the ZCC, and emphasize the need to follow all regulatory Best Management Practices (BMPs) via mail. This letter to businesses and facilities will also request that they share information with the utility related to chemical storage, such as SDS forms and Tier II reports for aboveground storage tanks.	Shepherdstown Water Department	Not Started	A template of a letter that can be sent to businesses is included in Appendix F.	Minimal
Plant tours	Shepherdstown Water Department will provide tours of the water plant to interested organizations such as watershed groups, schools, and civic organizations as requested.	Shepherdstown Water Department	Ongoing		None

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 Corporation Of Shepherdstown is provided in **Table 11**.

11.1. RESPONSE NETWORKS AND COMMUNICATION

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 in Tier II reports), water utilities should contact the local emergency planning commission (LEPC) 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.

Table 11. Corporation Of Shepherdstown Water Shortage Response Capacity

Can the water utility isolate or divert contamination from the intake and groundwater supply?	No
Describe the results of an examination and analysis of the public water system's ability to isolate or divert contaminated waters from its surface water intake or groundwater supply:	The utility can turn off the raw water pumps to divert potential contaminants.
Describe the results of an examination and analysis of the public water system's existing ability to switch to an alternative water source or intake in the event of contamination of its primary water source:	On an emergency basis, the utility can install a temporary pump on Town Run to act as an intake pump. A proposed permanent raw water intake on Town Run is planned to be installed and fully operational within the next 12 months.
Is the Utility able to close the water intake in the event of a spill?	Yes
How long can the Utility keep the intake closed?	The raw water intake can remain closed until the treated water storage levels become low (48 hours).
Describe the process to close the intake:	The raw water pumps are shut off as soon as a contamination is known.
Describe the treated water system's storage capacity of the water system:	The current treated water storage amount for the system consists of [redacted] tanks totaling [redacted] of treated water. At the time of this report, the Shepherdstown Water system was operating at [redacted] treated water storage capacity.
Gallons of storage capacity (raw water)	[redacted]
Gallons of storage capacity (treated water)	[redacted]
Is the Utility a member of WVRWA Emergency Response Team?:	Yes
Is the Utility a member of WV-WARN?:	No
List other agreements to provide receive assistance in case of emergency:	n/a

11.2. OPERATION DURING LOSS OF POWER

Corporation Of Shepherdstown 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

Can you connect to a generator at the intake/wellhead?:	No
Please provide a scenario that best describes your system:	
What do you have (KW)?	
What do you need (KW)?	
Can you connect to a generator at the treatment facility?:	No

Please provide a scenario that best describes your system:			
What do you have (KW)?			
What do you need (KW)?			
Can you connect to a generator at the distribution system?:		No	
Please provide a scenario that best describes your system:			
What do you have (KW)?			
What do you need (KW)?			
Does the utility have fuel on hand for generator?:		No	
Hours:			
Gallons:			
Provide a list of suppliers and alternate suppliers that could provide fuel in the event of an emergency:		Supplier	Phone Number
	Fuel	N/A	(000)000-0000
Does the utility test the generator(s) periodically?:		No	
Does the utility routinely maintain the generator(s)?:		No	
If the Utility does not have generator or the ability to connect to a generator, describe plans to respond to power outages:		The utility has not experienced power outages longer than one (1) day, which is under the system's existing treated water storage amount of [redacted] The emergency generator capacity for the treatment facility is 250 kW.	

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. Corporation Of Shepherdstown 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 Corporation Of Shepherdstown

Is the Utility able to meet water demands with the current capacity for the next five years?	Yes
Explain how you plan to do so:	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 13** is taken from the most recently submitted Corporation Of Shepherdstown PSC Annual Report.

Table 14. Water Loss Information

Water pumped - Total Gallons:		241,863,000
*Water purchased - Total Gallons:		0
Total gallons of water pumped and purchased:		241,863,000
Total gallons of water loss accounted for except main leaks:	Mains, plaint, filters, flushing, etc - Total Gallons:	35,222,000
	Fire department - Total Gallons:	5,862,000
	Back washing - Total Gallons:	0
	Blowing settling basins - Total Gallons:	0
Total Accounted for Water Loss		41,084,000
Unaccounted for lost water - Total Gallons:		57,410,000
Water sold - Gallons:		108,260,000
Water Lost From Main Leaks:		35,109,000
Total Gallons of Unaccounted for Lost Water and Water Lost from Main Leaks:		92,519,000
Total percent unaccounted for water		38
Describe the measures to correct water loss greater than 15%:	The utility is conducting leak detection and making necessary repairs, as well as fixing leaks when they are discovered and planning to replace old line sections.Shepherdstown Water completed a leak detection project in April 2019 and discovered 17 leaks over 65 miles of investigation.	

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.

Corporation Of Shepherdstown 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 spill notifications from a state agency, neighboring water system, local emergency responders, or other facilities?	Yes	
From whom do you receive notices?	The utility receives spill notifications from the WV Health Department and Maryland Department of Environment.	
Are you aware of any facilities, land uses, or critical areas within your protection areas where chemical contaminants could be released or spilled?	No	
Are you prepared to detect potential contaminants if notified of a spill?	No	
List laboratories (and contact information) on whom you would rely to analyze water samples in case of a reported spill.	Laboratories	
	Name	Phone Number
	Pace Analytical	[redacted]
	WV Office of Lab Services	[redacted]
Do you have an understanding of baseline or normal conditions for your source water uality that accounts for seasonal fluctuations?	Yes	

Does your utility (aside from turbidity monitoring) currently monitor your raw water through continuous monitoring at the surface water intake or groundwater source to detect changes in water quality that could indicate contamination?		Yes
Does your utility collect periodic grab samples (ex. possess reserved sample bottles, on-call laboratory services, and trained personnel) in response to a spill notification or to investigate changes in water quality that could indicate contamination?		Yes
Please explain:		n/a
Provide or estimate the capital and O&M costs for your current or proposed early warning system or upgraded system.	Capital Cost:	50,000
	O&M Cost:	5,000
Do you serve more than 100,000 customers?		No
Does your system currently receive spill notifications from a state agency, neighboring water system, local emergency responders, or other facilities?		Yes
Are you prepared to detect potential contaminants if notified of a spill?		No
Please describe the methods you use to monbitor at the same technical levels utilized by ORSANCO:		

12.0 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 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 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

Corporation Of Shepherdstown 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. Corporation Of Shepherdstown 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 Corporation Of Shepherdstown 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 Corporation Of Shepherdstown'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.

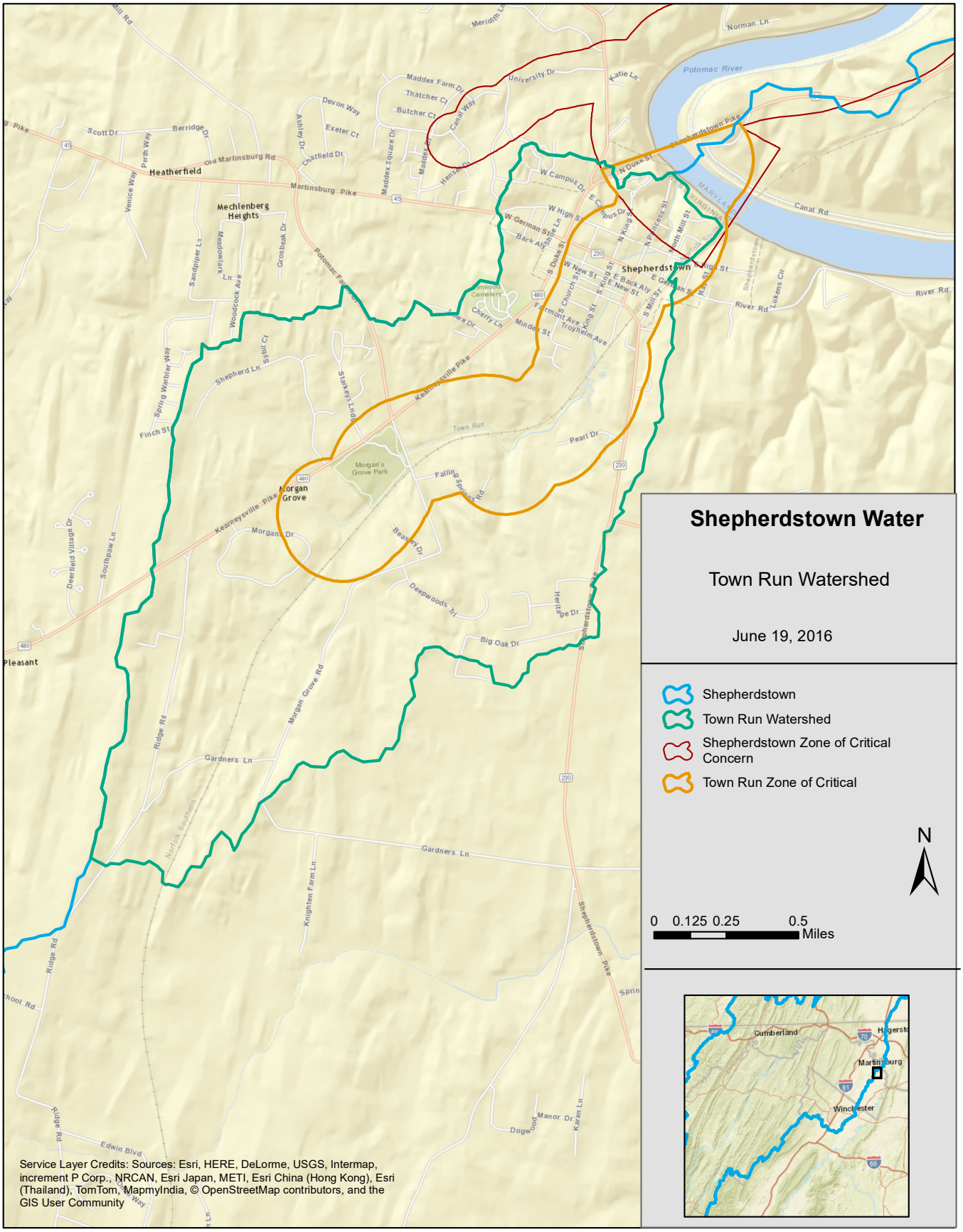
APPENDIX A. FIGURES AND TABLES

Water Source / Delineation

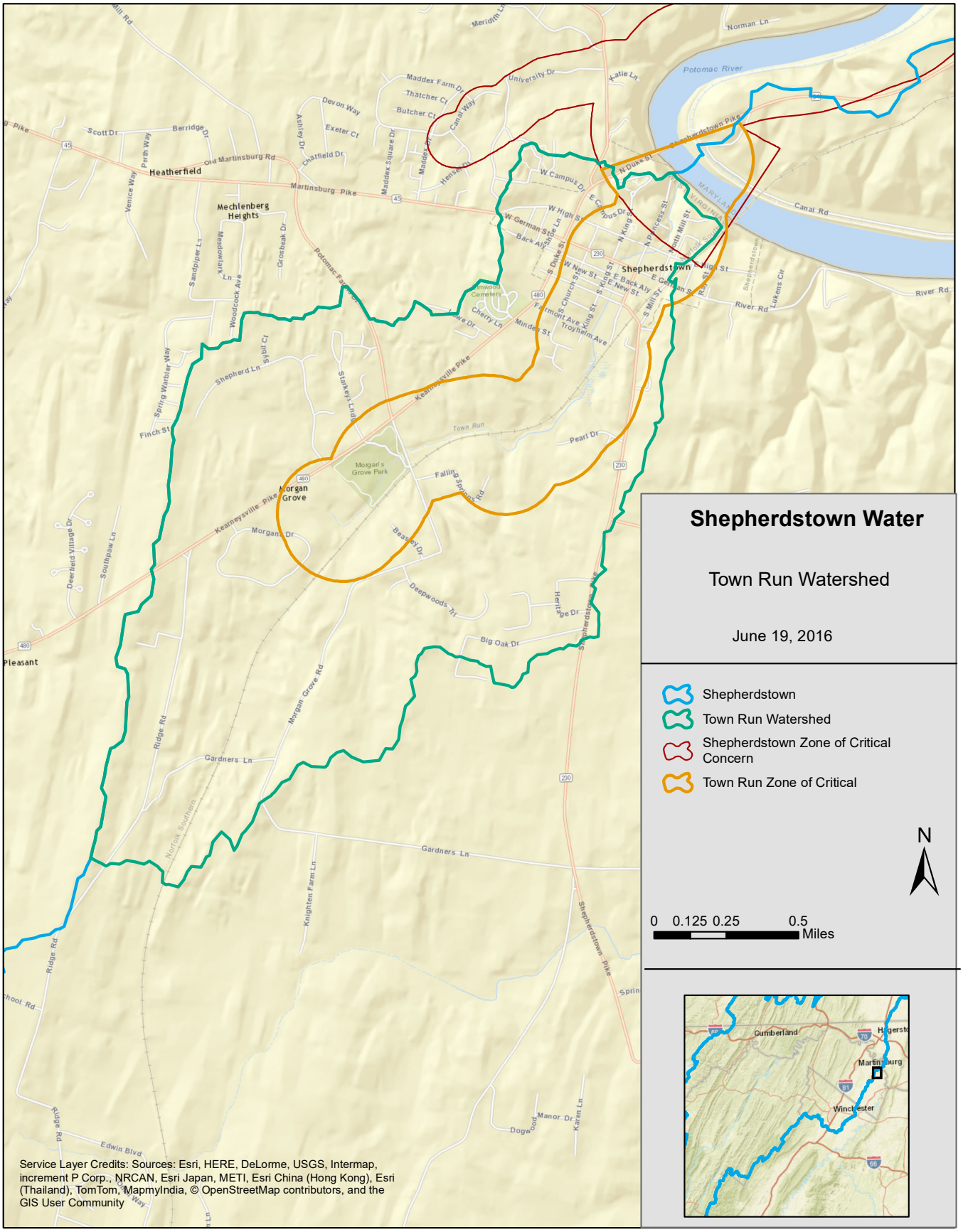
Surface Water Sources

Intake: Town Run

Map of watershed delineation area

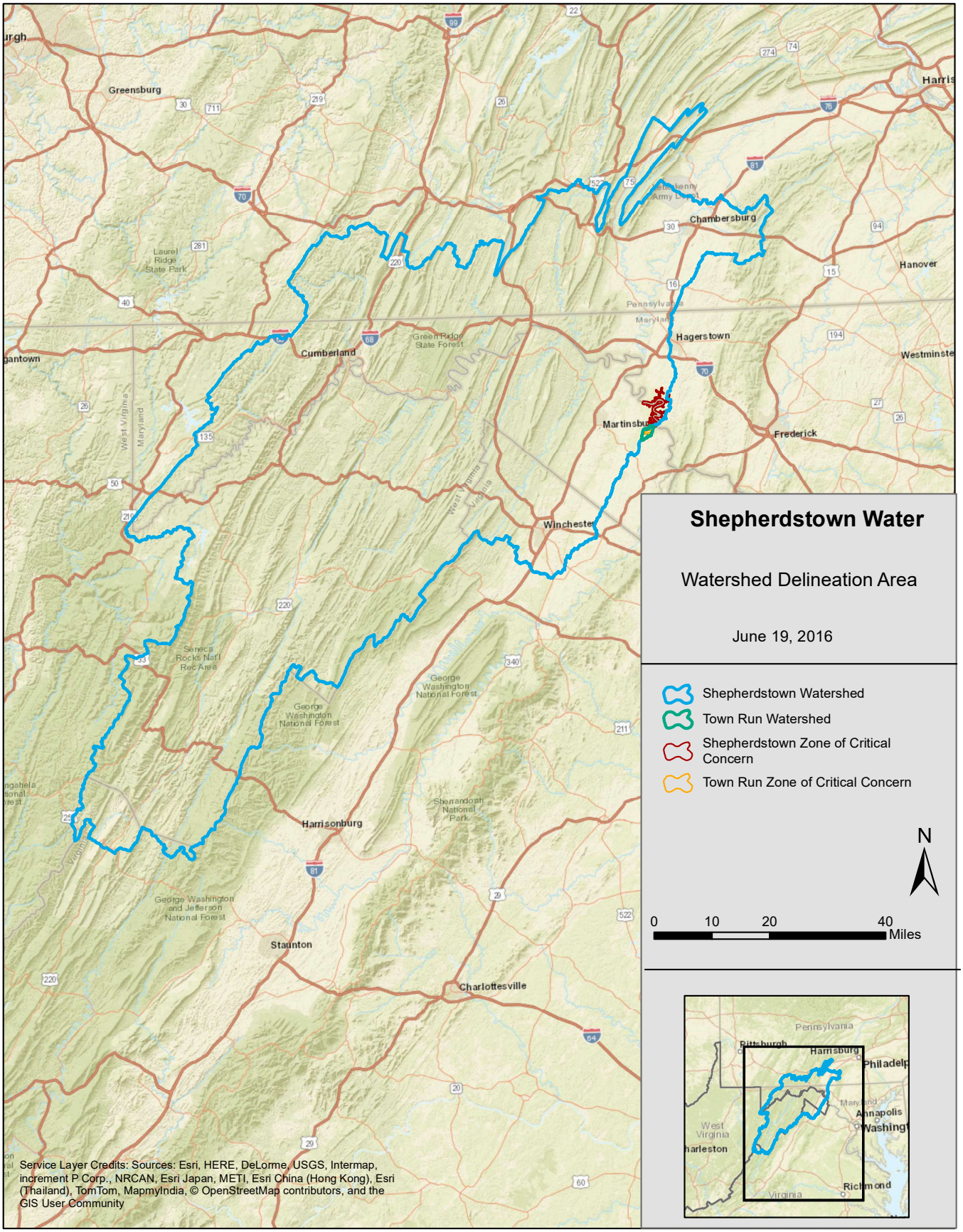


Map of zone of critical Concerns

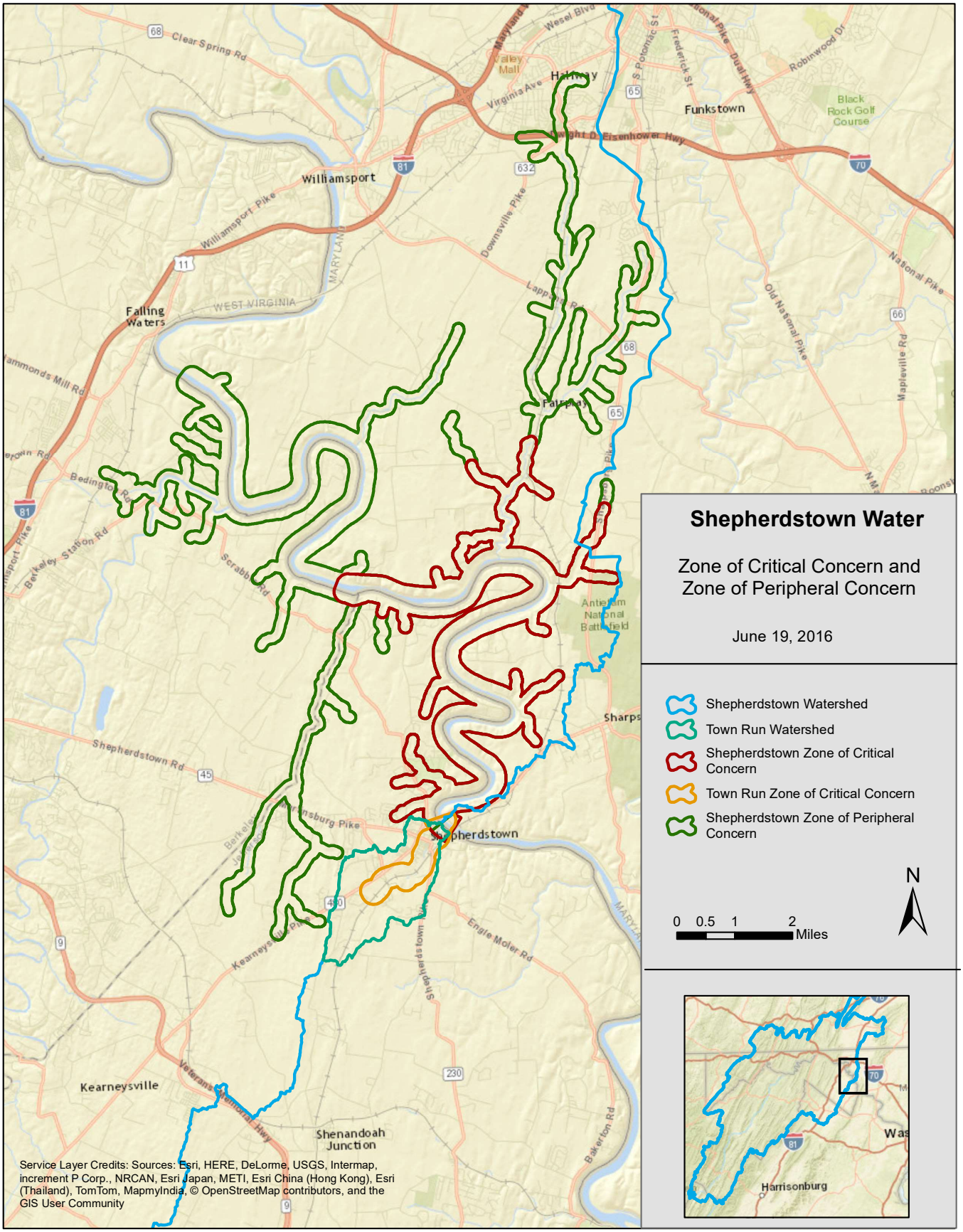


Intake: Potomac River

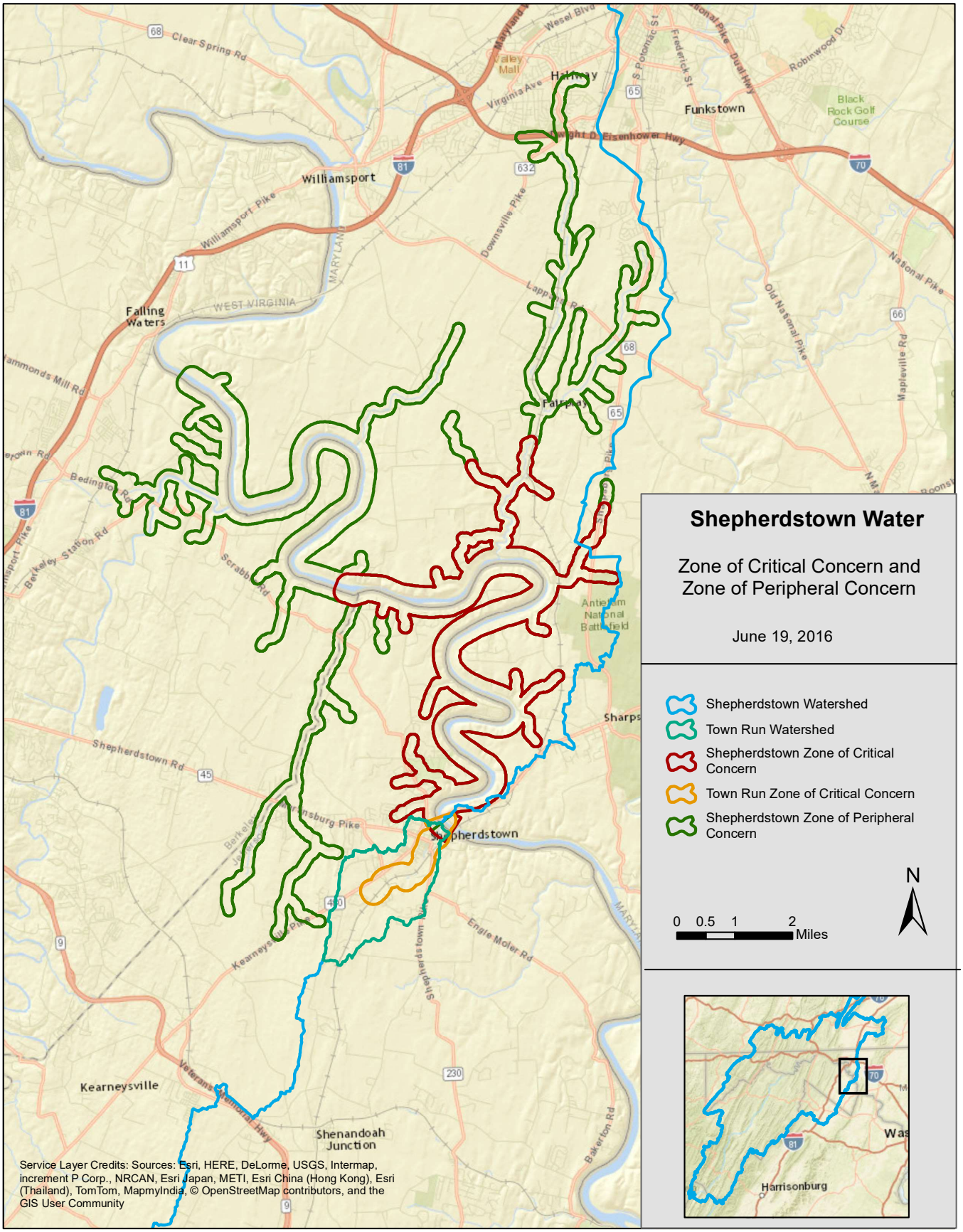
Map of watershed delineation area



Map of zone of critical Concerns



Map of zone of peripheral Concerns



PSSC Maps

PSSC Lists

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 for a groundwater source.

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

Form C - 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 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.

Appendix B - Form B
Proposed Ground Monitoring Worksheet

Describe the type of early warning detection equipment that could be installed, including design:
The early warning detection equipment that could be installed includes a level controller, display module, back panel, level & trough (see cost estimate in Appendix D) 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 Potomac River surface water would enter the laboratory in the water treatment facility, or upstream of the raw water intake on the Potomac River.
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 allowing near real time observation at the water treatment facility.
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.

APPENDIX C. COMMUNICATION PLAN TEMPLATE

Corporation Of Shepherdstown

PWSID: WV3301933

Authorizing Signature: [redacted]

Contact Phone Number: [redacted]

Contact Email Address: [redacted]

Plan Developed On: August 2021

ACKNOWLEDGMENTS:

This plan was developed by [insert name, title of person completing plan, and who they work for] 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.

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 Advisory. 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	Announcement	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.
B	Boil Water Advisory	Moderate	Water system users are advised to boil any water to be used for drinking or cooking, due to possible microbial contamination. The system operator will notify users when the boil water advisory is lifted.
C	Cannot 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	Do 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
[redacted]	Corporation Of Shepherdstown	[redacted]	[redacted]
[redacted]	Corporation Of Shepherdstown	[redacted]	[redacted]

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

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 Protection 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 Advisory, 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
  - 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 may 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.

EMERGENCY SHORT FORMS

Emergency Communication Information

	Name	Phone	Email
Designated spokesperson:	[redacted]	[redacted]	[redacted]
Alternate spokesperson:	[redacted]	[redacted]	[redacted]
Designated location to disseminate information to media:	Shepherdstown Town Hall 104 N King Street Shepherdstown, WV 25443		
Method of Contact:	newspaper posted notices call system		

Media Contacts:	Name	Title	Phone Number	Email
	[redacted]	Editor	[redacted]	[redacted]

Emergency Service Contacts

	Name	Emergency Phone	Alternative Phone	Email
Police	Shepherdstown Police Dept.	(911)___-____	[redacted]	
Fire	Shepherdstown Fire Hall	(911)___-____	[redacted]	
Ambulance	Shepherdstown Fire Hall	(911)___-____	[redacted]	
Hazmat	OHSEM Headquarters	(911)___-____	[redacted]	
Other	Shepherdstown Police Dept.	(911)___-____	[redacted]	
Other				
Other				

Sensitive Populations

Other Communities that are served by the Utility:	None			
Major User/Sensitive Population Notification	Name	Emergency Phone	Alternative Phone	Email
	[redacted]	[redacted]	[redacted]	
EED District Office Contact	Name	Phone	Email	
	[redacted]	[redacted]	[redacted]	
OEHS Readiness Coordinator	[redacted]	[redacted]		

Downstream Water System Contacts	Water System Name	Contact Name	Emergency Phone	Alternate Phone	Email
	[redacted]	[redacted]	[redacted]	[redacted]	

Are you planning on implementing the TIER Communications plan?:	Yes

Emergency Service Key Staff Members

	Name	Title	Phone	Email
Key Staff Responsible for Coordinating Emergency Response Rrocedures:		[redacted]	Public Works Director	[redacted]
[redacted]	[redacted]	Chief Water Operator	[redacted]	[redacted]
Staff Responsible for Keeping Confidential PSSC Information and Releasing to Emergency Responders.		[redacted]	Public Works Director	[redacted]
[redacted]	[redacted]	Chief Water Operator	[redacted]	[redacted]

Emergency Response Information

List Laboratories available to perform sample analysis in case of emergency.	Name	Phone
	REI Consultants	[redacted]
	WV Office of Lab Services	[redacted]
Has utility developed a detailed Emergency Response Plan in accordance with the Public Health Security Bioterrorism preparedness and Response Plan Act of 2002 that covers the following areas?:		Yes
When was the emergency response plan developed or last updated?:		2016

EMERGENCY CONTACT INFORMATION

State Emergency Spill Notification

1-800-642-3074

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 - [redacted]

Phone: [redacted]

Cell: [redacted]

E-mail: [redacted]

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/

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 ___:____ AM/PM, the _____ Water System began investigating an incident that may affect local water quality.

The incident involves the following situation at this location:

_____

_____

_____

There are no restrictions on water use at this time. As always, if water system customers notice anything unusual about their water – such as abnormal odors, colors, sheen, etc. – they should contact the water system at _____.

At this time there is no need for concern if you have consumed or used the water.

Regular updates will be provided about this Announcement as water system staff continue their investigation. Again, there are no restrictions on water use at this time.

State Water System ID# _____ Date Distributed: _____

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 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 WITHOUT BOILING IT FIRST.** Bring all water to a boil, 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 _____ or _____ at _____.

General guidelines on ways to lessen the health risk are available from the EPA Safe Drinking 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

On _____ at ___:____ 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.** You can't drink the water, but you can use it for showering, bathing, toilet-flushing, and other non-potable purposes.
- **BOILING WILL NOT PURIFY THE WATER.** Do not drink the water, even if it is boiled.

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 _____.

General guidelines on ways to lessen the health risk are available from the EPA Safe Drinking 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 D

"DO NOT USE" WATER NOTIFICATION

A LEVEL D WATER ADVISORY IS IN EFFECT

On _____ at ___:____ 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 SHOWER OR BATHE IN THE WATER.** You can't use the water for drinking, showering, or bathing. It can be used for toilet flushing and firefighting.
- **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: _____

UTILITY ISSUED NOTICE – LEVEL E

EMERGENCY WATER NOTIFICATION

A LEVEL E WATER ADVISORY IS IN EFFECT

On _____ at ___:____ 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, olors, 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: _____

APPENDIX D. SINGLE SOURCE FEASIBILITY

Water Source Alternative:

Back up intake	
Name of Alternative:	Town Run
Brief Description of the Alternative:	Town Run
Feasible?:	Yes
Provide Cost Estimate:	$0
Would this alternative supply 100% of your needs?:	Yes
Economic Criteria - Operation and Maintenance Costs:	3
Economic Criteria - Capital Cost:	3
Technical Criteria - Permitting:	3
Technical Criteria - Flexibility:	3
Technical Criteria - Resilience:	3
Technical Criteria - Institutional Requirements:	3
Environmental Criteria - Environmental Impacts:	3
Environmental Criteria - Aesthetic Impacts:	3
Environmental Criteria - Stakeholder Issues:	3
Final Score:	100.00%
Interconnection	
Name of Alternative:	Interconnection
Brief Description of the Alternative:	Interconnection
Feasible?:	No
Provide Cost Estimate:	$0
Would this alternative supply 100% of your needs?:	No
Economic Criteria - Operation and Maintenance Costs:	0
Economic Criteria - Capital Cost:	0
Technical Criteria - Permitting:	0
Technical Criteria - Flexibility:	0
Technical Criteria - Resilience:	0
Technical Criteria - Institutional Requirements:	0
Environmental Criteria - Environmental Impacts:	0
Environmental Criteria - Aesthetic Impacts:	0
Environmental Criteria - Stakeholder Issues:	0
Final Score:	0.00%
Treated water storage	
Name of Alternative:	Treated water storage

Brief Description of the Alternative:	Treated water storage
Feasible?:	No
Provide Cost Estimate:	$0
Would this alternative supply 100% of your needs?:	No
Economic Criteria - Operation and Maintenance Costs:	0
Economic Criteria - Capital Cost:	0
Technical Criteria - Permitting:	0
Technical Criteria - Flexibility:	0
Technical Criteria - Resilience:	0
Technical Criteria - Institutional Requirements:	0
Environmental Criteria - Environmental Impacts:	0
Environmental Criteria - Aesthetic Impacts:	0
Environmental Criteria - Stakeholder Issues:	0
Final Score:	0.00%
Tank for Raw Water Storage	
Name of Alternative:	Raw Water Storage
Brief Description of the Alternative:	Raw Water Storage
Feasible?:	No
Provide Cost Estimate:	$0
Would this alternative supply 100% of your needs?:	No
Economic Criteria - Operation and Maintenance Costs:	0
Economic Criteria - Capital Cost:	0
Technical Criteria - Permitting:	0
Technical Criteria - Flexibility:	0
Technical Criteria - Resilience:	0
Technical Criteria - Institutional Requirements:	0
Environmental Criteria - Environmental Impacts:	0
Environmental Criteria - Aesthetic Impacts:	0
Environmental Criteria - Stakeholder Issues:	0
Final Score:	0.00%
Other	
Name of Alternative:	Elevated Treated Water Storage
Brief Description of the Alternative:	Elevated Treated Water Storage
Feasible?:	Yes
Provide Cost Estimate:	$2,145,000
Would this alternative supply 100% of your needs?:	Yes
Economic Criteria - Operation and Maintenance Costs:	3

Economic Criteria - Capital Cost:	3
Technical Criteria - Permitting:	2
Technical Criteria - Flexibility:	3
Technical Criteria - Resilience:	3
Technical Criteria - Institutional Requirements:	3
Environmental Criteria - Environmental Impacts:	1
Environmental Criteria - Aesthetic Impacts:	2
Environmental Criteria - Stakeholder Issues:	2
Final Score:	82.44%

Feasibility Study Narrative

ANALYSIS OF ALTERNATIVES

Shepherdstown Water currently has no alternative source of water supply in the event the primary water source becomes contaminated.

1. **Backup Intake**

   The Shepherdstown Water surface water intake located on the Potomac River is currently the primary source of water supply. There is one source of water supply near the water treatment facility that is large enough to supply sufficient capacity – Town Run.

   The mouth of Town Run is located approximately [redacted] of the existing water treatment plant surface water intake on the Potomac River. There is no other source of water supply in the area that would be able to provide sufficient capacity to the water treatment facility.

   Shepherdstown Water has contracted the design of a backup intake and received final documents for construction. The utility plans to bid the project in the summer of 2019.

   Thus, this alternative was not considered in the feasibility analysis because it is already in the process of being implemented.

2. **Interconnection**

   Shepherdstown Water is not currently interconnected with another utility. The consideration of an alternative source of water could be determined using one other utility – [redacted]. The [redacted] system is located approximately [redacted] from the Shepherdstown Water system (see map in Appendix D).

   If the Shepherdstown Water active surface water source became contaminated, then their backup source of surface water would also become contaminated. Both Shepherdstown Water and [redacted] use the Potomac River as their source of water supply. Shepherdstown Water does not have another reasonable alternative source of water supply via interconnection in the area.

   Thus, this alternative will not be considered in the feasibility analysis.

3. **Treated Water Storage (Standpipe)**

   The Shepherdstown Water treated water storage capacity for the system consists of [redacted] water storage tanks totaling [redacted] On average, the water treatment facility produces [redacted] of water. The maximum produced by the water treatment facility from [redacted] was [redacted] according to monthly operating reports provided by the utility.

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The minimum required treated storage capacity, according to Senate Bill 373, is equal to two (2) days of system storage based on the plant's maximum level of production experienced within the past year, and the maximum required is equal to five (5) days of the average production, according to WV BPH standards requiring 20% turnover per day.

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

[redacted] $* 2 \text{ days} =$ [redacted]

Therefore, the system currently does not meet the minimum required treated water storage capacity. The remaining minimum required treated water storage capacity for the system would be:

[redacted]

The construction of [redacted] standpipe treated water storage tank cannot be considered in the feasibility analysis due to the topography of the water system.

Thus, the alternative will not be considered in the feasibility analysis.

4. **Raw Water Storage (Standpipe)**

Shepherdstown Water does not have any raw water storage capacity for the system. As mentioned in Alternative #3, the water treatment facility produces [redacted] on average and has a maximum production of [redacted].

The minimum required raw storage capacity, according to Senate Bill 373, is equal to two (2) days of system storage based on the plant's maximum level of production experienced within the past year, and the maximum required is equal to five (5) days of the average production, according to WV BPH standards requiring 20% turnover per day.

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

[redacted] $* 2 \text{ days} =$ [redacted]

Therefore, the system currently does not meet the minimum required raw water storage capacity. The construction of [redacted] standpipe raw water storage tank in the area is not feasible as an alternative due to the topography of the water system.

Thus, this alternative will not be considered in the feasibility analysis.

5. **Other (Elevated Treated Water Storage)**

An alternative being considered for the feasibility analysis is to construct an elevated treated water storage tank as opposed to a standpipe treated water storage tank. The main

constraint of this alternative is when preparing to obtain clearance from the West Virginia Division of Culture and History State Historic Preservation Officer (SHPO). SHPO described to Shepherdstown Water that the elevated storage tanks, if constructed on land that was not previously disturbed, would disrupt the historical view shed. When constructing elevated storage tanks in the past, the engineer has constructed the new elevated storage tanks on previously disturbed property already owned by the utility; thus, allowing Shepherdstown Water to avoid clearance problems with WV SHPO.

As discussed in Alternative #3, the minimum required treated water storage capacity for the system would be:

[redacted] $*$ 2 days = [redacted]

Therefore, the system currently does not meet the minimum required treated water storage capacity. The remaining minimum required treated water storage capacity for the system would be:

[redacted]

Thus, the construction of [redacted] treated water storage tank will be considered in the feasibility analysis. A cost analysis is provided in Appendix D.

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Matrix Document

Feasibility Matrix **Corporation of Shepherdstown Water Dept.** **PWSID: WV 3301933** **Date: 10/21/2021** **Completed by:** **Project Engineer - Ghosh Engineers, Inc.**

Criteria	Question	Backup Intake	Feasibility	Interconnect	Feasibility	Treated Water Storage	Feasibility	Raw Water Storage	Feasibility	Other (Elevated Treated Water Storage)	Feasibility
Economic Criteria											
What is the total current budget year cost to operate and maintain the PWSU (current budget year)?		[redacted]		[redacted]		[redacted]		[redacted]		[redacted]	
O and M Costs	Describe the major O&M cost requirements for the alternative?	N/A	3	N/A	0	N/A	0	N/A	0	Labor and materials for maintenance	2
	What is the incremental cost ($/gal) to operate and maintain the alternative?	$0.00	3	$0.00	0	$0.00	0	$0.00	0	$0.00	3
	Cost comparison of the incremental O&M cost to the current budgeted costs (%)	0.00%	3	0.00%	0	0.00%	0	0.00%	0	0.00%	3
O and M-Feasibility Score			***3.0***		***0.0***		***0.0***		***0.0***		***2.7***
Describe the capital improvements required to implement the alternative.		N/A		N/A		N/A		N/A		Construction of [redacted] elevated treated water storage tank.	
Capital Costs	What is the total capital cost for the alternative?	$0.00	3	$0.00	0	$0.00	0	$0.00	0	$2,145,000.00	2
	What is the annualized capital cost to implement the alternative, including land and easement costs, convenience tap fees, etc. ($/gal)	$0.00	3	$0.00	0	$0.00	0	$0.00	0	$0.01	3
	Cost comparison of the alternatives annualized capital cost to the current budgeted costs (%)	0.00%	3	0.00%	0	0.00%	0	0.00%	0	0.00%	3
Capital Cost-Feasibility Score			***3.0***		***0.0***		***0.0***		***0.0***		***2.7***
Technical Criteria											
Permitting	Provide a listing of the expected permits required and the permitting agencies involved in their approval.	N/A	3	N/A	0	N/A	0	N/A	0	WV DEP, WV DNR, ACOE, WV SHPO, US FWS, WV DOH and County Floodplain	2
	What is the timeframe for permit approval for each permit?	N/A	3	N/A	0	N/A	0	N/A	0	WV DEP (90 days), WV DNR (60 days), ACOE (90 days), WV SHPO (60 days), US FWS (60 days), WV DOH (90 days) and County Floodplain (90 days)	2
	Describe the major requirements in obtaining the permits (environmental impact studies, public hearings, etc.)	N/A	3	N/A	0	N/A	0	N/A	0	Environmental impact studies.	2
	What is the likelihood of successfully obtaining the permits?	N/A	3	N/A	0	N/A	0	N/A	0	Good	2
	Does the implementation of the alternative require regulatory exceptions or variances?	N/A	3	N/A	0	N/A	0	N/A	0	No	2
Permitting-Feasibility Score			***3.0***		***0.0***		***0.0***		***0.0***		***2.0***
Flexibility	Will the alternative be needed on a regular basis or only used intermittently?	N/A	3	N/A	0	N/A	0	N/A	0	Regular Basis or Intermittently	3
	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?)	N/A	3	N/A	0	N/A	0	N/A	0	The alternative will add [redacted] s of treated water storage to the system, and will not have any other impact.	3
Flexibility-Feasibility Score			***3.0***		***0.0***		***0.0***		***0.0***		***3.0***

Criteria	Question	Backup Intake	Feasibility	Interconnect	Feasibility	Treated Water Storage	Feasibility	Raw Water Storage	Feasibility	Other (Elevated Treated Water Storage)	Feasibility
Resilience	Will the alternative provide any advantages or disadvantages to meeting seasonal changes in demand?	N/A	3	N/A	0	N/A	0	N/A	0	Yes	3
	How resistant will the alternative be to extreme weather conditions such as drought and flooding?	N/A	3	N/A	0	N/A	0	N/A	0	Drought may limit the availability of water.	2
	Will the alternative be expandable to meet the growing needs of the service area?	N/A	3	N/A	0	N/A	0	N/A	0	Yes	3
Resilience-Feasibility Score			***3.0***		***0.0***		***0.0***		***0.0***		***2.7***
Institutional Requirements	Identify any agreements or other legal instruments with governmental entities, private institutions or other PWSU required to implement the alternative.	N/A	3	N/A	0	N/A	0	N/A	0	None	3
	Are any development/planning restrictions in place that can act as a barrier to the implementation of the alternative.	N/A	3	N/A	0	N/A	0	N/A	0	No	3
	Identify potential land acquisitions and easements requirements.	N/A	3	N/A	0	N/A	0	N/A	0	Property acquisition may be required for the tank.	2
Institutional Requirements-Feasibility Score			***3.0***		***0.0***		***0.0***		***0.0***		***2.7***
Environmental Criteria											
Environmental Impacts	Identify any environmentally protected areas or habitats that might be impacted by the alternative.	N/A	3	N/A	0	N/A	0	N/A	0	Problems may arise when obtaining clearance from the WV State Historic Preservation Officer (see Alternatives Analysis narrative, #5, for details).	1
Environmental Impacts-Feasibility Score			***3.0***		***0.0***		***0.0***		***0.0***		***1.0***
Aesthetic Impacts	Identify any visual or noise issues caused by the alternative that may affect local land uses?	N/A	3	N/A	0	N/A	0	N/A	0	Construction would cause temporary noise issues, and some visual impact would be made by the tank.	2
	Identify any mitigation measures that will be required to address aesthetic impacts?	N/A	3	N/A	0	N/A	0	N/A	0	The construction would need to be as quick as possible.	2
Aesthetic Impacts-Feasibility Score			***3.0***		***0.0***		***0.0***		***0.0***		***2.0***
Stakeholder Issues	Identify the potential stakeholders affected by the alternative.	N/A	3	N/A	0	N/A	0	N/A	0	Water customers and land owners.	2
	Identify the potential issues with stakeholders for and against the alternative.	N/A	3	N/A	0	N/A	0	N/A	0	A rate increase may be required to implement construction, and possible land ownership issues may arise.	2
	Will stakeholder concerns represent a significant barrier to implementation (or assistance) of the alternative?	N/A	3	N/A	0	N/A	0	N/A	0	No	3
Stakeholder Issues-Feasibility Score			***3.0***		***0.0***		***0.0***		***0.0***		***2.3***
Comments		This alternative is already in the process of being implemented with construction to occur in 2021 and 2022.		There are no known utilities that can supply adequate capacity for the treatment facility.		Due to the elevation of the Town, standpipe treated water storage tanks cannot be considered as an alternative.		Due to the elevation of the Town, standpipe raw water storage tanks cannot be considered as an alternative.		No comment	

Feasibility Matrix **Corporation of Shepherdstown Water Dept.** **PWSID:** **WV 3301933** **Date:** **10/21/2021** **Completed by:** **Project Engineer - Ghosh Engineers, Inc.**

Alternative Strategy Description	Economic Criteria					Technical Criteria							Environmental Criteria						Final Score	Total Capital Cost	Comments
	Operation & Maintenance Costs	Capital Costs	Total	Total %	Weighted Total	Permitting	Flexibility	Resilience	Institutional Requirements	Total	Total %	Weighted Total	Environmental Impacts	Aesthetic Impacts	Stakeholder Issues	Total	Total %	Weighted Total			
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%	$0.00	This alternative is already in construction in 2021 and 2022.
Interconnect	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%	$0.00	There are no known utilities that can supply adequate capacity for the treatment facility.
Treated Water Storage	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%	$0.00	Due to the elevation of the Town, standpipe treated water storage tanks cannot be considered as an alternative.
Raw Water Storage	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%	$0.00	Due to the elevation of the Town, standpipe raw water storage tanks cannot be considered as an alternative.
Other (Elevated Treated Water Storage)	2.7	2.7	5.3	88.9%	35.6%	2.0	3.0	2.7	2.7	10.3	86.1%	34.4%	1.0	2.0	2.3	5.3	59.3%	11.9%	81.9%	$2,145,000.00	No comment

Scoring:

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

APPENDIX E. SUPPORTING DOCUMENTATION