Source Water Protection Plan

August 2018

For the Town of Luray
PWSID 2139330

Prepared by:

TETRA TECH

Funded by:

VDH VIRGINIA DEPARTMENT OF HEALTH
Protecting You and Your Environment
www.vdh.virginia.gov

Office of Drinking Water
Safe Drinking Water for a Healthy Virginia

Table of Contents

Record of Review

The Source Water Protection Plan should be reviewed and revised at least every 3 years.

Date of Review	Name of Reviewer	Description of Updates (if any)
2002	VDH	Source Water Assessment Record
2018	Tetra Tech	Major Plan Creation

1. Statement of Adoption

Town of Luray adopted this Source Water Protection Plan and has a copy of the plan on file with the Virginia Department of Health Office of Drinking Water (VDH-ODW). The Town of Luray is the governmental entity that provides public water service within the Town in Page County. The service and assistance of the waterworks' representatives in preparation of the plan is acknowledged and greatly appreciated.

[VDH-ODW recommends inserting a copy of the page from Town Council/Board of Supervisors meeting minutes recording the adoption of the Source Water Protection Plan.]

2. Introduction

2.1. Protection of Groundwater Sources

Protection of sources which supply public drinking water is of vital importance to the residents of the Town of Luray. The Town, in this Plan, refers to the Town of Luray water system. The water supply represents a valuable resource and investment which, if it were to become polluted, could negatively impact public health and would be expensive to restore or replace. Reducing or preventing chemical and microbiological contamination of water sources can ideally allow public water systems to avoid costly treatments and minimize future monitoring requirements. When drinking water is contaminated, costs include the following:

- Providing emergency replacement water;
- Paying for treatment and/or remediation expenses;
- Finding and developing new supplies;
- Paying for consulting services and staff time;
- Litigating against responsible parties;
- Conducting public information campaigns when incidents occur;
- Failing to meet the regulations of the Safe Drinking Water Act;
- Reducing property value or tax revenue;
- Adding health-related costs from exposure to contaminated water;
- Economic impacts, such as interruptions to businesses and loss of development opportunities; and
- Losing community acceptance of treated drinking water.

Source Water Protection is a voluntary program in Virginia. Proposed source water protection strategies are not mandated by state or federal regulations. Proposed commitments and schedules by waterworks' representatives are subject to change.

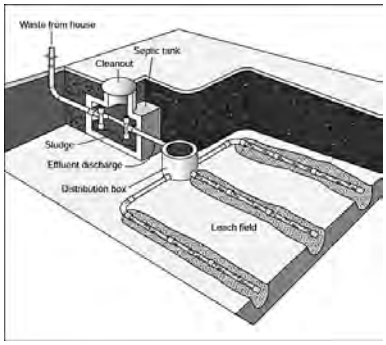
To avoid costly remediation, it is vital to reduce or prevent chemical and microbiological contamination of source waters. There are many normal day-to-day activities that could have the unintended consequence of compromising the community's drinking water supply. Some of the activities include:

- Improper use and disposal of household chemicals and fuels;
- Lawn treatments (excess fertilizers, and pesticides);
- Leaking oil and heating fuel tanks; and
- Improper management of septic systems.

To maintain quality drinking water, it is important to reduce and/or eliminate hazardous activities.

Groundwater can be contaminated by several different pathways:

- Infiltration from the surface;
- Leachate from onsite wastewater (septic) systems;
- Introduction of contaminants from the surface through improperly constructed or defective wells;
- Direct contamination through sink holes or other geologic features; or
- Dissolution of naturally-occurring substances in the soil or rock.



Septic Tank Schematic

Contaminant movement is affected by the properties of the aquifer as well as the overlying soils. Preventing contamination is paramount in keeping groundwater supplies safe.

2.2. Plan Purpose

The purpose of the Source Water Protection Plan (SWPP) is to protect groundwater, which serves as a source of public water supply, from the threat of contamination as a result of accidents or unwise practices from nearby residential, industrial, commercial, agricultural, waste management, or transportation activities.

2.3. Plan Goals

The goals of the SWPP are:

- To promote public health, economic development, and community infrastructure by maintaining an adequate drinking water supply for all residents of the community;
- To create an awareness of the communities' drinking water source(s); and
- To provide for a comprehensive action plan in case of an emergency affecting the water source.

3. Local Advisory Committee (LAC)

The purpose of the LAC is to evaluate the site-specific risks to the source water, develop site-specific recommended actions to mitigate the risks, and to ensure that the recommended actions are implemented. Community involvement is a critical element to developing a successful SWPP. The LAC involves the community in this process by incorporating community members and local officials into its membership, and by holding meetings with local stakeholders.

The LAC membership typically consists of waterworks employees, town or local government officials, county or regional government representatives, board members, and/or water customers. Extensive knowledge of source water protection or the water system components is not a prerequisite to being a committee member.

Table 1. Town of Luray Local Advisory Committee (LAC)

Name	Organization	Title
Joey Haddock	Town of Luray	Water Plant Superintendent
Steve Burke	Town of Luray	Town Manager
Bryan Chrisman	Town of Luray	Assistant Town Manager

The LAC contributes information to aid the development of the SWPP, reviews draft SWPPs, and ensures the implementation of recommended actions. The recommended actions that the LAC proposes are presented to the local officials and the waterworks for implementation.

The LAC holds meetings to solicit information from other local stakeholders, such as emergency response personnel, local health professionals, land or business owners, and other concerned citizens.

After reviewing the available information, characterizing the water source and the Source Water Protection Area, the LAC develops recommended actions to best protect the Town of Luray water source(s). The recommended actions developed by the LAC are listed in the following section.

4. Recommended Actions

The following source water protection measures are recommended to prevent potential contamination of the Town of Luray water supply.

Table 2. Summary of Recommended Implementation Activities

Action Number	Recommended Action	Planned Completion Date	Actual Completion Date
1	Promote education of the residents within the Source Water Protection Area (SWPA). Distribute brochures to customers via Town website describing the importance of source water protection and a list of general do's and dont's. See Appendix C for a brochure template.	12/2019	
2	Provide information about source water protection on the waterworks website at http://www.townofluray.com/water---waste-water.html by creating a link to the SWPP.	12/2018	
3	Monthly review with police chief the designated SWPA zone and appropriate response procedures. Such actions should include those recommended in the Emergency Response Plan in Appendix F	9/2018 Ongoing as needed	4/24/19
4	Provide the Town of Luray utility operators and the town council members source water protection information and maps.	12/2018	
5	Update the Town of Luray Comprehensive Plan to include source water protection.	12/2019	
6	Develop or revise a septic system ordinance requiring all septic systems shall be maintained in good working order and pumped out once every five years.		Completed 6/27/18
7	Create a scoring matrix to assign value to contaminates. Evaluate and rank the potential risk (from highest to lowest) of each of the Potential Sources of Contamination. Factors to consider are: • proximity to the source, • type of contaminates, and • likelihood of release of contamination.	12/2019	Completed 8/2018
8	Encourage abandonment of all unused private wells within the SWPA by including well protection and abandonment tips in the SWPP educational brochure.	12/2019	
9	Report open dump locations to Page County staff to ensure planning for any grants applied for through VADEQs Litter Prevention Program.	Ongoing as needed	Completed 4/24/2018

Action Number	Recommended Action	Planned Completion Date	Actual Completion Date
10	Coordinate with the local police chief and Page County officials to identify strategies for containing and cleaning up spills on roads and rail roads.	12/2018	
11	Consider fencing vital wellhead areas to prevent graffiti, trash, and vandalism.		Completed 2009
12	Seek grant funding for security systems at the Hite Spring site	12/2019	

5. Source Water Assessment & Protection Areas

5.1. Delineation of Source Water Assessment & Protection Areas

VDH delineates two different Source Water Assessment Area zones for each waterworks source. These zones are defined for groundwater sources as follows:

- Zone 1 is a 1,000-foot fixed radius around the well and is a priority zone for managing potential sources of contamination; and
- Zone 2 is a one-mile (5,280-feet) fixed radius outside of Zone 1.

The circular Zone 1 and Zone 2 delineations described above assume that the source is withdrawing from a confined aquifer comprised of uniform unconsolidated material. For groundwater sources which do not withdraw from a confined aquifer, the VDH recommends further study to delineate Zone 1 and Zone 2 assessment areas specific to each source. The Zone 1 assessment area should be defined as the area most at risk of source water contamination and the Zone 2 assessment area should be defined as the entire recharge area.

For the purposes of this plan, the Source Water Protection Area (SWPA) is defined as the area encompassing the Zone 1 and Zone 2 Source Water Assessment Areas. A map of the SWPA for each source is provided in Appendix A.

The Town of Luray relies on the Hite Spring and Well #6 to supply water to residents. Hudson Spring has been offline since 2009 but is maintained in the event of an emergency during which it may serve as an alternate source. The two springs have been designated as highly susceptible to contamination by the VDH because they are "located in an area that promotes migration of contaminant from certain land use activities of concern" [1].

In the Town of Luray system, both Well #6 and the Hudson Spring are considered ground water under direct influence of surface water (GUDI), This designation is most commonly assigned to sources in areas of karst topography.[2] Waterworks supplied by surface water or ground water under direct influence of surface water have separate monitoring requirements from groundwater only sources in the Waterworks Regulations. These requirements are specific to the number of customer and treatment type. They include specifications on sampling location, frequency, and type. Some of the required samples concern the water characteristics quoted in the GUDI definition below.

According to VDH Waterworks Regulations 12 VAC 5-590-430 a GUDI is:

"any water beneath the surface of the ground with significant occurrence of insects or other macroorganisms, algae, or large-diameter pathogens such as Giardia lamblia, or Cryptosporidium. It also means significant and relatively rapid shifts in water characteristics

[1] http://www.townofluray.com/assets/water-qualityreport-2016.pdf
[2] http://www.vdh.virginia.gov/drinking-water/drinking-water-data/

such as turbidity, temperature, conductivity, or pH that closely correlate to climatological or surface water conditions[3]."

Studies to determine Luray system recharge areas and time of travel may be especially beneficial to the system. It is recommended that, once completed, the Town of Luray use the results of these investigations to update Zone 1 and Zone 2 critical areas.

5.2. Geological Characterization

The Town of Luray water sources are in an unconsolidated aquifer. Unconsolidated aquifers are principally composed of sand and gravel and are typically found in river valleys and in the Virginia Coastal Plain physiographic province. These aquifers yield water via the pore spaces between the individual grains, which tend to be large for coarse-grained well-sorted aquifer material. Appendix A-3 contains geological maps.

The Town of Luray exists within the Elkton aquifer and the underlying carbonate bedrock is chemically weathered by water infiltration creating a karst environment. This is the only unconsolidated sediment aquifer west of the Atlantic Coastal Plain province in the Appalachian region. While karst topography is typically characterized by thin soil cover, the Luray bedrock is covered by thick alluvial fan deposits, alluvium, and some debris fan deposits along the western foot of the Blue Ridge Province. These alluvial fans contain manganese, iron ore, and abundant ground water resources (Southworth, 2009). The presence of karst sinkholes indicate water resources may be highly susceptible to land use contamination.

Luray is situated in an area where the Blue Ridge Province and Great Valley and Page Sections of the Valley and Ridge Province intermingle. Dashed contact lines in the USGS geologic map in Appendix A-3 indicate locations where these geologic units meet but are concealed beneath the alluvial deposits, so their precise location is uncertain.

The alluvial fan deposits, labeled Nf in the geologic map in Appendix A3, that occur in the majority of Luray land areas consist of unconsolidated sand, pebbles, cobbles and quartzite or sandstone boulders. Alluvial fan thickness is highly variable but has been measured in drill hole and mining data up to 150 meters thick. The deposits are derived primarily from Harpers and Anietam Formations (Southworth, 2009). The active Hite Spring and Well #6 are location in this geologic formation.

Debris fan deposits, Nd, consist of local rocks in a matrix of unstratified clay, silt, sand and pebbles. These deposits from fans and sheets on the low slopes and valleys. They may form terraces 36 meters higher than adjacent debris fans and range in thickness up to 30 meters (Southworth, 2009).

The Harpers formation, Cch, forms in a thin band along Luray's southwestern border between the alluvial fan deposits, Nf, and a thicker alluvium, Qa, formation. It consists of interbedded layers of quartzite, metasandstone, and metasiltstone as well as greenish or bluish-gray quarts-

[3] https://law.lis.virginia.gov/admincode/title12/agency5/chapter590/section10/

chlorite-sericite phyllite (Southworth, 2009). The alluvium contains unconsolidated silt, sand, cobbles, and boulders with a thickness up to 12 meters (Southworth, 2009). The currently inactive Hudson spring is in or directly adjacent to these formations. There are also two small sinkholes less than 50 square meters in diameter near this source.

There are small sections of Beekmantown Group, Ob, and Stonehenge Limestone, Os, Formations present in Luray. The former is characterized by light-grey dolostone containing chert nodules where the weathered surface displays “butcher block” cross hatched joints. The latter is characterized by a dark grey fossiliferous limestone with black chert modules. It contains some dolostone beds and silty limestone (Southworth, 2009).

The Town of Luray is not located in a Groundwater Management Area. Groundwater Management Areas are declared by Virginia Administrative Code 9VAC25-600-20 and managed by the Virginia Department of Environmental Quality. Wells in these areas are required to meet additional construction standards beyond the Virginia Waterworks Regulations. Withdrawals of 300,000 gallons per month or more in these areas require a groundwater withdrawal permit.

5.3. Land Use

An existing land use map for the SWPAs is presented in Appendix B-1. The Town of Luray water system consists of one active groundwater well, Well #6 given the state assigned identifier WL003; one active spring source, the Hite Spring; and one inactive spring source, the Hudson Spring. The two active sources are within one mile of each other.

Both primary Zone 1 protection areas for these sources are comprised of pasture and hay in addition to developed area of mixed intensity. A railroad transects both Zone 1 areas and East Main Street occurs within the Hite Spring Zone 1 area directly adjacent to the railroad. Their surrounding Zone 2 protection areas are predominantly comprised of the developed areas representing the Town. The offline source is maintained for emergency backup purposes and has similar land uses in both protection zones as the active sources. A major road, highway 360 business route, transects Zone 1 of the backup source.

5.4. Future Land Use

Future land use intentions are derived from the Page County Comprehensive Plan[4] and the Luray Town Plan[5]. While Luray is a slow-growth community, the Town is sensitive to future growth needs. Focus is directed on encouraging residential growth in a manner that will protect the surrounding agricultural resources and prevent congested traffic patterns. The main goals include:

- Maintain a land use pattern that adequately accommodates future residential, commercial and industrial growth.

[4] https://www.pagecounty.virginia.gov/DocumentCenter/View/78
[5] http://www.townofluray.com/assets/townplan-reduced.pdf

- Encourage new developments in, or near, the Town to have “Town-like” attributes in terms of land use patterns and design.
- Provide a “clear edge” between the Town (urban), and County (rural) areas.
- Ensure that residential developments are connected to public water and sewer.

In addition to minor transportation improvements, Luray future land use includes developing the Hawksbill Greenway and the Ralph H. Dean recreational areas, extending the road adjacent to the Greenway to connect the elementary and middle schools, and establishing landscaping along this route to increase the aesthetic value of the developments. Maps indicating future land use and project designs are presented in Appendix B-2.

6. Potential Sources of Contamination (PSC)

VDH develops an inventory of PSCs within the SWPA through its Source Water Assessment Program. This inventory contains information regarding the ownership of the PSC, the types of contaminants produced by the PSC, as well as the distance of the PSC to the water source. This inventory is summarized in Appendix E.

The location maps of PSCs within the SWPA are presented in Appendix A. These PSCs include publicly available information from DEQ, VDH, EPA, and other sources. *[insert only in non-public version of SWPP: Information on these sources, as well as the sources of the map reference data, is available in Appendix E.]*

The risk of each PSC varies depending on proximity to the well and potential pathways to reach groundwater. The highest priority area for protection includes the activities within Zone 1 of the SWPA. Town of Luray should use the inventory of PSCs in Zone 1 in evaluating the risk posed by each PSC and the need for protection measures.

The PSCs generally can be categorized as:

- Railroad and Highways
- Closed Storage Tank Releases
- Pesticides, Fertilizers and Agricultural Land Uses
- Concentrated Residential or Municipal Areas
- Public and Private Waste Water
- Private Wells
- Industrial Facilities
- Impaired Streams

Closed storage tank releases are the most numerous PSCs in the Luray protection areas. Threats associated with above-ground storage tanks may be from historic or active facilities. If these tanks remain at historic sites, they may contain residual chemicals/oils that could contaminate the source if they were to leak or be swept into the river during a flooding event. For active facilities, above ground storage tanks potentially contain materials that if released would pose a risk to public health. The PSCs categorized as Closed Storage Tank Releases can correspond to other PSC types.

There are 13 facilities inside Zone 2 for the three Luray water sources and 1 in Zone 1 of the active well source subject to the Resource Conservation and Recovery Act (RCRA). RCRA is the public law that creates the framework for the proper management of hazardous and non-hazardous solid waste as well as underground storage tanks. The majority of RCRA sites in Town of Luray WHPAs concern medical or automotive industries. Some sites may require a Hazardous Waste Management Permit, meaning they are engaged in the treatment, use, or disposal of hazardous waste. Such facilities can be a source of a wide variety of contaminants depending on the historical use of the site.

The source assessment found record of 2 underground injection wells in the source water protection areas, one of which is used by the town near the active well site. In general,

depending upon the depth, injection wells within the SWPA can potentially contaminate the groundwater source. The record for the underground injection well in the SWPA was provided by the US Environmental Protection Agency (USEPA) Underground Injection Control Program.

Railroad tracks run very closely to the public water supply within Zone 1 at both active source sites. The possibility of collisions and leaks are high. An accident on the main line, or leaks from standing train cars may result in contamination of water resources, especially where there are several sections of side track along the main line.

Major highways run through the Zone 1 and Zone 2 SWPAs. Major routes may carry heavy truck traffic through the region. A release from a vehicle accident may result in a hazardous materials spill to occur. If a hazardous materials spill were to occur, the substance spilled could infiltrate into the ground or runoff into surface water and potentially contaminate the water supply.

Pesticides and fertilizers used for farm operations can migrate into the water supply. Areas used for disposal of animal waste or burying dead livestock can also cause contamination of the source water. Increased nutrient load from these sources in surface water, especially affecting the Hite Spring, may result in algal growth, including an associated cyanobacteria commonly referred to as “blue-green algae”. Algal and bacterial presence may result in taste and odor issues. If stressed, cyanobacteria may also release cyanotoxins, chemicals that if consumed could severely impact human health. There are extensive agricultural areas in Zone 1 and 2 SWPAs for the Town of Luray system. Feed stores and home improvement stores that sell fertilizer and pesticides can be sources of contamination if these chemicals are not stored properly.

Luray water sources are located close to developed areas within town limits. Municipal areas have a concentration of homes, businesses, schools, industrial sites, and other facilities that may collectively introduce contaminants into water at a concentration to cause concern. Storm water runoff, care of public grounds, maintenance of city and county vehicles at garages, and residents’ activities in and outside their homes can con-tribute to contamination of the water source: fertilizers, pesticides, oils, paints, cleaning agents, etc. The Page Memorial Hospital and Shenandoah Regional Microbiological Laboratory may pose contamination concerns due to the presence of Regulated Medical Waste (RMW).

There are public waste water systems located in and near the SWPA. Accidental releases may allow untreated waste water to contaminate the water resource. Failing private septic systems can leach into surrounding soils and potentially contaminate the source water especially given the known presence of soils with poor perk performance in the region which permits contaminants to travel greater distances.

Other potential conduits include offline wells and contaminated streams that may feed ground water resources. Dry Run impacts the Zone 1 protection area for both active sources and is impaired by stress to benthic-macroinvertebrates. Hawks Bill Creek impacts Zone 1 of the offline Hudson Spring and is impaired by *E. coli*. East Hawks Bill Creek passes through the

Zone 2 protection area for the Hudson Spring source and is impaired by stress to benthic-macroinvertebrates as well as *E. coli*[6].

Identification of existing contamination sources may address immediate concerns about protection of the local water supply. To ensure that the supply remains uncontaminated, continual review of land use activities and identification of potential sources of contamination is necessary.

[6] Virginia Department of Health Potential Sources of Contamination Inventory

7. Source Water Protection Plan

The SWPP describes the actions necessary to minimize the risk to the quality of the source water utilized by the Town of Luray. The goal of the plan is to reduce or eliminate potential threats to drinking water supplies within the SWPA either through existing regulatory or statutory controls, or by using non-regulatory (and often voluntary) measures centered around an involved public.

7.1. Existing Measures and Activities

Current measures in place for protecting the quality of water within the SWPA are:

- Fencing around all public water sources
- Regular monthly meetings with Town officials and local emergency management
- A recent Emergency Response Plan tailored for source water protection generated and updated by SEMS asset management software dated March 23, 2018.
- The Virginia Department of Health provided a Wellhead Protection Plan, with assistance from Olver, Inc., in June 2008 for the Town of Luray
- Annual Water Quality Report published on the Town website at http://www.townofluray.com/water---waste-water.html
- Yearly high school student water quality project participation, sampling, and results report published on the Town website at http://www.townofluray.com/student-water-project.html.

7.2. Source Water Protection Emergency Response Plan

The Town of Luray has an Emergency Response Plan generated by SEMS asset management software dated March 23, 2018. The Emergency Response Plan provides contact information and defines basic emergency response procedures to aid the waterworks in responding to a source water contamination event. *[Insert only in non-public version of SWPP: The Source Water Protection Emergency Response Plan is located in Appendix F]*

7.3. Public Education and Outreach

In order for citizens to appreciate the benefits of source water protection, they must first understand what the problems are in providing safe drinking water, and how they can become involved in the process. Public education is the greatest promoter of voluntary action and public support for a community's wellhead source water protection program.

Activities and opportunities should be sought that will increase public awareness that source water protection is a local issue and that each citizen plays a part. A public education brochure template is available in Appendix C. Some other examples of public education and outreach include providing information about source water protection on your waterworks website and Annual Water Quality Report, and installing signs along roads in high visibility locations near the designated boundary of the SWPA that state "Entering Town of Luray Water Protection Area".

For several years, the Town of Luray has partnered with Luray High School Honors students in Earth Science Agriculture and Ecology class. Students learn about water quality by utilizing testing equipment, collecting water samples in local streams, and charting test results based on water quality standards. Students learn, based on the test results, the appropriate uses for the sampled water and possible contributors to contamination. These results are provided in a report to the Town and published on the Town website at: http://www.townofluray.com/student-water-project.html.

The Town of Luray publishes an Annual Water Quality Report on the Town website at http://www.townofluray.com/water---waste-water.html and mails this report to water customers yearly.

7.4. Implementation and Funding

The initial step in implementation should be to discuss responsible parties and timelines to implement the strategies. Community members can determine the best process for completing activities within the projected time periods. Feasible source management strategies are addressed in the Recommended Actions Section of this Plan.

Numerous funding opportunities are available to aid communities in the implementation of source water protection initiatives. The following is a summary funding sources currently available to support source water protection in Virginia:

Litter Prevention and Recycling Grant Programs – Virginia Department of Environmental Quality

Funding type: grant

Description: This program coordinates annual competitive and non-competitive Litter Prevention and Recycling Grant Programs to support localities' recycling and litter prevention activities. Contact program staff at 804-698-4029 to determine what resources may be available to encourage cleanup and reporting of dump sites.

Link:http://www.deq.virginia.gov/Programs/LandProtectionRevitalization/RecyclingandLitterPreventionPrograms/LitterPreventionandRecyclingGrantPrograms.aspx

Wellhead Protection Implementation Projects Grants – Virginia Department of Health – Office of Drinking Water

Funding type: grant

Description: This program supports the implementation of wellhead protection projects including well abandonment, educational outreach, wellhead fencing, advancing ordinances, emergency response planning, hazardous waste collection, and protection area delineation. This program requires that the waterworks have a protection strategy in-place (i.e. Source Water Protection Plan) and an active source water protection committee.

Link: http://www.vdh.virginia.gov/drinking-water/source-water-programs/source-water-protection-assistance-funding-opportunities/

Drinking Water State Revolving Fund – Virginia Department of Health – Office of Drinking Water

Funding type: low interest loan with possible principal forgiveness

Description: This program provides planning funding, which could be used to analyze solutions to source water measures or evaluate potential new sources. This program also provides low interest loans with possible principal forgiveness for waterworks construction projects including new wells and intake modifications, and low interest loans for waterworks to acquire land or conservation easements and to establish local voluntary incentive-based source water protection measures. Funding is prioritized for small, financially stressed, community waterworks.

Link: http://www.vdh.virginia.gov/drinking-water/financial-construction-assistance-programs/

Nonpoint Source Management Implementation Grant Program – Virginia Department of Environmental Quality

Funding type: grant

Description: This program provides grants for watershed projects, demonstration and educational programs and nonpoint source pollution control program development.

Link:http://www.deq.virginia.gov/Programs/Water/WaterQualityInformationTMDLs/NonpointSourcePollutionManagement.aspx

Virginia Wastewater Revolving Loan Fund – Virginia Department of Environmental Quality

Funding type: low interest loan

Description: This program provides low interest loans for acquisition of title or other rights to real property to protect or improve water quality, and for storm water runoff control best management practices.

Link:http://www.deq.virginia.gov/Programs/Water/CleanWaterFinancingAssistance/VCWRLFTableofContents.aspx

Virginia Clean Water Revolving Loan Fund – Virginia Department of Environmental Quality

Funding type: low interest loan

Description: This program primarily funds wastewater treatment projects, but also funds agricultural best management practices and non-point Source Pollution Abatement. This program can provide low interest loans to waterworks or localities to provide loans or other incentives to facilitate the implementation of agricultural best management practices.

Links:

Land conservation - http://www.deq.virginia.gov/Programs/Water/CleanWaterFinancingAssistance/LandConservation.aspx

Stormwater - http://www.deq.virginia.gov/Programs/Water/CleanWaterFinancingAssistance/StormwaterFundingPrograms/StormwaterLoans.aspx

Stormwater Local Assistance Fund – Virginia Department of Environmental Quality

Funding type: cost-share

Description: This fund provides matching grants for stormwater projects including new stormwater best management practices, stormwater best management practice retrofits, stream restoration, low impact development projects, buffer restorations, pond retrofits, and wetlands restoration.

Link:http://www.deq.virginia.gov/Programs/Water/CleanWaterFinancingAssistance/StormwaterFundingPrograms/StormwaterLocalAssistanceFund(SLAF).aspx

Virginia Land Conservation Foundation – Virginia Department of Conservation and Recreation

Funding type: grant

Description: Grants are awarded to help fund the purchase of permanent conservation easements, open spaces and parklands, lands of historic or cultural significance, farmlands and forests, and natural areas. This program may allow public waterworks to permanently protect land in the SWPA at little cost to the waterworks.

Link: http://www.dcr.virginia.gov/virginia-land-conservation-foundation/

The Land and Water Conservation Fund State and Local Assistance Program – Virginia Department of Conservation and Recreation

Funding type: cost-share

Description: This program supports the acquisition and/or development of public outdoor recreation areas. This may aid utilities in purchasing land in the SWPA when the source water protection goals do not conflict with the recreational use of the land. It should be noted that all LWCF assisted areas must be maintained and opened, in perpetuity, as public outdoor recreation areas.

Link: http://www.dcr.virginia.gov/recreational-planning/grants

Other Virginia Department of Forestry funding programs –

VDF administers a number of programs aimed at promoting healthy forests and wildlife habitat that may help waterworks to limit erosion on land that they control within the SWPA. Additionally, VDF administers programs aimed at supporting agricultural best management practices. Waterworks can use these programs to promote Best Management Practices within their SWPA.

Link: http://www.dof.virginia.gov/costshare/index.htm

Urban Waters Small Grants Program – US Environmental Protection Agency

Funding type: grant

Description: This program provides small grants to restore their urban waters in ways that also benefit community and economic revitalization. In general, projects should address local water quality issues related to urban runoff pollution, provide additional community benefits, actively engage underserved communities; and foster partnership

Link: https://www.epa.gov/urbanwaters/urban-waters-small-grants

Healthy Watersheds Consortium Grant – U.S. Endowment for Forestry & Communities, Inc.

Funding type: grant

Description: This program provides grants to accelerate strategic protection of healthy, freshwater ecosystems and their watersheds. The primary focus for applicants should be protection and stewardship of the landscape that comprises the watershed, rather than restoration of degraded habitats or projects with a strictly water quality improvement outcome.

Link: http://www.usendowment.org/healthywatersheds.html

Regional Conservation Partnership Program – U.S. Department of Agriculture

Funding type: cost share

Description: This program provides funding to locally driven, public-private partnerships that improve the nation's water quality, combat drought, enhance soil health, support wildlife habitat and protect agricultural viability. The program connects partners with producers and private landowners to design and implement voluntary conservation solutions that benefit natural resources, agriculture, and the economy. Applicants must match or exceed the federal award with private or local funds.

Link: https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/farmbill/rcpp/

7.5. References

Southworth, Scott, Aleinikoff, J.N., Bailey, C.M., Burton, W.C., Crider, E.A., Hackley, P.C., Smoot, J.P., and Tollo, R.P., 2009, Geologic map of the Shenandoah National Park region Virginia: U.S. Geological Survey Open-File Report 2009–1153, 96 p., 1 plate, scale 1:100,000.

Appendix A-1: Source Water Protection Area Zone 1 Zone 1 Topographical Maps

Figures reflecting maps of the water sources have not been included in electronic format for security purposes. To view figures, contact the Town of Luray at (540) 743-5511.

Appendix A-2: Source Water Protection Area Zone 2 Topographical Maps

Figures reflecting maps of the water sources have not been included in electronic format for security purposes. To view figures, contact the Town of Luray at (540) 743-5511.

Appendix A-3: USGS Geological Map Excerpt

Figures reflecting maps of the water sources have not been included in electronic format for security purposes. To view figures, contact the Town of Luray at (540) 743-5511.

Excerpt from Southworth, et al. 2009 Geologic Map of the Shenandoah National Park Region, Virginia. USGS Open-File Report 2009-1153.

Appendix A-4: Source Water Protection Geological Map

Figures reflecting maps of the water sources have not been included in electronic format for security purposes. To view figures, contact the Town of Luray at (540) 743-5511.

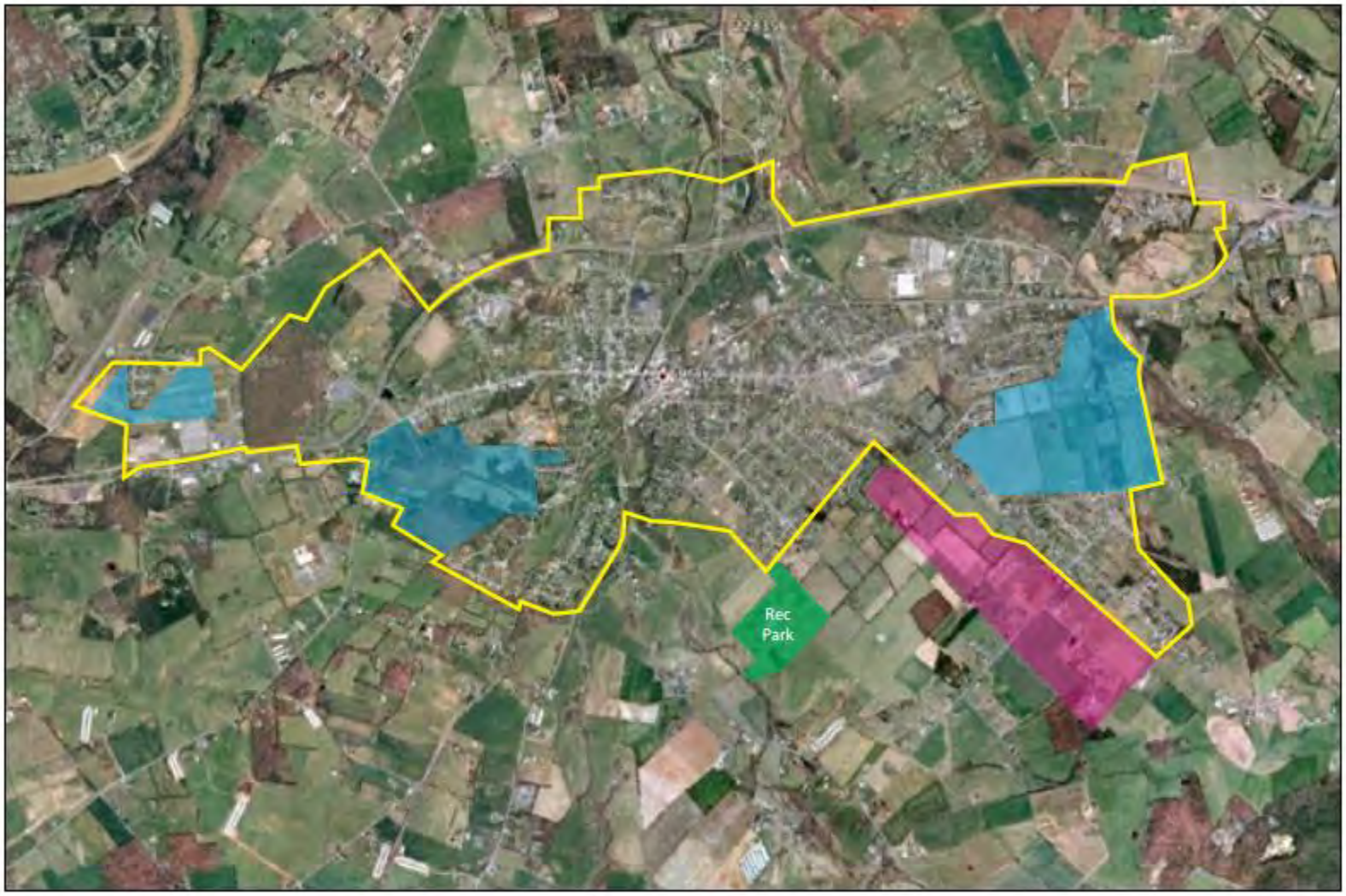
Appendix B-1: Source Water Protection Area Land Use Map

Figures reflecting maps of the water sources have not been included in electronic format for security purposes. To view figures, contact the Town of Luray at (540) 743-5511.

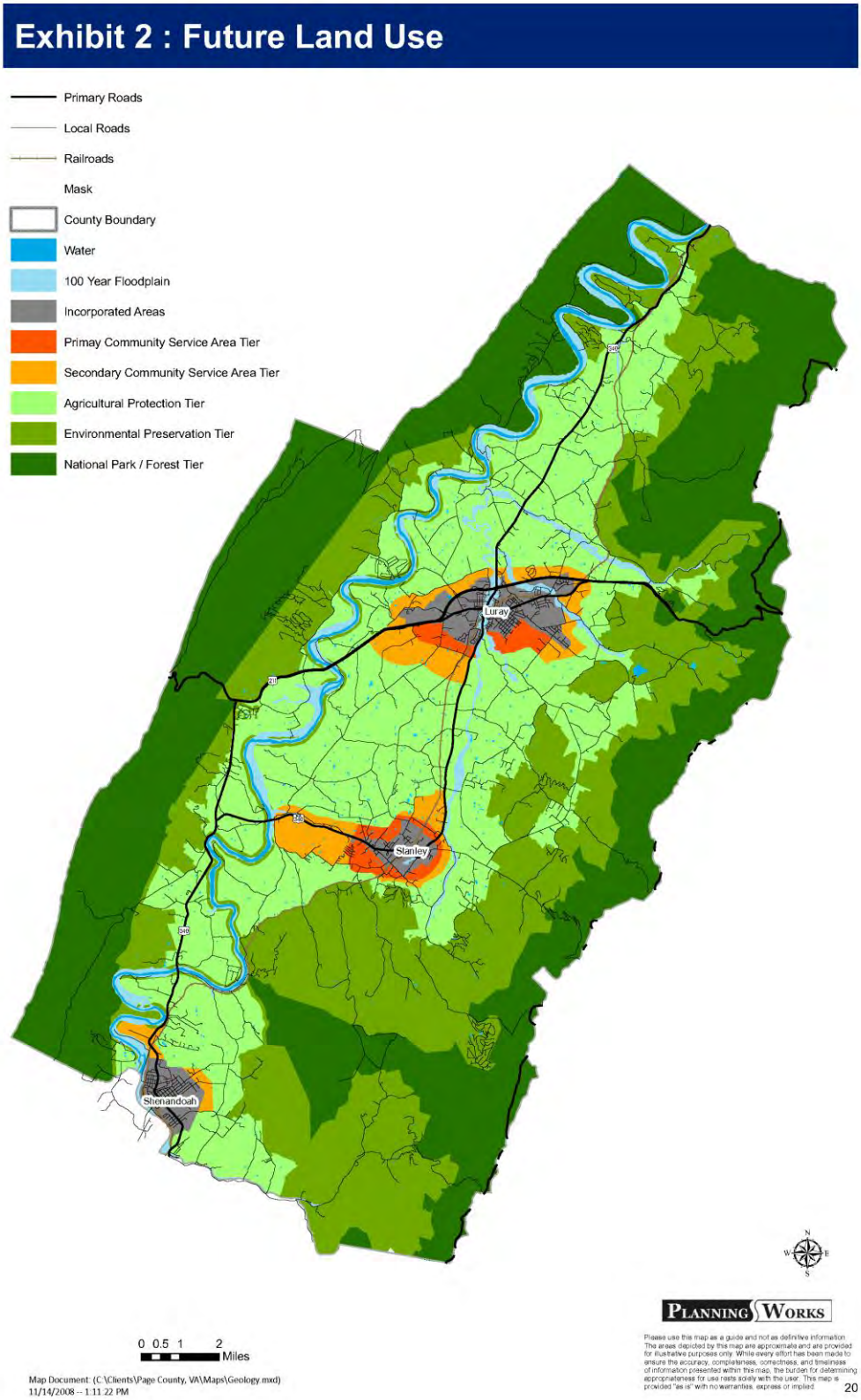
Appendix B-2: Source Water Protection Area Future Land Use Map *[Optional]*

Anticipated Greenway road improvements. The orange line represents Phase 5 connecting the elementary and middle schools. The blue line represents phase 6 connecting the schools with the Ralph Dean recreational area.

Anticipated future park and residential development around Luray as reflected in the 2013 Town Plan. The blue and pink areas represent locations in which Luray wishes to encourage residential growth.



Anticipated future land use around Luray as reflected in the 2013 Town Plan.



Appendix C: Residential Brochure Template

How To Protect Your Drinking Water

for residents of the
[PWS Name] Source Water Protection Area

[Insert photo of Town Seal/Company Logo here]

For questions regarding the [PWS Name] Source Water Protection Plan, please contact:

Name, Title
Phone: 555-555-5555
Fax: 555-555-5555
E-mail: someone@example.com

How Can I Protect My Water?

- **Never pour used motor oil or other hazardous waste materials onto the ground or in a storm drain. Find a proper disposal location at http://earth911.com.**
- **Don't flush unwanted medications. Find a drug collection location or event (https://www.deadiversion.usdoj.gov/drug_disposal) or place medications in a sealed container in the trash.**
- **Minimize the use of fertilizers, pesticides and herbicides on your lawn and farm.**
- **Join your local watershed organization.**
- **Learn about your drinking water supply and conserve water in your home.**
- **Pump your septic system every 3-5 years.**
- **Keep animals, including livestock and their waste, out of local streams.**

Source: http://www.ColumbiaVermourSWP.org

Where Does My Drinking Water Come From?

Your drinking water comes from [surface water name and/or groundwater]. [include brief description of sources/system].

Why Should I Be Concerned?

The public water supply is a valuable resource that, if contaminated, would negatively impact public health and put a financial burden on the community to restore or replace. As the map below shows, your property is located within our source water protection area. As such, things you do on your property can adversely affect our water source!

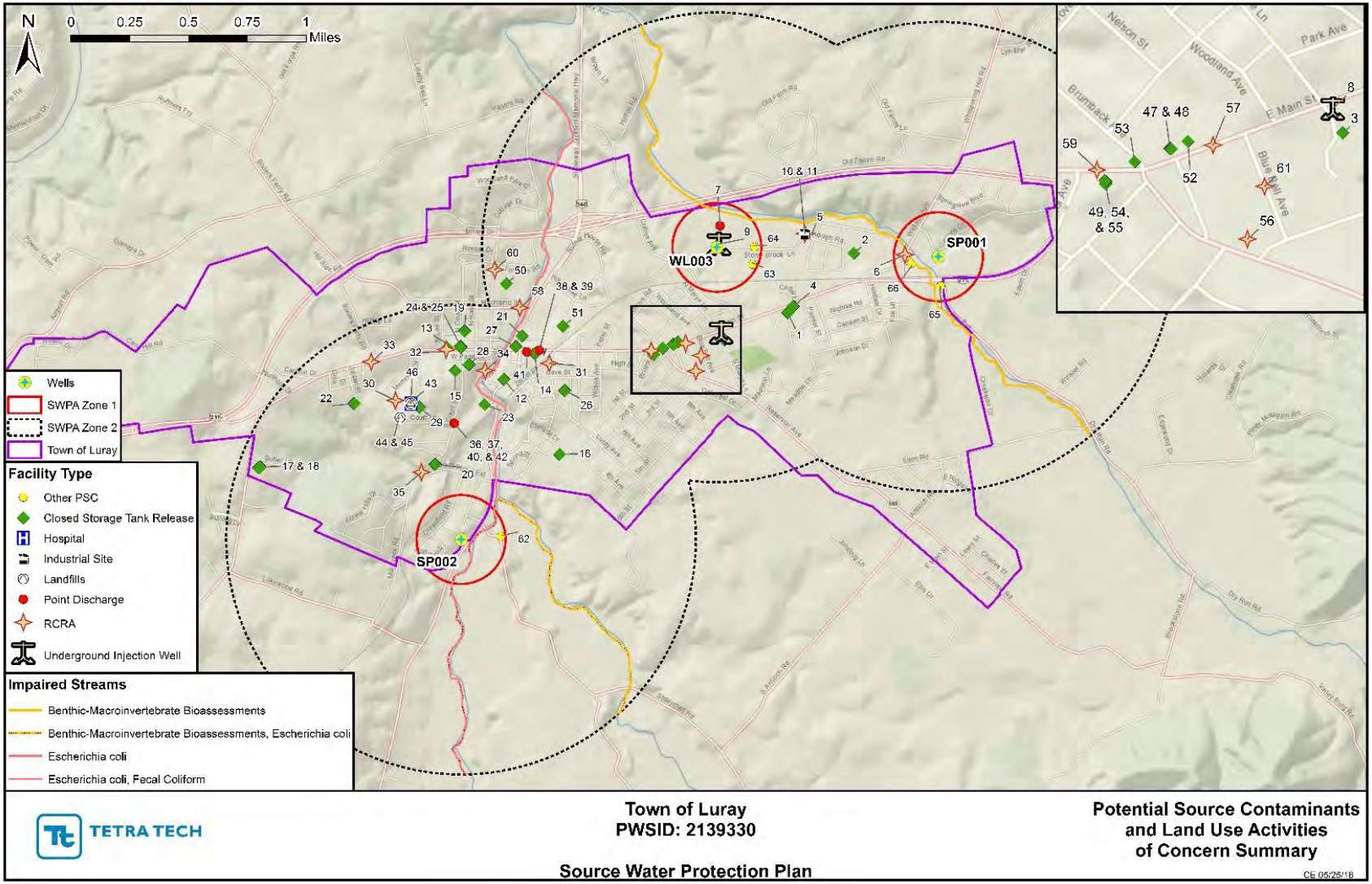
Insert photo of Zone I here

Appendix D: VDH ODW Field Office Construction Verification

PWSID	System Name	Source	Meets Construction Reqmts?
2139330	Town of Luray	Well # 6	Y

Data source: 5/11/2018 Email from Jess Tisinger, PE, VDH ODW LFO

Appendix E: Potential Sources of Contamination Inventory *[omit from public versions of the document]*



The following table contains a summary of Potential Sources of Contamination occurring in or near Luray water protection zones

Luray PSC Types	Zone 1 PSC Count	Zone 2 PSC Count	Totals
Closed Storage Tank Release	0	31	31
Industrial site		2	2
Other PSC	5	0	5
Hospital	0	1	1
RMW Storage/Steam Sterilizer	0	3	3
Point Discharge	1	7	8
RCRA	1	13	14
Underground Injection Well	1	1	2

Risk Ranking Methodology for Individual PSCs

In 2005 the Virginia Department of Environmental Quality created a Wellhead Protection Plan guidance document. This document contained an inventory establishing the level of risk specific land uses pose to surface and groundwater sources. This resource was used to create a point value methodology for ranking individual PSC risk to source water and is included in Appendix H. Additional factors have been assigned point values and the tally of these points represent the Risk Ranking in the Individual PSC Details table within this Appendix below. The following table indicates risk categories and point values used to rank each PSC and possibly prioritize or gauge the necessity for future protection actions:

Risk Category		Point Value
Land Use Risk	High	4
	Medium	3
	Low	2
	X or Unranked	1
Proximity to Source	Zone 1	2
	Zone 2	1

The following table contains Individual PSC details for potential sources within Luray water protection zones

Town of Luray Water System PWSID: 2139330							
Map ID	**Contaminant Type**	**Facility Type**	**Property Owner/Business Name**	**Mailing Address/Location**	**Zone 1**	**Zone 2**	**Risk Ranking**
1	Inorganics, SOCs, VOCs	Closed Storage Tank Release	Luray Tire Center	1128 E Main St Luray VA 22835		x	4
2	Inorganics, SOCs, VOCs	Closed Storage Tank Release	Wallace Computer Services	10 Wallace Ave Luray VA 22835		x	4
3	Inorganics, SOCs, VOCs	Closed Storage Tank Release	Wrangler/blue Bell	101 Blue Bell Avenue Luray VA 22835		x	4
4	Inorganics, SOCs, VOCs	Closed Storage Tank Release	P And J Tire	1338 E Main St Luray VA 22835		x	4
5	Site Specific	RCRA	O'SULLIVAN CORP.	31 STONEY BROOK LANE LURAY VA 22835-9066		x	2
6	Site Specific	RCRA	MOORE WALLACE USA INC	10 WALLACE AVE LURAY VA 22835	x		3
7	Site Specific	Point Discharge	LURAY WTP	LURAY INDUSTRIAL PRK LURAY VA 22835	x		5
8	Inorganics, Microbial, RADs, SOCs, VOCs	Underground Injection Well	VALLEY AUTO SALES	904 E MAIN ST LURAY VA 22835-		x	2
9	Inorganics, Microbial, RADs, SOCs, VOCs	Underground Injection Well	TOWN OF LURAY MUNICIPAL UTILITIES	45 EAST MAIN STREET LURAY VA 00000	x		3
10	Site Specific	Industrial Site	O'SULLIVAN CORP.	31 STONEY BROOK LANE LURAY VA 22835-9066		x	2
11	Site Specific	Industrial Site	EMCO ENTERPRISES INC	31 STONEYBROOK LANE LURAY VA 22835-9066		x	2
12	Inorganics, SOCs, VOCs	Closed Storage Tank Release	Page Cooperative Farm Bureau	127 Big Oak Rd Luray VA 22835		x	4
13	Inorganics, SOCs, VOCs	Closed Storage Tank Release	Centel Luray	18 Vogt Place Luray VA 22835		x	4

Town of Luray Water System PWSID: 2139330							
Map ID	**Contaminant Type**	**Facility Type**	**Property Owner/Business Name**	**Mailing Address/Location**	**Zone 1**	**Zone 2**	**Risk Ranking**
14	Inorganics, SOCs, VOCs	Closed Storage Tank Release	Mcconnell/Texaco	E Main St Luray VA 22835		x	4
15	Inorganics, SOCs, VOCs	Closed Storage Tank Release	Judicial Complex	101 S Court St Luray VA 22835		x	4
16	Inorganics, SOCs, VOCs	Closed Storage Tank Release	Luray High School	14 Luray Ave Luray VA 22835		x	4
17	Inorganics, SOCs, VOCs	Closed Storage Tank Release	Page County Schoolbus Garage	LEAKSVILLE ROAD - RT 616 LURAY VA 22835		x	4
18	Inorganics, SOCs, VOCs	Closed Storage Tank Release	Page County Schoolbus Garage	LEAKSVILLE ROAD - RT 616 LURAY VA 22835		x	4
19	Inorganics, SOCs, VOCs	Closed Storage Tank Release	Wadsworth Residence	110 N Court St Luray VA 22835		x	4
20	Inorganics, SOCs, VOCs	Closed Storage Tank Release	Holtzman Oil Luray Bulk Plant	191 South Court St Luray VA 22835		x	4
21	Inorganics, SOCs, VOCs	Closed Storage Tank Release	Luray Motor Company	26 N Broad St Luray VA 22835		x	4
22	Inorganics, SOCs, VOCs	Closed Storage Tank Release	Montvue Nursing Home	30 Montvue Drive Luray VA 22835		x	4
23	Inorganics, SOCs, VOCs	Closed Storage Tank Release	Hershberger Bulk Plant	S Hawksbill St Luray VA 22835		x	4
24	Inorganics, SOCs, VOCs	Closed Storage Tank Release	Judd Property	302 B West Main St Luray VA 22835		x	4
25	Inorganics, SOCs, VOCs	Closed Storage Tank Release	Former Campbells Plumbing and Electric Company	300 W Main St Luray VA 22835		x	4
26	Inorganics, SOCs, VOCs	Closed Storage Tank Release	Randy Arrington Residence	12 Blue Ridge Ave Luray VA 22835		x	4
27	Inorganics, SOCs, VOCs	Closed Storage Tank Release	Knizewski Property	2 West Main St Luray VA 22835		x	4

Town of Luray Water System PWSID: 2139330							
Map ID	**Contaminant Type**	**Facility Type**	**Property Owner/Business Name**	**Mailing Address/Location**	**Zone 1**	**Zone 2**	**Risk Ranking**
28	Inorganics, SOCs, VOCs	Closed Storage Tank Release	Page County-Building Official Office	101 S Court St Luray VA 22835		x	4
29	Inorganics, SOCs, VOCs	Closed Storage Tank Release	Page Memorial Hospital	200 Memorial Dr Luray VA 22835		x	4
30	Site Specific	RCRA	PAGE MEMORIAL HOSPITAL	200 MEMORIAL DR LURAY VA 228350000		x	2
31	Site Specific	RCRA	ATKINS AUTOMOTIVE CORP	22 ZERKEL ST LURAY VA 22835		x	2
32	Site Specific	RCRA	TURNERS BODY SHOP	320 W MAIN ST LURAY VA 22835		x	2
33	Site Specific	RCRA	MELVIN TUTT AUTO SALES	630 W MAIN ST LURAY VA 22835		x	2
34	Site Specific	RCRA	LURAY AUTO BODY	121 HAWKSBILL ST LURAY VA 22835		x	2
35	Site Specific	RCRA	HOLTZMAN OIL CORP - LURAY	191 SOUTH COURT ST LURAY VA 22835-1224		x	2
36	Site Specific	Point Discharge	SKYLAND STP	SKYLAND DEVELOPED AREA, SKYLIN LURAY VA 22835		x	2
37	Site Specific	Point Discharge	BIG MEADOWS	SKYLINE DRIVE, MILEPOST 51 LURAY VA 22835		x	2
38	Site Specific	Point Discharge	LURAY SEWAGE TREATMENT PLANT	45 EAST MAIN STREET LURAY VA 22835-1902		x	4
39	Site Specific	Point Discharge	LURAY SEWAGE TREATMENT PLANT	45 EAST MAIN STREET LURAY VA 22835-1902		x	4
40	Site Specific	Point Discharge	BIG MEADOWS	SKYLINE DRIVE, MILEPOST 51 LURAY VA 22835		x	2
41	Site Specific	Point Discharge	LOFT MOUNTAIN WAYSIDE	LOFT MOUNTAIN CAMPGROUND SKYL LURAY VA 22835		x	2

Town of Luray Water System PWSID: 2139330							
Map ID	**Contaminant Type**	**Facility Type**	**Property Owner/Business Name**	**Mailing Address/Location**	**Zone 1**	**Zone 2**	**Risk Ranking**
42	Site Specific	Point Discharge	MATHEWS ARM STP	MATHEWS ARM CAMPGROUND, SKYLIN SKYLINE DRIVE VA 22835		x	2
43	Inorganics, Microbial, RADs, SOCs, VOCs	Hospital	Page Memorial Hospital	200 Memorial Drive Luray VA 22835		x	2
44	Inorganics, Microbial, SOCs, VOCs	RMW Steam Sterlizer [SW]	Shenandoah Regional Microbiological Laboratory (PBR128) -	77 Court Lane Luray VA 22835		x	5
45	Inorganics, Microbial, SOCs, VOCs	RMW Steam Sterlizer [SW]	Shenandoah Regional Microbiological Laboratory (PBR334) -	77 Court Lane Luray VA 22835		x	5
46	Inorganics, Microbial, SOCs, VOCs	RMW Storage Facility [SW]	Valley Health - Page Memorial Hospital (PBR333) -	200 Memorial Dr Luray VA 22835		x	5
47	Inorganics, SOCs, VOCs	Closed Storage Tank Release	Mapco Express 4029	725 E Main St Luray VA 22835		x	4
48	Inorganics, SOCs, VOCs	Closed Storage Tank Release	East Coast #29	725 E Main St Luray VA 22835		x	4
49	Inorganics, SOCs, VOCs	Closed Storage Tank Release	7-Eleven #15904 - Luray	610 E Main St Luray VA 22835		x	4
50	Inorganics, SOCs, VOCs	Closed Storage Tank Release	Wrangler - Luray	320 North Hawksbill Street Luray VA 22835		x	4
51	Inorganics, SOCs, VOCs	Closed Storage Tank Release	Virginia Oak Tannery	Hill House Road Luray VA 22835		x	4
52	Inorganics, SOCs, VOCs	Closed Storage Tank Release	East End Texaco	717 E Main St Luray VA 22835		x	4
53	Inorganics, SOCs, VOCs	Closed Storage Tank Release	Former R & K Motors	633 E Main St Luray VA 22835		x	4

Town of Luray Water System PWSID: 2139330							
Map ID	**Contaminant Type**	**Facility Type**	**Property Owner/Business Name**	**Mailing Address/Location**	**Zone 1**	**Zone 2**	**Risk Ranking**
54	Inorganics, SOCs, VOCs	Closed Storage Tank Release	7-Eleven 15904	610 E Main St Luray VA 22835		x	4
55	Inorganics, SOCs, VOCs	Closed Storage Tank Release	7-Eleven Store 15904	610 E Main St Luray VA 22835		x	4
56	Site Specific	RCRA	BLUE RIDGE CLNRS	13 E LURAY SHOPPING CTR LURAY VA 22835		x	2
57	Site Specific	RCRA	EAST COAST OIL #29	725 E MAIN ST LURAY VA 22835		x	2
58	Site Specific	RCRA	POT ED CO BLUE RIDGE AREA THE	2 MECHANIC ST LURAY VA 22835		x	2
59	Site Specific	RCRA	7-ELEVEN #15904	610 EAST MAIN ST LURAY VA 22835-2052		x	2
60	Site Specific	RCRA	WRANGLER	320 N HAWKSBILL ST LURAY VA 22835		x	2
61	Site Specific	RCRA	WRANGLER INC	101 BLUE BELL AVENUE LURAY VA 22835-1656		x	2
62	Other PSC	Other PSC	Private Agriculture	215 State Rte 642, Luray, VA 22835	x		3
63	Other PSC	Other PSC	Andersen Storm Door Division Emco Enterprises	31 Stoney Brook Ln, Luray, VA 22835	x		3
64	Other PSC	Other PSC	Trailer Parking Lot	34 Stoney Brook Ln, Luray, VA 22835	x		3
65	Other PSC	Other PSC	Emmart Oil	1390 E Main St, Luray, VA 22835	x		3
66	Other PSC	Other PSC	Private Vehicle Storage	5 Wallace Ave, Luray, VA 22835	x		3

Appendix F: Source Water Protection Emergency Response Plan *[omit from public versions of the document]*

The Town of Luray has an Emergency Response Plan generated by SEMS asset management software dated March 23, 2018. This ERP has not been included in electronic format for security purposes.

Appendix G: Potential Conduits of Contamination Inventory *[omit from public version of the document]*

The Town of Luray and Page County have no formal record available documenting potential conduits of contamination. Town officials indicate there are very few private wells within Town limits.

Appendix H: Virginia Source Water Assessment Program Land Use Risk to Source Water

Virginia Source Water Assessment Program Land Use Risk to Source Water

Table 1
LAND USE ACTIVITY INVENTORY
(Community and Nontransient Noncommunity Waterworks)

CLASSIFICATION	CONTAMINANT	SURFACE WATER RISK	GROUND WATER RISK	NAICS CODE
Residential/Commercial				
Fuel Storage Systems [ground water only]	V	X	medium	814110
On-site sewage system [ground water only]	M, N	X	medium	814110
Agriculture				
Chemical/fuel storage areas	V, S, N	low	medium	111, 112
Crop and fodder production	S, N	low	medium	111
Specialty crop production/nursery (e.g. horticulture, citrus, nuts, fruits)	S, N	low	medium	112
Livestock/poultry				112
Pasture (grazing)	M, N	medium	low	112
Intensive animal feeding operations				112
Confined animal feeding operations (permitted)	M, N	high	high	112
Confined animal feeding operations (non-permitted)	M, N	high	high	112
Aquaculture	M, N	low	medium	11251
Animal burial areas	M, N	low	medium	112
Manure holding or spreading	M, N	medium	medium	112
Other				
Industrial/Commercial [Dry and Discharging]				
Above ground storage tank (> 660 gallons) excluding potable water and petroleum	V, S, N	medium	medium	
Animal Slaughtering or Processing	M, N	low	medium	311
Asphalt Plants	V, S, N	low	medium	32412
Car Wash	V	low	low	811192
Cemetery [ground water only]	M, N, S	X	low	812220
Coal Gasification Facility	V	low	medium	324199
Dry Cleaning Establishment	V	low	medium	812320
Electrical and Electronic Product Manufacturing	I, V	low	medium	335310, 334410
Electroplating/Metal Finishing	I, V	low	medium	332813
Fertilizer/Manufacturer/Distributor/Storage	N, S	medium	medium	325, 422
Fire Training Facilities	V	low	medium	922160
Food Processing	M, N	low	low	311
Funeral Home/Mortuary	M, V	low	low	812210
Furniture/Boat Refinish (Boat Yards)	V, S, N	medium	medium	811420, 336612
Gasoline Station/Service Center	V, S, N	low	medium	447100
Golf Course	N, S	low	medium	713910
Hazardous Waste Recovery Facility	V, S, R, M	high	high	562211
Hazardous Waste Transfer, Storage or Disposal	V, S, R, M	high	high	562
Hospital	V, S, R, M	low	medium	622110
Laboratories	V, S, R, M	low	medium	541380, 621510
Machine Shops	V	low	medium	332710
Marina [Surface Only]	M, V, S	medium	X	713930
Military Base	V, S, R, M	high	high	928110
Oil & Gas Production (Refining)/Storage/Pipelines	V	medium	medium	324110, 422710, 486910
Paint Shop	V	low	medium	811121
Pesticide/Herbicide Manufacturer/Distributor/Storage	S	medium	medium	325320, 422690,422910,
Photo Processor/Printer	I	low	medium	812290
Pipeline / Powerline Right of Way	S	low	low	486910, 221120
Plastic Manufacturer	V, S	low	medium	326100, 325211
Power Generation Station	S	medium	low	221110
Scrap and Junk Yards	V, I	low	medium	421930
Solid Waste Collection/Transfer Site	V, S, M, I	low	low	562111
Superfund Site	V, S, R, M, I	high	high	562211
Underground Injection Well [groundwater only]	V, S, R, M, I	X	high	562
Underground Storage Tanks [excluding potable water][groundwater only]	V	X	medium	
Underground Storage Tanks [leaking][regulated][groundwater]	V	X	high	
Wood Preservative Manufacturer/Wood Preserver	S	low	medium	321114
Other				
Wastewater Facilities				
Combined Sewer Overflow/Discharge	M, N, V, S	high	low	22132
Septage Lagoon	M, N	medium	medium	22132

Table 1
LAND USE ACTIVITY INVENTORY Continued
(Community and Nontransient Noncommunity Waterworks)

CLASSIFICATION	CONTAMINANT	SURFACE WATER RISK	GROUND WATER RISK	NAICS CODE
Sewer Lines (Surface-crossing and adjacent lines only) [surface water only]	M, N	High	X	22132
Storm Sewer Discharges and Stormwater infiltration ponds	V, N, S	Medium	low	22132
Untreated Piped Discharge [straight pipe]	M, N	High	low	22132
Wastewater Pump Station	M, N, V	High	low	22132
Wastewater Treatment Facility [point source discharge]	M, N, V	Medium	low	22132
Wastewater Treatment Nondischarging lagoon/mass drainfield	M, N, V	Low	medium	22132
Land Disposal				
Biosolids	M, N, I	low	low	111, 112
Industrial Sludge	M, N, I, S, V	low	low	562
Landfill (Lined)	M, N, V, S	low	medium	562212
Landfill (Unlined)	M, N, V, S	low	high	562212
Open Dump	M, N, V, S	low	High	5622
Septage	M, N	medium	Medium	111, 112, 562
Tire Pile	V	high	High	5622
Wastewater	M, N	medium	Medium	22132
Other				
Resource Extraction				
Coal	V	low	Low	21211
Oil + Gas	V	medium	Medium	211
Sand, Gravel, Limestone	V	low	Low	2123
Other				
Transportation				
Airport	V	low	Medium	422720
Parking Lots	V	low	Low	814
Primary Roadways	V, S, N, M, R	medium	Low	48
Railroad Tracks and Yards	V, S, N, M, R	medium	Low	482110
Salt Storage Sites	I	low	Low	48
Truck Terminals	V, S, N, M, R	medium	Medium	484
Special Cases (specifically identified as a significant source of contaminants)				
Barge and Vessel Traffic for surface sources		high	X	483211
Caves/Sinkholes for surface sources			X	

"x" – does not mean no risk

M = microbiological
N = nitrate/nitrite
V = volatile organic chemicals
S = synthetic organic chemicals
I = inorganic chemicals
R = radiological contaminants

(NOT all inclusive)

Table 2
LAND USE ACTIVITY INVENTORY
(Transient Noncommunity Waterworks)

CLASSIFICATION	CONTAMINANT	SURFACE WATER RISK	GROUND WATER RISK	NAICS CODE
Residential				
On-site sewage system [ground water only]	M, N	X	medium	814110
Agriculture				
Chemical/fuel storage areas	V, S, N	low	medium	111, 112
Crop and fodder production	S, N	low	medium	111
Specialty crop production/nursery (e.g. horticulture, citrus, nuts, fruits)	S, N	low	medium	111
Livestock/poultry				112
Pasture (grazing)	M, N	medium	low	112
Intensive animal feeding operations				112
Confined animal feeding operations (permitted)	M, N	high	high	112
Confined animal feeding operations (unpermitted)	M, N	high	high	112
Aquaculture	M, N	low	medium	11251
Animal burial areas	M, N	low	medium	112
Manure holding or spreading	M, N	medium	medium	112
Other				
Industrial/Commercial [Dry and Discharging]				
Above ground storage tank (> 660 gallons) excluding potable water and petroleum	V, S, N	medium	medium	
Animal Slaughtering or Processing	M, N	low	medium	311
Fertilizer/Manufacturer/Distributor/Storage	N, S	medium	medium	325310
Hospital	V, S, R, M	low	medium	622110
Laboratories	V, S, R, M	low	medium	541380, 621510
Marina [Surface Only]	M, V, S	medium	X	713930
Solid Waste Collection/Transfer Site	V, S, M, I	low	low	562111
Underground Injection Well [groundwater only]	V, S, R, M, I	X	high	562
Other				
Wastewater Facilities				
Combined Sewer Overflow/Discharge	M, N, V, S	high	low	22132
Septage Lagoon	M, N	medium	medium	22132
Sewer Lines (Surface-crossing and adjacent lines only) [surface water only]	M, N	high	X	22132
Storm Sewer Discharges and Stormwater infiltration ponds	V, N, S	medium	low	22132
Untreated Piped Discharge [straight pipe]	M, N	High	low	22132
Wastewater Pump Station	M, N, V	High	low	22132
Wastewater Treatment Facility [point source discharge]	M, N, V	Medium	low	22132
Wastewater Treatment Nondischarging lagoon/mass drainfield	M, N, V	Low	medium	22132
Land Disposal				
Biosolids	M, N, I	Low	low	111, 112
Industrial Sludge	M, N, I, S, V	Low	low	562
Landfill (Lined)	M, N, V, S	Low	medium	562212
Landfill (Unlined)	M, N, V, S	Low	high	562212
Open Dump	M, N, V, S	Low	high	5622
Septage	M, N	Medium	medium	111, 112 562
Wastewater	M, N	Medium	medium	22132
Other				
Special Cases (specifically identified as a significant source of contaminants)				
Barge and Vessel Traffic for surface sources		High	X	483211
Caves/Sinkholes for surface sources			X	

"x" – does not mean no risk

M = microbiological
N = nitrate/nitrite
V = volatile organic chemicals
S = synthetic organic chemicals
I = inorganic chemicals
R = radiological contaminants

(NOT all inclusive)