



Green Infrastructure at Cool Spring

Green Infrastructure Concept Plan
Potomac Valley Audubon Society

Matt Pennington

Kasey Osborne



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ABOUT THE AUTHORS

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Mr. Pennington is an environmental, community, and economic development planner with extensive expertise helping local governments and organizations balance economic and population growth with the preservation of natural resources. He is a certified Chesapeake Bay Landscape Professional (CBLP) and an award-winning stormwater professional who focuses on comprehensive planning, green infrastructure design and implementation, hazard mitigation, and securing grants for community projects and programs.

Mr. Pennington has been providing technical assistance to local governments, watershed organizations and other nonprofits. He is experienced in creating targeted audience outreach campaigns to reduce nonpoint pollution reduction for 13 years. In 2018, he led the Local Engagement Initiative on behalf of the West Virginia Department of Environmental Protection and is the former chair of the U.S. Environmental Protection Agency's Chesapeake Bay Program Local Leadership Workgroup.

Mr. Pennington earned a B.S. in Urban and Regional Planning from Frostburg State University.

Kasey Osborne, Project Scientist

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Ms. Osborne earned a B.S. in Wildlife and Fisheries Resources and M.S. in Professional Writing and Editing from West Virginia University, and an M.S. in Biological Sciences from Marshall University.

ACKNOWLEDGEMENTS

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INTRODUCTION

The Potomac Valley Audubon Society (PVAS) is one of the region’s premier environmental educational organizations. Engaging Jefferson, Berkeley, and Morgan counties in West Virginia and Washington County, Maryland, PVAS’ goal is to get people of all ages outside to explore and learn about the natural world. One method PVAS uses to accomplish this goal is through land preservation, specifically through the management of four nature preserves in West Virginia’s Eastern Panhandle, totaling approximately 600 acres. One of these preserves, Cool Spring in Charles Town, welcomes approximately 20,000 visitors annually.

With the popularity of outdoor recreation carrying over from the pandemic, Cool Spring is anticipating additional trail users in the coming years. While this growth in interest is welcome, it does come with land management responsibilities and the following obstacles to overcome:

- Cool Spring Preserve’s existing parking facility lacks capacity during normal business hours due to increased staff, so the lot cannot accommodate typical public; the lot also lacks infrastructure for electric vehicles
- Increased visitors have strained the existing septic system that is only open during nature center hours
- Higher trail system usage has created erosion and safety concerns at several locations through Cool Spring Preserve

In an effort to accommodate increased use, while keeping the mission of PVAS to “*preserve, restore, and enjoy the natural world through education and action,*” leaders desire to:

- expand the parking facility and incorporate green infrastructure (GI) to filter pollution and reduce runoff created from the new impervious surface
- install an electric vehicle charging station in the parking lot
- install a composting toilet facility
- identify best practices for trail construction and maintenance

1.1 Public forum

Downstream Strategies facilitated executive focus group input meetings to identify and review problem areas. Additionally, one community forum was held on March 4, 2025, to discuss potential proposed improvements, green infrastructure, and receive community feedback.

Figure 1: Pictures from public forum



Figure 2: Cool Spring Public Forum Announcement



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Share your thoughts, ideas, and comments on the new Cool Spring Preserve green infrastructure concept plan!

Host: *Matt Pennington, Downstream Strategies*

Free and open to the public. *Anyone under the age of 18 must be accompanied by an adult participant. Registration is not required but filling out the RSVP is appreciated for planning purposes.*

On Tuesday, March 4th Matt Pennington from Downstream Strategies will be presenting the concept plan for future green infrastructure at Cool Spring Preserve. The growing community demand for the preserve is exceeding our capacity and we need to make updates to the visitor services such as the parking lot. Our goal is to meet the community need while still protecting the sensitive ecosystem we have committed to preserving through the use of strategic green infrastructure. This is a community forum where Matt will present the draft of the concept plan and then open the floor to questions, comments, concerns, and ideas. Light refreshments will be served. There is also the option to listen in to the presentation via Zoom.

Schedule:

4:00 – (optional) come early to walk around the preserve and see the areas where improvement is needed and change is proposed. No Zoom option for this portion.

5:00 – indoor presentation by Matt Pennington. Zoom option available.

Important Details:

- **Activities:** The first (optional) part of the meeting will include a walk around the preserve. Primarily near the building. We will then go inside for the presentation of the concept plan.
- **Restroom:** Indoor, flushing restrooms will be available.
- **Parking/Where to Meet:** The Case Nature Center has a private parking lot.
- **What to Bring:** Bring your ideas and supplies for taking notes: paper/notebook and something to write with.

[RSVP HERE!](#)

1.2 West Virginia Stormwater Manual

Many of the recommendations refer to design standards found in the West Virginia Stormwater Management and Design Guidance Manual, issued by the West Virginia Department of Environmental Protection November 2012.

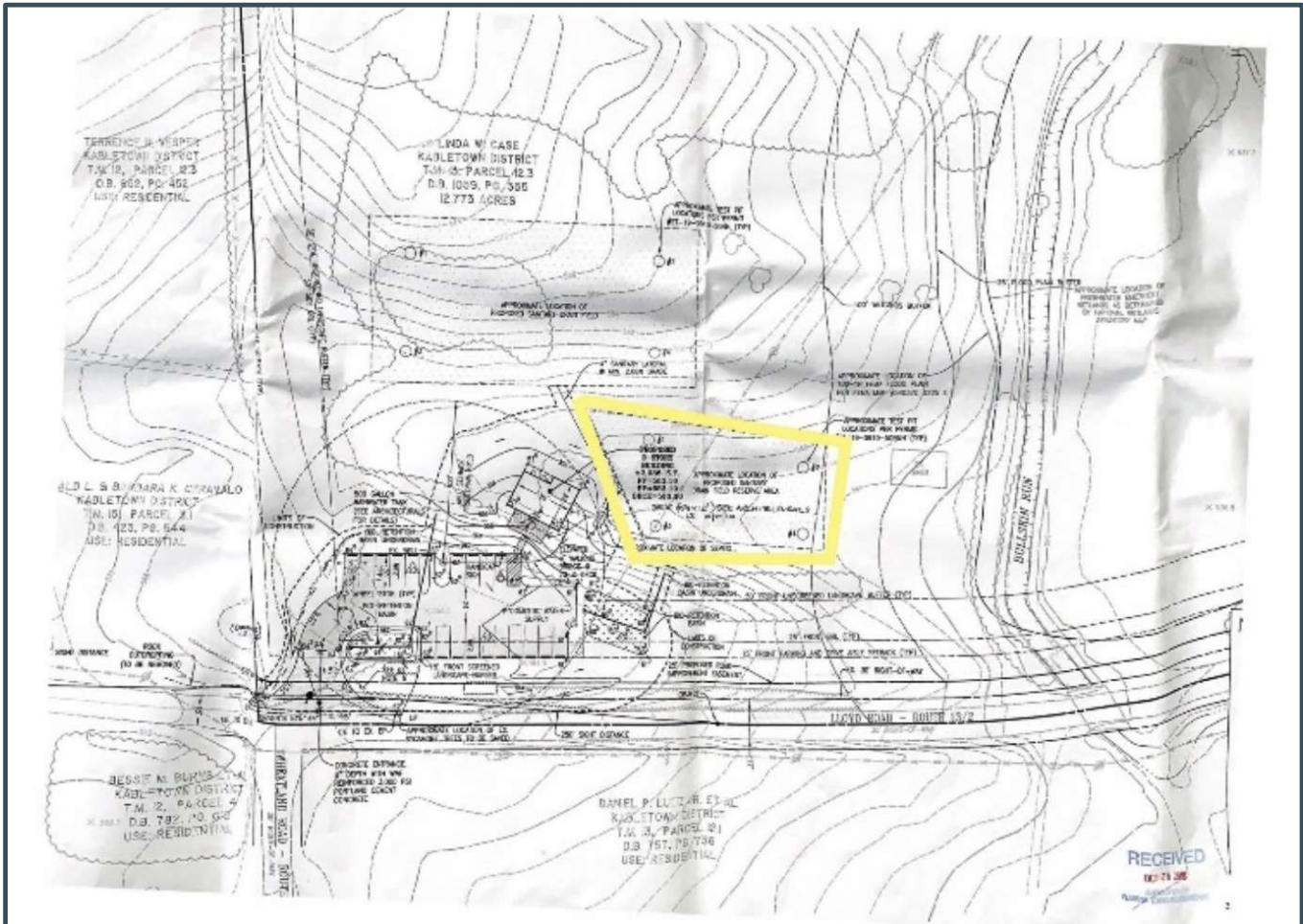
1.3 Utility and infrastructure conflicts

Existing locations for water and sewer infrastructure were evaluated during the concept plan development. This evaluation was based on a Craft Works–approved (Craft Works being the former owner of the PVAS facility) site plan provided by PVAS and developed by W.H. Gordon and Associates. The site must be thoroughly cleared by WV 811 “Call Before You Dig,” and the infrastructure’s final location must be verified to determine if any utility conflicts exist before proceeding to engineering.



This plan recommends implementing GI in the existing “septic reserve area” — shown below in yellow of an image of the approved plan in yellow.

Figure 3: Scan of approved Craft Works Site Plan



Source: W.H. Gordon (2008)

The reserve area is simply a “backup” drainfield and is only called into service if the installed drainfield should fail. This plan also recommends PVAS taking the below required steps to relocate said septic reserve area to a more suitable location.

- Contact licensed septic installer
- Submit subdivision application (Appendix A)
- Perform new percolation test in relocated area (certified septic installer)
- Excavation observation hole for Health Department inspection (6’ depth by 3’ width)

1.4 Site considerations and Jefferson County ordinances

Downstream Strategies conducted a site visit in February 2025 and reviewed the preliminary plans described above. Existing conditions, such as wetlands and the 100-year floodplain, and their relationship with Jefferson County ordinances were considered in the final concept plan recommendations.

Additionally, all future design must comply with Jefferson County ordinances and other referenced state and federal requirements from various agencies, including but not limited to Americans with Disabilities Act, West Virginia Department of Health and Human Resources, West Virginia Department of Environmental Protection, West Virginia Department of Highways.

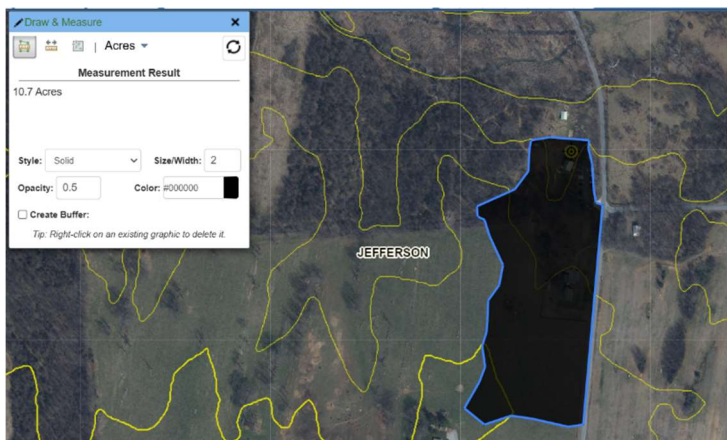
1.5 Cost estimates

Downstream Strategies developed the cost estimates in this plan based on the current Jefferson County bonding estimates, last updated in 2020. Design estimates are based on assumed hourly market rates and anticipated levels of effort. Finally, all candidate sites have a calculated dollar-per-acre-treated ratio for both the design and construction phases.

1.5.1 Drainage area

Figure 3 depicts the Cool Spring drainage area. Agricultural land use—a major contributor of Chesapeake Bay pollution (Chesapeake Bay Program, 2025)—flows from an adjacent property at a higher elevation. A preliminary drainage area analysis found that approximately 10.7 acres flow toward the proposed bioretention treatment area, a 4,000 percent increase of land area now being treated by bioretention. However, this concept plan recommends additional analysis be conducted to determine the appropriate size of GI practices. The drainage area will influence the overall cost-benefit ratio PVAS will achieve as it develops its GI retrofit.

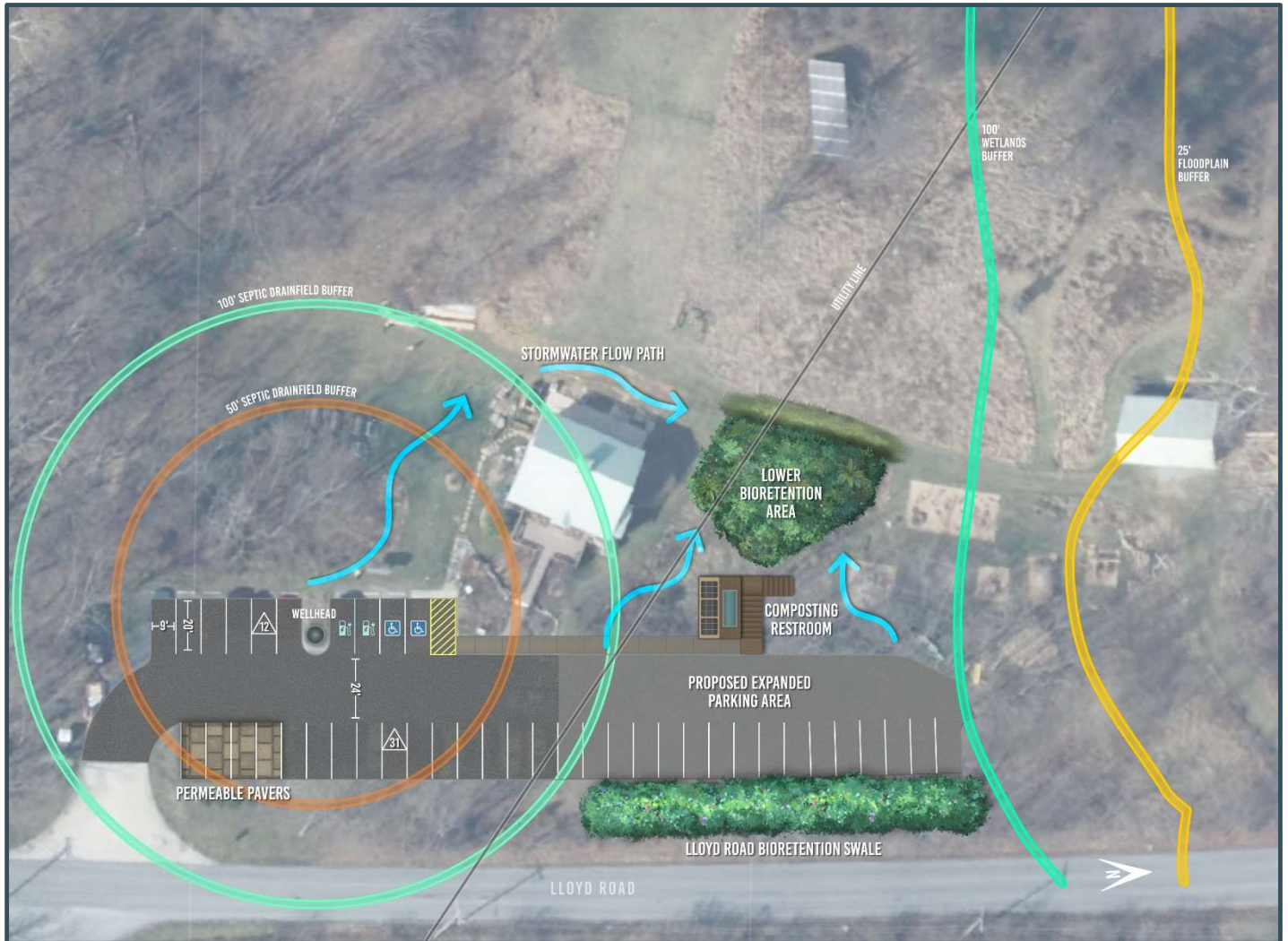
Figure 4: Drainage area delineation of Cool Spring facility



2. GREEN INFRASTRUCTURE RETROFITS

Figure 4 illustrates an overview of the GI retrofits for this concept plan. In the future, this plan will serve as the basis for grant opportunities to fund detailed engineering plans and construction. The following sections provide concept renderings and preliminary design and construction estimates.

Figure 5: Cool Spring facility BMP overview



2.1 Parking lot green infrastructure practices

The existing bioretention facilities along the north and south areas of the parking lot have been in need of maintenance and restoration since before PVAS acquired the property. These areas have eroding and unstable side slopes, exposed liners, overgrown vegetation, and a lack of pretreatment. In an effort to reduce the disturbance of the tree canopy and maximize the drainage area for areas both on and off the site, this concept plan recommends the following strategies:

Rain garden relocation to lower bioretention area: relocate northern bioretention to a lower elevation.

Lloyd Road bioswale: install a bioswale along Lloyd Road, which will capture runoff generated from the expanded parking area.

Permeable pavers: excavate the older soil media at the southern rain garden adjacent to the existing parking lot and replace the garden with permeable paver materials, which will increase parking and minimize stormwater runoff.

2.1.1 Rain garden relocation

Moving the underperforming rain garden to a lower elevation will increase the total treatment area from 0.25 acres to over 10.5 acres while increasing parking capacity and visitor flow to the nature center.

Figure 6: Site of parking lot expansion



Figure 7: Flow path of Cool Spring surface water flow path



Source: Downstream Strategies (2025).

Design costs will total \$16,180 at \$1,512 per acre treated (see Table 1). Current construction estimates total \$18,892 at \$1,765 per acre treated. These estimates will be refined during the design and engineering phase.

Table 1: Preliminary cost estimates: Lower bioretention

Task	Cost/unit	Units	Qty.	Total
Engineering and permitting	\$15,000	Per	1.0	\$15,000
Surveying	\$1,000	Per	0.5	\$300
Landscape design	\$880	Per	1.0	\$880
BR-7 Bio-media	\$43	CY	94.6	\$4,066
Clean #57 gravel (includes delivery)	\$27	Ton	26.9	\$712
Clean #8 choker stone (includes delivery)	\$27	Ton	13.4	\$363
Mulch	\$28	CY	18.1	\$507
Material delivery	\$300	Load	5.6	\$1,690
Plantings	\$1	SF	1954.0	\$1,954
Labor and equipment	\$2,400	Day	4.0	\$9,600
Preliminary estimate				\$35,072

2.1.2 Lloyd Road bioswale

The Lloyd Road bioswale drainage area is 0.32 acres and treats runoff from the Cool Spring Preserve parking lot. This facility should only be considered if the lower bioretention area cannot facilitate a BMP facility large enough to meet design requirements.

Design costs will total \$8,680 at \$27,125 per acre treated (see Table 2). Current construction estimates total \$12,359 at \$38,621 per acre treated. These estimates will be refined during the design and engineering phase.

Figure 8: Drainage area of Lloyd Road bioswale

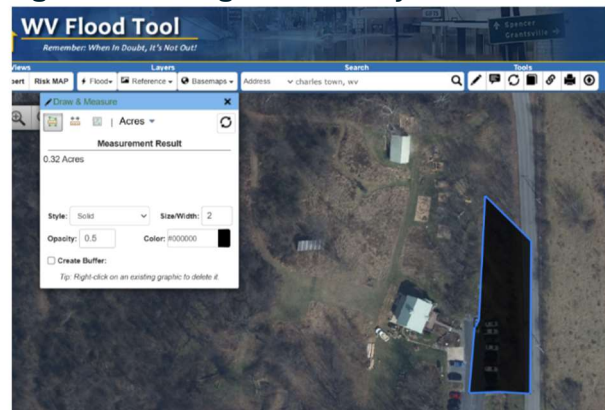


Table 2: Preliminary cost estimates: Lloyd Road bioretention swale

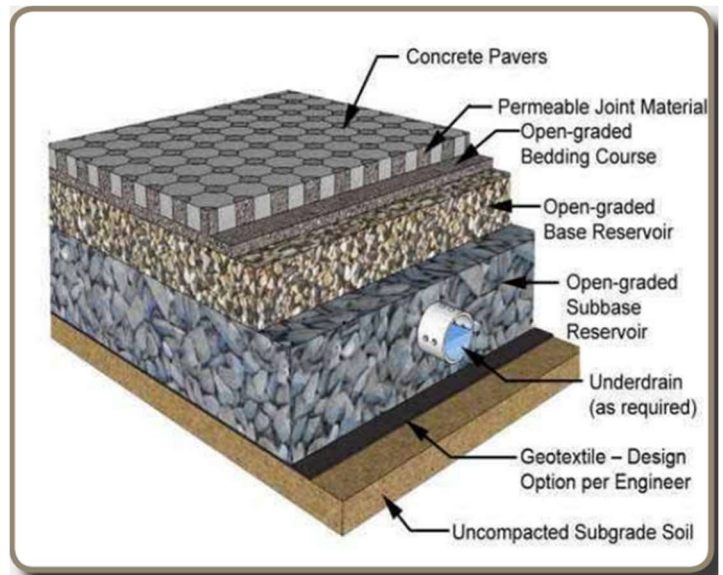
Task	Cost/unit	Units	Qty.	Total
Engineering and permitting	\$15,000	Per	0.5	\$7,500
Surveying	\$1,000	Per	0.5	\$300
Landscape design	\$880	Per	1.0	\$880
BR-7 Bio-media	\$43	CY	49.2	\$2,115
Clean #57 gravel (includes delivery)	\$27	Ton	12.9	\$341
Clean #8 choker stone (includes delivery)	\$27	Ton	6.4	\$174
Mulch	\$28	CY	11.9	\$332
Material delivery	\$300	Load	3.1	\$916
Plantings	\$1	SF	1281.0	\$1,281
Labor and equipment	\$2,400	Day	3.0	\$7,200
Preliminary estimate				\$21,039

2.1.3 Permeable pavers

PVAS should consider repurposing the existing, underperforming rain garden with permeable pavers. Permeable pavers have increased maintenance requirements, but PVAS' strong capacity makes them a great fit for permeable pavers: They retain full-time staff and a robust volunteer network capable of handling the upkeep of this BMP. Additionally, PVAS is one of the region's top environmental education providers and can use these permeable pavers as a training tool for local students and professionals.

The foundational work already in place from the rain garden includes an open-graded subbase reservoir and perforated underdrain. Therefore, only the top layer of soil media will be excavated and replaced with the appropriate layers of aggregate courses, as shown in Figure PP-2 of the West Virginia Stormwater Manual (see below).

Figure 9: Schematic profile of permeable pavers



David Smith, ICPI

Figure 10: Site of rain garden



Permeable paver pretreatment sediment trap

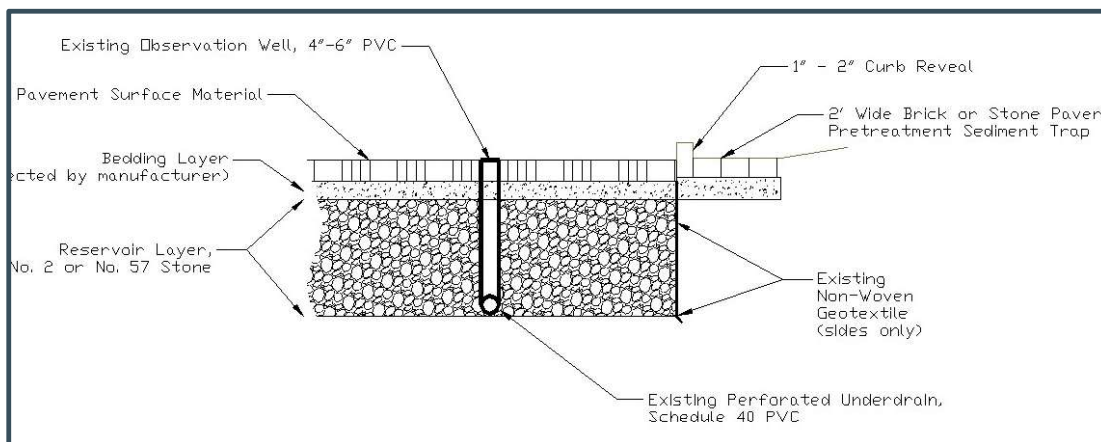
In an effort to minimize clogging of and maintenance for the permeable pavers, engineers should consider adding a pretreatment sediment trap similar to those found at the Peoples Natural Gas Field parking lot in Altoona, Pennsylvania. The below image shows a slight depression in the gutter pan of the trap, which can be easily cleaned out with basic hand tools like a snow shovel and broom. The slight “curb” slows water and allows sediment and debris to drop to the bottom of the trap. Cleaner water then flows over the “curb” into the stormwater practice.

Figure 11: Example of sediment trap



Source: Foster, C. (2025).

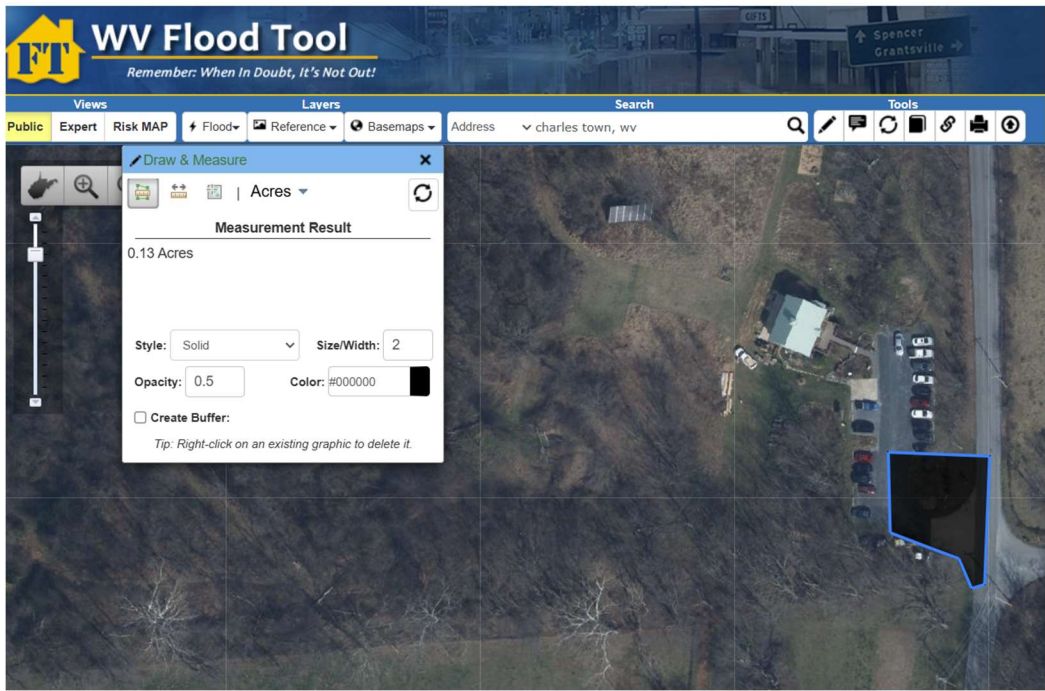
Figure 12: Schematic profile of pre-treatment



Source: Downstream Strategies (2025).

The permeable parking area drainage area is 0.13 acres and treats runoff from only four spaces and the drive isle of the Cool Spring parking lot. The real value of the permeable pavers lies not in the amount of runoff they treat but in furthering PVAS’ desire for Cool Spring Nature Preserve to showcase a variety of GI BMPs.

Figure 13: Drainage area of permeable parking area



Source: WV Flood Tool (205).

Design costs will total \$4,050 at \$31,153 per acre treated (see Table 3). Current construction estimates total \$9,270 at \$71,307 per acre treated. These estimates will be refined during the design and engineering phase.

Table 3: Preliminary cost estimates: Permeable paver parking area

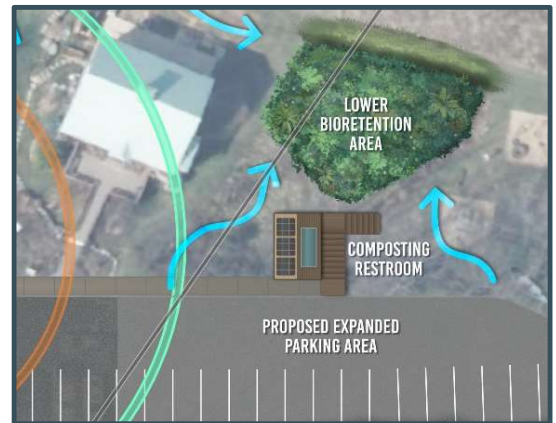
Task	Cost/unit	Units	Qty.	Total
Engineering and permitting	\$15,000	Per	0.25	\$3,750
Surveying	\$1,000	Per	0.30	\$300
Clean #57 gravel (includes delivery)	\$27	Ton	70.7	\$1,873
Clean #8 bedding stone (includes delivery)	\$27	Ton	5.0	\$137
Permeable paver block	\$3	SF	720.0	\$2,160
Material delivery	\$300	Load	1.0	\$300
Labor and equipment	\$2,400	Day	2.0	\$4,800
Preliminary estimate				\$13,320

2.2 Composting restroom

Stakeholder input suggested a concern with the potential overuse of the existing septic system and proposed a composting toilet facility. PVAS currently has a composting toilet at the Yankauer Nature Preserve in Berkeley County and seeks to find a similar alternative to its current method of managing wastewater at Cool Spring.

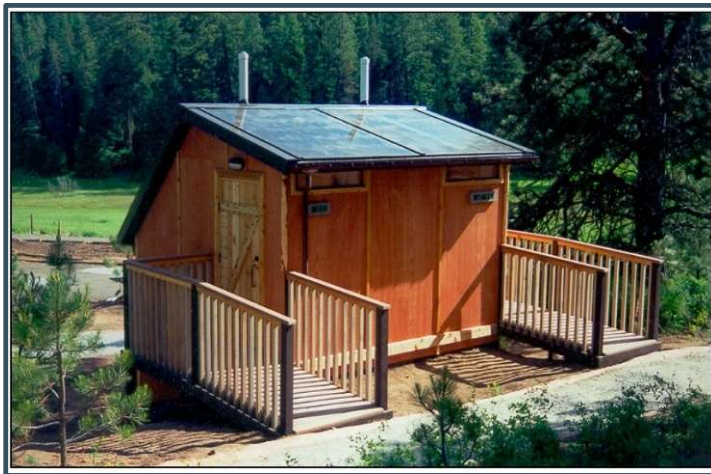
Design requests included storage hopper access and solar panel installation on the exterior structure. Comparable design examples offered by regional vendors are shown below.

Figure 14: Proposed placement

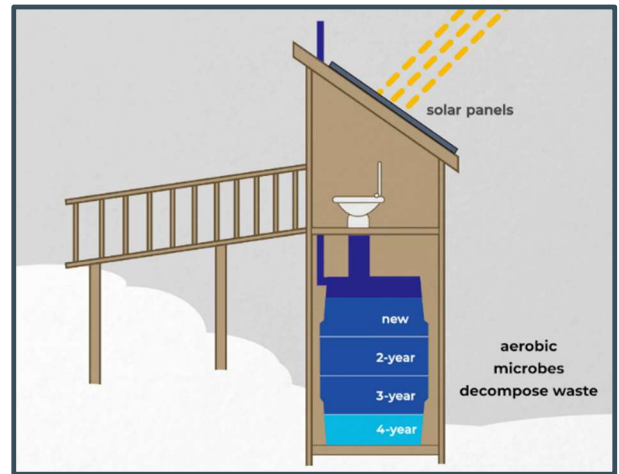


Source: Downstream Strategies (2025)

Figure 15: Exterior design (left); interior schematics (right)



Source: Advanced Composting Systems (1997).



Source: K-Rose Productions (2019).

2.2.1 Health Department requirements

West Virginia Department of Health and Human Resources ES-52 Section 6.2.e establishes a limit on where the composting toilet can be located: “The location of a septic tank, home aeration unit, vault privy, or other sewage tank shall be at least fifty (50) feet from a private water well or groundwater supply.”

Additionally, requirements regarding this facility may include but are not limited to the following:

6.13.a. Utilization of composting toilets may be only in conjunction with an approved grey water treatment and disposal system. (West Virginia Department of Health and Human Resources, 2025)

6.13.b. The design and construction of a composting toilet shall meet the requirements of NSF Standard 41. (National Sanitation Foundation, 2025)

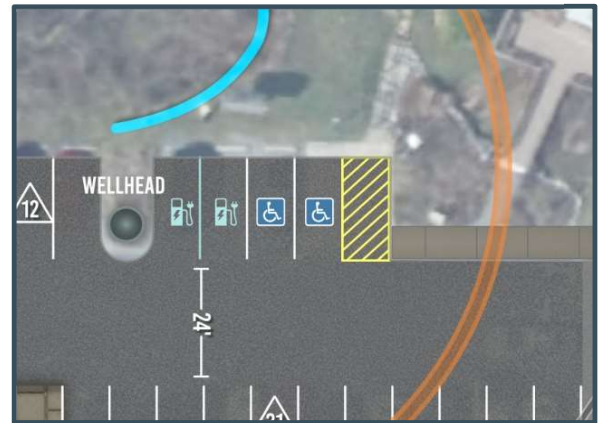


2.3 Electric vehicle charging station

Cool Spring Preserve sees increased visits from travelers seeking to “stretch their legs” during vehicle road trips. Leaders at PVAS wish to offer an electric vehicle charging station capable of recharging batteries within the 1–2-hour time frame of the average visit.

The electrical outlet is already in place under the elevated boardwalk and can be extended to the electric charging station parking stall. PVAS also wishes to achieve at least net zero emissions by offsetting the charging station through the composting restroom solar panel installation.

Figure 16: Proposed placement

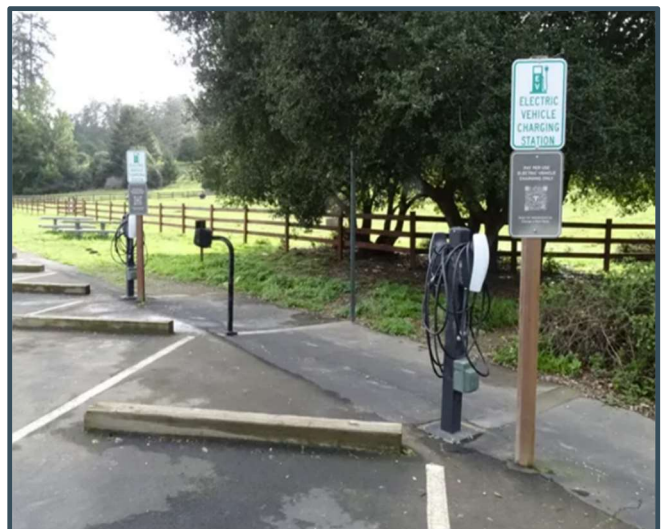


Source: Downstream Strategies (2025).

Figure 17: Existing electrical connection near proposed charging station



Source: Downstream Strategies (2025).



Source: National Park Service (2025).

3. TRAIL EROSION ISSUES

Cool Spring suffers from trail erosion in five separate areas of the preserve due to slope, overuse, and/or slick clay soils. Studies show that adding organic matter and compost, reseeding in late fall with a winter wheat or winter rye and then applying straw mulch in areas of heavy clay improve clay soils. (University of Maryland Extension, 2023). In some cases, periodic foot traffic can be beneficial; however, this should be monitored. If the foot traffic appears disruptive to seed germination and establishment, PVAS can install appropriate signage and make trail adjustments to help protect the affected areas. These areas can then be widened to their original alignments to accommodate the spring and summer crowds.

Additionally, PVAS should consider adding trees along eroded trail sections. As the trees grow, their canopy will overhang the trail to limit splash erosion caused by the impact of raindrops striking the trail.

Finally, this plan recommends following best practices found in the U.S. Department of Agriculture (USDA) Trail Construction and Maintenance Notebook, 2007 edition, for trail sites 1–4, as shown below in Figure 11. Trail erosion site #5 will feature a simple reroute to align with contours and meet other PVAS goals involving the existing gazebo.

Figure 18: Examples of foot traffic solutions



Source: Downstream Strategies (2025).



Source: Town of Montreat (2019).

Figure 19: USDA trail solutions

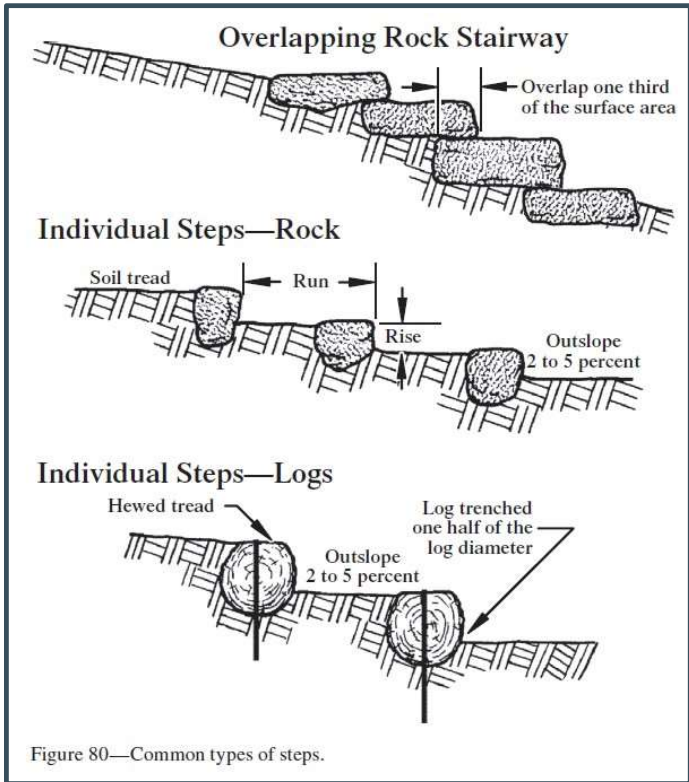


Figure 80—Common types of steps.

Source: United States Department of Agriculture (2007).

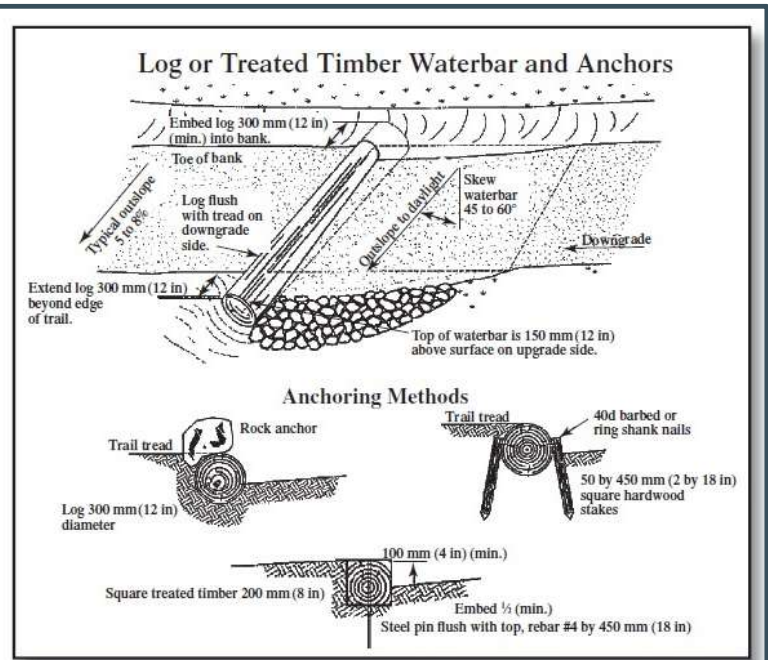
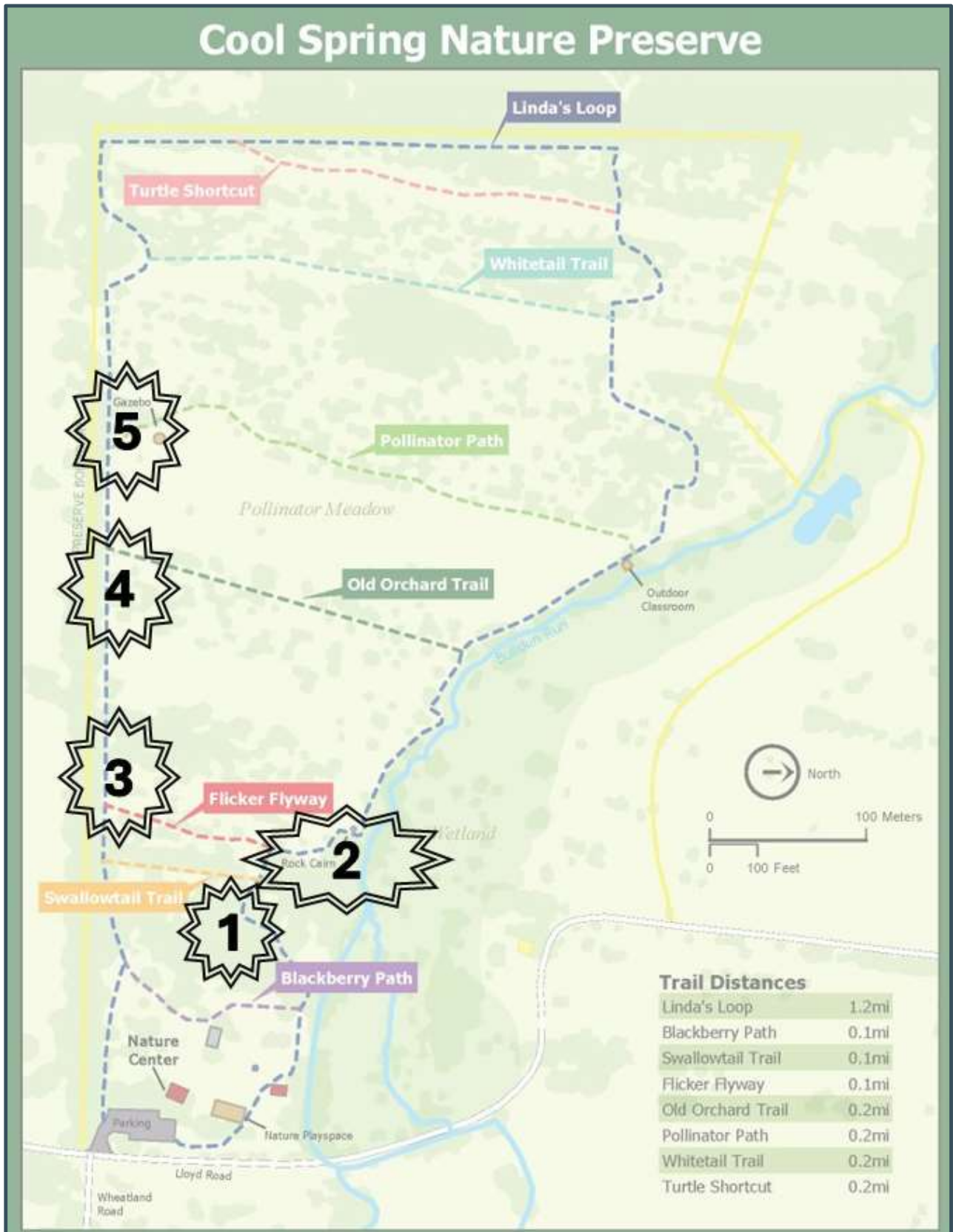


Figure 17—Logs used for waterbars need to be peeled (or treated with preservative), extended at least 300 millimeters (12 inches) into the bank, staked or anchored, and mostly buried.

Figure 20: Trail map and erosion sites 1-5



3.1 Trail erosion site #1 – Linda’s Loop stairs

The stairs of the Linda’s Loop trail are a 100–200-foot section of steep trail that become slick and difficult to traverse during wet weather. This plan recommends installing log steps with a minimum 6–8-foot landing. These steps will be adjacent to an all-grass maintenance equipment-only pass.

Figure 21: Site #1 – Linda’s Loop downhill approach with BMP

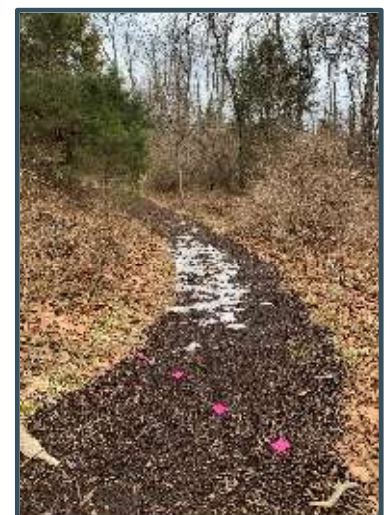


Source: Downstream Strategies (2025).

3.2 Trail erosion site #2 – Rock cairn

The waterbar log steps approach is recommended at this section of trail.

Figure 22: Site #2 – Uphill approach (left); Downhill approach (right)



Source: Downstream Strategies (2025).

3.3 Trail erosion site #3 – Flicker Flyway / Linda’s Loop southern intersection

The waterbar steps approach is recommended at this section of trail.

Figure 23: Site #3 – Downhill approach (left); Uphill approach (right)



Source: Downstream Strategies (2025).

3.4 Trail erosion site #4 – Old Orchard / Linda’s Loop southern intersection

The waterbar approach—see below—is recommended at this section of trail. Additionally, PVAS can consider the recommendations for improving clay soil structure, as described in Section 3.

Figure 24: Site #4 – Downhill approach (left); USDA typical waterbar (right)

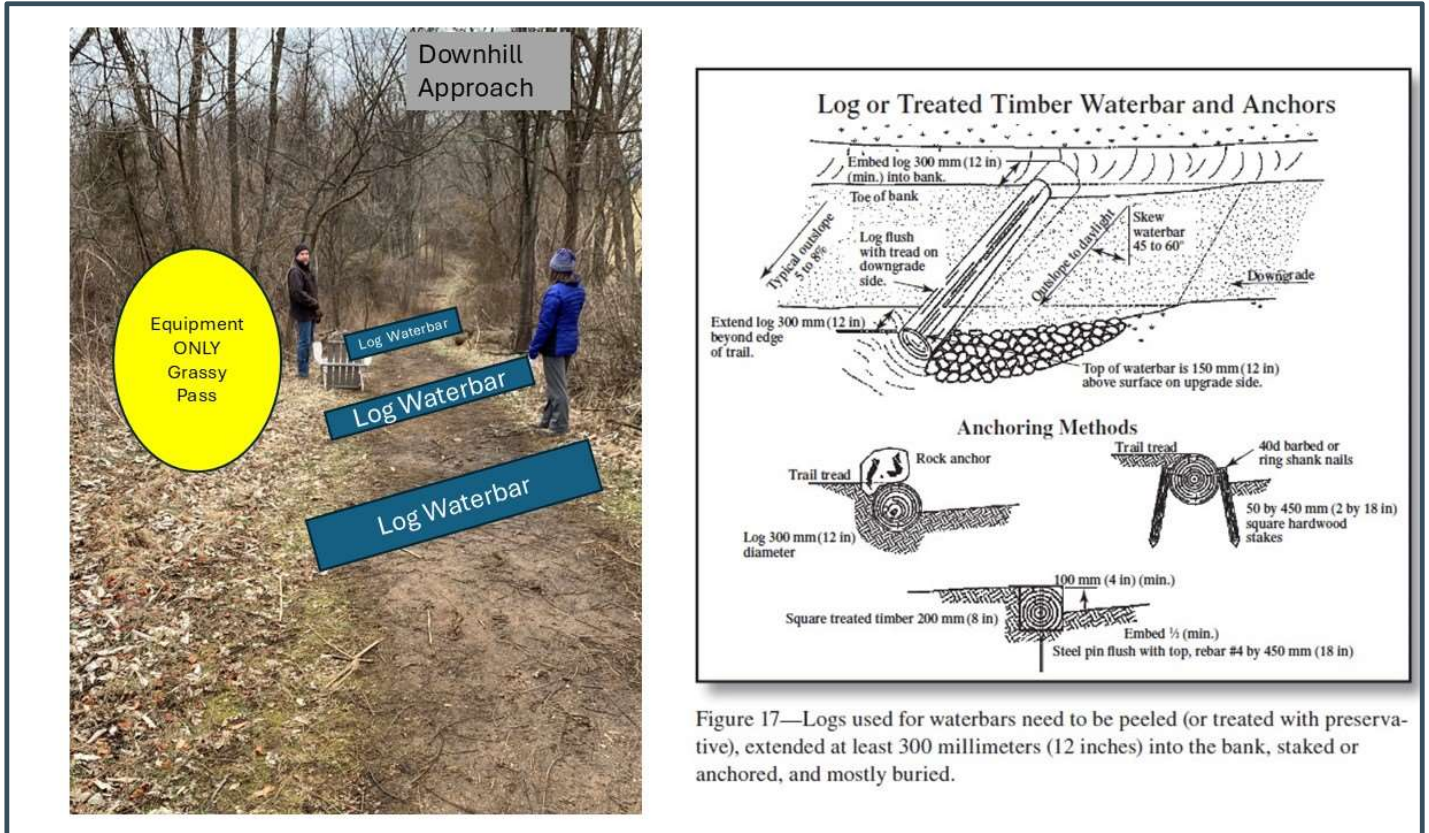
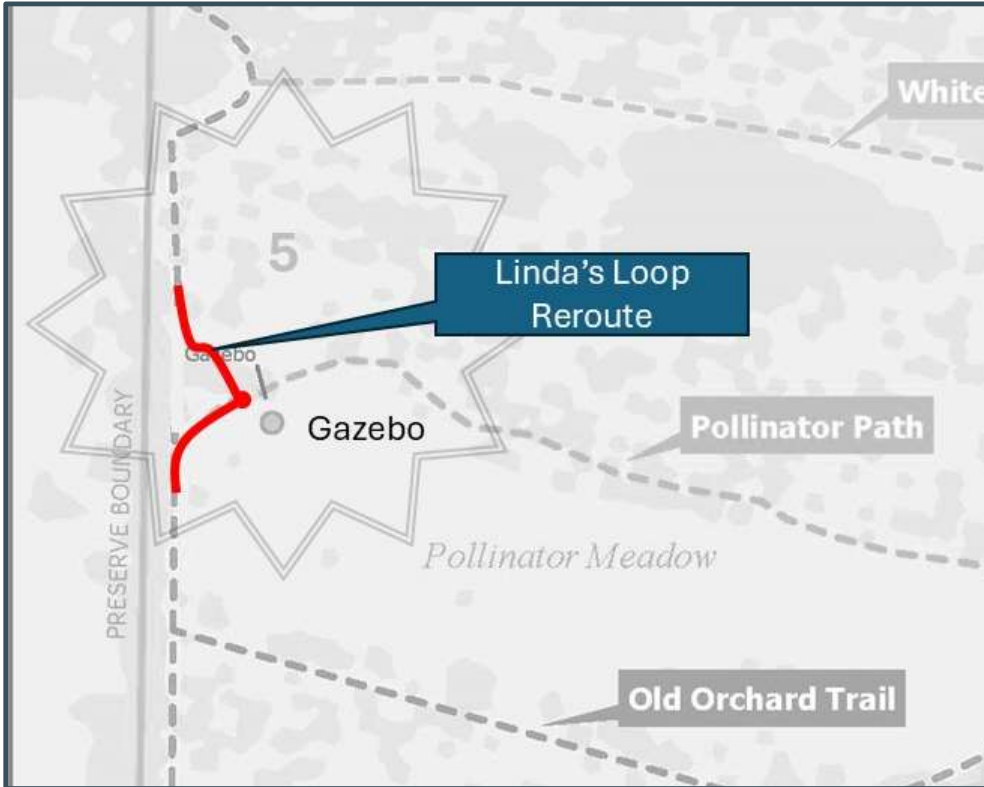


Figure 17—Logs used for waterbars need to be peeled (or treated with preservative), extended at least 300 millimeters (12 inches) into the bank, staked or anchored, and mostly buried.

3.5 Trail erosion site #5 – Linda’s Loop Trail reroute to gazebo

PVAS representatives expressed an interest in featuring the existing gazebo along Linda Loop Trail as a milestone marker for hikers during their visit. This reroute of Linda’s Loop will permanently close the heavily eroded section and redirect hikers toward the gazebo. The gazebo will act as an unofficial trail outpost or shelter for trail users in the more distant areas of the preserve.

Figure 25: Site #5 – Proposed reroute of Linda’s Loop Trail



Source: Downstream Strategies (2025).

Figure 26: Site #5 – Proposed reroute (left); Downhill approach (right)



Source: Downstream Strategies (2025).

4. CONCLUSION

This green infrastructure concept design meets PVAS' mission and vision to create a showcase of green infrastructure practices at the Cool Spring Nature Preserve. Relocating the underperforming rain garden to a lower elevation will not only capture and treat more acreage from neighboring agricultural lands, but it will also allow PVAS to expand its parking infrastructure from 20 spaces to 43. This new capacity will help welcome more than 20,000 expected visitors who wish to learn about the natural world and Chesapeake Bay restoration effort.

The next steps for PVAS are to develop grant proposals to build upon this concept plan.

Chesapeake Bay Trust. The Chesapeake Bay Trust Green Streets, Green Jobs, Green Towns (G3) Program is funded by the U.S. Environmental Protection Agency, West Virginia Department of Environmental Protection, and Chesapeake Bay Trust. G3 supports the design and implementation of green streets, GI, and urban tree canopy projects. The Trust is currently accepting applications with a deadline of March 10, 2025, at 4:00 pm. PVAS is well positioned to apply to G3 for:

- Track 2: Engineered Designs for Green Streets/Green Infrastructure Projects (generally less than \$35,000) and
- Track 3: Implementation/Construction of Green Streets/GI Projects (generally less than \$175,000).

More information is available at <https://cbtrust.org/grants/green-streets-green-jobs-green-towns/>

National Fish and Wildlife Foundation. The National Fish and Wildlife Foundation's (NFWF's) Chesapeake Stewardship Fund provides support to protect and restore water quality and habitats of the Chesapeake Bay and its tributary rivers and streams. The Fund prioritizes managing upland urban runoff through GI improvements. This includes efforts to reduce stormwater runoff on developed lands by implementing GI practices that capture, store, filter, and treat stormwater runoff through systems and practices that mimic natural hydrologic processes.

Given the current project status, PVAS should apply again to the Chesapeake Stewardship Fund. PVAS should also apply for the Small Watershed Grants program to support design and implementation. In previous years, this program awarded similar projects up to a \$500,000 cap.

Two liaisons with specialization in Cool Spring Preserve project are:

- Kristen Saacke Blunk, kristen@headwaters-llc.org, (814) 360-9766
- Dave Hirschman, dave@hirschmanwater.com, (434) 409-0993

More information is available at www.nfwf.org/programs/chesapeake-bay-stewardship-fund.

5. REFERENCES

- Chesapeake Bay Program. 2025. Agricultural Runoff.
<https://www.chesapeakebay.net/issues/threats-to-the-bay/agricultural-runoff>
- National Sanitation Foundation. 2025. Composting Toilets.
<https://www.nsf.org/consumer-resources/articles/composting-toilets>
- University of Maryland Extension. 2023. Soil Health, Drainage, and Improving Soil.
<https://extension.umd.edu/resource/soil-health-drainage-and-improving-soil>
- _____. 2023. Cover Crops For Gardens.
<https://extension.umd.edu/resource/cover-crops-gardens/>
- West Virginia Department of Health and Human Resources. 2025. Sewage Treatment and Collection System Design Standards.
https://oehs.wvdhhr.org/media/ip3kdxkd/es-52_individual_and_onsite_sewage_system_design_standards.pdf

APPENDIX A: JEFFERSON COUNTY HEALTH DEPARTMENT APPLICATIONS

Subdivision Application Instructions

1. Complete the application ES-76 (only sign the exemption in the middle of the page if lot(s) are not intended for building.
2. Have a certified septic installer complete the percolation test information page.
3. Mark off all lots prior to submitting application and plats.
4. Submit four (4) copies of the certified stamped plates with application.

Fee for Service: Subdivision with 1-10 lots \$140.00, 11+ lots add \$14.00 per lot.

Payment options:

Check Payments: Please make checks payable to Jefferson County Health Department and include a phone number on the top of the check.

Credit Card Payments: See options on the last page. Please note there is a **3.99% processing fee** for all credit card payments.

Cash Payments: Cash payments may be made in person.

How to Submit Application:

Walk-in: Our office is open to the public Monday - Friday 8:00am to 4:00pm.

Fax: 304-728-3314

Email: Christina.M.Pope@wv.gov



SUBDIVISION APPROVAL APPLICATION FORM

I. General Information

Name of Applicant: _____ E-Mail: _____

Mailing Address: _____ Phone: _____

Property Owner:-----

Address: _____ Phone: _____

Deed Recorded in Book: _____ Page: _____ County: _____

Location of Property (be specific - map may be attached): _____

Total Acreage of Tract: _____ Total Acreage to be Developed: _____

Number of Lots to be Developed: _____ Drinking Water Source: _____

Type of Structure to be Constructed: _____

Have any previous subdivision approvals or declaratory rulings been issued on this tract or adjacent tracts? Yes No

If yes, give details: _____

Signature of Applicant: _____ Date: _____

Exemption: The property referenced in this application to be divided for sale or gift is not intended for development requiring health department approval. The buyer has been informed that no soils or site evaluation has been performed on the property and that there is no proven or identified location where an onsite (septic) system can be installed. Should development of the property be proposed in the future, health department approval must be obtained prior to construction.

Signature: _____ Date: _____

(Property Owner)

II. Check List

Four (4) copies each of the following must accompany this application form.

- Plat plan of property (show lot layout, lot dimensions, lot numbers, streets, location of percolation test holes and six-foot observation trench, location of wells and public water lines, location of 10,000 square foot reserve areas).

The Local Health Department must evaluate each proposed lot as part of the subdivision approval process. Note: all proposed lots may not receive approval at the same time due to proposed layouts and actual site conditions.

III. For Health Department Use Only

Approval Issued: Yes No

Approval Number: _____

Date: _____

By: _____

SUBDIVISION APPROVAL FACT SHEET

(Retain this sheet - do not submit with application form)

1. West Virginia Legislative Rule 64CSR9 - Sewer Systems, Sewage Treatment Systems and Sewage Tank Cleaners, effective May 1, 1998, defines a subdivision as a tract of land which has been divided into two (2) or more lots, tracts, parcels, plats, sites, areas, units, interests, or other division for the purpose of dwelling or establishment development, and includes the division of land by deed, metes and bounds description, lease, map, plat or other instrument, or by any act of construction. This definition includes the addition of a dwelling(s) to a tract of land which may or may not already have an existing dwelling on it; regardless of whether a "new" lot is created by the act of surveying.
2. Division of land not proposed for development requiring onsite sewage disposal systems shall not require subdivision approval. Buyers of such properties should be informed that no approved onsite system installation areas have been established and that 64CSR9 Sewage Systems Rule, section 3.1. requires that a permit be obtained prior to construction of a dwelling or establishment on any site.
3. Prior to establishing a subdivision where an individual onsite sewage system(s) will be used, property owners or developers must obtain written health department approval before any improvements, construction, installation, or development is initiated on any lot, and before any water well or sewage installation permits can be issued.
4. To ensure there is adequate area for the installation and repair of individual onsite sewage systems, 64CSR9 requires that each dwelling or establishment served by an individual onsite sewage system must have a 10,000 square foot sewage system reserve area. This reserve area includes space for the original onsite sewage system plus replacement area for any future repairs. The reserve area shall not be disturbed during construction and no development or structures are permissible on this area. Form ES-76, and the required accompanying information must be submitted to begin the approval process.
5. After written approval is granted, the developer or each individual lot owner must obtain a health department permit for the construction of any water well or individual onsite sewage system. Any changes proposed after written approval has been given must be submitted, re-evaluated, and approved by the health department.
6. On lots less than two (2) acres in size, the 10,000 square foot reserve area for each lot must meet the requirements for the installation of a standard onsite sewage system. There must be a minimum of three (3) feet of suitable soil under any portion of the soil absorption system, and the average percolation rate must be between 5-90 min/inch.
7. On lots two (2) acres in size and over, standard, or alternative onsite sewage systems may be proposed for the 10,000 square foot reserve area. Soil and site requirements for alternative systems require an average percolation rate less than 120 min/inch; require a minimum of three (3) feet of soil between the soil absorption system and limestone rock strata; and require two (2) feet of soil between the soil absorption system and non-limestone bedrock and/or seasonal high-water table if additional treatment precedes the system or the proposed design is a low-pressure system.
8. Where multiple reserve areas are proposed, each reserve area shall not be less than 3,000 square feet.
9. All onsite sewage disposal reserve areas shall be staked in the field and shown on the submitted plat.
10. A minimum of four (4) percolation test holes and one (1) six-foot soil observation trench must be excavated on each lot. All testing must be done in the proposed onsite sewage system reserve area and must be conducted by a WV certified onsite sewer system installer. Six-foot-deep slit trenches may be required in limestone geology to determine soil depth over limestone rock strata.
11. A Sanitarian must visit each site prior to issuing written approval and must view all test holes prior to backfilling.
12. The effect of the location of driveways, underground utilities, and stormwater management structures must be considered in planning reserve area locations. Developers should be aware of any additional local requirements which may apply to land development.
13. Minimum distances must be maintained between sewer system components and drinking water supplies and lines. Refer to the WV Legislative Rules: 64 CSR 46 - Water Well Design Standards, and 64 CSR 47 - Sewage Treatment and Collection System Design Standards, and excerpts from 64 CSR 47 for Individual and On-site Sewage Systems.

To
 Charleston
 7.4 miles

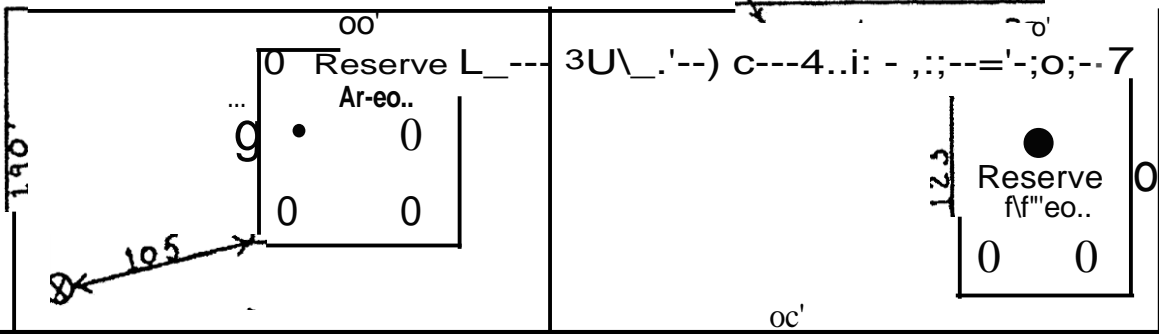
Brentwood
 Methodist
 Church

WV
 RT. 55

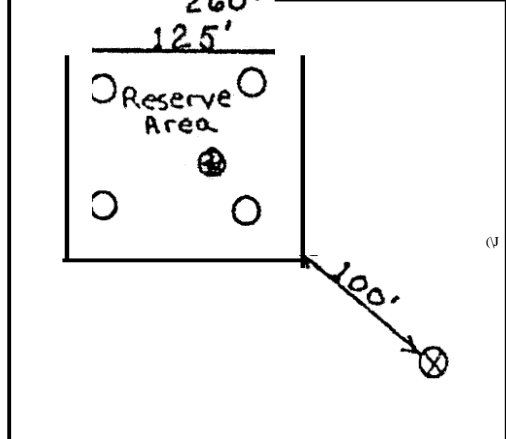
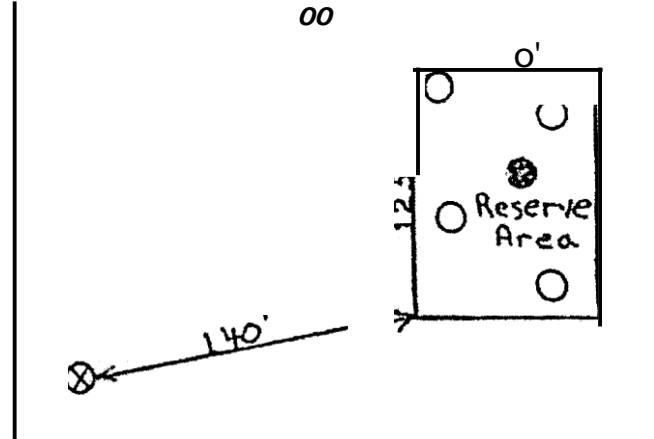
Jones
 Exxon

Lot No. 1 - 1.02 acres

Lot No. 2 - 1.11 acres



MAPLE LANE



Lot No. 3 - 1.30 acres

Lot No. 4 - 1.20 acres

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Payment Options and Submission

Check Payments:

Please make checks **payable to Jefferson County Health Department** and **include a phone number on the top of the check**. Mail to the address above or drop in the lock box outside our back door marked Environmental.

Credit Card Payments: 3.99% Fee applies to all Credit Card Transactions

Pay Via Form Below: Complete the credit card section below and submit along with your application via email, fax, mail or drop in the lock box outside our back door marked Environmental.

Pay Online: To use this option.

- You MUST submit your application(s) along with this payment form.
- Do not try to pay with the pay online button on our website as it will not work. You must receive a payment link to pay online.

I AM REQUESTING A PAYMENT LINK (check here): _____

Email all permit applications and payments to: Christina.M.Pope@wv.gov

PLEASE NOTE:

We are unable to accept credit card payments over the phone.

Credit Card Payment:

There is a 3.99% fee on all credit card payments.

Card Holder Name: _____

Account # _____

Expiration Date: _____ Security Code: _____ Amount: _____

Signature: _____

APPENDIX B: USDA TRAIL CONSTRUCTION AND MAINTENANCE NOTEBOOK, 2007 EDITION