

Surface Water Runoff Analysis Policy Update



west virginia department of environmental protection

Promoting a Healthy Environment

Jim Pierce, P.E. – October 22, 2015

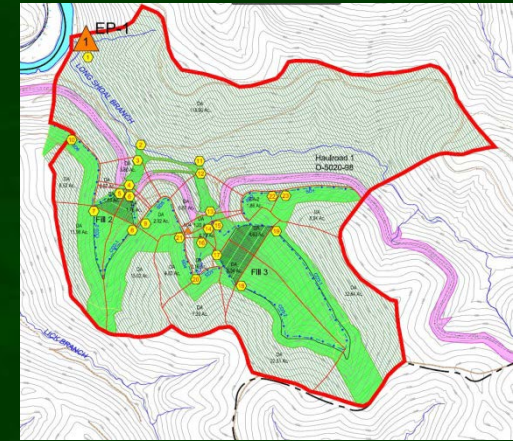
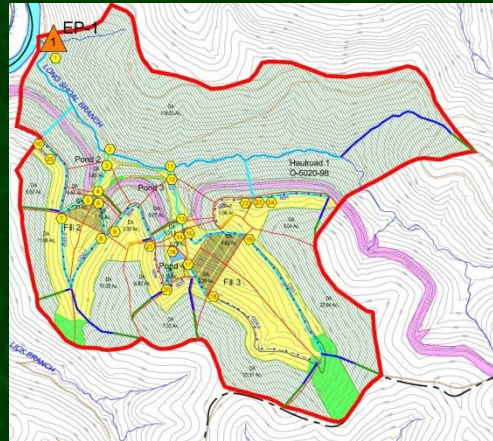
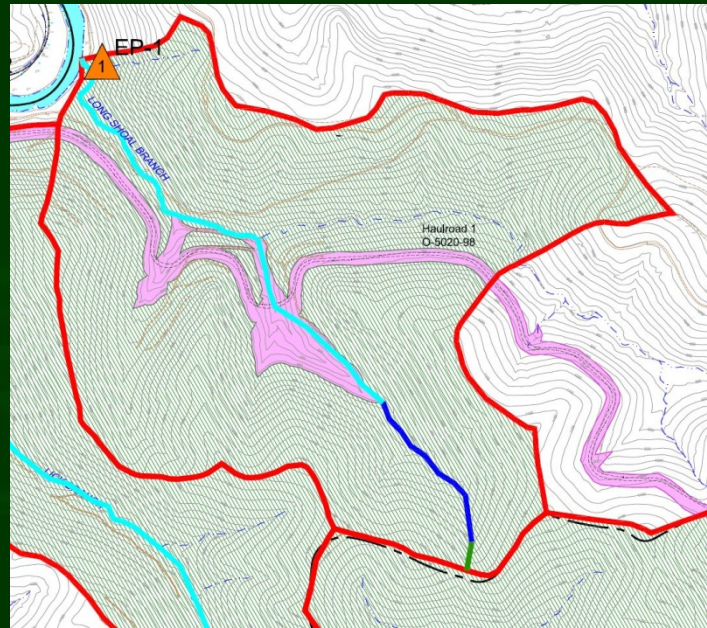
SWROA Legislative Rule (38-CSR2-5.6, et seq.) became effective on June 1, 2003

- Required for most permits
- Phased-in based on acreages over a 2-½ year period
- Permits or portions of permits were excluded if they were Phase I eligible and vegetated
- Blanket exemptions offered for haulroads, loadouts, and ventilation facilities
- Case-by-case exemptions for permits less than 50 acres



Key Components of a SWROA

- Evaluation Point (EP) siting at common locations to effectively model pre-mining, during-mining, and post-mining runoff scenarios.
- Meeting the “no-net increase” threshold, i.e., pre-mining peak flow cannot be exceeded by during-mining and post-mining peak flows at each EP.



Key Components of a SWROA, continued...

- Daily precipitation recording with monthly reporting.
- Any precipitation amounting to a 1 yr./24 hr. event, or greater, triggers a permit-wide drainage reconnaissance. Its results are to be reported to WVDEP within 48 hrs.
- A precipitation exceedance also activates the runoff monitoring plan. Flow measurement is required, as outlined by Item U-3 in the permit.



SWROA Effectiveness

Since its inception in 2003, over 1500 permits now have approved SWROA designs. Definitely, SWROA has been an effective design component to prevent off-site damage.



What's the Reason for Policy???

Some confusion still exists relating to the specified runoff monitoring, data collection, field reporting, and termination aspects of this rule. Further, we're offering clarification for various hydrologic modeling components. The overall purpose of this policy is to provide clarification for permits containing SWROA designs.

- Runoff Monitoring Plan and Data Collection (Item U-3)
- Inspection of Permit-wide Drainage System after a Storm Exceedance
- Reporting on Integrity/Function
- Implementation/Termination of SWROA
- Evaluation Point (EP) Siting Rationale/RCN-HSG references/Sheet Flow Conditions
- SWROA Design Storm



Top Ten SWROA Questions

1. I understand that I have to record rainfall, but where does it say in the regs that I have to measure peak flows?
2. What's the difference between an evaluation point (EP) and the U-3 monitoring point?
3. What if my permit has an approved SWROA, but lacks a runoff monitoring plan – do I still have to do flow measurements?
4. Most SWROA design storms are 25 yr.-24 hr., but when does a 100 yr. storm apply?
5. What constitutes reporting to the Secretary?
6. If I call my inspector on the phone, have I fulfilled the reporting requirement?
7. If I send an email to my inspector, is that considered proper reporting?
8. What does my permit-wide drainage inspection report need to include?
9. At what point in the life of a permit do SWROA requirements begin?
10. When can I discontinue SWROA requirements like rainfall recording and drainage inspections following a storm exceedance?



Runoff Monitoring Plan/Recording/Drainage Inspection

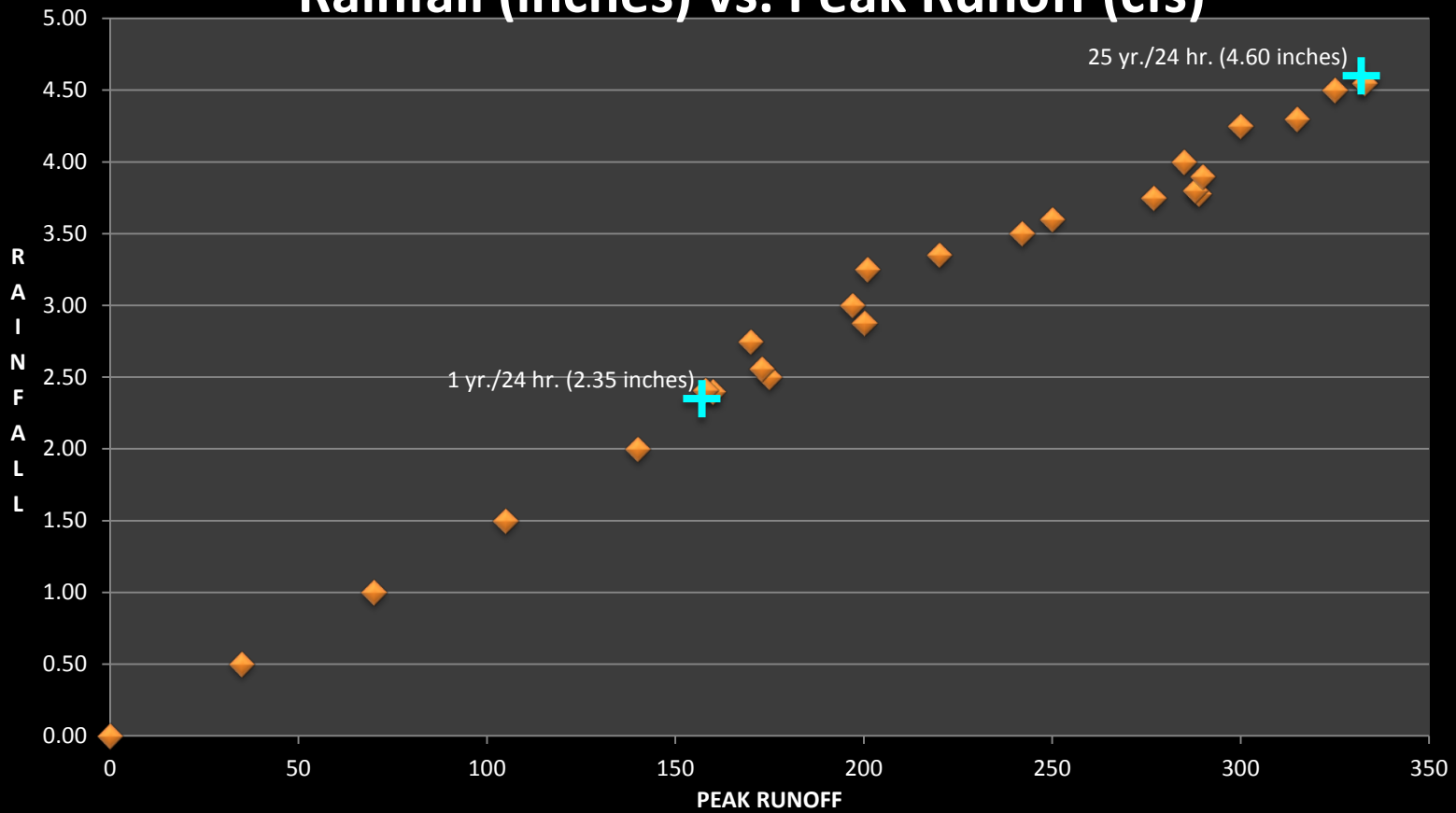
§5.6.b. Each application for a permit shall contain a runoff-monitoring plan which shall include, but not limited to, the installation and maintenance of rain gauges. The plan shall be specific to local conditions. All operations must record daily precipitation and report monitoring on a monthly basis and any one (1) year, twenty-four (24) hour event or greater must be reported to the Secretary within forty-eight (48) hours and shall include the results of a permit-wide drainage system inspection.

Measure and record precipitation on a daily basis. Peak runoff is to be recorded at the U-3 monitoring location only after a storm exceedance. A storm exceedance is any precipitation event of 1 year/24 hour, or larger, as measured by the designated rain gauge in Item U-3. A monthly report is to be provided to your inspector.

If a storm exceedance occurs, a permit-wide drainage inspection is to be conducted and its results reported to your inspector within 48 hours addressing integrity/function of structures.



Rainfall (inches) vs. Peak Runoff (cfs)



Implementation/Termination of SWROA

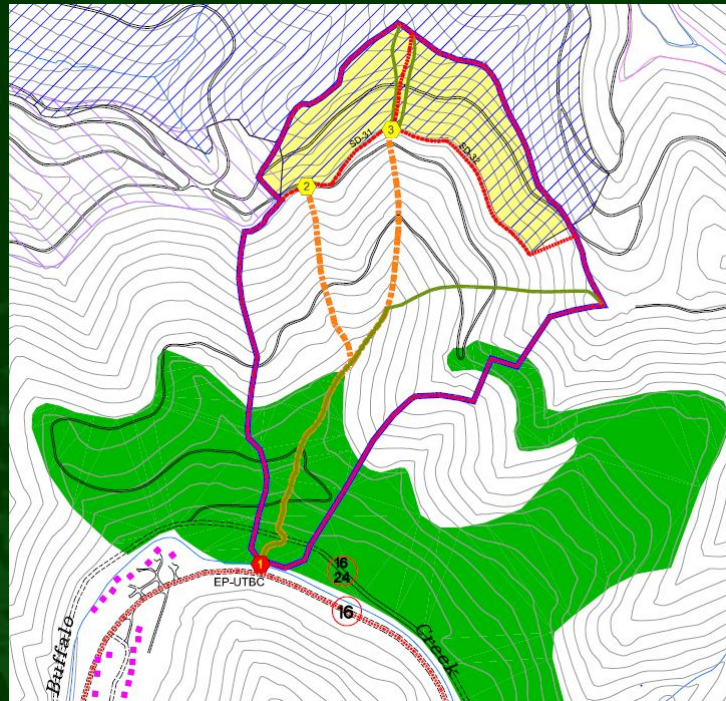
For any permit containing approved SWROA designs, such requirements are initiated when on-ground disturbance occurs.

When a permit becomes Phase II eligible and complete drainage structure removal occurs, the SWROA runoff monitoring plan (U-3) can be terminated. At this time, recording of rainfall and resulting runoff responses will no longer be required.



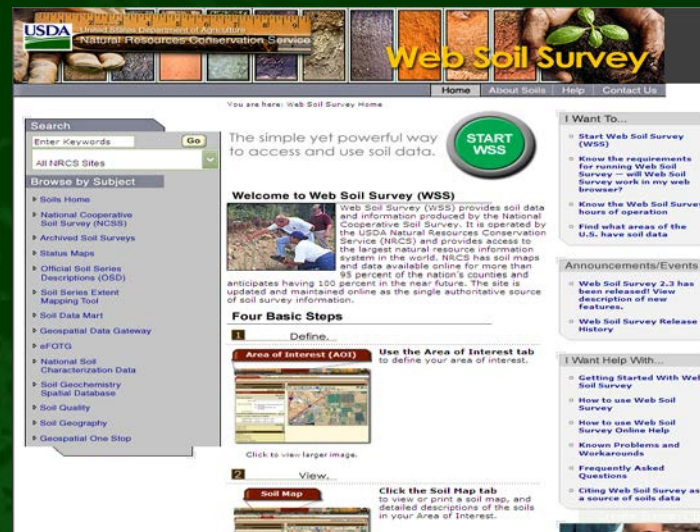
Evaluation Point (EP) Siting Rationale

EP locations shall be sited as close as practical to the permitted acreage while being located upstream of critical hydrologic structures such as, houses, buildings, stream constrictions/encroachments, etc. Further, any EP chosen for hydrologic modeling shall be located accordingly to determine pre-mining, during-mining, and post-mining peak flow volumes at a common location.



Runoff Curve Number and Hydrologic Soil Group Information Sources

SWROA pre-mining modeling should consider ground conditions at the time of permit issuance. Hydrologic analyses for the pre-mining condition must rely on realistic curve number and hydrologic soil group assumptions applicable to actual on-ground conditions. Such assumptions shall be substantiated by using the United States Department of Agriculture – Natural Resources Conservation Service – Web Soil Survey, as follows:
<http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm> .



The screenshot shows the USDA Web Soil Survey homepage. At the top, there is a navigation bar with the USDA logo, the text "Natural Resources Conservation Service", and the "Web Soil Survey" title. Below this is a search bar with a "Go" button and a "START WSS" button. The main content area is titled "Welcome to Web Soil Survey (WSS)" and includes a "Four Basic Steps" section with numbered steps: 1. Define... (Area of Interest (AOI)), 2. View... (soil map). The right sidebar contains sections for "I Want To..." (Start Web Soil Survey (WSS), Know the requirements, Find what areas of the U.S. have soil data), "Announcements/Events" (Web Soil Survey 2.3 has been released), and "I Want Help With..." (Getting Started With Web Soil Survey, How to use Web Soil Survey, etc.).



Sheet Flow Conditions

Example SedCad Output

#9	1	1. Forest with heavy ground litter	0.01	0.01	100.00	0.020	1.388
		7. Paved area and small upland gullies	25.00	85.00	340.00	10.060	0.009
		8. Large gullies, diversions, and low flowing streams	1.80	22.49	1,249.44	4.020	0.086
#9	1	Time of Concentration:					1.483

Predominate pre-mining land use for most permit applications is forestland.

Although TR55 defaults to 100 ft., this assumption may exaggerate peak flow calculations. This is most critical to the pre-mining modeling since the SWROA “no-net increase” flow threshold will be increased resulting in reduced protection.

Proposed policy will require a 300 ft. assumption for forestland ground conditions, unless suitable documentation is included to justify any variations.



SWROA Design Storm

The minimum SWROA design storm is a 25 year/24 hour precipitation event. This design standard is based upon the design storm of the last downstream hydraulic structure within the contributing watershed area for each EP. Normally, this will result in a 25 year/24 hour event to base SWROA designs upon. Some other situations could trigger a 100 year/24 hour design requirement like an occupied dwelling located upstream of an EP. Consequently, a 100 year/24 hour design standard may apply on occasion.



Questions???

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