NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

SPRING DEVELOPMENT

(No.)

CODE 574

DEFINITION

Collection of water from springs or seeps to provide water for a conservation need.

PURPOSE

Improve the quantity and/or quality of water for livestock, wildlife or other agricultural uses.

CONDITIONS WHERE PRACTICE APPLIES

In areas where a spring or seep will provide a dependable supply of suitable water for the planned use.

CRITERIA

Federal, State and Local Laws and Permits

Design, construction, operation and maintenance activities shall comply with all federal, state, local laws, rules, and regulations governing work in or along streams, floodplains or wetlands as well as pollution abatement, health, utility or safety activities.

Permits may be required from the following agencies as well as others:

1. ***U.S. Army Corps of Engineers (USACE)***
2. ***West Virginia Department of Environmental Protection (DEP)***
3. ***West Virginia Department of Natural Resources - Public Lands Corporation (Stream Activity Application)***
4. ***US Fish and Wildlife Service***
5. ***WV Division of Forestry***
6. ***Local City and County permits***

The owner or operator is responsible for securing all permits or approvals and for performing all planned work in accordance with WV laws and regulations. NRCS employees are not responsible and shall not procure permits, rights, or approvals or enforce laws and regulations. NRCS may provide the landowner or operator with technical information, pertaining to the rights or approvals to construct, operate, and maintain the practice.

All required permits shall be acquired before construction implementation.

General Criteria Applicable to All Purposes

An investigation of site conditions shall be made, including:

a. Soil borings

b. Water quality for the intended purpose

c. Water quantity for the intended purpose

d. Suitability of the spring location for the intended purpose

e. A determination that the farmer has the appropriate water rights or permits to develop the spring ***if required.***

f. An assessment to determine existing ecological functions and potential losses from the spring development ***if required.***

g. A certified wetland determination ***if required.***

h. An assessment of the cultural resource associated with the spring ***if required.***

NRCS, NHCP
May, 2006

NRCS, WV
August 2011

Conservation practice standards are reviewed periodically and updated if needed. To obtain the current version of this standard, contact your Natural Resources Conservation Service State Office or visit the Field Office Technical Guide (FOTG). ***Note: Bold italics is information added or changes made to the National Conservation Standard by WV.***

Develop springs by removing obstructions to the flow, collecting the water flow and storing the water, if flow from the spring is not sufficient to meet the peak demand of the intended use.

Remove obstructions to spring flow such as fine-grained sediments, rock, slope-wash materials and vegetation to allow the spring to flow freely. Design the development of the spring to prevent obstructions from reoccurring.

The type of collection system used for the spring development is dependent upon the type of spring and site geology. Design the collection system to collect sufficient water for the intended purpose of the spring. Collection systems generally consist of a restrictive barrier that forces water to collect in a perforated pipe that flows to an outlet.

When a collecting trench along the outcrop of the water bearing formation is to be used, the trench shall be excavated so that it extends into the impervious layer. An impervious cutoff wall of well-tamped clay, concrete or other suitable materials shall be constructed along the downstream side of the trench, to insure the flow enters the collection system. The collection system shall consist of subsurface drainage tubing or perforated pipe not less than 3" in diameter. A minimum 12 inch layer of crushed rock or gravel backfill extending to the impervious layer, may be use in conjunction with the drain pipe, or by itself.

If a spring box is not used in combination with a collection system, a pipe conduit shall extend directly to a trough, reservoir or distribution system.

Include measures in the collection system to prevent sediment from entering the system and/or provisions to trap and remove sediment that does enter the system.

Include a spring box, if necessary, to allow sediment to settle out of the spring flow or to provide storage to meet peak demands on the water from the spring. Locate the spring box to allow water to flow by gravity from the spring to the spring box. Construct the spring box of a durable material such as concrete, plastic, galvanized steel or naturally rot resistant wood. ***Spring boxes made from any of the types of pipes listed in NRCS Conservation Practice Standard 606, Subsurface Drain may be used. Polyethylene spring boxes shall be protected from direct exposure to sunlight.***

The spring box shall be of sufficient size to provide for the storage of sediment and any required storage of water. The cross-sectional area ***(minimum 1.5 square feet)*** of the spring box shall be large enough to allow access for periodic cleaning. Provide the spring box with a tight fitting cover to prevent trash and surface runoff from entering. ***Spring development systems (collection and conveyance) shall be excluded from livestock. As a minimum install one of the following:***

- ***a fence around the box with enough room for maintenance.***
- ***an impervious 4 mil plastic membrane covered with a minimum of with 12 inches of soil.***
- ***a 3 inch cap of concrete.***

To prevent freezing, bury the spring box in the soil.

The spring development shall have an outlet pipe ***(minimum 1.25 inch diameter)*** that carries the water to its intended use. Design the outlet pipe according to ***NRCS*** Conservation Practice Standard Pipelines, 516, Pipeline ***with a water tight connection.*** If the outlet is from a spring box, the outlet pipe shall be a minimum of 6 inches off the floor to allow for sediment collection. ***Pipes through the cutoff wall or outlet pipes shall be made of steel, copper, ASTM D1785 schedule 40 or 80 PVC pipe, ASTM D2241 SDR26 PVC pipe. PE pipe conforming to ASTM D3350 PE3408 SDR11may be used in cutoff walls constructed from materials other than concrete (i.e. compacted clay).***

A pump will be needed if gravity will not carry water from the spring to where the water will be used. Base the type and size of the pump upon available power sources and the water delivery needs.

When flow from the spring, whether intermittent or continuous, will exceed the capacity of the collection system, an overflow is required. Size the overflow to carry the maximum flow expected from the spring during

periods of wet weather. Manage the overflow so that it does not create a resource problem.

Design the spring development so that it is protected from damage by freezing, flooding, livestock, excess sediment, vehicular traffic and water quality contamination.

Follow Conservation Practice Standard 614, Watering Facility to design facilities to provide access for livestock and wildlife to water from the developed spring.

Re-grade areas disturbed by construction of the spring development to keep surface flow out of the spring. ***Extend the top of the spring box above the adjacent ground elevation and re-grade the area so that surface runoff is diverted away from the box.***

Re-vegetate disturbed areas as soon as possible after construction.

CONSIDERATIONS

A shutoff valve and vent system on the spring outlet pipe should be considered for winter shutdown, flow control and maintenance.

Native vegetation adapted to wet conditions should be considered on wet sites as an alternative to introduced grasses to stabilize areas after construction.

Consider how other conservation practices properly applied on the spring recharge area may increase infiltration of precipitation in order to conserve the spring's flows.

Consider how diversion of water from spring developments affects stream flows in the watershed.

Aquatic habitat quality may be conserved when a spring is developed near surface waters, or on a floodplain, by incorporating a float valve that shuts off flow to the tank, and returns overflow via a stable outlet to the same watershed where it was collected.

Springs may represent islands of unique habitat in the landscape, supporting plant and animal populations that only occur in an area of a high water table. Consider options for developing the spring or seep that preserve the conditions that support these unique habitats.

Springs are sources of water for fish and wildlife. Maintain fish and wildlife access to water from the spring development where possible.

Brush removal, excavation, clean out and withdrawal of water are manipulations that may affect wildlife habitat and wetland functions and values. However, selective removal of undesirable brush and management for desirable native plants may reduce evaporative losses and conserve biodiversity.

PLANS AND SPECIFICATIONS

Plans and specifications shall provide details of planned location, materials and construction requirements for the installation of the practice to meet its intended purpose. ***Reference WV form WV-Eng-62 Spring Development and Pipeline drawing.***

OPERATION AND MAINTENANCE

The O&M plan shall contain a schedule for the periodic monitoring of the following items:

- Sediment buildup in the spring box
- Clogging of outlet and overflow pipes
- Diversion of surface water from the collection area and spring box
- Erosion from overflow pipes
- Rodent damage

Any problems discovered shall be immediately repaired.

REFERENCES

National Engineering Handbook - Part 650, Engineering Field Handbook, Chapter 12, Springs and Wells.

The Restoration & Management of Small Wetlands of the Mountains & Piedmont in the Southeast. Somers, A. B. et al. USDA, Natural Resources Conservation Service, Watershed Science Institute. November 2000.

National Engineering Manual, Part 531 Geology 531.31, USDA, Natural Resources Conservation Service,

Groundwater & Wells, Fletcher Driscoll, Johnson Division.

Water Supply Paper 2220, Basic Ground-water Hydrology, US Geological Survey.

NRCS Conservation Practice Standards Subsurface Drain (606), Underground Outlet (620), Pipeline (516), Diversion (362), Fence (382), Critical Area Planting and others.