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

Utilities and Permits. The landowner shall be responsible for locating all buried utilities in the project area, including drainage tile and other structural measures.

The landowner shall obtain all necessary permissions from regulatory agencies, including the Illinois Department of Agriculture, US Army Corps of Engineers, US Environmental Protection Agency, Illinois Environmental Protection Agency and Illinois Department of Natural Resources – Office of Water Resources, or document that no permits are required.

General Criteria Applicable to All Purposes
An investigation of site conditions shall be made, including:

- Soil borings
- Water quality for the intended purpose
- Water quantity for the intended purpose
- Suitability of the spring location for the intended purpose
- A determination that the farmer has the appropriate water rights or permits to develop the spring
- An assessment to determine existing ecological functions and potential losses from the spring development
- A certified wetland determination
- An assessment of (any) cultural resources associated with the spring.

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.

Collection System. 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. 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.

If a collection trench is used, the trench shall be excavated so that it extends into the impervious layer. A cutoff wall shall be constructed along the downstream side of the trench if needed to ensure that the flow enters the collection system.

The cutoff wall may be constructed of plastic sheeting, well-tamped clay, masonry, concrete, or other impervious materials.

The collection system shall consist of subsurface drainage tubing or perforated pipe not less than 3-inches in diameter, wood box drain, or other suitable manufactured system. Surrounding the collector with geotextile fabric or a sand-gravel filter is recommended.

Crushed rock or gravel backfill, not less than 1 foot thick, may be used as a collection system if site conditions warrant, in lieu of other materials. Sand, gravel, and crushed rock shall be composed of clean, hard, durable particles.

Spring Box. 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.

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

Outlet. The spring development shall have an outlet pipe that carries the water to its intended use. Design the outlet pipe according to Conservation Practice Standard 516, Pipeline. If the outlet is from a spring box, the outlet pipe shall be a minimum of 6 inches off the floor of the spring box to allow for sediment collection. The intake to the outlet pipe shall be screened, as necessary.

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.

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

Overflow System. 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.

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

Regrade areas disturbed by construction of the spring development to keep surface flow out of the spring. Revegetate disturbed areas as soon as possible after construction in accordance with Conservation Practice Standard 342, Critical Area Planting.

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 for installing spring developments shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose.

All loose rock, sediment, encrustations, logs, and vegetation that can obstruct the free discharge of the spring shall be removed and disposed of so that they will not endanger the spring development.

Collection trenches, drain tiles, perforated pipe lines, sumps, and spring boxes shall be constructed to the grade shown on the plans.

Crushed rock or gravel for collection systems and sand-gravel material for filters shall be composed of clean, hard particles.

Construction operations shall be carried out in such a manner that erosion and air and water pollution are minimized and held within legal limits.

OPERATION AND MAINTENANCE

An Operation and Maintenance (O&M) Plan shall be prepared for and reviewed with the landowner or operator. 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.

For livestock operations, the O&M plan for Spring Development may be included as a part of the prescribed grazing plan.

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.