United States Department of Agriculture

Natural Resources Conservation Service

CONSERVATION PRACTICE STANDARD

SPRING DEVELOPMENT

CODE 574

(no)

DEFINITION

The collection and use of water from seeps or springs.

PURPOSE

This practice is used to accomplish one or more of the following purposes:

- Improve water quantity for livestock ~~and~~or wildlife.
- Improve water quality for livestock ~~and~~or wildlife.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to a site having a spring or seep with a dependable supply of suitable water for the planned use. ~~Identify and evaluate alternative water sources before considering the development of a spring.~~

CRITERIA

General Criteria Applicable to All Purposes

Plan, design, and construct the practice to comply with all Federal, State, ~~Tribal~~tribal, and local laws and regulations. The landowner is required to obtain all necessary permits prior to construction~~.~~ including filing for water rights on groundwater development when applicable. The landowner/contractor is responsible for locating all buried utilities in the project area including drainage tile ~~and other structural measures~~.

~~Design~~This should be a last resort practice both from an environmental and reliability standpoint. Identify and evaluate alternative water sources before pursuing the development of a spring.

Determine the water quality and quantity needs of the intended purpose, then design the spring development to collect sufficient water for the intended purpose while protecting ecological functions of the site. Design the spring development to minimize the risk of damage and water contamination caused by freezing, flooding, livestock, sediment, and vehicular traffic.

Developing a spring ~~for livestock water use~~ may cause adverse impacts to fish and wildlife habitat. Develop only the necessary water for the planned purpose~~.~~ and avoid developing sites that lack surface flow from which to measure flow rate. Place a screen over open pipe vents to prevent wildlife entrapment and ~~potential~~associated water contamination.

Conduct an evaluation of the site to determine—

- ~~Water~~If water quantity and quality ~~needed~~are adequate for the intended purpose.
- Suitability of the spring location.
- Soil and ~~geologic~~geological suitability.
- Impacts to existing ecological functions benefiting from the spring and potential losses caused by the spring development, including impacts to local wildlife and wildlife habitat, including wetlands, caused by the impoundment ~~and/~~or diversion of spring water.
- Effects of consumptive use on riparian health and function, stream flow, water temperature, and local aquifer recharge.
  ~~local aquifer recharge.~~
- Impacts on cultural resources.

Conduct an investigation to ~~**wetlands**~~identify the restrictive layer and take care not to puncture the restrictive layer as the spring may be lost.

Source area
If possible, design the spring development to preserve the existing morphology of the spring. Locate the collection site down slope from the point where the spring or seep emerges.

~~Exclude~~Fence or otherwise exclude livestock from the source area~~.~~ and manage grazing for healthy vegetation where grazing is permitted. Design livestock exclusion fencing using NRCS Conservation Practice Standard ~~(CPS)~~ Fence (Code 382).

Where applicable, maintain fish and wildlife access to water provided by the spring development.

Develop the spring by removing obstructions to spring flow such as fine-grained sediments, rock, slope~~-~~wash materials, and vegetation. Design the spring development to prevent obstructions from reoccurring.

Collection system
Install a collection system to convey spring flows from the collection site to the point of use. The collection system typically consists of tile or perforated pipe, gravel, cutoff wall, spring box, conveyance pipe, or other collection means appropriate to the site. If necessary, include measures to prevent sediment from entering the collection system. Construct the cutoff wall using concrete, clay, masonry, plastic sheeting, or sheet pile. See National Engineering Handbook Part 650, Subpart L “Spring and Well Design,” Section 650.18 “Spring Development and Design” for more information including diagrams of spring collection system components.

~~If the point of use is above the spring~~When a pump is needed, base the type and size of the pump on available power sources and water delivery needs. Design the pump according to NRCS ~~CPS~~Conservation Practice Standard Pumping Plant (Code 533).

Spring box
Include a spring box to trap sediment and store water to meet peak demands. The spring box

is in addition to NRCS Conservation Practice Standard Watering Facility (Code 614) when both practices are used. Livestock and wildlife do not water directly from the spring box. Protect the spring box from freezing by covering it with soil or other suitable protective methods for the site.

Size the spring box to provide sufficient storage of both sediment and any required water storage. Ensure that the cross-sectional area of the top of the spring box is a minimum of 1.5 square feet, and large enough to allow access for periodic cleaning. ~~Use a minimum cross-sectional area of 1.5 square feet.~~

Construct the spring box of a durable material such as concrete, rock, plastic, galvanized steel, or use wood that is untreated and rot resistant. Include a tight-fitting cover to prevent surface runoff, animals, or trash from entering. Locate the outlet pipe a minimum of 6 inches above the floor of the spring box to allow for sediment collection.

Outlet

Design the spring development with the capacity to convey water for the intended use. If using a pipe, design the pipe according to NRCS ~~CPS~~Conservation Practice Standard Livestock Pipeline (Code 516). Alternative outlet structures must meet NRCS ~~CPS~~Conservation Practice Standard Structure for Water Control (Code 587).

Design facilities intended to provide access to water from the developed spring according to NRCS ~~CPS~~Conservation Practice Standard Watering Facility (Code 614).

Spring flow management

Provide an overflow for when peak flow ~~from the spring exceeds~~runoff may exceed the capacity of the collection system. Size the overflow to carry the maximum flow expected from the spring. Locate the overflow in an area that does not cause erosion, degrade water quality, or create wet conditions near the watering facility.

To minimize potential adverse impacts to wetlands, implement one or more of the following measures (listed in order of priority):

- ~~If applicable, install~~Install a float valve on the tank or trough and leave all excess water in the spring.
- ~~Direct~~Include overflow pipe on the spring box and stock tanks, and direct overflow back as close to the source as possible to enhance existing wetlands.
- Establish new wetland habitat that provides similar wetland functions and values as those being lost.

Smooth and grade areas disturbed by construction of the spring development. Properly manage runoff from natural spring flow, collected water, and overflow.

Reestablish vegetation on disturbed areas after construction with native plant materials where possible. Where native vegetation is difficult to reestablish, follow NRCS ~~CPS~~Conservation Practice Standard Critical Area Planting (Code 342).

Springs often contain rare flora and fauna. Development should minimize disturbance to these species. Follow NRCS policy regarding impact to both wetlands and to threatened, endangered, or special concern species.

CONSIDERATIONS

Consider how other conservation practices applied within the spring recharge area may increase infiltration of precipitation or snowmelt to augment spring flows. ~~Consider testing water quality before developing a spring.~~

Consider testing water quality before developing a spring and periodically after the spring has been developed.

Consider establishing a setback distance that will limit activities in the source area that have potential to contaminate the spring.

Consider a shutoff valve on the spring outlet pipe for winter shutdown, flow control, and maintenance. Use the valve to keep water at the spring area and prevent water loss.

Consider adding a water battery (holding tank) with a float to collect water during non-watering seasons. Use a water battery only when spring flow is insufficient during watering periods. Water can be directed back into the system to help balance wetlands and minimize erosion. Use NRCS Conservation Practice Standard Watering Facility (Code 614) as appropriate to design the water battery.

Brush removal, excavation, cleanout, and withdrawal of water are manipulations that may affect fish and wildlife habitat and wetland functions. Selective removal of undesirable brush and management for desirable native plants may reduce evapotranspiration losses and conserve biodiversity.

Prior to construction, identify and control any undesirable plant species that may be spread by seed or through other means.

PLANS AND SPECIFICATIONS

Prepare plans and specifications for constructing the spring development. Describe the requirements for properly installing the practice to achieve the intended purpose.

As a minimum, the plans and specifications include—

- ~~Location of the spring~~Spring development location.
- Construction/excavation method.
- Materials used such as pipe diameter, pressure class, and collection system, including the intake, cutoff wall, spring box, outlet, overflow pipe, pipe vent screens, and any other pertinent components.
- Elevations and dimensions of pertinent components such as collection system, pipes, tanks, and troughs.
- Plans to divert impounded water.
- Measures taken to maintain existing ecological functions such as wetland and wildlife habitat.

OPERATION AND MAINTENANCE

Provide and review an operation and maintenance plan with the landowner. As a minimum, include in the plan—

- Operating according to any requirements associated with wetland impact minimalization.

- Removing sediment buildup in the spring box.
- Removing pipe scaling from calcium and alkali deposits. See Title 210 National Engineering Handbook, Part 650, Subpart L “Spring and Well Design,” Section 650.192 for a list of common acids used for scaling from mineral deposits.
- Removing obstructions ~~or blockage of~~ blocking the outlet and overflow pipes.
- Protecting against ponding water, flooding, and winter freeze. Divert surface water away from the collection area and spring box.
- Repairing erosion from overflow pipes.
- Checking operation of valves.
- Repairing rodent damage.
- Repairing damages from vandalism and theft.
- Maintaining livestock exclusion features such as fencing.
- Preventing woody vegetation from damaging the water source and spring development.
- Immediately repair any problems discovered. When cleaning out sediment from the spring box, place all sediments in the uplands away from the spring and associated wetlands.

REFERENCES

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