

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD**

WATERING FACILITY

(No.)

CODE 614

DEFINITION

A permanent or portable device to provide an adequate amount and quality of drinking water for livestock and or wildlife.

PURPOSE

To provide access to drinking water for livestock and/or wildlife in order to:

- Meet daily water requirements
- Improve animal distribution
- Provide a water source that is an alternative to a sensitive resource

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to all land uses where there is a need for new or improved watering facilities for livestock and/or wildlife.

CRITERIA

General Criteria Applicable To All Purposes

Design watering facilities with adequate capacity and supply to meet the daily water requirements of the livestock and/or wildlife planned to use the facility. Include the storage volume necessary to provide water between periods of replenishment. Refer to the National Range and Pasture Handbook for guidance on livestock water quantity and quality requirements. For wildlife, base water quantity and quality requirements on targeted species needs.

Locate facilities to promote even grazing distribution and reduce grazing pressure on sensitive areas.

Design the watering facility to provide adequate access to the animals planned to use the facility. Incorporate escape features into the watering facility design where local knowledge and experience indicate that wildlife may be at risk of drowning.

Include design elements to meet the specific needs of the animals that are planned to use the watering facility, both livestock and wildlife.

Protect areas around watering facilities where animal concentrations or overflow from the watering facility will cause resource concerns. Use criteria in NRCS Practice Standard 561, Heavy Use Area Protection to design the protection.

Install permanent watering facilities on a firm, level, foundation that will not settle differentially. Examples of suitable foundation materials are bedrock, compacted gravel and stable, well compacted soils. The site shall be well drained; if not, drainage measures shall be provided.

Design and install watering facilities to prevent overturning by wind and animals.

Design watering facilities and all valves and controls to withstand or be protected from damage by livestock, wildlife, freezing and ice damage.

Construct watering facilities from durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation. Follow appropriate NRCS design procedures for the material being used or industry standards where NRCS standards do not exist.

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 download it from the [electronic Field Office Technical Guide](#).

Use the criteria in NRCS Practice Standard 516, Pipeline to design piping associated with the watering facility. Include backflow prevention devices on facilities connected to wells, domestic or municipal water systems.

DESIGN

Capacity/size. The trough or tank shall have adequate capacity to meet the water requirements of the livestock (50 to 100 percent of the cattle needs for the day). This will include the storage volume necessary to carry over between periods of replenishment. A plastic trough or tank (livestock waterers) shall be sized and provided in sufficient numbers according to the manufacturer's recommendations.

A trough or tank that is supplied by city or rural water systems or by gravity flow from a pond shall have a minimum capacity of 50 gallons.

The inside perimeter of an open top watering trough or tank shall provide a minimum of 1.5 inch of drinking space per animal unit (1 animal unit equals 1,000 lb. of animal).

The trough or tank height may vary from 22 to 36 inches for horses, beef and dairy cattle. For sheep and goats, the minimum height shall be 8 inches.

The capacity of the water supply system to the trough or tank shall be based on the anticipated herd size served by the system and shall deliver the water in a relatively short period of time each day (6 hours or less). For supplying livestock water, the system shall have a capacity to provide at least 12 gallons per head per day for beef cattle and horses, 25 gallons per head per day for dairy cattle, and 1.5 gallons per head per day for sheep and goats. These requirements may need adjusting based on climatic conditions, type of feed, and other factors.

Gravity feed systems shall have sufficient head to supply the water for the design number of animals. Minimum elevation head shall be 4 feet (planned permanent water surface of pond or spring box to lip of trough or tank).

Location. The trough or tank shall be located to provide natural surface and subsurface drainage. The trough or tank shall not be

located adjacent to any well head. A separation distance of at least 150 ft. is needed for well head protection. If possible, locate the trough or tank down gradient from the well head. The location shall have easy access by livestock and also provide good grazing distribution.

Heavy use protection. An area of at least 10 ft. outside of the trough or tank that will be trampled by livestock shall be graveled, paved, or otherwise treated to provide firm footing and reduce erosion according to Conservation Practice Standard Code 561, Heavy Use Area Protection. A portable trough or tank used in intensive rotational systems which can maintain vegetative growth around the trough or tank is not required to have heavy use area protection. When concrete is used as a heavy use protection, the surface shall have a roughened finish and slope away from the trough or tank to prevent ponding of water on the concrete surface.

Trough or tank materials. The quality and durability of all materials shall be in keeping with the planned useful life of the installation. Common construction materials are reinforced concrete, galvanized steel, plastic, fiberglass, and large used equipment tires.

A reinforced concrete trough or tank shall be constructed of good quality concrete using sound, clean aggregates. The concrete mix shall be such that it will produce a compressive strength of 3,000 psi at 28 days. A concrete cast trough or tank shall have a minimum base thickness of 4 inches and a minimum wall thickness of 3 inches. Minimum steel reinforcement shall be one of the following:

- 3/8" bars spaced on 8-inch centers in both directions.
- 8 gauge welded wire mesh.

A galvanized steel tank shall have a wall thickness of at least 20 gauge.

A fiberglass tank shall be made of glass reinforced polyester to the manufacturer's design for the intended purpose. Minimum thickness of the walls and floor shall be 1/4 inch. All surfaces shall be coated with either a white gel coat at the time of manufacture or a polyester resin at time of installation to prevent deterioration due to sunlight and to

keep the tank serviceable. The top edge of the tank rim shall be protected with a 1 to 2 inch molded flange or other acceptable reinforcement.

A plastic trough or livestock waterers shall be made of polyethylene material to the manufacturer's design for the intended purpose. A freeze-proof plastic trough shall be equipped with floating plastic balls, electric heat elements, or heat wells as needed to ensure the water in the trough does not freeze.

When a heavy equipment tire is used as a trough or tank, it shall be of suitable quality to perform as intended for the useful life of the practice. The tire shall be free of chemicals injurious to livestock. An approved standard drawing shall be used to prepare site specific designs for this type of tank.

Appurtenances. A trough or tank shall be equipped with a suitable water supply pipe, drainage outlet, and overflow outlet, either as individual outlets or a combination of outlets. Plumbing shall be new galvanized steel, copper, bronze, or plastic pipe and fittings in conformance with Conservation Practice Standard- Pipeline, Code 516. Water supply pipelines are to have a minimum inside diameter of 1 1/4 inch for gravity flow systems or 3/4 inches for pressurized systems. The supply lines shall be connected in a manner to prevent leakage.

A water level control valve or overflow pipe shall be used to maintain the water at least 1 1/2 inches below the top of the trough or tank. New galvanized steel or plastic pipe and fittings shall be used for the overflow pipe and shall have a minimum diameter of 1 1/2 inches.

Drainage outlets for systems with flow-through water must extend at least 10 feet from the trough or tank and outlet at a location to provide a safe and stable discharge. The outlet location must not be accessible to the livestock.

Provisions shall be provided in the plumbing for drainage of the tank or trough for maintenance.

CONSIDERATIONS

Design fences associated with the watering facilities to allow safe access and exit for area wildlife species. To protect bats and other species that access water by skimming across

the surface, fencing material should not extend across the water surface. If fencing across the water is necessary it should be made highly visible by avoiding the use of single wire fences and using fencing materials such as woven wire or by adding streamers or coverings on the fence.

For watering facilities that will be accessible to wildlife, give consideration to the effects the location of the facility will have on target and non-target species. Also consider the effect of introducing a new water source within the ecosystem in the vicinity of the facility. This should include things such as the concentration of grazing, predation, entrapment, drowning, disease transmission, hunting and expansion of the wildlife populations beyond the carrying capacity of available habitat.

Consider the following guidelines for materials commonly used for watering facilities.

Concrete	3000 psi compressive strength
Galvanized Steel	20 gauge thickness
Plastic	Ultraviolet resistance
Fiberglass	Ultraviolet resistance

Where water is supplied continuously or under pressure to the watering facility, consider the use of automatic water level controls to control the flow of water to the facility and to prevent unnecessary overflows.

Watering facilities often collect debris and algae and should be cleaned on a regular basis. Consider increasing the pipe sizes for inlets and outlets to reduce the chances of clogging. Maintenance of a watering facility can be made easier by providing a method to completely drain the watering facility

Steep slopes leading to watering facilities can cause erosion problems from over use by animals as well as problems with piping and valves from excess pressure. Choose the location of watering facilities to minimize these problems from steep topography.

PLANS AND SPECIFICATIONS

Plans and specifications for watering facilities shall provide the information necessary to install the facility and shall be in keeping with this standard. If the watering facility is a component of a system that includes additional conservation practices, the information necessary to construct these additional practices shall be conveyed on the plans. As a minimum this shall include the following:

- A map or aerial photograph showing the location of the facility
- Detail drawings showing the facility, necessary appurtenances (such as foundations, pipes and valves) and stabilization of any areas disturbed by the installation of the facility
- Construction specifications describing the installation of the facility

OPERATION AND MAINTENANCE

An O&M plan specific to the type of watering facility shall be provided to the landowner. As a minimum the plan shall include, but not be limited to, the following items:

- a monitoring schedule to ensure maintenance of adequate inflow and outflow;
- checking for leaks and repair as necessary;
- if present, the checking of the automatic water level device to insure proper operation;
- checking to ensure that adjacent areas are protected against erosion;

- if present, checking to ensure the outlet pipe is freely operating and not causing erosion problems;
- a schedule for periodic cleaning of the facility;
- winter weather guidance.

REFERENCES

Brigham, William and Stevenson, Craig, 1997, Wildlife Water Catchment Construction in Nevada, Technical Note 397.

Tsukamoto, George and Stiver, San Juan, 1990. Wildlife water Development, Proceedings of the Wildlife Water Development Symposium, Las Vegas, NV, USDI Bureau of Land Management.

Yoakum, J. and W.P. Dasmann. 1971. Habitat manipulation practices. Ch. 14 in Wildlife Management Techniques, Third Edition. Ed. Robert H. Giles, Jr. Pub. The Wildlife Society. 633 pp.

National Engineering Handbook, Part 650 Engineering Field Handbook, Chapters 5, 11 & 12, USDA Natural Resources Conservation Service.

National Range and Pasture Handbook, Chapter 6, Page 6-12, Table 6-7 & 6-8, USDA-Natural Resources Conservation Service.

NRCS Practice Standard 561, Heavy Use Area

NRCS Practice Standard 516, Pipeline

**Natural Resources Conservation Service
Construction Specification**

WATERING FACILITY

1. scope

This item shall consist of the installation of a trough or tank to provide drinking water for livestock. Construction shall be carried out in such a manner that erosion, water, air, and noise pollution will be minimized and held within legal limits as established by state regulations.

2. LOCATION

The tank or trough shall be installed at the location shown on the drawings, or at the location designated by the NRCS technicians.

3. MATERIALS

The tank or trough shall be equal in size and quality to that specified or shown on the drawings. A concrete trough or tank shall be constructed from concrete per construction specifications for plain and reinforced concrete. All pipes and fittings shall be of the size and material shown on the drawings. Galvanized steel tanks shall have a minimum thickness of 20 gauge. Plastic and fiberglass structures shall be made of ultraviolet resistant materials or shall have a durable coating to protect the structure from deterioration due to sunlight.

4. INSTALLATION

The foundation area shall be cleared of all material not suitable for subgrade and be leveled to allow the trough or tank to be placed on firm ground. The area surrounding the trough or tank shall be smoothed and graded to permit free drainage of surface water away from it, yet allow access by the animals for which it is being installed. All backfill for underground pipes shall be compacted to the degree required to prevent caving after construction is completed.

5. HEAVY USE AREA

The trough or tank shall be located so that a dry surface is maintained around the base, extending 10 feet from all sides of the trough or tank. This area can be graveled, concreted, or paved. The minimum gravel mat thickness shall be 6 inches and concrete thickness shall be 4 inches. The mat may be pea gravel, chert, or clay gravel mixture. Concrete shall have a roughened finish.

The construction shall be performed in a workmanlike manner and the job site shall have a neat appearance when finished.