NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD AND SPECIFICATION

WATERING FACILITY

(No.)
CODE 614

DEFINITION

A device (tank, trough, or other watertight container) for providing animal access to water.

PURPOSE

To provide watering facilities for livestock and/or wildlife at selected locations in order to:

- protect and enhance vegetative cover through proper distribution of grazing;
- provide erosion control through better grassland management; or
- protect streams, ponds and water supplies from contamination by providing alternative access to water.

CONDITIONS WHERE PRACTICE APPLIES

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

CRITERIA

General Criteria Applicable To All Purposes

The tank or trough and associated livestock watering system shall be designed in accordance with the Missouri Livestock Watering Systems Handbook (MLWSH). A trough or tank shall have adequate capacity to meet the water requirements of the livestock and/or wildlife. This will include the storage volume necessary to carry over between periods of replenishment.

Where water supplies are dependable and livestock are checked daily, troughs with little water storage capacity may be used. Troughs or tanks must provide the daily water requirement of the livestock and provide access to the entire herd within a short period of time. Refer to MLWSH.

The site shall be well drained; if not, drainage measures shall be provided. Areas adjacent to the trough or tank that will be trampled by livestock shall be graveled, paved, or otherwise treated to provide firm footing and reduce erosion. Design of the protective surface around the trough shall be in accordance with NRCS Conservation Practice Standard 561, Heavy Use Area Protection.

If concrete is used as the surface coating, the pad shall extend a minimum of two (2) feet from the exterior wall of the tank or trough, in all directions, and be a minimum of 5 inches thick. Use of steel reinforcement (1/2 inch diameter), in the concrete pad, at 12 inches center to center in both directions is desirable. Alternative concrete pad designs provided to NRCS may be approved after evaluation. If natural gravel or rock is used as the top coating, the pad shall extend a minimum of six (6) feet from the exterior wall of the tank (or trough) and be a minimum of 12 inches thick. The type and size of pad shall be according to manufacturer's recommendations for proper installation.

Automatic water level control and/or overflow facilities shall be provided as appropriate. Valves or pipes shall be protected by shields or covers to prevent damage by livestock. Overflow shall be piped to a stable or suitable point of release. The trough and outlet pipes shall be protected from freezing and ice damage. Freeze-proof troughs or electric heaters may be used.

When a roof is placed over the trough to provide shade, the roof shall be designed for appropriate snow and wind loads and shall be durable to withstand anticipated livestock and wildlife activities.

All materials shall have a life expectancy that meets or exceeds the planned useful life of the installation. Common construction materials are reinforced concrete, steel, fiberglass, plastic and wood. All designs shall meet the

industry standards for the material being used. Generally applicable design requirements and procedures can be found in the documents referenced at the end of this standard.

A trough or tank may be prefabricated materials or shall be constructed with a reinforced concrete bottom and reinforced concrete, concrete silo staves, or steel sidewalls. They are installed on normally dry land where overflow or standing water will not damage the structure. Precast (freeze proof) concrete tanks and factory fabricated fiberglass tanks may be used. Tanks may be built from used heavy equipment tires.

Concrete structures shall be constructed from a concrete mix producing a minimum compressive strength of 3,500 psi at 28 days. 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.

CONSIDERATIONS

This practice may adversely affect cultural resources and must comply with GM 420, Part 401.

Topography should be evaluated to minimize trail erosion and flooding erosion from tank overflow.

Consider effects on erosion and movement of sediment, pathogens, and soluble and sediment-attached substances carried by runoff.

Watering facilities should be accessible to small animals. Escape ramps for birds and small animals should be installed.

Adequate protection for livestock during the winter should be considered.

Consider effects on the visual quality of onsite and downstream water resources.

Consider effects on wetlands and water-related wildlife habitats.

A grazing system may include several sources of livestock water and thus reduce demand on one source of water and potential erosion problems.

PLANS AND SPECIFICATIONS

Plans and specifications for installing troughs and tanks shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose. If the trough and/or tank are a component of a system that includes additional conservation practices, the information necessary to construct these additional practices will also be conveyed on the plans.

Development of plans will be guided by Engineering Field Handbook, Chapter 5, and shall be in accordance with National Engineering Manual, Parts 541 and 542.

OPERATION AND MAINTENANCE

An O&M plan specific to the type of installed trough or tank shall be provided to the landowner. The plan shall include, but not be limited to, the following provisions:

- check for debris, algae, sludge or other materials in the trough which may restrict the inflow or outflow system;
- check for leaks and repair immediately if any leaks are found;
- check the automatic water level device to insure proper operation;
- check to ensure that adjacent areas are well protected against erosion;
- check to ensure the outlet pipe is freely operating and not causing erosion problems; and
- prepare guidance for winter weather, such as adding material in the storage area to allow for ice expansion without damage.

Algae and iron sludge accumulation should be addressed in areas with water quality that is known to cause problems. Chemicals such as copper sulfate and chlorine can be recommended as needed, as long as local rules and regulations are followed.

REFERENCES

Missouri Livestock Watering Systems Handbook (MLWSH).

Engineering Field Handbook

National Engineering Manual

Manual of Steel Construction, American Institute of Steel Construction

Timber, National Design Specification for Wood, American Forest and Paper Association

Concrete, ACI 318, American Concrete Institute

Masonry, Building Code Requirement for Masonry Structures, ACI 530, American Concrete Institute

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The operation and maintenance plan for the system is the responsibility of the landowner. The tank or trough shall be checked frequently. Some of the items that need to be addressed are:

1. Check periodically to see if any type of debris has fallen into the trough which may restrict the inflow or outflow system.

2. Check tank for leaks or cracks and repair immediately if any cracks or wall separations are found.

3. Check the automatic water level device to insure that it is operating properly.

4. Inspect the outlet pipe to be sure it has a free outlet and is not causing any serious erosion problems.

5. If the trough has not been designed to prevent damage from freezing, it should be prepared for winter weather. This may include a measure such as adding material in the storage area to take up expansion.

6. Algae and iron sludges sometimes are problems in watering facilities. Chemicals such as copper sulfate and chlorine have been used. Federal, state, and local rules and regulations are to be followed when recommending chemicals.

7. Check for vandalism and normal wear and deterioration. Repair any damage that would prevent the system from working properly.

8. Remove large accumulations of manure at or near the tank or trough.

9. Inspect the condition of the pad or surfaced area around the tank or trough for deteriorating condition and repair or replace materials, as needed.

Additional details: _____

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General

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

The completed job shall present a workmanlike appearance and shall conform to the line, grades, and elevations shown on the drawings or as staked in the field.

All operations shall be carried out in a safe and skillful manner. Safety and health regulations shall be observed and appropriate safety measures used. Contractor shall be assured that all state laws concerning buried utilities have been met.

All trees, stumps, roots, brush, weeds, and other objectionable materials shall be removed from designated work area.

Materials

Tanks shall be as shown on drawings. Tanks shall be durable enough to withstand forces exerted by water, soil, and livestock and shall have a minimum design life of 10 years. Crushed rock or gravel shall be hard durable rock. Concrete for the pad or tank shall conform to Construction Specification 750, Reinforced Concrete. Geotextile shall conform to Construction Specification 753, Geotextile.

Placement

Tanks should be placed on suitable subgrade material and face south where possible.

Pads

The area adjacent to the tank (or trough) shall be protected from livestock traffic. Pads shall be constructed as shown on the drawings.

Vegetation

Topsoil shall be added, if needed, to establish vegetation on all disturbed areas. Refer to JS-AGRON-25 for seeding and mulching recommenda-tions or equivalent.

Additional Details:

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