NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD AND SPECIFICATION

HEAVY USE AREA PROTECTION

(acre)
CODE 561

DEFINITION

Protecting heavily used areas by establishing vegetative cover, by surfacing with suitable materials, or by installing needed structures.

PURPOSE

- Stabilize areas - urban, headquarters (or farmstead), recreation, or other facilities - intensively used by people, animals, or vehicles
- Provide controlled access for livestock to ponds and streams for watering
- Improve water quality
- Reduce erosion
- Improve aquatic habitat

CONDITIONS WHERE PRACTICE APPLIES

On frequently and intensively used areas that require special treatment to provide protection from erosion, livestock traffic, or other deterioration. This also includes urban and recreation areas.

DESIGN CRITERIA

General. All planned work shall comply with Federal, state, and local laws and regulations.

Drainage and erosion control. Provision shall be made for surface and subsurface drainage, as needed, and for disposal of runoff without causing erosion or water quality impairment. All treatment areas shall be shaped to prevent ponding of water.

Design Load. The design load will be based on the type of traffic, (vehicular, animal, or human) anticipated on the heavy use area. Areas that support vehicular traffic shall be designed for a minimum wheel load of 4,000 pounds.

Surface treatment. Individual designs shall be site specific. Table 1 will be used as a general guideline. The surface treatment shall meet the following criteria:

Asphalt The thickness of the asphalt course, the kind and size of aggregate, the type of proportioning of bituminous materials, and the mixing and placing of these materials shall be in accordance with good highway construction practice for the expected loading. Asphalt material and installation conforming to Section 403 of MoDOT standard specifications for highway construction is satisfactory. All areas paved shall have a minimum of 6 inches of base course consisting of gravel, crushed stone, or other suitable material. Geotextile in conformance with Missouri Construction Specification NRCS-MO753 may be used in conjunction with base course material.

Concrete The quality and thickness of concrete and the spacing and size of reinforcing steel shall be appropriate for the expected loading and in accordance with NRCS criteria and sound engineering practice. Concrete shall comply with the guidance in the current Construction Specification NRCS-MO750. Concrete shall

be placed on compacted or dense foundations or gravel bases.

Aggregate The total minimum thickness for a fine and/or coarse aggregate surface shall be as needed but in no case shall it be less than 6 inches.

If other surfacing materials such as cinders, tanbark, bark mulch, brick chips, and sawdust are used, the minimum thickness shall be as needed, but in no case shall it be less than 2 inches thick.

Structures. All structures shall be designed according to appropriate NRCS design criteria and standards and specifications.

Sprays and artificial mulches. Sprays of asphalt, oil, plastic, manufactured mulches, and similar materials shall be applied according to the manufacturer's recommendations.

Geotextile. Geotextile shall be considered on all sites with a soft or wet foundation. NRCS, National Engineering Handbook (NEH), Parts 642 and 643 (formerly NEH, Section 20) provide guidance for specifying quality and installation of geotextile. AASHTO M-288 (latest edition) may be used in the selection of the geotextile. Missouri Construction Specification NRCS-MO753 for geotextile may be used in lieu of or in conjunction with the previous references.

Vegetative Measures. Liming, fertilizing, soil preparation, seeding, sodding, and vegetation management shall be according to the planned use and conservation practice standard Critical Area Planting (342).

Additional Criteria Applicable to Controlled Access for Livestock

General. The treatment area shall extend an appropriate distance from facilities such as portable hay rings, water troughs, feeding troughs, mineral boxes, or other components.

Foundation preparation shall consist of removal and disposal of soil and other material that is not adequate to support the design loads.

The top surface of the watering access in a channel shall be a minimum of 6 inches below the existing channel bottom.

The ramp for the crossing/access shall extend up to the existing top of bank elevation.

Ramp slope shall be 6 (horizontal) to 1 (vertical) or flatter. An alternative configuration is a stairstep access with a minimum tread (horizontal distance) of 6 feet and a maximum rise (vertical distance) of 9 inches.

For livestock watering, provide access locations at least one every quarter mile in accordance with conservation practice standard Prescribed Grazing (528A).

Construct a fence to exclude livestock from the remaining streambanks and surface waters. Conservation practice standard Fence (382) or Use Exclusion (472) shall be used as needed to meet the intended purpose.

Refer to NRCS, National Engineering Handbook (NEH), Part 650, Engineering Field Handbook, Chapter 16 - Streambank and Shoreline Protection for details and specifications on lakeshore watering access, streambank watering access, and floating electric fence.

Stream crossing and livestock access facilities shall have a stable surface. The surface may be coarse aggregate, concrete, or natural bedrock.

Coarse aggregate shall conform to ASTM (American Society of Testing and Materials) Specification C33 unless otherwise shown on the construction drawings or designated by the engineer. The size number shall be between 1 and 467, as defined in Table 2, ASTM C33. Fine aggregate may be size number 5 through 67. Equivalent size aggregate conforming to MoDOT Standard and Specifications for Highway Construction, Section (1005, 1006, or 1007) may be used.

For concrete surfaced ramps, use a minimum 5-inch thick concrete slab. Reinforcement is required for cast-in-place concrete slabs. The concrete surface shall be roughened to provide a non-skid surface. Concrete shall comply with the guidance in the current Construction Specification NRCS-MO750.

Precast concrete panels may be used in lieu of cast-in-place concrete slabs.

A minimum of 1/2-inch diameter steel reinforcement on 18-inch centers, in both directions, shall be used.

Concrete surfaced ramps shall be placed over firm, native mineral soil material or a minimum gravel subbase thickness of 4 inches.

Concrete surfaced ramps may not be placed on organic soils unless a suitable base is provided to support the anticipated loads.

Additional Criteria Applicable to Improved Water Quality

Heavy use areas should be located to best serve the intended purpose. Where one of the purposes is water quality or stream protection, the heavy use area should be placed as far away from the waterbody or watercourse as possible.

Safety considerations for people and domestic animals shall be included in the design of the heavy use area protection.

Additional Criteria Applicable to Recreation Areas

The treatment area shall be conducive to the overall recreation area and aesthetically blend with the general landscape and surroundings.

CONSIDERATIONS

The location of heavy use areas should consider existing traffic patterns and provide flexibility for changes.

Recommendations vary on the size of heavy use protection areas required for livestock. Treatment area for mature cattle varies from 50 square feet per animal in semi-confined to 400 square feet per animal in total confinement to 4,000 or more square feet for animal exercise areas. Heavy use area protection may also be used for directing livestock (lanes) to various facilities. The size of a heavy use protection area is dependent on the landowner's operation including type of animal, time the animals are confined, or the intended use. Heavy use protection areas should be kept as small as practicable.

When heavy use areas are vegetated for protection, consideration must be given to the type and number of animals and the amount of time they are confined. The area should be sized so that the selected vegetation can be maintained in vigorous condition during the growth period and not destroyed by animal traffic.

When surface treatments such as bark mulch, wood-fiber, or other non-durable materials are used for short-term livestock containment areas, consideration should be given to vegetating the affected area with a cover crop. Surface treatments that are harmful to livestock shall not be used. For example, mulch high in tannic acid would be harmful to hooves.

Provisions should be made to collect and treat manure accumulations and contaminated runoff in accordance with a waste management system plan for the operating unit.

Any work in and/or around streams may require a permit from the US Army Corps. of Engineers, state water quality (permitting) authority, or local authority.

Extreme caution should be taken to minimize erosion and water quality impairment when locating watering points or stream crossings.

Heavy use areas may have an affect on the water budget, especially on volumes and rates of runoff, infiltration, and transpiration due to the installation of less pervious surfaces. Changes in runoff to off-site areas should be evaluated in regard to Federal, state, and local laws and regulations.

Heavy use areas may affect the quality of the surface water from the surfacing of confined animal areas due to an increase in the movement of sediment, animal by-products, and soluble and sediment-attached substances carried by runoff.

Consider locating watering sites on ridges (higher ground) rather than in draws (lower areas), to reduce operation and maintenance difficulties. Southernly slopes receive more sunlight and dry out faster; thus minimizing erosion and water quality problems around watering access locations, tanks, and troughs.

Heavy use areas may affect surface and groundwater by the introduction of nutrients on vegetated areas, and oils and chemicals associated with vehicular traffic. Sufficient distance shall be maintained between heavy use areas and sinkholes, other karst features, or wells to minimize impact on water quality.

For areas around livestock watering facilities or on areas that are frequently scraped, consideration should be given for the use of concrete in lieu of aggregate surfaces.

For urban and recreational areas, traffic control plants, landscaping timbers, and wooden walkways should be evaluated for effectiveness and aesthetics.

PLANS AND SPECIFICATIONS

Plans and specifications for heavy use area protection shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose. Plans and specifications shall include construction drawings, construction specifications, job sheets or other similar references. These documents shall specify the requirements for installing the practice, including the kind, amount and quality of materials to be used.

OPERATION AND MAINTENANCE

The Operation and Maintenance (O&M) plan shall specify that the treatment areas and associated practices be inspected annually and after significant storm events to identify repair and maintenance needs.

The O&M plan shall detail the level of repairs needed to maintain the effectiveness and useful life of the practice.

For livestock operations, the O&M plan for heavy use areas may be included as a part of an overall waste management system plan. Periodic removal of manure accumulations will be addressed in the O&M plan.

Table 1

Typical Surface Material Installations

Foundation Condition	Cross Section Option [4]
Firm [1]	Raised earth
Firm	Minimum 6" (2 inches fine aggregate over 4 inches coarse aggregate) [3]
Firm	Minimum 2" of other surfacing material such as cinders, tan bark, bark mulch, brick chips, or sawdust
Firm to medium	Minimum 6" (2 inches fine aggregate over 4 inches coarse aggregate) over geotextile, meeting Missouri Construction Specification NRCS-MO753 Geotextile [3]
Firm to medium	Minimum 2" fine aggregate over 2" coarse aggregate over 6 " base course of graded rock [2,3]
Firm	5" reinforced concrete with designed control joint spacing, over minimum 4" sand and gravel
Firm with permeable foundation	5" reinforced concrete with waterstop, over 6" sand and gravel
Firm	Minimum 3" asphalt over 6" sand and gravel
Medium to soft [1]	Minimum 4" (2 inches fine aggregate over 2 inches coarse aggregate) over 8" base course of graded rock [2,3]
Medium to soft (wet)	Minimum 4" (2 inches fine aggregate over 2 inches coarse aggregate) over 8" base course of graded rock over geotextile, meeting Missouri Construction Specification NRCS-MO753 [2,3,5]
Soft	Minimum 4" (2 inches fine aggregate over 2 inches coarse aggregate) over 18" base course of graded rock [2,3]
Soft (wet)	Minimum 4" (2 inches fine aggregate over 2 inches coarse aggregate) over 18" base course of graded rock over 6" sand and gravel [2,3,5]

1 Guidance can be found in National Engineering Handbook (NEH) Part 650, Engineering Field Handbook (EFH) Chapter 4 and Figure 4-14 for information regarding bearing capacity and foundation properties.

2 Graded Rock: Maximum stone size is the base course thickness dimension with a maximum of 10% passing the 3/4" sieve. All sizes between the limits are to be represented.

3 The 2" layer of fine aggregate over coarse aggregate is intended to protect livestock from injury. If coarse aggregate is reasonably fine, the topping of fine aggregate may be replaced by coarse aggregate material.

4 Special consideration shall be given when heavy use area is close to watertable or permeable bedrock is present.

5 Geotextile can be replaced by 6 inches of sand and gravel or 6 inches of sand and gravel may be replaced by geotextile.