

NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

HEAVY USE AREA PROTECTION

(Acre)

CODE 561

DRAFT 05/04/09

DEFINITION

The stabilization of areas frequently and intensively used by people, animals or vehicles by establishing vegetative cover, by surfacing with suitable materials, and/or by installing needed structures.

PURPOSES

- Reduce soil erosion
- Improve water quantity and quality
- Improve air quality
- Improve aesthetics
- Improve livestock health

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to urban, agricultural, recreational or other frequently and intensively used areas requiring treatment to address one or more resource concerns.

CRITERIA**General Criteria Applicable to All Purposes**

All planned work shall comply with Federal, state, and local laws and regulations ***governing structures and activities in or along streams, pollution abatement, health, and safety. The owner or operator shall secure all permits and approvals and is responsible for performing all planned work in accordance with such laws and regulations. NRCS employees shall not***

NRCS, NHCP
October 2003

procure permits, rights, or approvals, nor shall they enforce laws and regulations. NRCS may provide the landowner or operator with technical information needed to obtain the required permits, rights or approvals to construct, operate, and maintain the practice.

Additional permits may be required from the following agencies:

1. ***West Virginia Department of Health***
2. ***West Virginia Department of Agriculture***
3. ***West Virginia Department of Environmental Protection.***
4. ***Environmental Protection Agency***

Permits may be required from the following agencies when obstruction removal is performed within the boundaries of a stream or floodplain or if burning is required:

1. ***U.S. Army Corps of Engineers***
2. ***WV Department of Natural Resources***
3. ***WV Public Lands Corporation***
4. ***US Fish and Wildlife Service***
5. ***Local state and county ordinances.***

Measures shall be taken to limit the generation of particulate matter.

Safety of the users shall be incorporated into the design of the heavy use area protection.

Design Load. The design load will be based on the type of traffic, (vehicular, animal, or human) anticipated on the heavy use area.

NRCS, WV
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The minimum design load for areas that support vehicular traffic will be a wheel load of 4000 lbs.

Foundation. All site foundations shall be evaluated for soil moisture, permeability, texture and bearing strength in combination with the design load and anticipated frequency of use.

A base course of gravel, crushed stone, other suitable material and/or geotextile shall be provided on all sites with a need for increased load bearing strength, drainage, separation of material and soil reinforcement. ***Unless otherwise specified, base course thickness shall be a minimum of six (6) inches of course aggregate, such as ASTM C33 or AASHTO M43: No. 57, No. 1 or No. 3 or similar material. The base course thickness shall be the greater of two (2) times the largest aggregate diameter or the minimum thickness. A properly designed geotextile shall be installed under the base material.***

Natural Resources Conservation Service (NRCS), National Engineering Handbook (NEH), Parts 642 and 643 (formerly, NEH, Section 20) and AASHTO M-288 (latest edition) provide guidance in quality specification and geotextile selection.

An impervious barrier shall be provided on sites with a porous foundation (high permeability rate), where there is a need to protect ground water from contamination.

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

Surface Treatment. The surface treatment shall meet the following criteria:

Bituminous Pavement. The thickness of the pavement 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 ***West Virginia*** Department of Transportation, ***Division of Highways Standard Specifications Roads and Bridges, Section 401 or 402*** criteria for the expected loading.

Choose a mix type appropriate for the surface application. The minimum thickness of asphalt wearing course shall be two inches for access areas.

When bituminous/asphalt pavement is used for animal feed pads it shall be protected by a coating of sand, sawdust or similar material.

Concrete. The quality and thickness of concrete and the spacing and size of reinforcing steel shall be appropriate for the expected loading.

Concrete thickness shall be a minimum of four (4) inches in accordance with the requirements in Conservation Practice (CP) Waste Storage Facility (313); Slabs on Grade section. Concrete surfaces shall be roughened for increased traction where used by livestock.

Other Cementitious Materials. Soil cement, roller compacted concrete, and coal combustion by-products (flue gas desulfurization sludge and fly ash) may be used as surface material if designed and installed to withstand the anticipated loads and surface abrasion.

Aggregate. A fine or coarse aggregate surface shall be a minimum ***two (2)*** inches thick.

Aggregate such as ASTM C33 or AASHTO M43: No. 67 or No. 8, WV Crusher Run or similar material is appropriate for surface material.

Other. Surfacing materials, such as cinders, tanbark, bark mulch, brick chips, shredded rubber and/or sawdust, shall have a minimum layer thickness of 2 inches.

Structures. All structures shall be designed according to appropriate NRCS standards and specifications or Engineering Handbook recommendations.

Fabricated and roofed structures shall be designed in accordance with CP Waste Storage Facility (313).

Sprays and Artificial Mulches. When utilizing sprays of asphalt, oil, plastic, manufactured mulches, and similar materials, the manufacturer's recommendations for application shall be incorporated into the design.

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. Provision shall be made to exclude unpolluted run-on water from the treatment area. All treatment areas shall be shaped to prevent ponding of water.

Vegetative Measures. Liming, fertilizing, soil preparation, seeding, mulching, sodding and vegetation management shall be according to the planned use and appropriate conservation practice standard in the local technical guide. If vegetation is not appropriate, other measures shall be used to accomplish the intended purpose. ***Grass covered areas are intended to provide permanent vegetated cover (not for prescribed grazing).***

Additional Criteria for Heavy Use Areas Utilized by Livestock.

The treated area shall extend an appropriate distance from facilities such as portable hay rings, water troughs, feeding troughs, mineral boxes and other facilities where livestock concentrations cause resource concerns.

Livestock Heavy Use Areas (LHUA) provide a protected surface from the animal's hoof action, reducing excessive erosion, sediment movement or nutrient transport to surface or subsurface water.

CNMP. LHUA's shall be planned in accordance with a Comprehensive Nutrient Management Plan (CNMP) and associated conservation practices. The CNMP documents the "conservation system" within the conservation plan that is unique to animal feeding operations and shall be developed before a LHUA structure is designed. This will include the producer's decisions concerning the management of the livestock, livestock manures and waste products, movement, loafing areas, etc.

Reference the conservation resources "Planning Guide for Livestock Heavy Use" for additional LHUA planning guidelines. NRCS conservation practice (CP) standards Critical Area Planting (342); Fencing (382); Prescribed Grazing (528); Filter Strip (393); Roofed Runoff (558); Animal Trails and Walkways (575); Manure Transfer (634);

Waste Storage Facility (313); Vegetated Treatment Area (635); Watering Facilities (614); Windbreak /Shelterbelt Establishment (380); or Access Control (472) shall be used as companion practices, when needed, to meet the intended purpose of the heavy use area protection.

Provisions shall be made to collect, store, utilize and/or treat manure accumulations and contaminated runoff in accordance with appropriate conservation practice standards ***and regulations.***

Livestock Heavy Use Areas (LHUA). Feed Pads designed for cattle, sheep, etc. may or may not be roofed. They are designed for 100 % confinement or where livestock have pasture access (not confined) in association with CP Prescribed Grazing (528).

LHUA Equine All-Weather, not roofed, non-grazing (exercise or holding lots), are gravel surfaced lots utilized when prescribed grazing pastures are not available for use. They are especially helpful in times of pasture establishment, maturing vegetation or during very wet or drought conditions.

Location. The location of LHUA shall:

- ***Be above the 25 year-24 hour floodplain delineation.***
- ***Divert all surface water away from the feed pad, lot and/or vegetated treatment area.***
- ***Be located as far as possible from springs and wells and no closer than 100 feet to neighboring wells or potable water sources.***
- ***Not be placed closer than ten (10) feet from the top or toe of a defined bank.***
- ***Be buffered by terrain or a windbreak/shelter belt when a separation distance (visual or odorous) is a concern.***

Roofs. A roof may be installed for the purpose of diverting rainfall away from a feed pad, when other practices are not practical or cost effective. ***The roof and supporting structure shall be designed and***

installed in accordance to CP Waste Storage Facility (313).

Curbing. *Curbing shall be installed in areas necessary to:*

- *Contain manure or prevent clean water from entering an area. Curbs shall be a minimum of twelve (12) inches high except where equipment needs to cross.*
- *Divert waste to a Manure Transfer System or Waste Storage Facility.*
- *Contain solids while allowing liquids to discharge to a Vegetated Treatment Area (VTA) thru a slotted or open curb (normally 4" wide and spaced every 10 feet).*

Size. *The LHUA's square footage shall be sized according to the number and size of livestock and the area necessary for feed rings, watering facilities, equipment and necessary feed bunker length as needed (Reference Table 1).*

All LHUA's:

- *Are designed for livestock use during the winter months and/or mud season.*
- *Temporarily contain waste.*
- *Have a protected transition area (concrete, gravel, etc.) such as from the access lane to the pad access/egress gate.*
- *Store all accumulated waste in accordance with CP Waste Storage Facility (313).*
- *Where livestock are not confined and have unlimited access to feed pads, planning considerations shall be given to reduce or eliminate waste accumulation near and around the LHUA.*

In addition to the above bullets;

Roofed Feed Pads:

- *Shall be surfaced with concrete unless other materials such as asphalt, gravel or wood chips are approved by SCE.*
- *Shall provide watering facilities to confined livestock on the pad.*

Uncovered (no roof) Feed Pads Serving Ten (10) Animal Units or Less:

- *Shall be surfaced with concrete unless other materials such as asphalt, gravel or wood chips are approved by SCE.*
- *Shall have a minimum 2% grade.*
- *May be designed so runoff can be treated in accordance with CP Vegetated Treatment Area (635).*
- *Shall remove solid waste weekly and stored it in a waste storage facility.*

Exercise Lots or Paddocks Serving Ten (10) Equine Units or Less:

- *Shall be surfaced with Gravel when used as an exercise lot.*
- *Unsurfaced lots shall have a minimum 2% to a maximum 6% grade.*
- *Shall have a minimum 2% grade.*
- *May be designed so runoff can be treated in accordance with CP Vegetated Treatment Area (635).*
- *Shall remove solid waste daily and store it in a waste storage facility.*

Other Uncovered (no roof) Feed Pads or Lots shall:

- *Be sloped a minimum 2%.*
- *Collect and store all runoff and waste in accordance with CP Waste Storage Facility (313) and/or CP Manure Transfer (634).*

Additional Criteria for Areas Utilized for Recreation. *The treated area shall be conducive to the overall recreation area and aesthetically blend with the general landscape and surroundings.*

Plants, landscaping timbers, traffic control measures, wooden walkways, etc. shall be evaluated for effectiveness, aesthetics and accessibility as covered by the Americans with Disabilities Act.

CONSIDERATIONS

When stabilizing heavily used areas consider adjoining land uses and the proximity to residences, utilities, cultural resource areas, wetlands or other environmentally sensitive areas, and areas of special scenic value.

For heavy use areas conducive to protection by vegetation, consideration must be given to the effect(s) of treading and/or miring. The vegetative species selected should tolerate and persist under heavy use conditions. If practicable, consider increasing the size of the area and/or establishing a rest/non-use period to allow plant recovery and increase vigor.

Heavy use area protection effects on the water budget, especially on volumes and rates of runoff, infiltration, and transpiration due to the installation of less pervious surfaces should be considered in the selection of surfacing materials.

The transport of sediments, nutrients, bacteria, organic matter from animal manures, oils and chemicals associated with vehicular traffic, and soluble and sediment-attached substances carried by runoff should be considered in selection of companion conservation practices.

If the purpose of the heavy use area protection is improvement of water quality, the heavy use area should be (re)located as far away from the waterbody or watercourse as possible. Any work in and/or discharges near streams, wetlands or waterbodies may require a permit from the US Army Corps of Engineers, state water quality (permitting) authority, or local authority.

The size of heavy use areas utilized by livestock is dependent on the landowner's operation including type and number of animal, confinement periods, and/or the intended use. The size of treatment areas can range from 30 square feet per animal in partial-confinement to 400 square feet per animal in total confinement to 4000 or more square feet for animal exercise areas. Heavy use protection areas should be kept as small as practicable.

For areas with aggregate surfaces that will be frequently scraped, consideration should be given to the use of concrete or cementitious materials to lessen the recurring cost of aggregate replacement.

Encourage the use of multiple feed pads to reduce excessive use of adjoining pastures and improve pasture rotation. If the herd is maintained in groups on separate parts of the farm, then more than one LHUA may be planned.

Fencing may be needed to confine livestock, control access to the stabilized pad, separate animals from vegetated treatment area, or where vegetation requires protection.

TABLE 1 – RECOMMENDED SPACE REQUIREMENTS FOR LIVESTOCK HEAVY USE AREAS *

TABLE 1-A SPACE REQUIREMENTS FOR BEEF CATTLE 100% CONFINED (24 HR/DAY) SQUARE FEET (SF) PER HEAD				
TYPE OF AREA	CALVES 400 – 800 LBS.	BRED HEIFERS, STEERS OR COWS 800 – 1200 LBS.	COWS 1,300 LBS.	
Roofed Concrete Feed Pad (SF/Head)	25	35	50	
Paved Lot ; open- no roof (SF/Head)	50	60	75	
Not Paved Lot; open-no roof with mound (SF/Head)	300-600	400-800	500-800	
Trough Length (Linear feet per animal)	1.7	2.0	2.5	
TABLE 1-B SPACE REQUIREMENTS FOR BEEF CATTLE NOT 100% CONFINED ON FEED PAD (6 TO 12 HR/DAY) ROOFED OR NOT ROOFED SQUARE FEET (SF) PER HEAD				
TYPE OF AREA	CALVES 400 – 800 LBS.	BRED HEIFERS, STEERS OR COWS 800 – 1200 LBS.	COWS, BULLS 1300 LBS. AND OVER	COW/CALF
Concrete Feed Pad (with pasture access)	20	25	30 Cows 40 Bulls	45
Trough Length (LF/animal)	1.7	2.0	2.5	2.5
TABLE 1-C SPACE REQUIREMENT FOR EQUINE AREA -NOT ROOFED 100% CONFINED WITH ACCESS TO SHELTER SQUARE FEET (SF) PER HEAD				
Type of Area	Horses		Watering Facility	
Exercise Area Surfaced with Gravel	400 SF /horse; (min. width 12 feet/horse)		Do not add to total design area.	
Exercise Area (2 -6% slope) Not Surfaced	500 minimum SF 1000 SF/HORSE High Density 2500 SF/Horse Low Density		Do not add to total design area.	
Dry Lot-No Exercise Surfaced with Gravel (Min. width 12')	256 SF /horse and used by one horse only.		4 ft. x 6 ft. concrete apron for automatic waterer.	
TABLE 1-D RECOMMENDED SPACE REQUIREMENTS FOR SHEEP SQUARE FEET (SF) PER HEAD				
Type of Area	Feeder	Ewes with	Dry Ewes 150-	Rams

	30 – 110 lbs.	Lambs	200 lbs.	180-300 lbs.
Roofed Feed Pad	10	15	16	30
Open Lot ; Surfaced, with access to shelter	10	20	16	30
Open Lot -Not Surfaced	25	40	35	35
Trough Length (LF per animal)	1.0	1.5	1.5	1.0

TABLE 1-E OTHER RECOMMENDED SPACE REQUIREMENTS

Feed Trough Width	Hay Ring – Dia. = 7' 10"	Automatic Watering Facility	Width of Center Aisle for Tractor or Feed Wagon
Center Feed Area 5 – 8 LF (cows access both sides)	50 square feet	4 ft. x 6 ft. concrete apron for each automatic waterer	10 – 12 LF (not applicable to equine exercise areas)
Single Side Feed Width 4 LF	10 cows or 5 horses per ring	Maximum 20 beef cows, 16 bulls, 40 ewes, 10 rams OR 10 horses/bowl or according to manufacturer.	

Livestock Heavy Use Area feed pads or lots shall be sized according to the following:

1. Select Table based type of animal, confinement and if the area is roofed or not roofed.
2. Use the information from Table(s) selected in Item 1 to determine the required square footage (SF) per animal based on type of operation.
3. Use the information from Table(s) selected in Item 1 to determine the required minimum trough length or width for the number of animals (if appropriate).
4. Determine additional square footage necessary for hay rings, watering facilities, feed bunks, equipment access, etc. from Table 1E.

*** References: MWPS- 6, MWPS-18, NDSU NM-1155, PSU –G-5 Sheep Design Criteria, Oregon State Univ.-Extension EC 1610-2007, All-Weather Horse Paddocks Ohio DNR,**

REFERENCES

National Pollutant Discharge Elimination System (NPDES)

National Clean Water Act (CWA) Section 502(14)

U.S. Environmental Protection Agency (EPA)

West Virginia Department of Agriculture

WV Dept. of Environmental Protection

WV Department of Health and Human Resources; 64CSR46, TITLE 64, Interpretive Rule Department of Health, Series 46

WV DEP or EPA website on CAFO's;

[http://cfpub.epa.gov/npdes/home.cfm?prog_id=7;](http://cfpub.epa.gov/npdes/home.cfm?prog_id=7)

<http://www.wv.gov/Offsite.aspx?u=http://www.wvdep.org>

210-VI-EFH Amendment 45, WV5 Preparation of Engineering Plans

210-V-NEM Part 505 – Non-NRCS Engineering Services

WV NRCS Engineering Field Handbook

WV NRCS Conservation Resources “Planning Criteria for livestock Heavy Use Areas”

Agricultural Waste Characteristics of the Agricultural Waste Management Field Handbook, Chapter 4 (AWMFH)

CP 313 -Table A for livestock manure volumes (CF).

ASTM C33; Standard Specifications for Concrete Aggregates

AASHTO M43: Standard Specification for Sizes of Aggregate for Road and Bridge Construction.

North Dakota State Univ. Extension Service NM-1155, 10/2006

Oregon State Univ.-Extension EC 1610-07

The Midwest Plan Service (MWPS)- 6; Beef Housing and Equipment Handbook 4th Ed. 1987 MWPS-18 Section 2; Manure Storages 2001

Using All-Weather Geotextile Lanes and Pads; MWPS Ag. eng. Digest AED45, 07/99

All-Weather Horse Paddocks Ohio DNR, 2005.

Penn State Agricultural and Biological Engineering; Sheep Housing Design Criteria G-5, PSU/92

NRCS Soil Data Mart Information, Engineering Properties, Water Features, Flood Duration, Hydrologic Soil Group, Risk of Corrosion –concrete, Water Table Depth, Physical Soil Properties etc.:
<http://soildatamart.nrcs.usda.gov/>

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 plans, drawings, job sheets, **utility notification, construction specifications including method of material disposal**, or other similar documents. These documents shall specify the requirements for installing the practice, including the kind, amount and quality of materials to be used.

NRCS shall be notified prior to commencement of construction.

All materials shall be inspected by NRCS personnel prior to installation.

OPERATION AND MAINTENANCE

An Operation and Maintenance (O&M) plan shall be prepared for and reviewed with the landowner or operator. The plan shall specify that the treated areas and associated practices are 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 the overall waste management plan.

Periodic removal and management of manure accumulations will be addressed in the O&M plan.