NATURAL RESOURCES CONSERVATION SERVICE
VIRGINIA ENGINEERING DESIGN NOTE #561 (DN-561)
HEAVY USE AREA PROTECTION

Heavy Use Area Protection is 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.

This standard may be used for spot treatment of problem areas on Access Roads or Animal Trails and Walkways. It should not be used to create an access road or an animal trail or walkway.

Field Investigation
A full investigation of the topography of the site, soil conditions, erosion, water quality and quantity, air quality, and degree and type of usage should be made before a site-specific plan is prepared. Additional information about the farming operations and animal density is required for areas utilized by livestock. For sites that are used by people, aesthetic considerations should be part of the investigation.

Foundation Preparation
To the extent possible, areas to be treated should be excavated with vertical edges around the perimeter.

Surface Treatment
The type of material selected is to be appropriate for the loading, uses, and exposure of the area using one of the following:

Concrete - The slab thickness shall be a minimum of 5 inches. Virginia Construction Specification VA-731. Plain (Unreinforced) Concrete Construction provides material and installation guidance. Isolation joints shall be installed between a new slab and any other fixed object or different material, such as an existing slab, building foundation, posts or piers, etc. Control joints shall be installed 10-15 feet apart on 5” slabs where control of cracking is required. The spacing should never exceed 15 feet. The control joint must extend into the slab to a depth of one-fourth (1/4) of the slab thickness.

Bituminous Pavement – The use of bituminous pavement is allowed but it is not a recommended material because it does not hold up well with continuous animal traffic. It also gets soft during hot weather.

Other Cementitious Materials - Use of soil cement, roller compacted concrete, and coal combustion by-products will require the assistance of the Area Engineer.

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

is 6 inches for use with animals. The volume of traffic will determine the appropriate thickness to be used in other applications.

Base Course
All areas to be paved shall have a 5-inch base course of gravel, crushed stone, or other suitable materials. The material in place may be used if adequate.

Geotextile
Geotextile shall be installed in accordance with Specification VA-795 Geotextile.

Drainage and Erosion Control
Surface runoff shall be controlled to minimize overland flow onto and through the heavy use area. If the HUA has the potential to cause contamination of water and is located upslope and within 50 feet of a sensitive area (water source, water conveyance, sinkhole, or wetland), a vegetative buffer with a 20 foot minimum width should be maintained between the HUA and the sensitive area.

All areas disturbed during construction should be revegetated in accordance with Virginia Conservation Practice Standard *Critical Area Planting (Code 342)*. Unless special provisions are made for drainage and erosion control, heavy use areas should not be placed on slopes less than 1 percent or greater than 8 percent.

AREAS UTILIZED BY LIVESTOCK

If used to treat a concentrated livestock area, this practice shall be a component of an Agricultural Waste Management System (AWMS) Plan.

Site Selection
Heavy Use Area (HUA) feeding areas should be constructed on relatively level areas. The slopes away from the feeding areas should be a minimum of ¼ inches per foot (2%). When an HUA feeding area is located on a point or a ridgetop where the immediate downslope away from the HUA is greater than 10%, the feeding area should be fenced to prevent animal access to the downslope, particularly on erodible soils.

Treatment Area Size
The exact size of heavy use areas utilized by livestock in other circumstances is dependent on the cooperator's operation including type and number of animals, confinement periods, and/or the intended use. The following is to be used as guidance. Where other livestock are involved, consult appropriate literature (i.e. Midwest Plan Service guidelines) or expertise for sizing. Tables 1-4 show the recommended requirements for beef and dairy cattle, sheep, and horses.

<u>Grassed Loafing Lots</u>: Where disturbed exercise lots are being improved for water quality purposes, establish a minimum of three grass paddocks and one sacrifice area as follows:

1. Loafing paddocks should be sized at no smaller than one acre per twenty cows except on favorable sites. Up to thirty cows may be considered, provided the site has adequate soil fertility, favorable slopes, and four or more paddocks are planned.

2. An unpaved sacrifice area shall be established and sized at 750 square feet/animal unit.

3. Avoid slopes that are less than 1% or greater than 8%.

4. Seed paddocks in accordance with Virginia Conservation Practice Standard *Critical Area Planting (Code 342)*.

5. Develop an operation and maintenance plan which addresses field rotation, use of sacrifice areas, fencing patterns, access roads, etc.

6. Provide an alternative watering system that meets the needs of the rotational schedule and protects water quality.

7. Fence cattle from all streams and concentrated flow areas such as drainage ways and sinkholes.

8. Provide field filter strips in accordance with Virginia Conservation Practice Standard *Filter Strip (Code 393)* for all grassed and sacrifice areas.

9. Maintain a minimum 100-foot grass buffer between grassed loafing lots and streams unless the runoff is collected and managed in a method outlined in the AWMS Plan. This buffer shall be designed in accordance with the Virginia Conservation Practice Standard *Filter Strip (Code 393)*.

10. Concentrated flow will be managed as outlined in the AWMS Plan.

Runoff Treatment

Runoff from the site shall not directly discharge into surface water bodies. If used to treat a concentrated livestock area, this practice shall be a component of an AWMS Plan. Runoff from the area shall be collected and contained in a *Waste Storage Facility (Code 313)* or treated in a method compliant with the AWMS Plan. Other components of the plan may include but are not limited to: *Roof Runoff Management (Code 558)*, *Filter Strip (Code 393)*, *Diversion (Code 362)*, *Grassed Waterway (Code 412)*, and *Critical Area Planting (Code 342)*. Local, state, and federal laws and regulations may also dictate treatment methods. The AWMS Plan must be developed and approved before the *Heavy Use Area Protection (Code 561)* is designed and installed.

TABLE 1 – RECOMMENDED SPACE REQUIREMENTS – BEEF CATTLE[1]

(Square Feet Per Head)

TYPE OF AREA	COW-CALF	PRE-CONDITIONING	FINISHING 600LB. - MARKET
Feeding Lot:			
Surfaced	60 – 75	40 – 50	50 – 60
Unsurfaced (w/ mounds)	-	150 – 300	250 – 500
Unsurfaced (w/o mounds)	350 – 800	300 – 600	400 – 800
Mound	40 – 50	20 – 25	30 – 35
Open Front Shelter	25 – 30	15 – 20	20 – 25
Shade	-	-	20 – 25
Handling Facilities:			
Total area	60 – 80	40 – 50	50 – 60
Holding pen	20 – 25	12 – 15	15 – 20
Crowding pen	12 – 15	6 – 8	8 – 12

[1]Source: Midwest Plan Service, Structures and Environmental Handbook, MWPS –1, June 1987 revision, Planning 511.1 (Midwest Plan Service, Structures and Environment Handbook, offers some excellent suggestions for beef cattle planning livestock heavy use areas. The concept of "mounding" which is used extensively on operations in the Western U.S. is discussed in Chapter 511.)

TABLE 2 – RECOMMENDED SPACE REQUIREMENTS – DAIRY CATTLE[2]

(Square Feet Per Head)

TYPE OF AREA	AGE OF DAIRY ANIMALS IN MONTHS				
	3 – 4	**5 – 8**	**9 – 12**	**13 – 15**	**16 - 24**
Resting Area	20	25	28	32	40
Surfaced Outside Lot	30	35	40	45	50

[2]Source: Livestock Waste Management Handbook, Volume 1, 1983 CRC Press, Overcash, Humenik, Miner

TABLE 3 – RECOMMENDED SPACE REQUIREMENTS – SHEEP[3]

(Square Feet Per Head)

TYPE OF AREA	TYPE OF ANIMAL			
	Rams 180 - 300 lbs.	**Dry Ewes 150 - 200 lbs.**	**Ewes with Lambs**	**Feeder Lambs 30 - 110 lbs.**
Soil, Unsurfaced	25 – 40	25 – 40	30 – 50	20 – 30
Surfaced	16	16	20	10

[3]Source: Midwest Plan Service, Structures and Environment Handbook, MWPS-1, 11th Edition, 1983, Planning 513.1

TABLE 4 – RECOMMENDED SPACE REQUIREMENTS – HORSE[4]

(Square Feet Per Head)

TYPE OF AREA	NUMBER OF HEAD		
	Minimum[4]	**High Density[5]**	**Low Density[5]**
Soil, Unsurfaced	500	1000	2500

[4]Source: Hubbard Feeds, Inc. [5]Source: USDA-NRCS, Utah