NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

HEAVY USE AREA PROTECTION
(Ac.)

CODE 561

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.

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. 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.

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

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. 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.

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

Surface treatment. The surface treatment for concentrated animal feeding and loafing shall meet the following criteria:

Concrete. Subgrade shall be a minimum of 6". 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 sound engineering practice.

Structural slabs shall meet criteria within ACI-318 as appropriate. Non-structural concrete slabs on grade shall be designed according to appropriate design methods within ACI-360 and recommended practices within ACI-02 "Guide for Concrete Floor and

Slab Construction." Concrete shall be cured consistent with practices and recommendations within ACI-308 "Standard Practice for Curing Concrete."

Unless documented design of slab (meeting the above criteria for non-structural slabs) indicates a more conservative design is required, slab thickness, reinforcement and control joint spacing shall meet the minimum criteria within Table 1 of this standard.

Table 1 – Non-Structural Concrete Slab

Loading/Use	Slab type
LIGHT – Animal traffic, ¾ ton pick-up truck, small farm tractor, skid steer, etc.	A
HEAVY – Above plus: Loading of Commodity trucks, milk trucks, Large (70 HP and above) tractors with loaded tires, etc.	B

Slab type	Option	Thickness	Plastic Shrinkage and Settlement Reinforcement	Temperature Reinforcement	Maximum Control Joint Spacing
A	A(1)	4"	0.1% (volume) microfiber –fibrillated polypropylene or nylon		10'
A	A(2)	4"	Strux 45/90* 4#/CY	Strux	20'
A	A(3)†	4"		w2.9 x w2.9 10" x 10"	30'
B	B(1)†	5"		No. 3 Gr.60 18" O.C. (with 18" x ½ " smooth steel dowels at joints)	30'
B	B(2)†	5"		w2.9 x w2.9** 6" x 6"	30'
B	B(3)	5"	Strux 45/90 4.5#/CY	**	20'

†Welded wire fabric shall be located within upper ½ of slab and supported at spacing of 2' or less No.3 bar shall be located within upper ½ of slab and supported by a 3' O.C.. or less.
* W.R. Grace Structural Fiber
** Requires dowel baskets (or equivalent) w/ 18" smooth No. 4 dowels 3'

Other Heavy Use Areas. For other heavy use areas, the following materials may also be used:

Bituminous Pavement. Limited to areas which do not receive frequent livestock traffic. 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 Department of Transportation criteria for the expected loading. It shall have a minimum 12" of base course consisting of gravel, crushed stone or other suitable material.

Other Cementitious Materials. Soil cement, roller compacted concrete, and coal combustion by-products (flue gas desulphurization 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 2-inches thick. Areas which will receive frequent use by livestock or equipment, such as barnyards and travel lanes, should have a minimum thickness of 4 inches. Such frequently used surfaces should also be at least 3 feet above groundwater. The gravel shall have sufficient fines, such as screenings and ground limestone, to serve as a binder. The gravel shall be wetted and compacted with a smooth roller or other loaded construction equipment.

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. Such treatments shall be limited to areas which do not receive frequent livestock or equipment traffic.

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

Stairways required as part of trails shall be adequately anchored to prevent sliding. For pedestrian trails, riser heights will normally be 6 to 8 inches. Treads shall have surfaces which will resist sliding when wet. Wheelchair ramps shall be provided as required for the planned use.

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. The use of materials which are toxic to aquatic life, as defined by the Federal Clean Water Act, shall not be used where runoff from the surface will enter waterways or streams.

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. For areas where livestock will be loafing or feeding (i.e. not travel lanes), the heavy use area shall meet setback requirements in Table 2. If area does not meet setback distances, treatment area shall be designed in accordance with the Vegetated Treatment Area (635) standard. Otherwise divert the polluted runoff to storage facilities, constructed wetlands, vegetated treatment area, or any combination of these and/or other practices that provide for effective treatment of contaminants. The size of the heavy use area should be adequate, for the type of surface and intensity of traffic, to prevent erosion or traffic damage. 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 6 percent. Crown or super elevate travel lanes to promote good drainage. Fencing (382) shall be used to keep livestock from these buffer areas and the adjacent stream or waterway.

Table 2 - Minimum Setback Distance from Potential Heavy Use Area to Resource Concerns

Concern	Minimum Downslope Distance	Minimum Upslope Distance
Public Water Supply (a)	1000 Feet	500 Feet
Residence (Neighbor)	500 feet	500 feet
Adjoining Property Line	200 feet	100 feet
Well/Spring	300 feet	100 feet
Lake/Pond/River/Water body	300 feet	100 feet
Diversion (b)	100 feet	25 feet
Gully/Swale/Ravine	100 feet	25 feet
(a) Check with DES Source Water Protection Regulations for the area. (b) Sensitivity of waterway or diversion outlet shall be considered.		

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 technical guide. If vegetation is not

appropriate (i.e. for factors such as traffic intensity, shade, etc.), other measures shall be used to accomplish the intended purpose.

Additional Criteria for 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.

NRCS conservation practice standards Critical Area Planting, Code 342; Fencing, Code 382; Prescribed Grazing, Code 528a; Vegetated Treatment Area, Code 635; Filter Strip, Code 393; or Use Exclusion, Code 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 an approved CNMP and other NRCS conservation practice standards.

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.

Additional Criteria for Areas Utilized for Equine Loafing and Exercising

Pads may be installed within 300 feet of neighboring residents. Where pads are to be located within 100 feet of a residence, the landowner shall provide evidence that the neighbor has been contacted and has no objection to the location.

The recommended minimum pad size ranges from 50' x 50' for a single horse up to 100' x 100' for multiple horses on the pad at once. These minimum pad sizes consider the horses to be stabled the majority of the time and brought onto the pad periodically for exercise and training. The minimum size may be increased depending on the type of exercise or planned confinement on the pad for longer time periods. Consult an equine specialist for recommendations.

The pads shall be designed and maintained to minimize the potential of foot/hoof damage by preventing contact with course aggregate. Livestock feeding on the pad is not recommended unless measures are taken to remove excess/discarded feedstock from the pad surface.

Aggregate pads consist of a geotextile fabric, overlain with a finished thickness of 6 to 8 inches of compacted stone sand or course washed sand with the following gradation in Table 3. This material is typically readily available at Aggregate Plants for DOT use.

Table 3 - Gradation

Size	Percent Passing
3/8"	100
#4	95
#8	75
#16	50
#30	30
#50	15
#100	6
#200	2
These percentages may vary +/- 3% except for the #200 and 3/8" sizes which must be within 1%.	

Pads are to be graded for positive drainage to prevent ponding and excessive velocities that could displace fines on the pad surface. Grades between 1 and 2% are recommended. Vegetated Treatment Areas adjacent to the pad and especially at the outlet end of the pad are recommended.

Fencing may be necessary to restrict animal access or for confinement purposes. Where fencing is necessary, consideration should be given to fencing that is highly visible and will not pose a safety hazard to the animal(s). Minimum height for fencing shall be 60 inches to deter horses from jumping

over. The minimum height from the ground shall be no lower than 6 inches. Care should also be taken during cleaning operations to insure a soil ridge is not built up around the pad at the fence line causing concentrated runoff from the pad surface.

Special operation and maintenance considerations are needed for special aggregate pads as follows:

- Aggregate pads will degrade over time with animal usage and cleaning. Periodic resurfacing to sustain a 10-yr functional design life may be needed.
- Once the pad thickness wears down to half the original depth, the aggregate may begin to break down. When this occurs, the pad is to be resurfaced with additional aggregate material back to the design depth.
- The area adjacent to the pad and installed runoff and pollution control measures are to be maintained for stability.

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, chemicals and particulate matter associated with vehicular traffic; and soluble and sediment-attached substances carried by runoff should be considered in selection of companion conservation practices.

Consider using additional air quality conservation practices such as Windbreak/ Shelterbelt Establishment (Code 380) or Herbaceous Wind Barriers (Code 603) to impede transport of particulate matter between the source (i.e., heavy use area) and nearby sensitive areas.

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 40-60 square feet per animal (1000 lbs.) in partial-confinement, to 60-100 square feet per animal (1000 lbs.) in total confinement, to 4000 or more square feet for animal exercise areas. Heavy use protection areas should be kept as small as practicable. Consult the Midwest Plan Service Handbook for livestock area variations.

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 vegetation of the affected area with a cover crop.

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.

PLANS AND SPECIFICATIONS

Plans and specifications for heavy use area protection shall be in keeping with this standard and shall describe the the requirements for installing the practice, including the kind, amount and quality of materials to be used.

All required national, state and local permits will be secured before construction activities begin.

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.

requirements for applying the practice to achieve its intended purpose. Plans and specifications shall include construction plans, drawings, job sheets or other similar documents. These documents shall specify 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.

Conservation practices should be implemented that limit particulate matter emission into long-term maintenance plans.

REFERENCE

Midwest Plan Service, Structures and Environment Handbook, 11th Edition, 1983, Revised 1987.