

**USDA
NATURAL RESOURCES
CONSERVATION SERVICE**

**MARYLAND CONSERVATION
PRACTICE STANDARD**

**HEAVY USE AREA
PROTECTION**

**CODE 561
(Reported by Ac.)**

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.

PURPOSE

This practice may be applied as a part of a conservation management system to support one or more of the following purposes:

1. Reduce soil erosion;
2. Improve water quantity and quality;
3. Improve air quality;
4. Improve aesthetics;
5. Improve livestock health.

**CONDITIONS WHERE PRACTICE
APPLIES**

This practice applies to urban, agricultural, and recreation areas or other frequently and intensely used areas that require treatment to address one or more resource concerns.

This practice does not apply to protecting areas where other conservation practice standards are more applicable. For example, to establish vegetation on critically eroding areas, refer to the

Maryland conservation practice standard for Critical Area Planting (Code 342). Refer to the conservation practice standard for Waste Storage Facility (Code 313) when stacking pads are needed for waste field storage.

CONSIDERATIONS

General

When stabilizing heavily used areas consider the adjoining land uses and the proximity of 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 protection should be relocated as far away from the waterbody or watercourse as possible. Any work in and/or discharges near streams, wetlands

Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact the [Natural Resources Conservation Service - Maryland](#) or visit the [electronic Field Office Technical Guide \(eFOTG\)](#).

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. Heavy use protection areas should be kept as small as practical.

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.

Consider the location of the site, distance, and gradient relative to streams, sinkholes, drainage ways, and wellheads; depth to bedrock; depth to water table; aquifer flow characteristics; traffic patterns and density; type of maintenance equipment; proximity to neighbors; prevailing winds; visual effects; and operation and maintenance costs.

For structural design measures, consider all items that will influence the performance of the structure, including loading assumptions, material properties, and construction quality.

Select the stabilizing material based on the intended use, animal type, desired maintenance frequency, and runoff control.

CRITERIA

General Criteria Applicable to All Purposes

Comply with Federal, state, and local laws and regulations.

Take measures to limit the generation of particulate matter during construction.

Incorporate safety measures for the users 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.

If the heavy use area is to have a roof, use snow and wind loads as specified in ASCE 7-98, Minimum Design Loads for Buildings and Other Structures, Agricultural Building Snow and Wind Loads. If the heavy use area is to serve as part of a foundation or support for a building, use the total load in the structural design.

Foundation - Evaluate all site foundations for soil moisture, permeability, texture and bearing strength in combination with the design load and anticipated frequency of use.

Provide a base course of gravel, crushed stone, other suitable material and/or geotextile 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.

Provide a minimum 3-inch base course of gravel, crushed stone, or other suitable materials under all concrete areas. Provide a minimum 6-inch base course of gravel, crushed stone, or other suitable material under all asphalt areas. The material in place may be used if it has adequate drainage and bearing capacity. Use geotextile for soil separation when foundation is soft or poorly drained.

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

Remove and dispose of soil and other material in the foundation that are not adequate to support the design loads.

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

1. **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

the Maryland Department of Transportation criteria for the expected loading. The minimum thickness of asphalt wearing course shall be two inches for access areas. Bituminous/asphalt pavement shall not be considered for use with animals.

2. **Concrete.** The quality and thickness of concrete and the spacing and size of reinforcing steel shall be appropriate for the expected loading. Design concrete in accordance with the requirements in the Maryland practice standard Waste Storage Facility (313), slabs on grade section.
3. **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.
4. **Aggregate.** A fine or coarse aggregate surface shall be minimum 2-inches thick.
5. **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 - Design all structures according to appropriate Maryland NRCS standards and specifications or Engineering Field Handbook recommendations.

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

Drainage and Erosion Control - Provide surface and subsurface drainage, as needed and for disposal of runoff without causing erosion or water quality impairment. Exclude unpolluted run-on water from the treatment area. Shape treatment areas 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, use other measures to accomplish the intended purpose.

Fencing - Provide fencing as needed for containment, direction control, and use exclusion of animals, people, or vehicles from an area. Follow the Maryland conservation practice standard for Fence (Code 382) and or Maryland conservation practice standard for Use Exclusion (Code 472).

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 Concentrated Livestock Areas

Heavy use areas are intended to be a planned component of a Comprehensive Nutrient Management Plan (CNMP) or a Waste Management Plan (WMP), which addresses all practices needed to improve water quality from areas being frequently and intensively utilized by livestock.

Use Maryland NRCS conservation practice standards Critical Area Planting (342); Fencing (382); Prescribed Grazing (528a); Filter Strip (393); or Use Exclusion (472) as companion practices, when needed to meet the intended purpose of the heavy use area protection.

Extend the treated area 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.

Control surface runoff from upstream areas to minimize clean water flow onto the heavy use area by the use of diversions, grassed waterways, lined waterways, underground outlets, or roof runoff structures. Divert clean surface water, to the fullest extent practical, to a safe and stable outlet.

Collect, store, utilize and/or treat manure accumulations and contaminated runoff in accordance with other Maryland NRCS conservation practice standards. Store contaminated runoff from the area in accordance with Maryland conservation practice standards for Waste Storage Facility, (Code 313), or treat runoff using the Maryland conservation practice standard for Wastewater Treatment Strip (Code 635).

Size the heavy use area based on the criteria in Table 1. Where other types of livestock are involved, consult appropriate literature, such as Midwest Plan Service, for sizing requirements. Confined concentrated livestock areas are defined as animals being enclosed within an area for 45 consecutive days.

Animal Type	Confined/Feeding Area With Other Shelter or Access to Pasture Available (Sq. Ft./A.U.)	Total Confinement (Sq. Ft./ A.U.)
Cattle	40 - 60	95 - 135
Horses	60 - 80	80 - 120
Sheep	25 - 35	60 - 80
Swine	20 - 50	50 - 125

When evaluating areas adjacent to existing paved areas, the combined sizing of the existing paved area and the additional proposed paved area needs to be considered. The sizing limits should be a combination of both paved areas.

Surface Treatment - Concrete is recommended for concentrated confinement areas. Other surface materials may be used for stabilized feeding pads but consider the type of equipment that will clean the area and long term maintenance issues. Select from one of the following materials that is consistent with the intended use:

1. **Concrete** – Use a minimum thickness of 5 inches. Reinforce with minimum 6”x 6”- 6/6 gage welded wire mesh. Base course thick-

ness may vary depending on site conditions. Use a minimum of 3-inch base course of gravel, crushed stone, or other suitable material.

2. **Gravel** – Provide 6-inch base course of AASHTO M43, No. 4 stone (¾ to 1½-inch) or CR-6 with a minimum 3-inch surface layer of fine stone dust or sand with a maximum particle size less than ¼-inch. The ¼” or smaller surface stone size is recommended to prevent embedment of the stone into the animal’s hooves which can cause abscesses. This occurs more often when the heavy use area is adjacent to a paved area, such as a concrete barnyard. Other surface layer materials, such as fly ash, shingle tab waste, tanbark, sawdust, etc., may be used. Use geotextile, unless foundation soils are firm and well drained;
3. **Other materials** – Where other surfacing materials such as fly ash, asphalt millings, etc. are used, the minimum thickness is 6 inches. Use geotextile, unless foundation soils are firm and well drained.

Additional Criteria for Livestock Travel Lanes and Watering Areas

Slope travel lanes and watering areas where practical for good drainage. Divert polluted runoff from travel lanes and watering areas onto a grass filter area with a minimum length of 20 feet. Construct travel lanes on the contour where possible to provide a sheet flow discharge. When constructing travel lanes on the contour is not practical, use concrete or asphalt waterbars spaced at regular intervals (50 feet maximum).

Surface Treatment - Concrete provides the most maintenance free surface. Where possible, avoid paving areas on slopes greater than 8%.

Follow the surface treatment criteria shown in the section of this standard, Concentrated Livestock Areas.

Additional Criteria for Grass Loafing Areas for Livestock

Where disturbed loafing areas are being improved for water quality purposes, the following criteria are applicable:

1. Establish a minimum of three grassed loafing paddocks and a sacrifice area;
2. The grassed loafing paddocks are to be sized at no smaller than one acre per twenty cows;
3. Establish an unpaved sacrifice area sized at 750 sq. ft./animal unit;
4. Avoid slopes that are less than 3% or greater than 8%;
5. Seed grassed loafing paddocks in accordance with Maryland conservation practice standard for Critical Area Planting (Code 342). To avoid livestock health problems due to endophyte toxicity, use a low endophyte variety of tall fescue when possible.
6. Fence cattle from all streams and concentrated flow areas such as drainage ways and sink-holes;
7. Provide livestock with a water supply that protects water quality in accordance with Maryland conservation practice standard for Watering Facility (Code 614);
8. Provide field filter strips between grassed loafing paddocks, streams, and drainage ditches in accordance with Maryland conservation practice standard for Filter Strip (Code 393). For sacrifice areas, provide treatment in accordance with the Maryland conservation practice standard for Wastewater Treatment Strip (Code 635). Otherwise, divert the polluted runoff into waste storage, constructed wetlands, or any combination of these and other practices that will provide effective treatment of contaminants;
9. Develop an operation and maintenance plan that addresses field rotation, use of sacrifice areas, fencing patterns, access roads, water sources, etc.

PLANS AND SPECIFICATIONS

Describe the requirements for applying the practice to achieve its intended purpose and include the kind, amount and quality of materials to be used.

1. Carry out construction operations in a manner such that erosion, air, and water pollution will be minimized and held within legal limits;
2. Complete required smoothing, grading, or leveling prior to the start of surfacing operations. Compact the subgrade as necessary to attain a firm foundation for the surfacing materials;
3. Do not place hot bituminous surfacing materials on a wet subgrade;
4. All components of the completed structure shall comply with cross-sections, lines, grades, dimensions, and material specifications shown on the plans;
5. Provide steel reinforcement as specified on the construction drawings;
6. Use granular backfill material and compact by a minimum of four complete passes of a sheepsfoot, rubber tired or vibratory roller. Fill material shall contain sufficient moisture such that the required degree of compaction will be obtained with the equipment used. Place to a height or elevations, lines, and slopes as shown on the construction plans;
7. All areas disturbed by the construction will be stabilized immediately after construction as required on the construction plans and in accordance with Maryland Conservation Practice Standard for Critical Area Planting (Code 342).

Materials - Personnel with appropriate NRCS engineering approval authority shall inspect all materials. Materials must conform to the following material specifications:

1. **Concrete** - Concrete must meet the minimum requirements of Maryland Department of Transportation, State Highway Administration, *Standard Specifications for Construction and Materials*, Section 902, Mix No. 3 (3,500 psi), air-entrained, Type IA or IIA cement.

Other mixes may be used when design computations are completed.

2. Water – Water used for mixing or curing concrete shall be clean and free from injurious amounts of oil, acid, salt, organic matter or other deleterious substances.
3. Preformed Expansion Joint Filler – Joint filler shall conform to the requirements of ASTM-D1752, Type I, II, or III, unless bituminous type is specified, in which case it shall conform to ASTM-D994 or D1751.
4. Joint Sealers – Joint sealer shall conform to the requirements for ASTM-C920, Federal Specification SS-S-210A, or Federal Specification TT-S-227, as appropriate for the specific application.
5. Waterstops – Vinyl-chloride polymer types shall be tested in accordance with Federal Test Method Standard No. 601, and shall show no sign of web failure due to brittleness at a temperature of -35 degrees Fahrenheit. Colloidal waterstops shall be at least 75 percent bentonite in accordance with Federal Specification SS-S-210A.
6. Asphalt - Asphalt shall meet the requirements of Maryland Department of Transportation, State Highway Administration, *Standard Specifications for Construction and Materials*, Section 504. Choose a mix type appropriate for the surface application.
7. Aggregate - Gravel and rock riprap must meet the requirements of Maryland Department of Transportation, State Highway Administration, *Standard Specifications for Construction and Materials*, Sections 901.01 and 901.02 respectively or appropriate AASHTO Standards. Recycled concrete may be substituted if appropriately sized.
8. Geotextile - Geotextile may be woven or nonwoven and must meet the requirements of Maryland Department of Transportation, State Highway Administration, *Standard Specifications for Construction and Materials*, Section 921.09, Class SE.
9. Organic Surfaces – Material such as tanbark and saw dust shall be free of contaminants and rot.

OPERATION AND MAINTENANCE

Prepare an Operation and Maintenance (O&M) plan and review 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.

Provide the level of detail 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 to limit particulate matter emission into long-term maintenance plans.

A written O&M Plan shall contain a minimum of the following information, as applicable:

1. Inspect the Heavy Use Area at least twice a year and after severe storm events;
2. Scrape the surface as needed to remove excess manure and/or sediment;
3. Repair paved areas by repairing holes and replacement of paving materials.
4. Replace loose surfacing material such as gravel, cinders, sawdust, tanbark etc as needed when removed by livestock or equipment traffic or by scraping;
5. Repair any deteriorating areas;
6. Maintain all vegetation that is part of the plan by fertilization and liming according to soil test recommendations and reseedling or replanting as necessary;
7. Inspect inlets and outlets of pipes and culverts and remove any obstructions present;
8. Maintain flow into filter areas by removing accumulated solids, reconstructing waterbars, etc.

SUPPORTING DATA AND DOCUMENTATION

The following is a list of the minimum data and documentation to be recorded in the case file:

1. Location and extent of the practice on the conservation map.
2. Assistance notes which include dates of site visits, name or initials of the person who made the visit, specifics as to alternatives discussed, decisions made, and by whom.

Field Data and Survey Notes

Make a full investigation of the topography of the site, soil conditions, farming operations, erosion, hydrology, water quality and degree and type of usage before a specific plan is prepared for the area.

Record field data and survey notes on appropriate MD forms and engineering paper. The following is a list of the minimum data needed:

1. Location and extent of the heavy use area protection.
2. Description of the objectives of the practice, including the desired functions which the heavy use area protection is expected to provide.
3. Soils investigation logs and notes, as appropriate for site conditions and the proposed design. Soil survey map with the site identified. Documentation should include soil texture, depth to seasonal high water table, depth to bedrock and permeability of the soil.
4. Topographic survey of the site, as appropriate for site conditions and the proposed design.
5. Drainage area delineation.

Design Data

Record design data on appropriate MD forms and engineering paper. For guidance on the preparation of engineering plans, see Chapter 5 of the Engineering Field Handbook. The following is a list of the minimum required design data:

1. Show on the plans the job class, the plan view showing the extent of the area treated, location map, design assumptions, utility notification and construction specifications.
2. Comprehensive Nutrient Management Plan or Waste Management Plan, as appropriate, when animals are involved.
3. Description of surface treatment with material description. Show profiles and cross sections, as appropriate, of the heavy use area with grades and thickness of the base course and surface treatment.
4. Runoff treatment design.
5. Grading and drainage plan for the site where appropriate.
6. Vegetative plan. Include the seedbed preparation, seeding species and rate, lime, fertilizer and mulching requirements according to Maryland conservation practice standard Critical Area Planting (Code 342).
7. Estimated quantities.
8. Written Operation and Maintenance plan.

Construction Check Data

Record the construction check data on survey notepaper, ENG-28, or other appropriate engineering paper. Plot the survey data in red on the as-built plans. The following is a list of minimum data needed for As-built documentation.

1. Document site visits on CPA-6. Include the date, name of recorder, and specifics about discussions, inspections, activities, personnel on site and decisions made and by whom.
2. Installation and construction check notes are to be recorded in sufficient detail to show that the practice meets this standard and applicable specification. Minimum requirements are:
 - a. Measurements to show length, width, and grades of completed heavy use area protection marked in red on the "as-built" plans;

- b. Statement as to the materials installed and thickness, to be placed on the "as-built" plans;
- c. Statement on seeding installation.
3. If appropriate state/local authorities approve urban erosion and sediment control plans, no additional documentation is necessary.
4. Final quantities and documentation for quantity changes.
5. Materials certification documentation.
6. Sign and date statement on plans that "Construction meets or exceeds plans and NRCS practice standards and specifications." Statement to be signed and dated by a person with appropriate engineering job approval authority for construction.

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REFERENCES

1. Maryland Department of the Environment, Water Management Administration, *1994 Maryland Standards and Specifications for Soil Erosion and Sediment Control*.
2. Maryland Department of Transportation, State Highway Administration, *Standard Specifications for Construction and Materials*, Baltimore, Maryland, January 2001.
3. Midwest Plan Service, *MWPS Publications*, <http://www.mwpsHQ.org/>
4. USDA, Natural Resources Conservation Service, *Maryland Field Office Technical Guide, Section IV, Standards and Specifications*.
5. USDA, Natural Resources Conservation Service, *National Engineering Handbook, Part 650*.
6. USDA, Natural Resources Conservation Service, *National Engineering Handbook, Part 651, Agricultural Waste Management Field Handbook*.
7. USDA, Natural Resources Conservation Service, *National Engineering Manual*.
8. USDA, Natural Resources Conservation Service, *National Handbook of Conservation Practices*.