

## CONSERVATION PRACTICE STANDARD

### HEAVY USE AREA PROTECTION

(sq. ft.)

#### CODE 561

#### DEFINITION

Heavy Use Area Protection is used to stabilize a ground surface that is frequently and intensively used by people, animals, or vehicles.

#### PURPOSE

Heavy Use Area Protection is used:

- To provide a stable, non-eroding surface for areas frequently used by animals, people or vehicles
- To protect or improve water quality

#### CONDITIONS WHERE PRACTICE APPLIES

This practice applies to all land uses where a frequently or intensively used area requires treatment to address one or more resource concerns.

#### CRITERIA

General Criteria for All Purposes

**Design Load.** Base the design load on the type and frequency of traffic, (vehicular, animal, or human) anticipated on the heavy use area.

**Foundation.** Evaluate the site foundation to ensure that the presumptive bearing capacity of the soil meets the intended design load and frequency of use.

Where necessary, prepare the foundation by removal and disposal of materials that are not adequate to support the design loads.

Use a base course of gravel, crushed stone, other suitable material, geotextile, or a combination of materials on all sites that need increased load bearing strength, drainage, separation of material and soil reinforcement. Refer to Natural Resources Conservation

Service (NRCS), National Engineering Handbook, Part 642; Design Note 24, Guide for Use of Geotextiles; or other State-approved reference for geotextile selection.

If there is the potential for ground water contamination from the heavy use area, select another site or provide an impervious barrier. Make provisions to treat contaminated surface runoff from the impervious area.

**Surface Treatment.** Select a surface treatment that is stable and appropriate to the purpose of the heavy use area. Surface treatments must meet the following requirements according to the material used.

Concrete. Design slabs-on-ground subject to distributed stationary loads, light vehicular traffic, or infrequent use by heavy trucks or agricultural equipment in accordance with American Concrete Institute (ACI) *Guide for the Design and Construction of Concrete Parking Lots (ACI 330R)*. Design slabs-on-ground subject to regular or frequent heavy truck or heavy agricultural equipment traffic in accordance with ACI *Guide to Design of Slabs-on-Ground (ACI 360R)*.

Design concrete structures in accordance with NRCS National Engineering Manual (NEM), Part 536, *Structural Engineering*.

Bituminous Concrete Pavement. Refer to AASHTO Guide for Design of Pavement Structures or the applicable State highway department's specification for design criteria for bituminous concrete paving.

In lieu of a site-specific design for areas that will be subject to light use, pave with a minimum of 4 inches of compacted bituminous concrete over a subgrade of at least 4 inches of well-compacted gravel. Use bituminous

concrete mixtures commonly used for road paving in the area.

**Other Cementitious Materials.** Cementitious materials, such as soil cement, agricultural lime, roller-compacted concrete, and coal combustion by-products (flue gas desulfurization sludge and fly ash), can be used to provide a durable, stable surfacing material. Based on the properties of the surface material, develop a site-specific mix design with compressive strengths necessary for the expected use and loading on the heavy use area. Select materials that are non-toxic and that have chemical properties that are compatible with the intended use.

**Aggregate.** Design aggregate surfaces for expected wear and intended use. In lieu of a site-specific design for areas that will be subject to light non-vehicular use, install a minimum combined thickness for aggregate surfacing and base course of 6 inches for livestock and 4 inches for other applications.

For other applications, use Agricultural Engineering Note 4, *Earth and Aggregate Surfacing Design Guide*, or other appropriate methodology to design aggregate thickness.

**Mulches.** Use a minimum layer thickness of 6 inches for materials such as limestone screenings, cinders, tanbark, bark mulch, brick chips, or shredded rubber. Mulches are not recommended for livestock or vehicular applications.

**Vegetation.** Select vegetation that can withstand the intended use. Establish the vegetation in accordance with the criteria in PA342, *Critical Area Planting* or the appropriate State reference.

**Other.** Other materials can be used if they will serve the intended purpose and design life. Includes soil surfaces.

**Structures.** When a roof is needed to address the resource concern, use PA367, *Roofs and Covers*. For non-waste applications, design structures according to the accepted engineering practice.

**Drainage and Erosion Control.** Include provisions in the design for surface and subsurface drainage, as needed. Include provisions for disposal of runoff without causing erosion or water quality impairment.

To the extent possible, prevent surface water from entering the heavy use area.

Stabilize all areas disturbed by construction as soon as possible after construction. Refer to the criteria in PA342, *Critical Area Planting* for establishment of vegetation. If vegetation is not appropriate for the site, use the criteria in PA484, *Mulching* to stabilize the disturbed area.

**Offsite Runoff Control.** Runoff from roofs and other upslope areas shall be diverted away from the heavy use area to the fullest extent possible. This is required for heavy use areas associated with livestock. Associated practices include PA362, *Diversion*, PA558, *Roof Runoff Structure*, PA587, *Structure for Water Control*, and other companion practices as appropriate.

**Paved Surface Treatment Areas.** These paved treated areas include asphalt, concrete, other cementitious materials, aggregates, or other similar inorganic materials. These are permanent sites or sites that are used on a reoccurring or regular basis throughout the year or used from year to year.

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

The use of non-cementitious surface treatment shall be limited to low intensity animal use applications. If open, clean aggregate surfaces are used; provide at least one foot of compacted soil between the open, clean aggregate and bedrock or the seasonal high water table.

Provisions shall be made to collect, store, utilize and/or treat manure accumulations and contaminated runoff in accordance with other NRCS conservation practice standards. Manure must be collected on a regular basis. Runoff shall be directed to a PA313, *Waste Storage Facility*, or a PA635, *Vegetated Treatment Area* or a PA656, *Constructed Wetland* and other companion practices, when needed to meet the criteria and intended purpose of the heavy use area protection.

The exception shall be runoff collection and treatment for Equine Heavy Use Areas.

**Additional Criteria for Equine Heavy Use Areas**

These areas are designed specifically for horse usage and must be built and managed to meet all of the following conditions:

- Treated area must be stoned with appropriate aggregate. A base zone, binder zone, and top layer of aggregate or other material suitable for equine. Slope pad 1% to 5%. Sites with poor subbase require a geotextile.
- The treated area must be fenced separately from the pasture. Fence meets PA382, *Fence Standard*.
- Requires manure solids and/waste feed to be removed weekly.
- The treated area sized for maximum equine access group. See sizing guidelines found in Section III of the FOTG, Concentrated Livestock Area Guidance, "Exhibit 5".
- Divert all upslope runoff.
- Runoff shall be sheet flow across lower edge or be collected and redistributed to a vegetated buffer.
- The vegetated buffer can be partially or fully in the pasture. Maintain at least 3 inches of vegetation in the buffer area at all times of the year. The minimum length shall extend downslope 150' or at least 2X the upslope length of the treated area, whichever is less. The exception is that for small areas the minimum vegetative buffer length shall be 35' unless located above a stream or sensitive area, and then it must be 50'.
- Slope of vegetated buffer 1 to 15%.

For sites that do not meet all of the above listed criteria, provisions shall be made to collect, store, utilize and/or treat manure accumulations and contaminated runoff. Runoff shall be directed to a PA313, *Waste Storage Facility*, or a PA635, *Vegetated*

*Treatment Area* or a PA656, *Constructed Wetland* and other companion practices, when needed to meet the criteria and intended purpose of the heavy use area protection.

**Additional Criteria for Temporary Earthen Livestock Heavy Use Areas**

Criteria can be found in PA528, *Prescribed Grazing* under Criteria for Temporary Earthen Livestock Heavy Use Areas.

**Additional Criteria for Recreation Areas**

The Americans with Disabilities Act of 1990 (ADA) requires recreation areas that are used by the public to be accessible to people with disabilities. Address accessibility requirements for new construction and when existing facilities are being altered.

**CONSIDERATIONS**

Heavy use areas can have a significant impact on adjoining land uses. These impacts can be environmental, visual and cultural. Select a treatment that is compatible with adjoining areas. Consider such things as proximity to neighbors and the land use where the stabilization will take place.

Vegetated heavy use areas may need additional materials such as geogrids or other reinforcing techniques or planned periods of rest and recovery to ensure that vegetative stabilization will succeed.

Consider the safety of the users during the design. Avoid slippery surfaces, sharp corners, or surfaces and structures that might entrap users. For heavy use areas used by livestock avoid the use of sharp aggregates that might injure livestock.

Paving or otherwise reducing the permeability of the heavily used area can reduce infiltration and increase surface runoff. Depending on the size of the heavy use area, this can have an impact on the water budget of the surrounding area. Consider the effects to ground and surface water.

Installation of heavy use area protection on muddy sites can improve animal health. Mud transmits bacterial and fungal diseases and provides a breeding ground for flies. Hoof suction makes it difficult for cattle to move around in muddy areas. In addition, mud

negates the insulation value of hair coat and the animals must use more energy to keep warm. As temperatures fall, animal bunching may occur, which can reduce or eliminate vegetative cover and lead to erosion and water quality concerns.

To reduce the negative water quality impact of heavy use areas, consider locating them as far as possible from waterbodies or water courses. In some cases, this may require relocating the heavily used area rather than just armoring an area that is already in use.

To the extent possible, maintain a 2 foot separation distance between the bottom of the surface material and the seasonal high water table or bedrock.

To reduce the potential for air quality problems from particulate matter associated with a heavy use area, consider the use of PA380, *Windbreak/Shelterbelt Establishment*, PA603, *Herbaceous Wind Barriers*, PA375, *Dust Control from Animal Activity on Open Lot Surfaces*, or PA373, *Dust Control on Unpaved Roads and Surfaces* to control dust from heavy use areas.

Consider ways to reduce the size of the heavy use area as much as possible. This may require changes in how the livestock are managed but in the long run may result in less maintenance and a more efficient operation.

For areas that will need to be cleaned frequently by scraping, loose aggregate or other non-cementitious materials may not be the best choice. Consider a more durable surface such as concrete.

### PLANS AND SPECIFICATIONS

Prepare plans and specifications for Heavy Use Area Protection that describe the requirements for installing the practice according to this standard. As a minimum the plans and specifications shall include:

1. A plan view showing the location and extent of the practice. Include the location and distances to adjacent features and known utilities.
2. Typical section(s) showing the type and required thickness of paving or stabilization materials.
3. A grading plan, as needed.

4. Where appropriate, plans for required structural details.
5. Method and materials used to stabilize areas disturbed by construction.
6. Construction specifications with site specific installation requirements.

### OPERATION AND MAINTENANCE

Prepare an operation and maintenance (O&M) plan and review with the operator prior to practice installation. The minimum requirements to be addressed in the O&M plan are:

1. Periodic inspections – annually and immediately following significant rainfall events.
2. Prompt repair or replacement of damaged components especially surfaces that are subjected to wear or erosion.
3. For livestock heavy use areas, include requirements for the regular removal and management of manure, need for minimum amount of organic material for stacking, as needed. Discussion on extent of animal confinement and limitations or criteria for access to pastures over winter.
4. For vegetated heavy use areas, restrict use as needed to protect the stand and to allow vegetative recovery. Include frequency of vegetative removal.

### Design and Check Data Requirements

See document “Design and Check Data Requirements” for Heavy Use Area Protection which includes “As-Built” requirements.

### REFERENCES

- American Concrete Institute. 2006. Design of Slabs-on-Ground. ACI Standard 360R-06. Farmington Hills, MI.
- Korcak, R. F. 1998. Agricultural Uses of Coal Combustion Byproducts. P. 103-119. *In* Wright, R. J., et al (eds.) *Agricultural Uses of Municipal, Animal and Industrial Byproducts*. USDA-ARS, Conservation Research Report 44.
- USDA-Natural Resources Conservation Service. 2014. *Agricultural Engineering Note 4, Earth and Aggregate Surfacing Design Guide*, Washington, DC.

