



Heavy Use Area Basic Specification

Purpose

The purpose of this project is to create stabilized footing in areas where livestock travel and congregate on the property, causing mud issues during the wet season. The creation of heavy use areas (HUAs) will alleviate these issues and will enhance overall farm and facilities management.

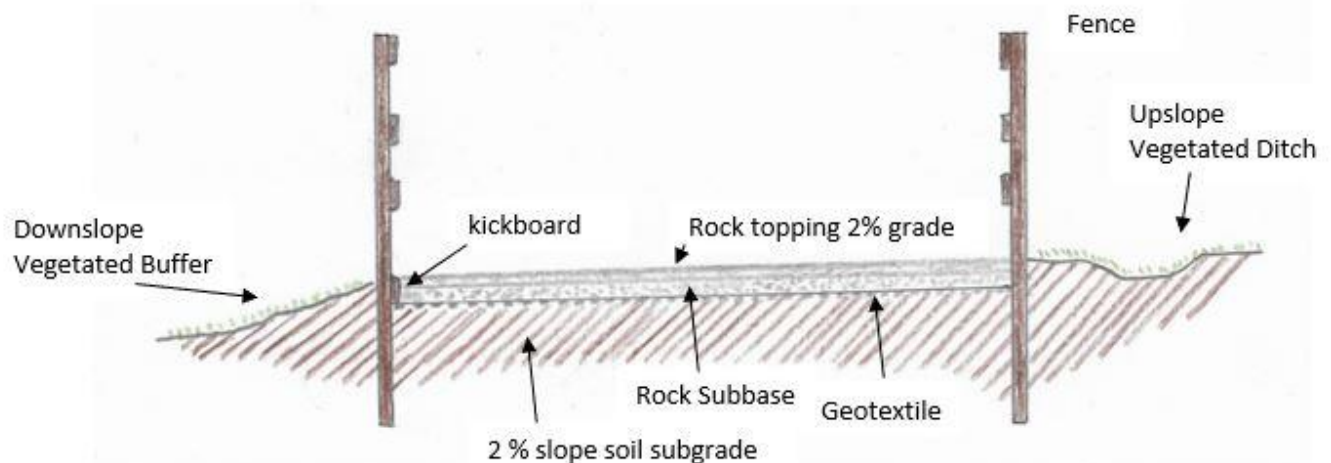
A **heavy use area** is an enclosed section of land covered in a layer of compacted gravel to protect the ground surface. **Heavy use areas** eliminate mud issues by providing stabilized, permeable footing to keep animals above the native soil surface. The optimal season for construction is summer. Constructing in the wet season can result in disturbance of non-organic layer and potential additional cost, as rock volume estimates are for compacting rock in summer with only minimal needed wetting for ideal compaction.

Construction

I. **Site Preparation:**

Construction should take place in the dry season. This design involves installing nonwoven geotextile fabric, a gravel base layer, and a gravel surface layer. A profile view is included below. Siting your HUA on firm, moderately to well-drained soil (flat or mildly sloped) will reduce the amount of excavation needed and the HUA will need less maintenance. Be sure to contact your jurisdiction's Building Dept. for any needed grading permits (grading, stormwater, floodplain, etc.), or known restrictions (too near ditches or streams, septic systems, property boundaries, natural areas, etc.). Do not place HUAs in flat, wet areas with high water tables as they will likely fail prematurely.

Longitudinal Diagram: Heavy Use Area



- Determine Total Area of the HUA: $X' \times Y' = XY$ sq. ft. Ex. $40' \times 60' = 2,400$ sf
- Total volume of each HUA layer is XY sq. ft \times depth. Ex. $2,400$ sf $\times 0.5'$ (six inch base layer) = **1,200 cubic feet of larger rock**. Another layer at $4'' = 2,400$ sf $\times 0.33' =$ **792 cubic feet** of smaller rock is needed. And you may opt for a third layer of even smaller rock as topping. $2'' = 2,400' \times .166' =$ **400 cubic feet of scalpings**. Scalpings are less expensive than rock and don't become dust and blow away as smaller sand particles do.

Cubic feet of rock can be converted to cubic yards by dividing by 27. A cubic yard of rock weighs approximately 1.3 tons, so converting cubic yards to tons allows you to estimate how many loads it would take to deliver it. A rock truck without a pup trailer can typically haul up to 14 tons in a load. So for the example above, you would need **58 tons (4 loads) of larger rock, 38 tons (2.7 loads) of smaller rock, and 14.8 tons (just over 1 load) of scalplings**. Delivered rock prices vary widely depending on the company and product, it is advisable to call around for best local prices.

Locating Services: *If any excavation is planned as part of this project, the landowner will first call the Oregon Utility Notification Center - Dig Safely 1-800-332-2344.* It is the landowner's responsibility to ensure no utilities will be affected by this project.

- Landowner to call Oregon Utility Notification Center - Dig Safely 1-800-332-2344

Permits: It is also the landowner's responsibility to obtain any necessary permits and to comply with all ordinances and laws pertaining to this project.

- Landowner to obtain permits for construction, if necessary. Check with the county or city building department for any required permits.
- Ensure that the location of HUA is not within 10 feet of any septic drain field.
- Ensure that the HUA is not within 100 feet of any drinking water well.

II. **Grade area:**

Prepare the site by removing organics from the surface as necessary to get to firm base soil (spreading the spoil in the adjacent field area, not where erosion can occur) and grade the footprint of the HUA to ~ 2 %, sloping away from the center (and stall openings) of the designated HUA. A 2 % slope is a one foot of drop every 50 feet. A filter strip of grass vegetation should be planned at the downslope edges of the HUA to help intercept infiltrate and treat any nutrient laden storm runoff. If the area is higher than 2% slope, larger baserock (3-4") can be used up to about 4-5% slope. For sites with steeper slopes, options include 1) pre-engineered geotextiles (e.g. geogrid cellular confinement products) following the manufacturer's installation recommendations, 2) additional excavation to lessen the slope, or 3) work with a licensed engineer on another solution.

III. **Geotextile:**

The application of a non-woven geotextile is **required**. A geotextile is a heavy-duty, permeable fabric used in construction that allows water to drain, separates soil from rock, and prevents gravel loss. It also enhances the strength and longevity of the HUA significantly.

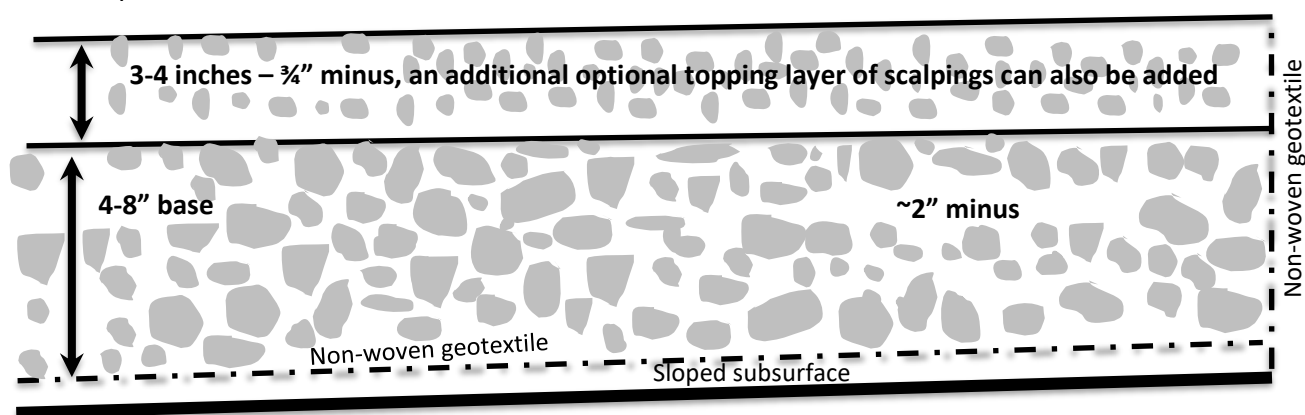
- Fabric shall be:
 - **Nonwoven needle-punched geotextile**
 - A minimum tensile strength of 150 lbs. and minimum weight of 7 ounces per square yard.
 - Installed under all treatment areas.
 - A minimum overlap of geotextile panels without sewing shall be 12 inches at all joints.
- Fabric staples can be used to hold down geotextile before the base rock is applied.
- Extend the geotextile fabric beyond the edge of the Heavy Use Area.
- "Key" fabric underground to prevent livestock from finding the edges and pulling the fabric up. Essentially wrap fabric behind HUA.
- Install the fabric in the direction of the slope.

- Typically, rolls are around 12.5' wide and 360' long (4,500 sf). Nonwoven is more difficult to find, but it is available locally. We suggest using key words such as "Erosion Control Nonwoven Geotextile fabric Portland Oregon" in a web search engine to find local product.

IV. Gravel:

A minimum of 6-8 inches of compacted gravel is necessary, recommended footing is a combination of ½" - 2" minus and ¾" minus or scalplings as a sealing layer on top to create a durable, comfortable structure with easy maintenance.

- Gravel Base = min. 4-6" coarse aggregate, comprised of ½" - 2 ½" minus rock
- Gravel Sealing layer and/or gravel Finish layer = 2" ¾" rock
- Gravel Finish = 2" of fine aggregate, comprised of ½" minus or scalplings, down to 1/200" size
- Gravel should be compacted in 3 to 4-inch layers with a jumping jack, hand tamper, heavy equipment, smooth drum vibratory roller or equivalent equipment. Completed depth is at least 8" deep.



The above diagram is not to scale, but shows schematically the dimensions of the heavy use area or Animal Walkway

V. Perimeter:

Fencing and management are required components of an HUA practice in order to be able to contain livestock during wet soil conditions to protect soil quality and forage grasses. Many different types of fencing are suitable for perimeter fencing, depending on livestock type and management style. Woven wire, power, panel, rail or multi-strand wire are all acceptable. Perimeter kickboards, rock, etc. are needed if the HUA surface is more than a few inches higher than the native soil surrounding, in order to reduce topping loss. Kickboards can be of many materials, usually pressure treated lumber is recommended. The Geotextile fabric can be wrapped around the kickboard, or if no kickboard is used, can come up under the fenceline between the soil and gravel layers.

Maintenance

- Manure will need to be cleaned picked off the heavy use area at least twice per week. Optimally this is done daily. Manure left on the heavy use area for extended periods of time will block the drainage of water which can cause mud and premature failure of the entire system.
- Water can be sprayed onto the heavy use area during dry summer months to control dust.
- Gravel will need to be replenished in depressions or over the entire area as needed with use. Periodic regrading/ compacting is recommended as needed.
- Promptly repair or replace damaged components.