Lanes That Keep Dairy Animals High and Dry

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For grazing systems to be profitable, grazing animals must be able to harvest high quality forage and spread their own manure as easily and efficiently as possible. If they are dairy animals, they also need to get back to be milked at least twice a day. Access to good lanes is one of the most important tools a dairy grazier has available to properly manage pastures. Without good lanes, animals may experience mastitis, high somatic cell counts, hoof problems, and reduced feed intake.

Lanes that keep cattle high and dry are an important part of a successful grazing operation. Making the investment to design and construct high quality lanes can help avoid these potentially serious problems. This publication outlines several options for building high quality cattle lanes.
GENERAL RECOMMENDATIONS FOR LANES

A few first steps help ensure lanes are well laid out and appropriate for the situation:

**Step 1. Decide what type of lane you need.**
Installing lanes can be costly. Improved lanes are typically only needed on dairy farms, on muddy or eroded sections for other livestock, or on farms with central watering systems where animals will return to the same area daily. The type of lane you build depends in part on how much time and expense you are willing to invest in a lane system. In general, the less expensive the lane is to build, the more costly and time consuming it is to maintain. The cheapest and easiest to install is a raised and crowned earthen lane. Reinforced lanes utilize crushed stone, gravel, or other material to strengthen the surface and increase the ability to tolerate traffic.

**Step 2. Plan for good cow flow.**
Good cow flow is essential for getting cows in and out of pastures efficiently. Reinforced lanes should be used for the first 250 to 500 feet from the milking facility, because this is the most heavily used part of the lane. A rule of thumb is to reinforce 10 linear feet of lane per cow on silt loam or finer textured soils.

**Step 3. Decide on lane width.**
Make improved lanes at least 12 feet wide to allow access by maintenance equipment. Wider lanes may be needed to accommodate haying equipment but should be no wider than necessary to avoid animals lingering in the lanes. Follow tops or crowns of hills where possible to reduce erosion potential.

**Step 4. Crown and ditch all lanes.**
Most lanes should have shallow grass swales on each side with a 1% slope to move water to a waterway and should be crowned 12 to 18 inches above the swale bottom.

![Figure 4. Make sure lanes provide for effective movement of animals.](image)

![Figure 5. Ditching and crowning is a critical part of building effective lanes.](image)
LANE-BUILDING MATERIALS

The following materials are commonly used for lane development. Frequently, combinations of these materials are used on single lanes.

**Soil** – Used to some extent in all lanes and can be obtained on site or brought in from other locations.

**Crushed Stone** – Also known as screenings, this is typically limestone, granite, or other bedrock materials ground to pass through a 3/8” sieve. It is commonly used as the final or top material on a lane to provide comfortable and durable footing for animals.

**Fieldstone** – These are large rocks coming from farm fields that are used as a base course material to provide strength and durability to a lane. This material is then covered with soil and/crushed rock.

**Breaker Rock** – Stone that has been crushed to yield pieces smaller than 6 inches in diameter. It is used as a base course.

**Sand or Fine Gravel** – Can also be used as a base material under fieldstone or breaker rock.

**Geotextile Fabric** – A durable fabric that increases load capacity and helps keep other materials from sinking into the soil.

**Concrete** – Concrete can provide a long-lasting and durable lane. While it has been used in some areas, it is an expensive option. In addition, as the concrete breaks up it can become problematic.

TYPES OF LANES

Lane-building materials may be combined in a number of different ways to provide improved lanes on livestock farms. Some of these combinations are discussed next.

**Unimproved Lanes**
Some farms can get by without improved lanes. Unimproved lanes may be adequate in low traffic areas such as away from barns. Farms with low animal numbers also may not need to invest in lane improvement. Analyze your needs and decide which type of lane best suits your situation.
Raised Earth Lane
This is the cheapest option, but one that requires the most maintenance. These lanes can be built on well- to moderately well-drained soils. Some farmers have used them on poorly drained soils and have been successful, but you must raise them the full 18 inches to keep them dry. Raised earth is used to some extent in most other lane systems.

Crushed Stone Lane
This option starts with the raised earth lane with a minimum of 6 inches of crushed stone added. This can be used on well- to moderately well-drained soils. Farmers have been successful with this on other soils if the base is raised at least 18 inches.
**Crushed Stone over Geotextile**

This option is the same as a crushed stone lane except that it is built over a geotextile fabric. The geotextile fabric greatly increases the load-bearing capacity of the lane, wicks away water, and keeps rock separated from the soil foundation. It allows for use of this option on somewhat poorly drained soils.

Local construction material suppliers may handle this fabric. This option is not used often because fabric tends to work its way up into the thin layer of rock. To get the most out of the fabric's qualities, follow these guidelines:

- Fabric will provide drainage both horizontally and vertically. To take advantage of this ability, the sub-base must be crowned to drain.

- If the sub-base cannot be crowned, provide a 6-inch gravel layer under the fabric.
- No soft spots or low spots should be present.
- Rolls of fabric come in 12-foot and 15-foot widths. They can be cut in half for 6- or 7.5-foot-wide lanes.
Crushed Stone over Base Course Material
This option is the same as the crushed stone lane except we now add a layer of base course material to provide a stable sub-base on more frequently used lanes for increased load bearing capacity.

This option includes a 4-inch surface layer with a 6-inch base course of graded rock. This is the most common reinforced lane. The additional material increases the price but makes for a better lane.

Crushed Stone over Geotextile plus Base Course Material
This option is the same as a crushed stone lane over geotextile fabric except a layer of base course material is added to provide a stable sub-base on more frequently used lanes for increased load bearing capacity. This option includes a surface layer with a 6-inch base of course material. This option is often used after leaving the milking facility where lanes are most heavily travelled.
**Crushed Stone over a Base Course over Sand and Fine Gravel**

This last option consists of a layer of crushed stone over base course material over 6 inches of sand and fine gravel. This option is suitable for all soil drainage classes and costs about the same as the previous option. The geotextile option may be a better choice, however, because the fabric provides better load-bearing capacity in wet and soft foundation soils.

![Diagram of Crushed Stone over Base Course over Sand and Fine Gravel]

**STREAM CROSSINGS**

When you are crossing a waterway or stream, it is best to excavate for the crossing. The top surface of the finished lane should be 2 inches below the bottom of the stream or waterway. This will keep the surface material from washing away and the cattle hoofs from coming in contact with stones. Prior to working on streams or waterways contact the appropriate agency for all necessary permits.

![Figure 19. Layer of crushed stone over a base course over sand and fine gravel.](image1)

![Figure 20. Breaker rock being covered with crushed stone for a stream crossing.](image2)

![Figure 21. Finished stream crossing.](image3)
CONCRETE/LANE INTERFACE
The place where cattle step off of concrete is a common trouble spot. This problem can be solved by providing a good base of course material with a thick layer of surface material that overlaps onto the concrete at least 6 to 10 feet as shown in Figure 19. This surface layer will need to be maintained frequently, but it will eliminate the mudhole at the end of the concrete.

Figure 22. Access lane and concrete overlap.

SUMMARY
Well designed lanes will greatly improve your cattle’s access to your well managed pastures and also keep the animals much healthier and cleaner. Options vary in cost from region to region, but the use of locally available materials will help reduce them. Contact your Land Conservation Department (Soil and Water Conservation Districts in states other than Wisconsin) or the Natural Resources Conservation Service or county extension office for design and layout assistance.

Useful Codes or Specifications for Building Lanes
Critical Area Planting Code 342

Heavy Use Area Protection Code 561

Stream Crossing Code 578

Wisconsin NRCS Standard 575 for Animal Trails and Walkways