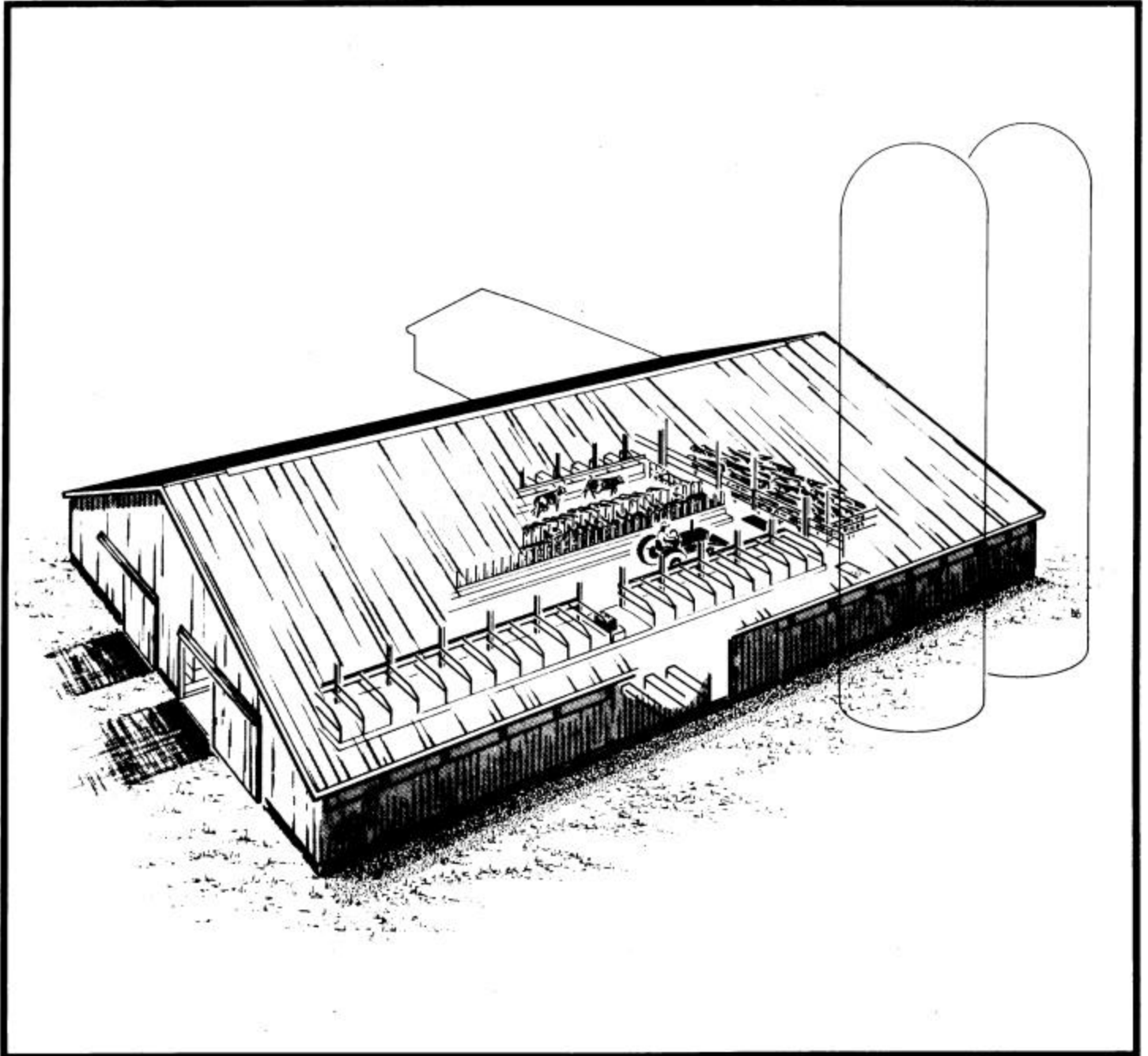




FREE STALL DAIRY SYSTEM, 100 TO 200 COWS



The Canada Plan Service prepares detailed plans showing how to construct modern farm buildings, livestock housing systems, storages and equipment for Canadian Agriculture.

This leaflet gives management information and describes one of these detailed plans. To obtain a copy of the Canada Plan Service detailed plan, contact your local provincial agricultural engineer or extension advisor.

FREE STALL DAIRY SYSTEM, 100 TO 200 COWS

PLAN M-2104 REV 85:03

This plan is for an expandable free stall dairy barn designed for 100 cows, with an optional second wing for expansion to 200 cows if needed. Each wing has four rows of free stalls with a feeding area along the centerline. For 100 cows, the stalls, feeding area and holding pen require a barn 24 x 36 m (80 x 120 ft); for 100 more cows the added wing would be 24 x 30 m (80 x 100 ft) because the same holding pen could serve both wings.

MILKING CENTER The milking center (separate plan M-2501 or M-2502) is attached to one side of the main barn, adjacent to the holding area. For 100 cows, the one with a single return alley (M-2501) is suitable; for 200 cows, use one (M-2502) with two return alleys.

The holding area is designed to pen 50 cows at once (1/4 or 1/2 of the herd, depending on herd size).

FEEDING SYSTEM The plan locates silos, grain storage and feed room at the side of the barn opposite the milking center; this allows later expansion to 200 cows. Overhead conveyors carry mixed rations from the feed room to mechanized feed bunks at the building centerline. Choose a feed-spreader system that allows different rations to be fed in each quadrant of the barn; this way the herd can be divided into two (or even four) feeding groups, with the concentrate part of the ration adjusted for each group size, stage of lactation or level of milk production.

VENTILATION This barn is made with a high, cathedral ceiling and an insulated roof. This gives a modified environment, with natural ventilation provided by adjustable side wall openings and an open roof ridge. During cold winter weather the barn temperature will seldom be up to 15°C warmer than outdoors. If you try to keep it too warm by closing up the side wall openings to tightly, the barn will fog and drip excessively, to the detriment of both cattle and structure. If, on the other hand, the barn is allowed to ventilate excessively, manure may freeze in the alleys and regular cleaning will be impossible. There is a compromise here, and good managers find the building works best if the ventilation is adjusted to keep the barn no colder than about -3°C, an overnight temperature at which some manure may freeze but not hard enough to prevent scraping with a tractor.

To adjust the natural ventilation, side wall openings consist either of continuous tilt-in doors or an adjustable woven-reinforced plastic curtain (plan M-9351). For dairy barns the tilt-in doors are more traditional, but the plastic curtain system is cheaper and probably easier to adjust. In either case a winch-and-cable system to each side of the barn is strongly recommended, in order to make rapid and timely ventilation adjustments without walking all around the barn.

The open ridge slot serves as the ventilation air outlet. This is not adjustable, and is made a full 300 mm (1 ft) wide to move a lot of air when needed. Vertical side baffles and a flat rain-cap may be added as shown in the plans, for regions where drifting snow or heavy rains could make problems for the feeding area below. Treat the exposed truss joints with a penetrating wood preservative where the open ridge allows frequent wetting of the wood.

MANURE SYSTEM This barn is designed to be cleaned daily with a small tractor scraper, or a manure scoop on a skid-steer loader. Cow alleys are scraped to drop-slots opening through the floor into a liquid manure holding tank under the holding pen.

This tank is good for about 1 month's manure and wash water production. When it is almost full, manure is mixed and transferred to long-term outside storage by a tractor-powered pit pump, connected by a portable J-pipe to an underground transfer pipe. These pipes are usually 125 mm (5 in.), the same as the pump openings. The underground transfer pipe can be smooth PVC with sealed watertight joints but fitted with galvanized steel pipe lengths at the end connections where plastic pipe could be easily damaged. This transfer pipe must slope uniformly, either back to the holding tank or out to the long-term storage, so that it can be water-flushed and completely drained after each pumping operation.

On some sloping sites where the top of the long-term storage can be at least 2-3 m below the barn floor, the size of the under-floor holding tank can be reduced from 1 month to 1 day's capacity, and a large concrete pipe (diameter at least 600 mm (2 ft)) carries manure at a uniform slope down to the bottom of the long-term storage. Again, it is very important to seal all the pipe joints watertight and backfill with clay, well compacted.

To control water pollution, manure handling and storage systems must be placed and built so seepage cannot get into ground and surface water supplies. Plan for sufficient storage to eliminate spreading manure on snow, frozen ground or sensitive crops. For most farms spring and fall applications are best, requiring at least 6 month's storage capacity. Obtain approval of your plans from the proper local authorities before starting construction.