



## Site Planning Thoughts for Incremental Expansion

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When producers decide to make a change to their dairy facility, they sometimes view the proposed change as an isolated project in relation to the rest of the dairy operation. A more prudent approach would be to consider each facility change as an integrated component of your future dairy operation and not just as a band-aid for the existing one.

In order for each change to be a viable integrated component, a vision of the future dairy facility should be in mind. A facility master plan is a plan that uses drawings and written documentation to articulate the vision of the future facility. A master plan will show the location of all existing and proposed buildings for the site. It will also show both existing and future major infrastructure items like utilities, roads, walkways, etc. Topography needs to be included so that proper drainage of surface runoff and piped waste can be ensured. Existing and proposed topography also allows for easy calculation of cut/fill volumes as needed.

A crucial step in developing a facility master plan is to decide how big of an operation should be planned. This question must ultimately be answered by the producer after much thought and consultation with farm advisors. It is my position that master plans should not preclude expansion beyond the wildest dreams. After all, dairy facility engineers in the 1970s suggested that producers allow room to double their herd size in 10 to 15 years. As we are well aware, many producers have far exceeded that recommendation either by choice or as a necessity to remain in business.

Dairy producers should evaluate their site relative to expansion issues like CAFO and profitability, coupled with future technologies like on-farm manure treatment systems. In the crystal ball, I think we will see farms buying more or perhaps even all of their feed and having manure treatment systems in place so they are not as land-base driven as they are now. Several cows per acre could be possible in the future! All of this should be kept in mind during development of a farmstead master plan for your site.

Incremental expansion variables should focus on maximizing the following:

1. Cow Comfort. New dairy housing shelters need to be designed and positioned to maximize ventilation. Research has shown that barns should be



oriented with the prevailing summer winds perpendicular to the sidewall. This allows more opportunity for air to be evenly distributed in the shelter and enhances airflow at the open ridge. Strive to space barns at least 80 ft. apart—preferably 120 ft. Construct stalls that are properly sized for the group of cows that will be using them, and avoid stall structural members that significantly inhibit airflow at cow level. Ensure that adequate electrical service is in place to allow full outfitting of the barn with cooling fans. Sufficient water supply and properly sized delivery pipes are needed to deliver water to drinking stations and evaporative cooling equipment during peak demand periods.

2. Labor Efficiency. Labor cost is one of the largest costs incurred by a dairy producer. Facilities should be designed to minimize the labor required to accomplish all jobs. Design shelters, walkways, and other animal use areas so caretakers can efficiently move through and between groups of animals or multiple shelters. Install gates and fencing in key locations so that one caretaker can easily segregate cow groups and move individual cows between groups as needed.

3. Cow flow. Provide adequately sized alleys and crossovers without dead ends in shelters so cows are free to walk between feed, water, and resting areas. Construct walkways between shelters and the milking center so cows can be efficiently moved to and from the buildings with minimal stress. Allow for easy sorting of targeted cows from their group for observation, treatment, group change, or removal from the facility.

4. Herd Management Philosophy. Develop a management plan for each group of cattle on the farm. Only after defining all management groups can facility needs be accurately determined. The number of animals in each management group is a key variable in determining the space that needs to be allocated for that group. Plan for expansion within each management group as the size of the overall herd increases. For example, with accurate planning an area that was once occupied by two management groups can be transformed for use by a single group when other facilities are brought on line for the other group.

5. Equipment Efficiency. Shelters positioned to maximize ventilation may have other structures adjacently located to maximize equipment efficiency. Feed delivery and push-up equipment can be conveniently used in multiple shelters with strategically located all-weather roads. Strive to use minimal equipment to remove and transport manure to storage or treatment areas. Utilize gravity flow as much as possible. Do not attempt to gravity flow sand-laden dairy manure.

6. Integrate all traffic. Cow traffic, people traffic, on-farm equipment traffic, and delivery and shipment traffic all need to be integrated for maximum overall efficiency. Proper management will ensure that important daily traffic patterns are not interrupted during key events during the year, like filling silo. Severe



congestion can be avoided by laying out traffic patterns so they do not overlap on common ground at the same time of use.

For additional information, including a working example of an incremental expansion process, see the paper "Farmstead Layout: Putting the Pieces Together" by John Tyson in *Dairy Housing and Equipment Systems* NRAES-129 available from the Natural Resource, Agricultural, and Engineering Service. Contact them by phone at 607-255-7654 or by the web at [www.nraes.org](http://www.nraes.org).