
**Historic Context for Richmond Area Dairy Barns,
c. 1900-1955**

Richmond, Virginia

**VDOT PROJECT No.: 0288-072-104, PE101
PPMS No.: 17155
VDHR No.: 97-1293**

Prepared for:

**VIRGINIA DEPARTMENT OF TRANSPORTATION
1401 East Broad Street
Richmond, Virginia 23219
(804) 371-6753**

Prepared by:

**THE LOUIS BERGER GROUP, INC.
203 East Cary Street, Suite 100
Richmond, Virginia 23219-3736
(804) 225-0348**

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**VIRGINIA DEPARTMENT OF TRANSPORTATION
1401 East Broad Street
Richmond, Virginia 23219
(804) 371-6753**

Prepared by:

Megan Rupnik

**THE LOUIS BERGER GROUP, INC.
203 East Cary Street, Suite 100
Richmond, Virginia 23219-3736
(804) 225-0348**

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I. Historical Background

Dairy products have been a staple in the American diet since the colonial period. Beginning with the colonization of America, records show that cattle were imported, with the cattle population stabilizing by 1650 (Pirtle 1926). Milk, butter, and cheese were used universally by the colonists, and dairy products were primarily made for home or local use (Selitzer 1976). Milk sold locally was fresh from the family cow that was often pastured on public land located in the center of the town. By the end of the nineteenth century, however, with the general movement of population from the farms to the cities, it became necessary to mass produce and improve the quality of milk, and the industrial vision of perfected dairying involved large dairies with high-producing cows (DuPuis 2002). Significant inventions, such as commercial milk bottles, milking machines, tuberculin tests for cattle, pasteurization equipment, refrigerated milk tank cars, and automatic bottling machines, contributed toward making milk a more healthful and commercially viable product.

At the national level, the Bureau of Animal Industry of the United States Department of Agriculture (USDA) established the Division of Agrostology and the Dairy Division in 1895 in an effort to improve the quality of dairy products (National Agricultural Library [NAL] 2002). The early work of the Dairy Division consisted primarily of collecting and disseminating information. In response to interest expressed by dairymen, the Division issued bulletins and circulars on various subjects concerning the dairy industry. Legislation and regulations passed at the national level to ensure a safe food supply also affected the dairy industry. With the passage of the Meat Inspection Act of 1890 and the amendment of 1906, Congress authorized USDA inspectors to enforce standards of sanitation and hygiene in the meat and dairy industries (NAL 2002). Score cards were developed for use by USDA Dairy Division inspectors when visiting dairy facilities. The score cards rated the health of the herd; the cleanliness of the cows, the milking utensils, and the dairy employees; and the handling of the milk (NAL 2002). In 1919 the milk specialists of the Dairy Division began to organize educational milk campaigns in cities and in rural communities to deal with surpluses generated by the increased production of milk and dairy products during World War I. As a result of ongoing milk campaigns, substantial increases in consumption of milk occurred (NAL 2002).

At the same time experts in the federal sector were researching and developing regulations for the dairy industry, the private sector was actively conducting research and campaigning for dairy products. One expert was Dr. Charles E. North, who played a leading role in gaining public acceptance of milk pasteurization laws during the first half of the twentieth century. Additionally, North developed a system of sanitation that was used nationwide. Devised to provide for the production of clean milk, the sanitation system had six requirements: healthy cows; careful grooming of cows; clean hands and clean clothing; clean, dust-free barns; thoroughly washed and sterilized milking utensils; and prompt and effective cooling of the milk (NAL 2002). As the list of milk sanitation regulations grew longer, however, the financial and physical resources needed to market milk increased substantially and made milk production a capital-intensive operation (DuPuis 2002). Managing milk production costs became a constant struggle for most dairymen.

The Dairy Industry in Virginia

Cattle were first introduced to the Virginia Colony of Jamestown in 1611. There were nearly 5,000 cattle in the colony by 1627, and 100,000 by 1665. Eventually every farm or plantation kept cows that supplied milk for home use. In many towns and villages, including Richmond, cows would roam the streets, grazing on vacant lots and fields. Beginning in the 1850s, as dairy farming was developing into a specialty, cows were housed in cheaply constructed barns and were often milked outside in the yards (Pirtle 1926). Eventually, in Virginia and nationwide, it became difficult for residents of growing cities and towns to provide their own milk. As a result, farmers would locate on the outskirts of cities and increase the number of cows on their farms to supply customers in town (Bottom 1926). There were no

cooling facilities for milk, however, so it was impossible to ship milk any great distance, allowing only those farmers living in close proximity to cities and towns to become commercial dairymen. A city's "milkshed" was defined by those dairy farms that were close enough to provide milk to the city and that were inspected by the city's health officials (Virginia State Dairymen's Association, *The Virginia Dairyman* July 1946). As transportation and cooling methods improved, and as sufficient funds were provided to allow health officials to conduct inspections, a city's milkshed increased.

At the beginning of the twentieth century the growing dairy industry was loosely regulated. In Virginia, dairy products were sold with little guarantee as to their purity, and little or no protection existed for the dairyman against the trafficking of cattle infected with tuberculosis or Bang's disease. Virginians were susceptible to receiving out-of-state dairy products that were of questionable quality because of a lack of high-quality home-produced dairy products (Reaves 1982). In September 1907 dairy farmers and others interested in the creation of a sound dairy industry in Virginia considered the feasibility of launching a statewide program of dairy development, and Virginia's first dairy organization, the Virginia State Dairymen's Association (VSDA), was established (Reaves 1982). At that first meeting, topics of discussion included the viability of shipping fresh milk long distances by rail, the hygienic methods of milk handling, and the importance of refrigeration, as well as the role of rapid transportation and direct delivery (Reaves 1982). Topics that were repeatedly the focus of the VSDA and all those who played a role in the dairy market included, as seen at the first meeting of the VSDA, cow disease, cow quality, hygiene, cow feed, production costs for producing milk, and so on.

One of the first major milestones of the VSDA was the establishment of a state regulatory agency. The association made a formal application to the General Assembly for an appropriation of \$7,500 to establish a state regulatory agency with the legal authority to supervise the merchandising of stock feeds, as well as the purity of dairy products and the sanitary conditions under which they are manufactured or produced. In 1908 the law establishing the Dairy and Food Division was passed. At that time, 85 percent of the dairy products consumed in Virginia came from other states (Reaves 1982).

In addition to increasing the profitability of dairy farming and securing favorable legislation, the VSDA served as a source of scientific and technical information for farmers through publications, including a newsletter called *The Virginia Dairyman*. Similar producer and breed associations, at state and local levels, proliferated throughout the country during the late 1910s and early 1920s. Agricultural extension services like the one based at the Virginia Polytechnic Institute in Blacksburg also acted as sources of information. Cow testing agencies were also established, the first being in Michigan in 1906. The first Virginia cooperative cow-testing association was created in the Blacksburg area in September 1908, and the Loudoun-Fairfax Cow-testing Association was established in 1911 (Reaves 1982).

The VSDA then directed its efforts toward the enactment of legislation to provide for the testing and eradication of tuberculosis in cows. Rockingham County led the state in offering free tuberculosis testing in 1909. By 1917 the incidence of bovine tuberculosis among the cows that supplied milk to Washington, D.C., had fallen to less than one percent. Pasteurization also safeguarded the milk supply, and all of Virginia's cities and many of its smaller towns enacted pasteurization ordinances before 1914 (Sharrer 2000).

Few purebred herds existed before 1900. Once it became apparent to dairymen that disease control was possible, attention to breeds and breeding, which had been long advocated but little practiced before the twentieth century, increased. Improvement came in the early twentieth century with the application of Mendelian principles to selecting cows that had a distinctive figure—bony frame, narrowing toward the rump, with a big belly and udder. Ayrshires, Guernseys, Jerseys, and Holsteins, which exhibited the desirable characteristics, became the leading breeds (Sharrer 2000).

To provide better housing for high-quality livestock and protect them from disease, a sanitary dairy barn was developed. The concept of a sanitary dairy barn originated at the New York Agricultural Experiment Station around the beginning of the twentieth century (Sharrer 2000). Previously dairy barns had been tightly constructed with low ceilings to keep the stock warm in the winter. Once it was understood that tuberculosis and other diseases were spread via water droplets, barn builders were interested in developing methods of eliminating condensation and allowing as much light and fresh air as possible (Sharrer 2000). Ventilation systems became key ingredients in dairy barn design, with the King System highly favored throughout the United States. As early as the 1880s, Professor F.H. King of the Wisconsin Agricultural Experiment Station developed the principles that formed the basis of the King System, which featured a number of small air intakes and one or more large outtake flues (Kelley 1924) (Figure 1). In

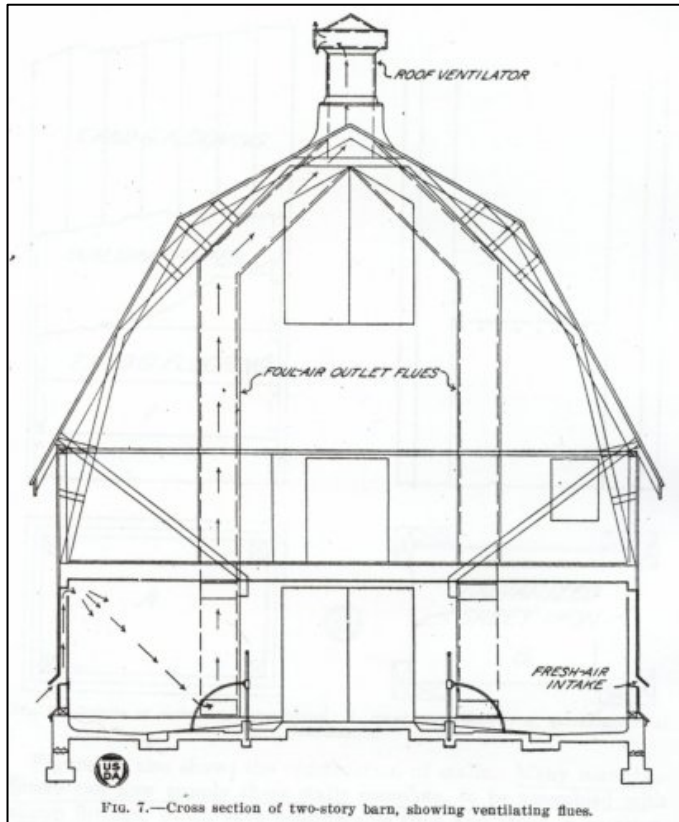


FIGURE 1: Dairy Barn Ventilation System (USDA 1923)

addition to a standard dairy barn, milk houses and silos became intrinsic to a dairy farm's daily operations.

Production costs of dairy farming increased as dairymen made improvements to the quality of their cows and dairy buildings. With this rapid rise in the cost of producing milk, Virginia dairymen began taking an interest in milk marketing in 1916 (Reaves 1982). Mirroring conditions at the national level, Virginia dairymen were interested in promoting the health benefits of milk consumption to the general public and fostering a greater appreciation of milk and the dairy industry. Additionally, Virginia's Dairy and Food Division began promoting dairy farming in the state. Publishing a bulletin titled *10 Reasons for Buying a Virginia Dairy Farm*, the Dairy and Food Division touted the desirable attributes found in Virginia, such as an ideal climate, low-priced lands, cheap silage, and an ideal transportation network, in an effort to bring industry to the state (Purcell 1915). A similar bulletin was published in 1926 by the Virginia Agricultural Experiment Station in partnership with the USDA. In 1910, 4,300 Virginia farms were producing milk

commercially. By 1920 more than 13,700 Virginia farms had become engaged in commercial milk production, representing about 8 percent of all farmers in the state. With butter included with milk and cream, approximately 44 percent of Virginia's farms were selling dairy products in 1920 (Reaves 1982). The distribution of dairy cows on commercial farms in 1924 is displayed in Figure 2.

Richmond's Milk Market

Concurrent with development of state-level interest in improving dairy farming, the City of Richmond focused on improving the quality of milk produced within its milkshed. The first steps to improve the milk supply of Richmond were taken in May 1907, under the supervision of the City Health officer, Dr. E.C. Levy (Strauch 1923). Levy viewed the dairy farm as a factory in which "the most delicate, the most valuable and the most easily contaminated food is produced and handled," and he believed that properly constructed dairy barns would greatly aid in securing a clean milk supply for Richmond (Strauch 1923).

monthly (City of Richmond 1917). According to Strauch, the rising costs of production and a fall in profit caused some dairy farmers to sell off their herds and discontinue farming in 1917.

Although some dairymen were selling off their herds, the number of dairy farmers holding permits to sell milk in Richmond continued to increase. In 1922, 191 dairy farmers were providing milk to the city. Richmond's milkshed at that time encompassed the counties of Amelia, Augusta, Albemarle, Buckingham, Caroline, Cumberland, Chesterfield, Charlotte, Charles City, Dinwiddie, Fluvanna, Goochland, Hanover, Henrico, Louisa, Nottoway, New Kent, Powhatan, Spotsylvania, and Prince Edward. During the following year Strauch stated that every drop of milk sold in Richmond continued to be produced in barns constructed according to the standard plan and commented that territory for many miles around Richmond was dotted with dairy barns, all built in uniform style (Strauch 1923).

Dairy farming in the Richmond area continued to prosper into the mid-twentieth century. An increase in truck transport allowed for greater profitability of the industry in the 1940s and resulted in a period of expansion in dairy farming in the 1940s and 1950s (Pezzoni 1999). The dairy barns constructed in the Richmond area, and across the country, from the 1930s through the 1950s continued to be built on similar plans, yet incorporated newer technologies in building materials and equipment in their designs.

II. Themes

Agriculture

The Richmond milkshed, during the first half of the twentieth century, was composed of Amelia, Augusta, Albemarle, Buckingham, Caroline, Cumberland, Chesterfield, Charlotte, Charles City, Dinwiddie, Fluvanna, Goochland, Hanover, Henrico, Louisa, Nottoway, New Kent, Powhatan, Spotsylvania and Prince Edward counties. Beginning as early as 1907, Richmond focused on advancing the dairy industry through the establishment of more hygienic practices. City health officials struggled to improve conditions under which milk goods were produced and transferred, and disease and contamination was a prevailing concern in the Richmond area and nationwide. Chief among Richmond's efforts to modernize and regulate the industry were the establishment of standard plans for dairy-related buildings, with particular focus on the dairy barn, and inspections designed to assure that dairymen were complying with the recommendations set forth by the city and the USDA. The Richmond region's remaining dairy barns are the physical manifestation of the history and evolution of Richmond's dairy industry and efforts toward sanitation and self-regulation, as detailed in Section I. Changing farm practices, both nationally and at the state level, are reflected in the design of the barn and other outbuildings.

Architecture

Rising concerns over health and hygiene in the early twentieth century prompted a shift in dairy barn design. As incidences of cattle diseases peaked between 1890 and 1915, literature focusing on promoting hygienic farming practices increased, and state and city agencies and private associations made efforts to educate farmers (Lanier 1997). By the turn of the twentieth century agricultural literature at the national level promoted a standard dairy barn designed to replace the odorous, poorly ventilated, poorly lighted, and windowless barns of the nineteenth century. As early as 1905 the Dairy Division of the Bureau of Animal Industry began investigating dairy barn construction and requested that those dairymen with "exemplary barns" contact them with specifications for materials and construction techniques (United States Department of Agriculture [USDA] 1905). Responding to a great demand for information on the construction of dairy barns, the Dairy Division, under leadership of Ed H. Webster, published a brief circular on dairy barn design in 1906. In 1908 Webster wrote that the Dairy Division had begun developing basic principles of hygienic dairy building construction, but that the designs were still in

formative stages (Webster 1908). That year the agency issued a circular of recommendations for dairy barn design. Although the location, treatment for exposure, size, form, and building materials would vary from dairy to dairy, the USDA felt that problems of ventilation, cubic air space per cow, light, floors, and ceilings—those issues most directly relevant to disease prevention—would be universal.

In its 1908 circular, the USDA provided detailed plans for a modern dairy barn and other dairy buildings. Although the location and precise layout of buildings on a dairy farm were left to the individual dairyman, Webster stipulated that the amount of space allotted to various specific functions should meet standard requirements (Figure 3). In the USDA plan, the exterior width of a dairy barn was 36 feet 4 inches, allowing ample space for stalls and passages, while the length was variable, based on the number of cows to be housed. The side walls were to be built of stone or concrete as far up as the window sills and the remainder of frame construction. The end walls were constructed entirely of stone or concrete (Webster

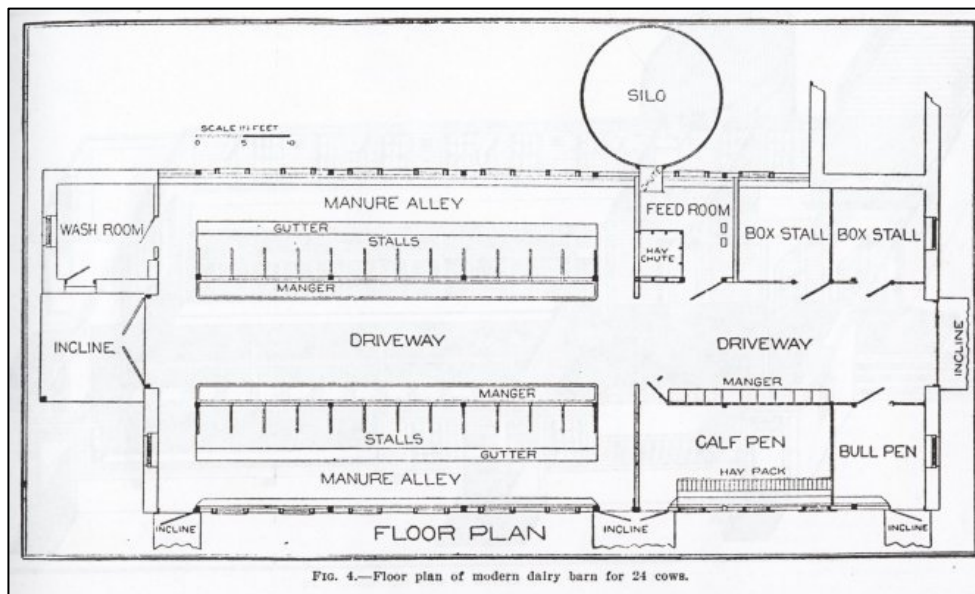


FIGURE 3: Dairy Barn Plan Provided by the USDA in 1908 (Webster 1908)

1908). Approximately 6 square feet of window space was recommended for each cow. The stalls had a width of 3 feet 6 inches and a depth of 4 feet 6 inches, and the alleys located behind the cows were 4 feet wide. Concrete flooring was recommended as the only sanitary option; additionally, concrete was durable and therefore economical, and comfortable for animals when enough bedding material was used (Webster 1908). Regional variable factors in the dairy barn design included the ceiling height and the ventilation system. The circular also included recommendations and designs for silos, dairy houses, creameries, and ice houses.

Building plans were also made available to prospective dairymen by private industry. In 1911 Kent Manufacturing Company, which sold dairy barn blueprints and specifications, published a promotional pamphlet titled “Helpful Hints For Him Who Builds a Dairy Barn.” The pamphlet provided suggestions on such topics as site, size, and appearance of dairy barns. Plank frame barns, called the “newest thing in barn framing,” were considered to be a more economical option than barns constructed of heavy timber (James 1911). The importance of an appropriate ventilation system was emphasized, and the King System of Ventilation was recommended. Unlike Webster’s plans, which recommended 6 square feet of glass per cow, these plans only called for 4 square feet of glass per cow, reducing costs. The Kent pamphlet elaborated further on window openings, recommending a single sash window hung at the bottom. Opening the window from the top pushed the air towards the ceiling, enhancing circulation and protecting cows from drafts (James 1911). Like the USDA, the pamphlet encouraged a barn width of 36

feet and the use of concrete floors. The Kent Manufacturing Company also advocated the use of iron columns, writing that “dairymen and farmers are finding iron columns far better supports for a barn than wood, as they occupy less space, interfere less with light and air, are neater, more up-to-date in appearance, and are more durable, costing less in the long run than wood” (James 1911). Walls were designed to be modified for different climatic conditions: one layer of siding was sufficient for the South, but dead air spaces between the façade and interior walls were needed in the North.

The City of Richmond began promoting a standard dairy barn in 1907, a year after the first USDA circular, and by 1917, according to Richmond’s Chief Dairy Inspector Thomas J. Strauch, all new barns and newly renovated barns in the Richmond milkshed conformed to a standard dairy barn plan (Figures 4 and 5). In a paper presented at the International Association of Dairy and Milk Inspectors Convention held in October 1922, Strauch clearly outlined the standards required for dairy barns by the City of Richmond:

The building was to be at least thirty-four feet wide, for a double row of cows, allowing a width of three and one-half feet per stall, with four square feet of light and two square feet of ventilation for each stall. We use the diffusion system of ventilation, which consists of a number of openings cut in each side of the barn, each opening one foot wide and two feet long, about two and one-half feet from the ground, all covered with muslin. Each stall has one of these openings in front of it. The plans called for at least 500 and more than 800 cubic feet of air space per stall. The stalls, floor and mangers were to be of concrete, and the stanchions, stall divisions, and posts of iron. This type of barn would be our standard barn [Strauch 1923].



FIGURE 4: Exterior View of a Richmond Milkshed Dairy Barn. Hatcher Dairy Farm, 2003



FIGURE 5: Interior View of a Richmond Milkshed Dairy Barn. Poland Dairy Farm, 2003

Gambrel roofs and milk houses were standard in Strauch’s plan. The barn’s ventilation design, usually manifested as rectangular vents under the windows, represented a simplification of the King and Rutherford dairy barn ventilation systems that were popular among agricultural engineers of the period. Strauch’s plan also called for a T-shaped open-air breezeway that separated the cow stable from the milk house. The concrete-floored breezeway facilitated ventilation and cleaning and doubled as a storage area for equipment. The design also permitted the extension of the hay mow over the milk house, feed room, and breezeway; this allowed for all-weather transfer of hay from a wagon parked in the breezeway through a trap door in the hay mow (Pezzoni 1999). Strauch’s dairy barn plans, as outlined here, were not dissimilar to the national standard. They were, however, modified to make them more suitable to their region, as was suggested by national-level publications. Few of the surviving dairy barns in the Richmond milkshed have these particular features.

In 1923 the USDA’s Dairy Division published a comprehensive circular specifically geared to dairy barn construction. The circular established the essential features in dairy barn construction and two common

types of dairy barns were defined. These were a one-story cow stable, with feed stored in a separate building, and a two-story barn in which the feed was stored on the floor above the cows. That circular suggested that the two-story model was commonly found in colder regions, while dairymen in southern states usually constructed a one-story barn. Richmond's barns, both before and after 1923, were most often two stories. Virginia's central location and cold winters most likely made the one-story, "southern" model inefficient. The two-story barn, prevalent in much of the Mid-Atlantic region, was also more practical, as it provided extra storage space. This publication, like those issued previously, focused on light, recommending 4 square feet of glass per cow; air movement, stipulating no less than 500 and no more than 1,000 cubic feet per animal; and proper ventilation, suggesting the King System. Additionally, a barn should be dry, well-drained, and, when possible, run north-south to maximize available light. In 1945 the USDA recommendations were substantially the same (USDA 1945).

III. Associated Property Type: The Richmond Milkshed Dairy Barn

Description

Richmond milkshed dairy barns are two-story, partially frame structures with gambrel roofs. Commonly sited lengthwise on a north-south axis, the dairy barns are three bays wide to allow for a center aisle with a row of stanchions on either side, and contain a ventilation system of intake-outtake flues as exhibited by metal ventilators located along the roof-ridge. The exteriors are usually clad in a combination of concrete block and weatherboard siding; earlier dairy barns may be clad entirely in weatherboard siding, and later dairy barns may be almost entirely constructed of concrete block. The side elevations have a multi-window fenestration, usually one window for each milking station, and the windows are usually metal sash. The gambrel roofs are universally clad in standing seam metal.

Concrete and iron are significant building materials used in dairy barn interiors. Reflecting an interest in sanitation and in easy clean-up, concrete was used as the flooring material. All floor elements in a dairy barn are of concrete, including the ramps leading into the barns and the gutters and mangers. The ceiling and walls tend to be clad in drywall, another material that can be easily cleaned; however, walls and ceilings of earlier barns may be clad in board and batten or stucco. Iron support posts are located along the center aisle, and metal milking stanchions are located on the side aisles. Wood support posts may be found in place of iron posts in earlier dairy barns.

Accessory buildings, including silos and milk houses, are usually attached to the main barn structure with enclosed or partially enclosed walkways. The milk houses are commonly one-story structures with gable roofs clad in standing seam metal and are often constructed of the same building material as the barns, typically concrete block and weatherboard siding. The milk houses are usually one or two bays and have metal sash windows. Silos, depending on their age, vary in building materials. By the beginning of the twentieth century fireproof building materials, such as reinforced concrete, concrete block, and tile, were used to build silos.

Significance

Early in the development of the dairy industry, the City of Richmond took an active role in insuring that its citizens had milk free of disease and contamination, and the construction of sanitary dairy barns and dairy-related buildings was one of their first initiatives. The evolution of the dairy industry's sanitation standards is reflected in the design and construction of the Richmond milkshed dairy barns.

The Richmond milkshed dairy barns may be eligible for listing in the National Register of Historic Places under **Criterion A** for their association with the development of the dairy industry at a local and state level. The dairy barns, along with the milk houses and silos, are important physical manifestations of the

history and evolution of Richmond's dairy industry. The dairy barns reflect the evolution of the sanitation measures adapted by the city to provide safe milk products.

Dairy barns that were directly and significantly associated with individuals who played an important role in the development of the dairy industry in Richmond or in important social events that may have occurred at the dairy farm may be eligible for listing in the National Register under **Criterion B**.

The Richmond milkshed dairy barns may be eligible for listing in the National Register under **Criterion C** as examples of a distinctive building type, built according to nationally recognized standard plans. In 1917 the Dairy Inspector of the City of Richmond reported that all the dairy barns in the Richmond milkshed met the city's design standards.

The Richmond milkshed dairy barns are unlikely to yield important archaeological information about prehistory or history and are therefore not likely to be eligible for listing in the National Register under **Criterion D**.

Integrity

A Richmond milkshed dairy barn should retain its original **location** to be eligible for the National Register, and a rural **setting** is also key to the integrity of the dairy barn. In addition to being part of an agricultural landscape, the dairy barn should retain its integral milk house and silos. Although the milk house and silo are important elements to the dairy, earlier dairy barns, dating from the turn of the century, that may never have had milk houses and silos may therefore still be eligible.

The **design** of a Richmond milkshed dairy barn, including its siting, plan, massing, and fenestration, should remain intact. The integrity of a dairy barn's interior layout is important to its integrity of design. The interior space should be clearly defined by three aisles.

The presence of original exterior **materials** is paramount to a dairy barn's integrity. Weatherboard siding, concrete block, and metal roofs and windows are significant exterior building materials. On the interior, the dairy barn must at least retain the original concrete ramps, floors, gutters, and mangers, as well as the metal milking stanchions. Interior walls and ceilings should be clad in drywall or a similar material that is easily cleaned.

For Richmond milkshed dairy barns to qualify for listing in the National Register under this context, the barns must have a direct **association** with the Richmond dairy industry. The dairy barn must have functioned as a dairy barn and supplied milk products to the city of Richmond.

Dairy barns that are eligible for listing in the National Register under Criterion C should have integrity of design, materials, and workmanship of those features that characterize the Richmond milkshed dairy barn type. Properties do not necessarily require integrity of association/feeling, location, or setting to be eligible under Criterion C. Dairy barns that are significant under Criterion A or B should have integrity of materials and feeling/association, and should retain some aspects of design and workmanship, i.e., enough integrity to convey the period of significance.

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