Washburn-Crosby Milling Complex,
West Engine House
701-709 South First Street
Minneapolis
Hennepin County
Minnesota

HABS No. MN-69-C

HABS
MINN,
27-MINAP,
20-C-

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Buildings Survey
National Park Service
Rocky Mountain Regional Office
Department of the Interior
P.O. Box 25287
Denver, Colorado 80225

HABS
MINN,
27-MINAP,
20-C-

HISTORIC AMERICAN BUILDINGS SURVEY

WASHBURN-CROSBY MILLING COMPLEX,
WEST ENGINE HOUSE

HABS No. MN-~~69C~~ 69-C

Location: 701-709 South First Street (Southwest side of South First Street, between Portland and Eighth Avenues), Minneapolis, Hennepin County, Minnesota.

USGS Minneapolis South Quadrangle, Universal Transverse Mercator Coordinates: Zone 15; 479740:4980480; 479860:4980420; 479820:4980360; 479700:4980400

Present Owner: Riverside Industries, Inc.
P.O. Box 1125
Minneapolis, Minnesota 55440

Present Occupant: None.

Present Use: Vacant.

Significance: The West Engine House, as part of the Washburn-Crosby Milling Complex, was an integral part of the milling process. The increased capacity of the "A" Mill, rebuilt in 1880, and the seasonal fluctuations in water power made it necessary to add an auxilliary power source. The engine house was designed to accommodate a 1000 hp steam engine for the west milling unit of the "A" Mill. Described as one of the finest steam plants in the United States, it became a model for the flour milling industry.

PART I. HISTORICAL INFORMATION See HABS No. MN-69 for general information.

A. Physical History:

1. Date of erection: 1884. Building permit dated September 20, 1884 indicates an expected completion date of November 1, 1884. An account in the Northwestern Miller on February 13, 1885 indicates that the steam engine is in place.

2. Architect: Not known.

3. Original and subsequent owners: The following is a chain of title to the land on which the Engine House stands. Reference is to the Hennepin County Recorder and Register of Deeds, Hennepin County Government Center, Minneapolis, Minnesota.

1890 Deed August 21, 1890, document #128160, recorded in book 315, page 545.
Gysbert Van Steemoyle
To
C.C. Washburn's Flouring Mills Co.

1899 Deed September 11, 1899, document #298295, recorded in book 514, page 105.
C.C. Washburn's Flouring Mills Co.
To
Washburn Crosby Co.

1928 Deed July 31, 1928, document #1492724, recorded in book 1142, page 317.
Washburn Crosby Co.
To
General Mills, Inc.

1968 Oeed December 27, 1968, document #3756097, recorded in book 68, page 3756097.
General Mills, Inc.
To
Riverside Industries, Inc.

4. Builder, contractor, suppliers:

a. Builder: Not known, indicated on the building permit only as day work.

b. Suppliers: Supplier of building materials not known. Compound condensing engine supplied by William Wright of NewBurgh, New York.

5. Original plans and construction: The earliest plans and drawings located are from a survey made January 1898. These drawings are part of the archives of General Mills, Inc. Several lithograph drawings dated ca. 1890 reveal that the building was constructed as shown on the plans.

6. Alterations and additions: The West Engine House has remained relatively intact. A single story building to the north, the engineer's tool room has been altered to become part of the office.

B. Historical Context:

The Washburn-Crosby Milling Complex established by Cadwallader C. Washburn in the 1870's was destroyed by an explosion in 1878. Technological innovations culminated in the 1879 construction of the C Mill, the first automatic, all-roller gradual reduction mill in the nation. In 1880 the "A" Mill was equipped in the same way and production capacity was greatly increased. A plentiful supply of wheat and high demand for flour also supported the increased production. Problems were encountered with seasonal fluctuations in the flow of water and often the mill was shut down for lack of power. It became necessary to install a steam engine for auxiliary power. The solidly constructed stone building housed a 1000 hp compound condensing engine. The engine from the William Wright Company weighed 56,000 pounds and had a 20 foot diameter flywheel. Installed in February of 1885 and started up the following month, it supplied power to the west milling unit of the "A" Mill. Continued growth helped make Washburn-Crosy, and later General Mills, leaders in the milling industry.

PART II. ARCHITECTURAL INFORMATION

A. General Statement:

1. Architectural character: The Engine House is a simple rectangular structure of heavy rusticated stone. The three bay facade of the building has round arched openings, one in each bay which run vertically through the full two stories.

2. Condition of the fabric: The exterior masonry is sound although an accumulation of paint is cracked and peeling. Windows are broken and boarded up. Condition of the roof and interior have not been determined.

B. Description of Exterior:

1. Overall dimensions: The two story building is 38 feet wide, divided into three equal bays. The depth is 42 feet. The structure abuts the Washburn "A" Mill.

2. Foundations: The two foot thick foundation walls are constructed of rough cut stone blocks.

3. Wall construction: Wall construction is the same as that of the foundations.

4. Structural system: Exterior stone walls are load bearing. Interior structural system is not known.

5. Doorways and doors: The door is located within the north bay opening. This yellow painted wood door is not original to the structure.

6. Windows: Within the north bay opening the top one-third is filled by two windows of six panes each. The middle one-third is boarded up and the lower one-third has one window of four panes to the north of the door. Within the middle bay glazing runs the full two stories with six large four-pane windows. Within the south bay the top one-third is boarded up and the lower two-thirds are filled by four-pane windows.

7. Roof:

   a. Shape, covering: The roof of the structure is slightly sloped away from the "A" Mill. The original roof was indicated as gravel. No observation was able to be made of the existing roof.

   b. Cornice: A plain metal cornice runs along two sides of the building. Some green paint remains on the cornice. A metal railing also runs along the northeast side of the roof.

C. Description of Interior: Not accessible.

D. Site:

1. General setting: The Engine House faces northwest onto a vacant lot. The back of the Engine House abuts the "A" Mill and the northeast side abuts the three story Mill Office building and a small one story structure of unknown origin.

2. Outbuildings: None.

3. Landscape, enclosures: The lot has no major features and is used for parking.

PART III. SOURCES OF INFORMATION

A. Original Architectural Drawings: C.C. Washburn's Flouring Mills Co., From Survey made January 1898, Archives of General Mills, Inc., Minneapolis, Minnesota.

B. Early Views: From the collections of the Minnesota Historical Society, Saint Paul, Minnesota. Two views dated ca. 1890, showing the Washburn Milling Complex. One photograph dated 1971 showing the office and engine house area.

C. 8ibliography:

1. Primary and unpublished sources:

Oeed records, #128160, #298295, #1492724, #3756097, Hennepin County Recorder and Register of Oeeds, Hennepin County Government Center, Minneapolis, Minnesota.

Building Permits: #A38, #A33709, Department of Insepctions, Minneapolis, Minnesota.

2. Secondary and published sources:

Edgar, William C., The Medal of Gold, Minneapolis; The Bellman Company, 1925.

The Minneapolis Tribune, Saturday, February 21, 1885, Article page 3.

The Northwestern Miller, Local and Personal Columns for January 30, 1885; February 13, 1885; February 20, 1885; March 6, 1885; March 13, 1885; April 10, 1885; April 17, 1885; May 8, 1885.

Sanborn Insurance Maps: maps for 1885, 1904, 1912, 1949, The Sanborn Insurance Company.

Prepared by:
Pamela J. Bakken
University of Minnesota
March 1986

PART IV. PROJECT INFORMATION

This project was prepared as a class project for Architecture 5142, Historic Building Research and Documentation, a class offered in the School of Architecture and Landscape Architecture at the University of Minnesota, Minneapolis, Minnesota. The class project was prepared under the direction of Professor Foster W. Dunwiddie in cooperation with the State Historic Preservation Office of the Minnesota Historical Society, Saint Paul, Minnesota. Historical data was compiled by Pamela J. Bakken, University of Minnesota, March 1986.

ADDENDUM TO:
WASHBURN-CROSBY MILLING COMPLEX, WEST ENGINE HOUSE
701-709 South First Street
Minneapolis
Hennepin County
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HABS MN-69-C
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PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

FIELD RECORDS

HISTORIC AMERICAN BUILDINGS SURVEY
National Park Service
Rocky Mountain System Support Office
12795 West Alameda Parkway
Denver, Colorado

HISTORIC AMERICAN BUILDINGS SURVEY

ADDENDUM TO:
WASHBURN-CROSBY MILLING COMPLEX
WEST ENGINE HOUSE

HABS No. MN-69-C

This historical report is an addendum to a 5 page report that was previously transmitted to the Library of Congress.

Location: 701-709 South First Street, Minneapolis, Hennepin County, Minnesota

Latitude: 44.974531, Latitude: -93.266790. This coordinate was obtained by inputting the above address into Google Earth on 13 February 2012. The location of the West Engine House has no known restrictions on its release to the public

Date of Construction: 1884-1885

Engineer: William De la Barre, consulting engineer

Present Owner: Minnesota Historical Society
345 Kellogg Boulevard West
Saint Paul, Minnesota 55101

Present Occupant: Mill City Museum

Present Use: Vacant

Significance: The West Engine House was added to increase the motive power of the Washburn "A" Mill during a period of rapid expansion for the Washburn Crosby Company and the flour-milling industry at Saint Anthony Falls. The West Engine House accommodated the first of two identical 1,000 horsepower steam engines installed at the Washburn-Crosby complex in 1885; together, the engines made up one of the finest industrial steam plants in the nation. The West Engine House represents the steam-power period of the milling district's history, bridging the gap between the waterpower that founded the industry at Saint Anthony Falls and modern electricity.

Project Information: This report is an addendum to a five-page report transmitted to the Library of Congress in 1986. The West Engine House will be renovated for use as an interpretive theater by the Mill City Museum, which occupies the "A" Mill. Before beginning construction, the Minnesota Historical Society hired Hess, Roise and Company to prepare an addendum to the original

HABS documentation, which was completed in 1986 by Pamela J. Bakken, a University of Minnesota student, as a class project. Tom Pfannenstiel oversaw preparation of the addendum for the Minnesota Historical Society. Photographer Jerry Mathiason, as a subcontractor to Hess Roise, completed the photography in June 2005.

PART I. HISTORICAL INFORMATION

See HABS No. MN-69 for general information.

A. Physical History:

1. Date of erection: 1884. A building permit for the structure was issued on September 20, 1884. Historic newspaper accounts indicate that the West Engine House construction was completed by mid-December 1884 and that the engine was installed from January to March 1885. The engine was fully operational in April 1885.

2. Architect: Not known.

3. Original and subsequent owners: Part B of this report contains the chain of title for the property for the period from 1890 to 1986. The Washburn Mill Complex was designated a National Historic Landmark (NHL) in 1983 and was purchased by the City of Minneapolis for redevelopment through the Minneapolis Community Development Agency (MCDA) in 1988. One decade after a catastrophic fire in February 1991, the Mill City Museum was constructed within the ruins of the Washburn "A" Mill. Ownership of the property was transferred from the MCDA to the Minnesota Historical Society in 2001.

4. Builder, contractor, suppliers:

   a. Builder: The building permit lists the builder as "day work," suggesting that the construction was completed by day laborers supervised by someone from Washburn Crosby.

   b. Suppliers: The supplier of the building materials is not known. The compound condensing engine was manufactured by William Wright of Newburgh, New York, and the boiler equipment (housed separately) by Butman Furnace Company of Cleveland, Ohio.

5. Original plans and construction: The earliest known plans and drawings are from a survey made in January 1898. These drawings are at the archives of General Mills, Inc., in Golden Valley, Minnesota, and photographic copies of them are available at the Mill City Museum in Minneapolis.

6. Alterations and additions: The exterior walls of the West Engine House have remained relatively intact, but the roof, window openings, and interior have been modified by remodeling, fire damage, and partial demolition.

B. Historical Context:

Introduction
Once integral to the industrial power of the Washburn Crosby Company flour mills, the West Engine House of the Washburn "A" Mill is now dilapidated, the result of a disastrous fire in 1991. The building was one of three erected between 1884 and 1894 to shelter steam engines that supplemented the waterpower of Saint Anthony Falls. The Washburn Crosby Company—which became General Mills in 1928—grew remarkably beginning around 1880 as the company developed innovative milling techniques and dynamic marketing methods. Steam power helped the company keep pace with consumer demand by increasing the efficiency of the milling machinery and continuing operation when low river flow or waterwheel repair would have idled equipment. After the turn of the twentieth century, hydroelectric power transmitted from Saint Croix Falls supplanted the steam engines. The enormous West Engine House steam engine was removed and replaced with a 400 horsepower General Electric motor, which is still on display in the museum. The evolution of the mill's motive power from water to steam to electricity was typical of the company's approach to innovation and expansion, and is exemplified in the building alterations and the chronology of the West Engine House machinery.

The Washburn Crosby Company at Saint Anthony Falls
Milling was first attempted at Saint Anthony Falls by frontier soldiers from Fort Snelling who built a waterpowered gristmill on the west bank of the Mississippi River in 1823. The soldiers were inexperienced millers and their efforts resulted in flour of such poor quality that the troops who ate bread made from it complained bitterly. Nevertheless, the government mill was the only one within the boundaries of present-day Minnesota and continued to be used for grinding wheat and corn until 1849, when the property was sold to Robert Smith, a congressman from Illinois. During the 1850s, as settlers began to arrive in the fledgling towns of Saint Anthony and Minneapolis, several merchant mills were established at the falls. Although the flour produced from the local spring wheat was regarded as inferior to that of winter wheat, early Minneapolis millers were able to sell their flour on the East Coast of the United States, first reaching consumer markets that later proved significant in the growth of the local milling industry.

In 1855, Smith sold his property on the west bank of the river to Cadwallader C. Washburn, a fellow congressman from La Crosse, Wisconsin. C. C. Washburn established the Minneapolis Mill Company to lease waterpower rights to mill operators and branched into milling himself in 1866, when he ordered the construction of a six-story, limestone structure. Called the Washburn "B" Mill, but disparagingly referred to as "Washburn's Folly" by those who doubted the viability of the new industry, the building was the largest flour mill east of Buffalo, New York. Washburn formed a series of partnerships with George Christian to operate the mill, which was outfitted with twelve "run of stone" and could turn out about 840 barrels of flour a day, three to four times more than neighboring mills. The "B" Mill was located along South Second Street, two blocks from the Mississippi River (Figure 4). Water to run the mill was drawn through a long headrace tunnel that ran from a canal along First Street to the wheel pits under the mill building. A tailrace tunnel returned the water to the river below the falls.[1]

The production capability of the Washburn "B" Mill expanded in the early 1870s as "New Process" methods were developed and refined at the mill. In this process, conceived by miller George Christian and inventor Edmund LaCroix, the hard berries of locally grown spring wheat were cracked on traditional millstones set relatively far apart and run at a low velocity, in contrast to the close-set millstones and fast grinding methods of the old process. The cracked bran was removed from the kernels of grain by air purifiers, which separated the lightweight bran flakes from the "middlings." The middlings were then ground on one or two more sets of millstones, gradually reducing the wheat to fine, speck-free, high-gluten flour. Additional mechanized equipment such as bolters (which sifted the flour between reductions), wheat cleaners, conveyors, and elevators automated the process, reducing the need for human labor and increasing capacity. The New Process revolutionized the industry and started Minneapolis on its ascent as a flour-milling capital.[2]

A second Washburn facility, the "A" Mill, was constructed along the canal to the north and east of the existing "B" Mill. Completed in 1874 and outfitted with the most modern New Process machinery available, the six-and-a-half-story building measured 138' long and 100' wide. The "A" Mill was one of the largest mills in the world at the time, with a capacity three times that of the earlier "B" Mill. The increased output of the Washburn mills was met by skyrocketing demand, as New Process flour was shipped throughout the United States and exported to Great Britain. In the spring of 1878, shortly after Washburn partnered with his brother William D. Washburn and John Crosby to form Washburn Crosby and Company, a large addition was begun to the west side of the "B" Mill. The addition was nearly completed when a flour-dust explosion destroyed the Washburn "A" Mill and five neighboring buildings on May 2, 1878. The "B" Mill, located in the far corner of the Washburn property away from the "A" Mill, was relatively unscathed. Following the explosion, high priority was given to the completing the "B" Mill addition, which was named the "C" Mill when it was finished in 1879. Work on reconstructing a larger "A" Mill also began immediately.

The "C" Mill was hastily equipped to restore the company's production after the explosion. When a vacant space at the south end of the addition was discovered, Washburn and Christian had it equipped with roller mills—already used in Hungary, the milling capital of Europe—in order to compare production output with that of the millstones. The "C" Mill became commonly referred to as the "experimental mill" due to its trial run of roller machinery. The substitution of

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[1] William C. Edgar, *Medal of Gold* (Minneapolis: Bellman Company, 1925), 12.
[2] John Storck and Walter Dorwin Teague, *Flour for Man's Bread* (Minneapolis: University of Minnesota Press, 1952), 212.

rolls for millstones proved successful, increasing the productive capacity and lowering costs by requiring less dressing and maintenance than the millstones. Coupled with the New Process innovations, rollers transformed flour milling. When the new, enlarged "A" Mill was completed and furnished in 1881, it was equipped with roller machinery, securing the Washburn Crosby Company's dominance in the industry. [3]

Although equipment in the Washburn mills was innovative, the power behind the operation was as old as time. The direct waterpower at Saint Anthony Falls was harnessed beginning in the mid-nineteenth century for sawmilling, paper milling, other manufacturing industries, and small-scale flour milling. The Minneapolis Mill Company formed by Washburn in 1856 constructed canals and related infrastructure to convey the water to mill sites on the west side of the river, and administered leases allocating the water to the industries. Direct waterpower provided a very economical means of industrial energy for the Washburn Crosby Company and the other flour mills of the West Side Milling District, and was a critical factor in the growth of the flour-milling business in Minneapolis. In the first volume of *A History of Industrial Power in the United States, 1780-1930*, Louis C. Hunter discusses the important relationship between waterpower and the emerging industry:

> The large merchant flour mills that came into prominence in the late [nineteenth] century marked a kind of halfway point in the transition from water mills of the traditional kind to the factories of the new industry. Large in scale, market-oriented and profit-motivated, such mills had little more in common with the country gristmill than the material processed and the grinding operation. In the merchant mill the extension of mechanization from grinding to the cleaning, cooling, bolting and packing operations, and to handling operations throughout added very substantially to power requirements. Power was required not only to perform the several operations themselves but . . . to accommodate the enlargement of capacity resulting from all these improvements.[4]

The Washburn mills, by their sheer size as well as their innovation, were prime examples of the growth in the flour-milling industry and their need for power only increased as the machinery was refined and capacity expanded.

New Power for a Growing Industry

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[3] Edgar, *Medal of Gold*, 105. For a more thorough history of the Washburn Crosby Company, see the National Historic Landmark documentation for the Washburn "A" Mill Complex (1983) and the initial Historic American Buildings Survey documentation, HABS No. MN-69, prepared in 1986 by Gary Anderson, Patricia Anderson, Kevin Donahue, and Lisa McNelis as a project for the class "Historical Building Research and Documentation" at the University of Minnesota, under the direction of Professor Foster W. Dunwiddie. The "A" Mill was immense and only the upper half of the building was equipped at first, the remainder was equipped in 1891.
[4] Louis C. Hunter, *A History of Industrial Power in the United States, 1780-1930*, vol. 1, *Waterpower* (Charlottesville: University Press of Virginia, 1979), 113.

As gradual-reduction, all-roller milling techniques were refined in the late 1870s and early 1880s, periodic disturbances in the river flow hampered flour production at a time when the industry was enjoying both an increase in demand for its product and a dramatic rise in capacity. The *Northwestern Miller* typically gave a weekly account of the local flour output, correlating production to the water level at the falls. The "Local and Personal" columns from the early months of 1885 indicate that low-water conditions caused several of the mills to shut down for lack of power. The January 30 issue of the journal included many examples, and the local column concluded with an endorsement of steam power:

> As it has been pretty conclusively established this season that waterpower, no matter how good it may be, cannot be depended upon in the winter, it is quite probable that several more of the larger mills on the falls will supplement their waterpower with steam power in the spring. J. B. Bassett, of the Columbia Mill, on Monday informed us that his company would never undertake to go through another winter without steam, and that it would put in an engine next summer. Hinkle, Greenleaf and Company, whose Humboldt Mill is the most seriously affected of any in the city, are also understood to have concluded to put in steam. There are likewise other firms that have made up their minds that steam power is indispensable as an adjunct to waterpower, and while not yet ready to bargain for the same, they expect to reach that point in a few months.[5]

The Pillsbury Company, Washburn Crosby's chief rival at Saint Anthony Falls, was the first to augment its waterpower with steam engines. The Pillsbury "A" Mill acquired a 1,400 horsepower steam engine in the early winter of 1884, only three years after the mill's initial construction. Pillsbury's Anchor Mill obtained a smaller steam engine in September of that year. These engines allowed the two Pillsbury mills to operate steadily through the winter, putting the company at a clear advantage.

Two more steam engines—at the Pettit and Palisade Mills—came online in January 1885. With four steam engines in operation, the Minneapolis flour mills achieved production exceeding the previous winter's output, but still short of full capacity. In what proved to be a prophetic statement, the *Northwestern Miller* declared towards the end of that winter that "steam is already quite a factor in the situation, and will become more so shortly."

In September 1884, the Washburn Crosby Company had purchased a site between its "A," "B," and "C" Mills for the planned construction of two engine houses and a boiler house (Figure 4). The installation of the two Washburn engines in the spring of 1885 brought the total number in

Minneapolis to six. By 1892, ten more mills in the area were fitted with auxiliary steam power, leaving only five that relied solely on the flow of the river. The security of a steady power source

[5] "Local and Personal: Happenings In and About the World's Milling Centre," *Northwestern Miller* 19 (January 30, 1885): 101. This column is hereafter cited as "Local and Personal."

allowed the Minneapolis mills to continue to invest in machinery upgrades while maintaining high production levels year-round, ultimately securing the city's place as the flour-milling capital of the world.[6]

Supplementary steam power was a logical progression for the industry. During the period immediately following the Civil War, steam engines emerged as a primary source of industrial power elsewhere in the United States. By 1870, slightly more energy was drawn from steam engines than from flowing water in most of the country, although in Minnesota approximately 60 percent of industrial equipment was waterpowered. Steam became the standard more quickly in other parts of the country where the terrain was flat and the waterpower inadequate to run machinery. Of the six states that were large flour producers, Minnesota, New York, and Pennsylvania were the most dependent on waterpower; Illinois, Indiana, and Missouri relied more heavily on steam power. During the final decades of the nineteenth century, the proportion of steam power in Minneapolis increased until it exceeded waterpower.[7]

Construction of the Washburn-Crosby Steam Plant

Favorable waterpower leases allowed the Washburn-Crosby mills to be the first to draw water from the canal, so the company could maintain a high level of production even during times of low water flow. Yet, anticipating that waterpower would be unable to meet the long-term demands of the growing industry, the company pursued auxiliary steam power. William De la Barre, an Austrian engineer who came to Minneapolis to assist C. C. Washburn in the selection of a flour-dust exhaust system following the "A" Mill explosion, was entrusted with the task of finding the right engines for the new steam plant. Plans for the facility were well underway by September 5, 1884, when the *Northwestern Miller* reported:

> It is now pretty certain that steam power will be put in for the Washburn "A" and "C" Mills. [William] De la Barre and [A. M.] Bailey leave in a few weeks on a trip to investigate the merits of different makes of engines, and as soon as they report, it is expected that two engines will be ordered. One will be of 1,000 horsepower for the upper or larger half of the "A" Mill, and the other of 750 horsepower for the "C" Mill. Excavations for the engine and boiler houses have already been commenced. They will be located on the upper side of the "A" Mill, and will consist of two engine houses and one boiler house. The former will be thirty-five by forty-five and twenty-five by forty feet respectively, and the latter seventy by seventy-seven feet. All buildings will be one story high, and the

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[6] "Local and Personal," *Northwestern Miller* 19 (January 23, 1885): 77; Storck and Teague, *Flour for Man's Bread*, 254.

[7] Storck and Teague (*Flour for Man's Bread*) and Lucile M. Kane, *The Falls of Saint Anthony* (Saint Paul: Minnesota Historical Society Press, 1987) both discuss the rise in prominence of steam power.

> engine buildings constructed of stone, and the boiler house of brick. The boiler house will contain thirteen steel boilers. The time within which it is expected to have the steam power ready for use is four months, and the total cost of the improvement is estimated at $70,000.[8]

The paper continued to report on the project's progress in the following months. The boiler house was completed by the beginning of October, a "solid and handsome structure" of white brick with an iron roof sited between the First Street canal and the train trestle that traversed the Washburn-Crosby complex. Construction of the West Engine House and the "C" Mill Engine House started shortly thereafter. On December 12, the *Northwestern Miller* reported that the buildings were ready to be fitted with machinery.[9]

De la Barre and Bailey decided to order engines from William Wright and Company in Newburgh, New York. William Wright claimed to have invented a rotative, automatic cut-off valve while an employee for Corliss, Nightingale and Company in Providence, Rhode Island, in 1849. This valve, which subsequently modernized steam engine design, was utilized on Wright-designed engines on Civil War gunboats, including the storied *Kearsarge* and the pumping engines of the Brooklyn Water Works. Wright founded his own engine works in Newburgh in 1870 and built engines under patents issued in 1866, 1878, and 1880. Wright engines were used primarily in industrial applications throughout the United States. The manufacturer had already installed at least two engines in the Twin Cities, both at the Saint Paul Warehouse and Elevator Company, in 1883.[10]

Initially, De la Barre and Bailey planned to purchase engines of two different sizes, as reported in the *Northwestern Miller*. When they returned from their trip to New York, the milling journal stated that they had ordered 1,100 and 900 horsepower engines from Wright. Ultimately, though,

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[8] Quote taken from "Local and Personal," *Northwestern Miller* 18 (September 5, 1884): 223; Edgar, *Medal of Gold*, 122. More information about De la Barre is available in the manuscript biographies and personal papers collections at the Minnesota Historical Society (MHS). Little is known about A. M. Bailey other than that he was an employee of the Washburn Crosby Company who became one of the members of the capital holding corporation formed in 1887 following the death of C. C. Washburn.

[9] "The Mississippi River and Some of its Tributaries," *Water-Power in the United States* (n.p., n.d), 175; "Local and Personal," *Northwestern Miller* 18 (1884): 223, 247, 319, 439, 569.

[10] E. M. Ruttenber and L. H. Clark, *History of Orange County, New York, with Illustrations and Biographical Sketches of Many of its Pioneers and Prominent Men*, vol. 1 (Philadelphia: Everts and Peck, 1881; repr., Interlaken N.Y.: Heart of the Lakes Publishing, 1980), 364 (citations are to the Heart of the Lakes edition); John J. Nutt, *Newburgh, Her Institutions, Industries, and Leading Citizens: Historical, Descriptive, and Biographical* (Newburgh, N.Y.: Ritchie and Hull, 1891; repr., Newburgh: Patricia A. Favata, 1992), 242-243 (citations are to the Favata edition); Hubert E. Collins, "Setting the Valves of the Wright Steam Engine," *Power* 29 (1908): 1-6; Susan McCown, "William Wright House," HABS No. NY-5689, May 12, 1980. The article in *Power* explained how to set engine valves and included detailed diagrams of the operation of a Wright automatic cut-off engine patented in 1873, indicating that many Wright engines were still in use in 1908. The article, though, does not mention specific examples or locations. Wright's residence, a Carpenter Gothic-style house built ca. 1860 in Newburgh, was photographed prior to its demolition in 1975; a documentation report for HABS/HAER was submitted in 1980. The report states simply that "William Wright was a prominent inventor and engineer in the field of steam engineering."

two identical, 1,000 horsepower engines were installed at the Washburn-Crosby complex, with the practical advantage of interchangeable parts. Typical of the contemporary reverence for large pieces of industrial machinery, the engines were named: the "C. C. Washburn" in the case of the "A" Mill engine, and the "John Crosby" for the "C" Mill apparatus.

Installation of the engine in the West Engine House (in the "A" Mill) began in January, as anticipated, but was not completed in time to relieve the strain from the low water. The *Northwestern Miller* noted on January 23 that a crew was working on the engine night and day, but that it would not be ready for use until the middle of February. The powerful engine got off to a faltering start the following week, pushing the estimated date it would be placed in service back to March 1. By the end of March, the engine still was not running properly. Throughout this period, the half of the "A" Mill that was to be powered by the engine was shut down due to low water at the falls. According to the March 27 issue of the *Northwestern Miller*:

> Considerable trouble is being experienced in getting the new William Wright engine of the Washburn "A" Mill started. It has been run twice for a few hours, and has both times melted the brass, or rather the soft metal out of the brass in the main bearing so badly as to necessitate jacking up the main shaft to get the brasses out and redress them. As the shaft, with face plates, fly wheel, etc., weighs over forty tons, the job is a troublesome one, aside from the annoyance caused by the failure to start the engine at the time agreed upon, as it is of course needed during the present scarcity of water.[11]

James Wright, superintendent for the William Wright engine works, visited Minneapolis during this period to address the problems with the installation. A new kind of bearing was substituted for the brass bearings in the engine, which was finally functioning in early April. By this time, though, the hydraulic turbines were running the machinery in the "A" Mill, thanks to a spring thaw that had increased the level of the Mississippi.[12]

James Wright also may have assisted with the installation of the "C" Mill engine, which was underway at the time of his visit. The milling journal reported on May 8 that the second Wright engine had run for several days and its performance was satisfactory. Once both engines were in place, the *Northwestern Miller* proclaimed that the Washburn mills had one of the finest steam plants in the country. The delay may have increased the company's costs—the *Minneapolis Daily Tribune* and *Northwestern Miller* reported that the purchase of the engines and the

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[11] "Local and Personal," *Northwestern Miller* 19 (March 27, 1885): 293.
[12] "Local and Personal," *Northwestern Miller* 19 (April 10, 1885): 341.

construction of the associated facilities were $10,000 to $25,000 above the $75,000 budgeted—and it likely affected profits, as well.[13]

The delay did not appear to hurt local sales of the Wright engines, though. Many milling companies were pursuing steam power at this time. The *Northwestern Miller* noted on May 22 that a number of engine manufacturers, including Wright, had recently visited the city. Feature articles about the Washburn-Crosby engines printed in February and May 1885 probably intrigued rival mills. The company ran large advertisements in subsequent issues of the *Northwestern Miller* promoting "Wright's Patent Automatic Cut-off and Compound Steam Engine, Wm. Wright, Patentee and Builder," featuring an illustration of one of the Washburn-Crosby engines. Following completion of the West Engine House and "C" Mill engines, the Wright Company secured at least two more contracts in Minneapolis. The Crown Roller Mill installed one Wright engine in 1885 and a second one four years later.[14]

Operation of the Washburn-Crosby Wright Engines

Steam for the engines was generated at the boiler house, located directly adjacent to the First Street canal, in steel coal-heated boilers manufactured by the Butman Furnace Company of Cleveland, Ohio. Coal was delivered by hopper railcars to a brick coal house measuring 30' x 60'. Built in May 1885 on the south side of the boiler house, the coal house was located directly under the railroad trestle that crossed the Washburn-Crosby complex and ran through the center of the "A" Mill. Water for the boilers was drawn directly from the canal, which proved to be a weakness of the system. When the river was low and waterpower was limited, steam production was also restricted by the shortage of water. Several months after the initial installation, equipment was added that used the waste heat going up the chimney to preheat the cold water from the canal, improving the boilers' efficiency.[15]

Each boiler contained fifty-four 4" tubes in a steel tank that was over 5' in diameter and 18' long. It took a battery of four boilers generating 500 horsepower of steam to run each engine. The steam was transmitted under pressure through 10"-diameter iron pipes in underground

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[13] "Local and Personal," *Northwestern Miller* 19 (May 8 and May 15, 1885): 437, 461; "One Thousand Horse Power," *Minneapolis Daily Tribune*, February 21, 1885.

[14] "Saint Paul Elevators," *Northwestern Miller* 15 (May 18, 1883): 462; "Local and Personal," *Northwestern Miller* 19 (April 10, 1885): 341; "The Wind Blew It In," *Northwestern Miller* 19 (May 22, 1885): 496; Demian Hess and Jeffrey A. Hess, "Crown Roller Mill," HABS No. MN-12, January 1990, 14.

[15] R. P. Wallis, "Map of Washburn-Crosby Co., Minneapolis, Minn.," March 7, 1918, available at the General Mills Archives, Golden Valley, Minnesota; "One Thousand Horse Power"; "Local and Personal," *Northwestern Miller* 18 (October 3, 1884): 319; "Local and Personal," *Northwestern Miller* 19 (May 8 and May 22, 1885): 437, 485; Edward P. Burch, "Electrical Engineering in Minnesota," *Bulletin of the Minnesota Federation of Architectural and Engineering Societies* 19 (July 1934): 5. A property plat of the General Mills Minneapolis facility dated May 31, 1939 illustrates the tunnel system in relation to the buildings, and indicates that a tunnel ran between the "C" Mill boiler house and the West Engine House. An article in *Cassier's Magazine* from August 1909 titled "Modern Power Station Design" discusses the relationship between steam plants, boilers, and coal supplies. Although the article was written long after the construction of the West and "C" Mill Engine Houses, many of the desirable characteristics described were employed at the Washburn-Crosby complex.

tunnels running from the boiler house to each of the engine houses. The piping entered the West Engine House at the basement level, where valves and couplings regulated the intake of steam and fed it to the engine above ground.[16]

The appearance of the massive "A" Mill engine, which weighed nearly one hundred tons, was described in the *Minneapolis Daily Tribune* and the *Northwestern Miller*. The flywheel—itself 56,000 pounds—was flanked by horizontal cylinders over 4' in length. The assembled machinery was secured on top of broad piers of limestone and brick in the basement of the West Engine House (Figure 1). The engine was raised above the floor level on pillow blocks and steel girder bed plates, patented by Wright, which distributed the lateral strain of the engine and stabilized its movement, allowing it to operate more efficiently. A center trough accommodated the moving shafts and bearings, and a hole in the floor contained the rotating flywheel. The engine practically filled the interior of the building.[17]

The operation of the automatic cut-off, compound steam engine was described by the press, as well. High-pressure steam entered a 30"-diameter cylinder on the right side of the engine. The cylinder was fitted with a governor, said to be another of Wright's patented designs. The governor regulated the speed of the engine by adjusting the apertures of the rotating valves that admitted steam to the cylinder, reducing the supply as the speed increased and causing the engine to slow.[18] The rotating valves cut off the steam with every stroke, which allowed the steam to expand within the cylinder and push the piston, producing extra work and increasing the efficiency of the engine. The steam was exhausted from the high-pressure cylinder to a larger, 56"-diameter, low-pressure cylinder on the left side of the engine. The steam from this cylinder was exhausted into a condenser, which produced a vacuum that also acted upon the piston. The pistons in the two cylinders worked opposite each other, operating rods connected to crankshafts that turned the 20'-diameter flywheel located in the center of the engine.

The flywheel, which was capable of operating at over sixty revolutions per minute, ran two flat leather belts, each 40" wide. The belts traveled about 4,300 feet per minute through an opening in the west wall of the "A" Mill to a pulley 9'-6" in diameter. The pulley transferred the power to

vertical shafts that ran the belt-driven milling equipment on the upper floors of the mill. The steam engine could operate in tandem with the mill's original hydraulic turbines, located in deep

[16] "One Thousand Horse Power."

[17] "Giants at Work," *Northwestern Miller* 19 (May 1, 1885): 418. A survey plan of the Washburn "A" Mill dated 1898 (Figure 1) shows the size of the engine relative to the West Engine House interior.

[18] The governor was an apparatus consisting of a belt connected to the engine that spun an upright shaft to which two balls were attached. As the engine speed increased, centrifugal force would cause the balls to swing outward and partially close a valve to the cylinder.

wheel pits underneath the north end of the building, or the belts could be slipped off the pulley when the waterpower was sufficient for the mill's needs.[19]

The engine for the "C" Mill was operational in early May 1885, and presumably had a set-up similar to that of the "A" Mill. The Washburn Crosby Company continued to grow in the following decade, as did its power needs. The "A" Mill was not fully equipped at the time of the steam engine's installation and the engine supplied auxiliary power only to the upper half of the mill. In 1891, roller mills were installed in the remainder of the mill, replacing the few remaining millstones still in use. The west side of the "A" Mill was remodeled with new equipment in 1893 and the overall increase in capacity required a third steam engine, added in 1894.[20]
The East Engine House (HABS No. MN-69-F, still extant but substantially altered), was constructed on the east side of the "A" Mill to meet the new power requirements. The brick building housed a triple-expansion vertical steam engine purchased by A. H. Brockman, Washburn Crosby's chief engineer at the time, after he viewed the engine at the 1893 Columbian Exposition in Chicago. Capable of developing 1,200 to 1,500 horsepower, the engine powered the fair's pioneering Ferris wheel before assuming a more utilitarian purpose at the newly expanded "A" Mill. The engine, manufactured by the Schichau Company in Germany, was an unusual type for the milling industry and particularly well-engineered. It received a great deal of press and was in use until the mid-twentieth century, far outlasting its contemporaries in the Minneapolis milling district.

The Development of Hydropower at Saint Anthony Falls
Even as the potential of steam power was being realized, another power source was emerging that would soon eclipse the mighty steam engine. Beginning in the 1880s, hydropowered turbines were put in place at Saint Anthony Falls, generating electricity for the growing city of Minneapolis. The falls were first put to such a use when the Pillsbury Company installed arc lamps in its "A" Mill in 1881. The following year, the river's hydroelectric potential was evident again when the Minneapolis Brush Company built a small generating station to power five arc-light machines illuminating commercial and public spaces near downtown. After experiencing the fickle effects of the river, the fledgling power company moved upriver and installed steam engines to run its facilities in 1884.[21]

Further hydroelectric development of the falls languished until 1889, when the two waterpower companies that had formed on opposite sides of the river in 1856 merged to become the Pillsbury-Washburn Company. This company, headed by De la Barre, was the sole entity to

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[19] "One Thousand Horsepower." For an explanation of the transmittal of power within the mills, see Hunter, Chapter 9.
[20] Edgar, *Medal of Gold*, 151, 154; "Washburn A Mill Complex," National Historic Landmark nomination; A. R. Ulstrom, "Power in the Flour Milling Industry," *Midwest Power Conference* (1942), 101; Thomas Wilson, "Twin City Power Plants," *Power* 44 (September 5, 1916): 335-336. The Wright engine in the "C" Mill was replaced with a larger Allis-Chalmers Corliss engine and a rope drive before 1916. The "C" Mill and associated buildings were demolished in 1960.
[21] Kane, *Falls of Saint Anthony*, 145.

oversee the development of waterpower at the falls for both milling and hydroelectric purposes. At first, De la Barre focused on improving the dams, canals, and tailraces that supplied water to the West Side Milling District. In 1894, he sold surplus waterpower rights to the successor of the Minneapolis Brush Company, Minneapolis General Electric. Capitalizing on that sale, De la Barre built a dam and hydropower plant on the east side of the river, below the falls. When completed in 1897, the plant generated 10,000 horsepower of electricity used solely by the Twin City Rapid Transit Company, which operated the regional streetcar system. A second hydropower facility, the Hennepin Island Plant, was completed under De la Barre's supervision in 1908. This plant generated 9,000 kilowatts of electricity for general transmission, using only surplus water during periods when the river flow exceeded the requirements of the existing milling and power industries.

The flour-milling industry continued to grow during the period when hydroelectricity was being generated at Saint Anthony Falls, yet the milling process was still largely dependent on direct waterpower and steam power. Since the electricity from the Hennepin Island Plant was generated by surplus water, it was available only when the mills could achieve ample power from their direct-drive water turbines and was of no real benefit to the milling companies. Further technological development of steam turbines also allowed the mills to upgrade their power capabilities without extensive alterations to their existing facilities.

Washburn Crosby was apparently the first milling company in Minneapolis to install a steam turbine, which generated electric power for handling grain at its new concrete elevator, completed in 1908.[22] Electrical development in the milling district was rapid after that date, according to Maurice Dwight Bell, general superintendent of the Washburn Crosby Company in the 1920s. During the 1910s, additional steam turbines were installed and electrical motors were placed in new mills instead of reciprocating engines. In most cases, the steam turbines generated 300 to 2,000 kilowatts of electricity to run the milling equipment, although it was also possible to connect the line shafts directly to the turbines by means of reduction gears. New boilers with increased steam pressure were also added, along with feed-water heaters, economizers, and other equipment to increase boiler efficiency. Although steam-generated electricity was used only to meet seasonal demand, each mill consumed several hundred tons of coal per day to feed the boilers.[23]

The installation of electrical generators was a significant step in the motive power of the mills, as mechanical changes and wiring prepared the equipment for later electrical upgrades. Bell explained that "when electricity was generated only by reciprocating engines, it was cheaper to use the steam engines as a direct application. With the introduction of the steam engine operating

[22] "Washburn Crosby Milling Complex, No. 1 Elevator," HABS No. MN-69-F, 1991; Maurice Dwight Bell, "Power in the Flour Mills at Minneapolis," *Mechanical Engineering* 50 (November 1928): 834-835.
[23] Bell, "Power in the Flour Mills."

under higher economies and with improvement in generator and motor design, the situation was changed. The number of electrically driven mills [increased] because of the convenience in applying power electrically."[24] Some mills attached motors to the horizontal waterwheel shafts so that when waterpower was insufficient, electric current from steam-driven generators could make up the power deficiency.[25] Motors also were connected so that they could be used as generators when there was an excess of waterpower available, thereby transmitting electrical power to another location, as was the case at the Crown Roller Mill beginning in 1910.[26] Although the ranks of milling equipment were still operated by a central line drive, the motive power had evolved and electricity gained a foothold within the industry.[27]

As local hydroelectric capability and electrical power transmission improved, electricity began to be used more regularly by the flour-milling industry. Hydroelectricity first supplemented other types of power, just as steam power initially augmented direct waterpower. Steam turbines remained at the mills as back-up systems or to handle peak loads, since the production and transmission of hydroelectricity was also subject to the seasonal vagaries of river flow and demand in excess of supply.[28]

The Minneapolis General Electric Company began looking beyond Saint Anthony Falls for hydroelectric-generating locations as the local demand for electricity grew. In 1903, the company began building a hydroelectric station at Saint Croix Falls, Wisconsin. Long-distance transmission lines carrying 60,000 volts of electricity made the plant one of the primary power suppliers to the Twin Cities when it was completed in 1906. By 1910, electricity from Saint Croix Falls was available for use by the Minneapolis flour mills, although the initial contracts were for the purchase of surplus or off-peak power to supplement the waterpower and steam power already in place.[29]

The Washburn Crosby Company appeared reluctant to embrace the emerging hydroelectric technology. In equipping a new mill in Buffalo, New York, in 1903, the company chose to install

two enormous steam engines totaling 5,500 horsepower rather than risk the potentially unreliable hydroelectricity generated at nearby Niagara Falls. By 1919, however, electric transmission was more sure and efficient, and the Buffalo plant abandoned its steam engines altogether in favor of

[24] Bell, "Power in the Flour Mills."
[25] R. D. Thomas, "Water Power Development on the Mississippi River above Saint Paul," *Bulletin of the Affiliated Engineering Societies of Minnesota* 2 (September 1917): 221.
[26] Hess and Hess, "Crown Roller Mill," 17; "N. W. Consolidated to Electrify Mill Units," *Northwestern Miller* 173 (February 15, 1933): 394. Northwest Consolidated, which owned the Crown Roller and Standard Mills, later expanded its facilities to become a small hydroelectric plant by generating electricity for Northern States Power and then leasing back what it needed to operate its mills.
[27] Bell, "Power in the Flour Mills," 836.
[28] Ulstrom, "Power in the Flour Milling Industry," 101.
[29] Edgar, *Medal of Gold*, 221-223; Bell, "Power in the Flour Mills," 835- 836.

electric motors.[30] The company's experience in operating mills elsewhere in the country probably influenced its practices in Minneapolis, and eventually electricity came to be accepted as a reliable power source.

Thomas Wilson, in a 1916 article about the various power installations at Saint Anthony Falls, explained that the "great mills of the Washburn Crosby Company" were operated by a combination of steam power, waterpower, and purchased electricity. The steam capacity was from "6,000 horsepower in heavy-duty Corliss engines, 1,500 horsepower in a triple-expansion marine engine of German manufacture, and the balance of the steam power [was] developed by horizontal turbo-generators."[31] An employee handbook published by the Washburn Crosby Company five years later stated that 14,000 horsepower was needed to run the Minneapolis plant, and confirmed that the power came from a variety of sources. During the summer, 9,000 horsepower was achieved from the mills' waterwheels (or rather, turbines), and 5,000 horsepower of electricity was acquired through transmission from the hydropower plant at Saint Croix Falls. During the winter, the mill limited its dependence on Mother Nature and relied solely on its own power capabilities; steam engines replaced the waterwheels and electric-generating steam turbines replaced the imported hydropower.[32]

As generation and transmission of electricity became more reliable, the flour industry was more willing to take advantage of this inexpensive power source. The flour-milling process—a continuous operation to which disruptions were costly—required a constant, steady source of power. By the late 1920s, when the Washburn Crosby Company became General Mills, the electrical infrastructure had matured to the point where it was able to minimize power surges, lightning damage, and inconsistencies in transmission, and become a primary source of power for the mills.

The Final Switch to Electricity

According to General Mills superintendent Bell, commercial electricity was not available at the milling district until after most of the big companies had installed highly efficient steam plants to meet their requirements.[33] Despite the technological advances of engine machinery and the increased efficiency and transmission of energy, the direct-drive waterpower of Saint Anthony Falls proved to be the most cost-effective source for the large flour mills, including General

Mills. Waterpower was used until 1960 when the Saint Anthony Falls lock and dam was built, sealing off the canal that supplied water to the remaining mills in the West Side Milling District.

[30] Edgar, *Medal of Gold*, 221-223.
[31] Wilson, "Twin City Power Plants," 334.
[32];*Guidebook: Information for Employees* (Minneapolis: Washburn Crosby Company, 1921), 11-13, available at the Minnesota Historical Society.
[33] Bell, "Power in the Flour Mills," 835.

In preparation for this change, General Mills undertook major electrical improvements. Historic building and electrical permit records show that electric motors, transformers, and fixtures were installed throughout the milling complex from 1948 to 1960 to replace the line shafts that had operated the equipment since the company began. Contracts for electrical work appear to have been let on a quarterly basis and called for the installation of multiple motors at a time. Presumably, each individual roller mill, bolter, cleaner, sifter, and conveyor housed within the mill building received its own motor, which could then be plugged into a central electrical system supplied with current from an on-site transformer. With this change, the mill completed its evolution to modern, mechanized industry.

Alterations to the West Engine House

No definite information exists to indicate when the West Engine House steam engine was decommissioned and removed. It might have been taken out of the building in the early 1910s, as electricity began to be used in the Washburn-Crosby complex. The “C” Mill’s Wright engine appears to have been replaced by a Corliss engine prior to 1916. An article published that year contains a photograph of a four-cylinder, triple-expansion Corliss engine identified as a feature of the Washburn “C” Mill. A report of the American Society of Mechanical Engineers’ spring meeting in Minneapolis-Saint Paul in 1914 stated that a power plant costing $30,000 was scrapped at the Washburn Crosby Company and replaced with modern equipment. Since the Corliss engine in the “C” Mill was still in place in 1916 (and, as a steam engine, probably would not have been referred to as “modern equipment”), the Schichau engine in the East Engine House was still in operation, and there were no other known power plants at the Washburn-Crosby complex, it might be safe to conclude that the West “A” Mill engine was the one scrapped. The “modern equipment” mentioned in 1914 might have been the General Electric motor that remained in the West Engine House when the photographs accompanying this report were taken in 2005 (HABS No. MN-69-C-9). A 1966 inventory of the property identified the motor as simply “old.”[34] The pulley on the north side of the motor aligned with the bricked-in opening on the “A” Mill wall (HABS No. MN-69-C-8), possible evidence that the motor was connected by a belt drive to a main line shaft, as the Wright engine had been. There is little beyond circumstantial evidence, though, on which to base this assumption.

Conclusion

A statement by Maurice Bell aptly summarizes the evolution of motive power at the Washburn-Crosby and General Mills plants, as well as the Minneapolis flour-milling district as a whole. “Cheap and motive power has always been of first concern in flour milling,” he wrote.

“Waterpower was the first to meet these requirements, and then came steam, and in recent years electric power.”[35] The West Engine House is the best remaining symbol of an auxiliary power

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[34] Patchin Appraisals, “Surplus Equipment Catalog, General Mills, Inc., Minneapolis, Minn.,” [ca. 1966], 127-A, available at the Minnesota Historical Society.
[35] Bell, “Power in the Flour Mills,” 834.

source that propelled the Washburn-Crosby flour mill—and the milling district of Minneapolis—to greatness.

PART II. ARCHITECTURAL INFORMATION

A. General Statement:

Beginning in the 1880s, when the Minneapolis flour milling industry was developing rapidly, the interiors of the mills at Saint Anthony Falls were remodeled to become more efficient and productive. Auxiliary buildings such as engine and boiler houses, packing facilities, warehouses, and grain elevators were erected between and around the mills. The West Engine House of the Washburn-Crosby complex—utilitarian in purpose and straightforward in design and materials—fits squarely within this trend. Built in 1884 contiguous to the west side of the Washburn "A" Mill (HABS No. MN-69-A), the engine house was located between the Mill Office (HABS No. MN-69-B) and the railroad trestle that spanned the Washburn-Crosby complex and moved its Gold Medal flour to world markets.

B. Description of Exterior:

The engine house structure measures 38' wide and extends 42' from the "A" Mill facade.[36] The masonry bearing walls are approximately two stories high, of rusticated, ashlar limestone similar to the adjoining mill building. Three two-story, segmental-arched openings with slightly projecting stone header blocks extend upward from grade level on the west facade. A floor plan included in an 1898 survey of the mill shows a pair of hinged doors in the center opening (Figure 1). A later rendering also shows doors in the center bay topped by an arched transom along with multi-light arched windows in each of the side bays. No historic photographs exist to corroborate the presence of the double doors, however, and other depictions seem contradictory. A colored rendering of the milling complex ca. 1900 shows the bottom of the three openings elevated several feet above the ground. Photographs of the facade taken in 1985 show what appears to be triple-sash, multi-light wood windows in both the center and south bays. Regardless of the actual window operation, the height of the openings and the large dimensions of the sashes probably allowed large machinery to be moved in and out of the building through the west facade openings.[37]

HABS photographs taken of the West Engine House in 1985 show that the openings were further altered over time, especially in the north bay where a pedestrian door and spandrel panel were inserted in the lower two-thirds of the opening and two pairs of casement windows were located

[36] "One Thousand Horse Power." Although the engine house does not appear to have been altered, historic reports from the time of construction state the dimensions as 32' x 42'.
[37] *Northwestern Miller* 162 (June 4, 1930): 808.

in the upper portion. Following the “A” Mill fire in 1991, the bays were filled with concrete block, as documented in the photographs taken in June 2005. In November 2005, the concrete block was removed from all three openings and then replaced in the north and middle bays. The stone piers between the openings are slightly bowed as a result of the recent modifications to the block infill. The piers have been temporarily strengthened with a system of wooden posts and brackets.

Until very recently, a single door opening at ground level on the north facade of the engine house contained a rusted, steel, hinged grille in a pattern of large, open squares; the grillework door was removed in November 2005. The area surrounding this doorway contains stone of random size and bond, contrasting with the regular pattern of dressed ashlar on the remainder of the building. The remaining door openings on the north facade of the engine house—one near the “A” Mill facade with a segmental-arched header of buff-colored brick enclosed with brick and concrete, and a second, rectangular, unframed opening located near the center of the wall at the second-floor level—likely allowed passage between the West Engine House and a second-story addition to the mill office constructed in 1915.

As originally constructed, the West Engine House had an eaveless shed roof of shallow pitch that extended downward from the third-story window sills of the “A” Mill. A molded sheet-metal cornice along the north, west, and south edges of the roof provided slight ornamentation to the building facade. The trestle adjacent to the south wall of the engine house was widened at some point, clipping off the southwest corner of the engine house roof and altering part of the original molded cornice. A cast-concrete, ceiling-level ledge of the trestle platform now projects over the south wall, supported by steel I-beams that extend in a wide V shape from the rear center of the ledge to the west and east walls of the engine house. The roof of the building collapsed during the 1991 fire. The building is now open to the air and the stones of the north and west perimeter walls remain uncapped.

C. Interior Description:

The interior of the building had not been documented previously, as it was inaccessible in 1985 at the time of the first HABS report. When photographed for this addendum, two horizontal metal I-beams spanned the width of the single-room interior from north to south. The built-up beams, which appear to have been warped by the fire, contained open webs with crossed-bar lacing. An L-shaped mezzanine stood near the north wall and three raised platforms of varying heights were attached to the east wall. The mezzanine and platforms were constructed of concrete decking framed in metal, supported by vertical metal posts at the corners. The

mezzanine and platform structures were removed from the building in November 2005, along with the I-beams at the roof level.

Most of the interior wall surface is limestone of irregular size and bond. There are patches of stucco parging, especially on the east wall. Ground-level openings in the adjacent “A” Mill wall have been enclosed with brick and concrete block. Arched window openings at the second-story level of the mill have been enclosed with brick. A brick patch near the center of the mill wall, measuring approximately 8’ x 10,’ aligns with the location of the motor (removed), indicating the location of the opening through which the engine belt powered the mill. A single door opening near the south end of the east wall is filled with a steel-framed, clear-glass pane.

The reinforced-concrete floor slab is elevated several steps above the ground, probably raised from the original floor level. The existing flooring of square, red-clay tiles appears to date from the early twentieth century. Two high, concrete steps are located at the exterior doorway on the north facade, set within the depth of the stone wall. A second, short set of steps leads from a doorway in the east wall of the engine house to the ground level of the adjacent “A” Mill. Near the center of the room, two square sections of flooring form a hatch that opens to the basement. [38]

Several pieces of rusted electrical equipment remained in the building at ground level and are shown in the accompanying photographs taken in June 2005. The remaining items appear to be these listed in the surplus equipment catalog:

- one General Electric 400 horsepower wound rotor motor, 514 rpm, 440 v., S#191438 (HABS No. MN-69-C-9);
- one 30” x 38” double arm split cast-iron pulley, cast-iron motor-and-pulley stand;
- one General Electric 800-amp oil circuit breaker;
- one General Electric drum controller;
- one bank of five grid resistors.

Although the inventory did not identify a date of manufacture or installation, it did include a notation indicating that the equipment was “old.”[39]

Differing site plans of the Washburn-Crosby complex from 1921 label the building as both the “West ‘A’ Engine Room” (Figure 5) and a “reception room” (Figure 6). A site plan from 1959

identifies the space as a “visitor’s room.”[40] It is not clear what interior alterations, if any, took place to accommodate this use and when its function was changed. By 1921, the motor was

[38] An early twentieth-century article on the design of hydroelectric stations endorsed tile as the best floor finishing for a generator room as it did not absorb oil, was easily cleaned, and presented “a very handsome appearance.” Frank Koester, “The Architecture of Hydro-Electric Stations,” *Cassier’s* 36 (June 1909): 163.
[39] Patchin Appraisals, “Surplus Equipment Catalog.”
[40] “Property Plot Plan,” Engineering Department, General Mills, October 5, 1959. Available at the Mill City Museum, Minneapolis, Minnesota.

probably already bolted to the center of the floor—a rather imposing piece of equipment for a reception room. Possibly the mezzanine level served as the reception area, with the mill office and addition adjacent to the north. There might also have been additional wood structure or partition walls within the space that burned or have been demolished.

The basement, which is not lighted or readily accessed, has limestone perimeter walls and a dirt floor. The ceiling is reinforced, plank-formed, cast concrete supported at irregular intervals by steel I-beam joists of various lengths and dimensions. The basement contains two broad, floor-to-ceiling piers of limestone, brick, and concrete that span almost the entire width of the space from east to west. The piers originally supported the massive Wright compound steam engine. The piers are spaced about 7’ apart and sit approximately 4’ from the north, east, and south walls. The space between the west wall and the ends of the piers is 2’ to 4’ in width.

The south pier appears to be the more intact of the two and is primarily limestone with some irregular areas of brick on the north face. A 14” ledge is located on the east end of the pier, approximately 3’ above floor level (HABS No. MN-69-C-Field Record Photograph 2). There is a vertical notch in the approximate center of the pier, and an indented area in the western half of the north side.

The north pier is a combination of smooth cast concrete, stone, and brick, indicating that it was altered during the twentieth century. The north pier is slightly longer than the other and appears to have been increased in length. The east half of the pier’s south face is brick and limestone in roughly equal proportions, but the remaining visible sides of the pier are cast concrete. Two voids in the western half are each approximately 2’ square and extend through the entire width of the pier.

The eastern halves of both piers have semi-circular areas of dark glazing on their facing sides (HABS No. MN-69-C-Field Record Photograph 1). Although the composition of the glazing is not known, it is likely the remnants of lubricating oil that sprayed out from the center of the flywheel in a centrifugal pattern.

The east wall of the engine house basement is the foundation wall of the “A” Mill, and is mostly ashlar limestone. An area in the center of the wall approximately 9’ wide is filled with brick to the ceiling level (HABS No. MN-69-C-Field Record Photograph 1). This enclosed opening aligns with the space between the basement-level piers and a similar enclosed opening at the ground level of the engine house, indicating the original opening for the belts connecting the steam engine with the mill’s drive shaft.

Steel or cast iron pipes ranging from 4” to 10” in diameter encircle the piers. Two pipes approximately 8” to 10” in diameter protrude from the “A” Mill wall and run between the south pier and the south basement wall, one on top of the other and about 2’ apart (HABS No. MN-69-

C-Field Record Photograph 2). The lower pipe passes through a large block of brick and concrete located next to the east end of the south pier and is supported above the floor level by several low, brick piers as it continues to the west. The narrower, upper pipe originates from lower on the "A" Mill wall and immediately bends upward before extending along the south side of the basement about 2' below the ceiling. At the southwest corner of the basement, these pipes make a right angle and extend along a portion of the west wall. A large, circular valve wheel is located near the ceiling between the south pier and the west basement wall (HABS No. MN-69-C-Field Record Photograph 3). The valve joins the upper pipe to a vertical section, which attaches to a large pipe at the ground level. The two large ground-level pipes extend through an arched, brick-filled opening, which has been partially excavated to reveal a tunnel leading towards the west. Additional pipes of smaller diameters also extend through the tunnel opening. Another section of pipe attaches to the north end of the valve and continues to the northwest corner of the basement, where it turns and runs parallel to the north pier.

An inventory of surplus equipment at the General Mills complex conducted in 1966 lists the contents of the West Engine House, including items in the basement and tunnel. The basement items appear to have been removed. All that remains is wood shelving propped next to both piers, and accumulated trash.

PART III. PROJECT INFORMATION

The West Engine House will be renovated for use as an interpretive theater by the Mill City Museum, which occupies the "A" Mill. Before beginning construction, the Minnesota Historical Society hired Hess, Roise and Company to prepare an addendum to the original HABS documentation, which was completed in 1986 by Pamela J. Bakken, a University of Minnesota student, as a class project. Tom Pfannenstiel oversaw preparation of the addendum for the Minnesota Historical Society. Photographer Jerry Mathiason, as a subcontractor to Hess Roise, completed the photography in June 2005. After demolition of some of the floor made it possible to reach the basement, he finished the photography on that level in November 2005. Greg Snyder of CPMI, the contractor for the rehabilitation, assisted with access to the basement. Charlene Roise served as principal investigator and report editor for Hess Roise. Staff historian Erin Hanafin Berg conducted research and fieldwork, and is the author of this report.

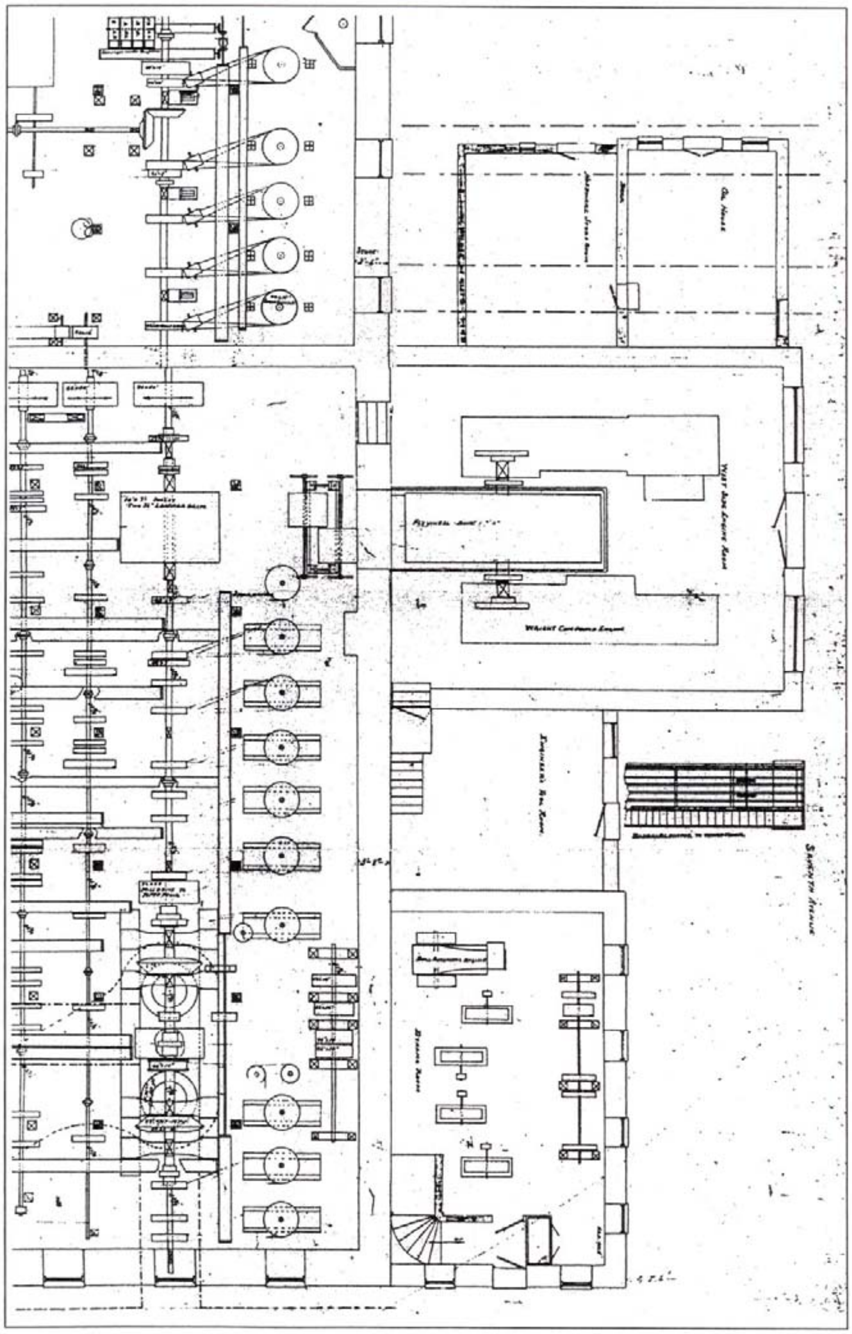

Figure 1. Xerographic copy of part of floor plan, C. C. Washburn's Flouring Mills Co., January 1898. (Complete, full-size xerographic copy available at Mill City Museum, Minneapolis.) "PLAN OF 1ST FLOOR 'A' MILL NORTH DIVISION FROM SURVEY MADE JANUARY 1898."

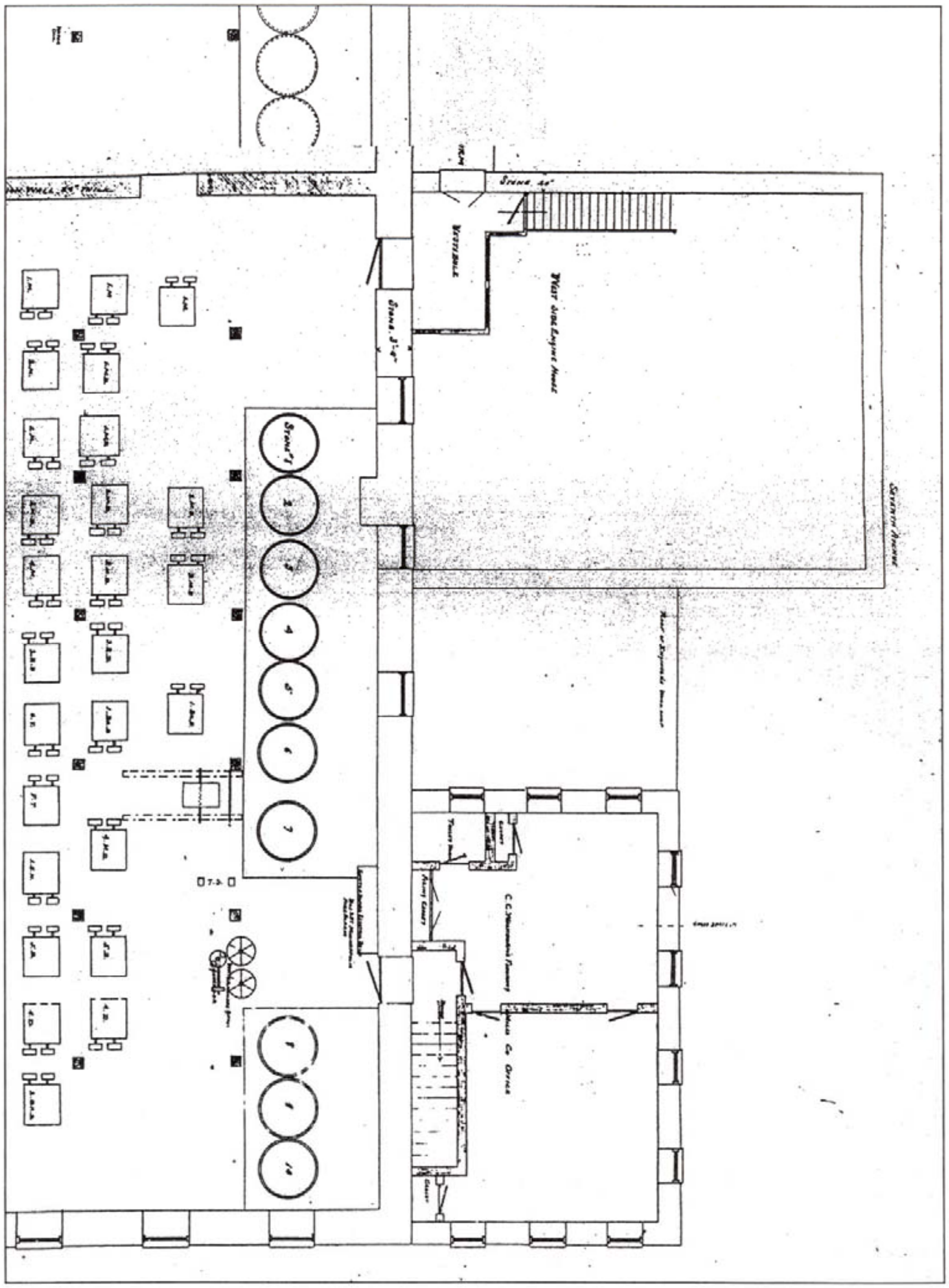

Figure 2. Xerographic copy of part of floor plan, C. C. Washburn's Flouring Mills Co., January 1898. (Complete, full-size xerographic copy available at Mill City Museum, Minneapolis.) "PLAN OF 2ND FLOOR 'A' MILL NORTH DIVISION FROM SURVEY MADE JANUARY 1898."

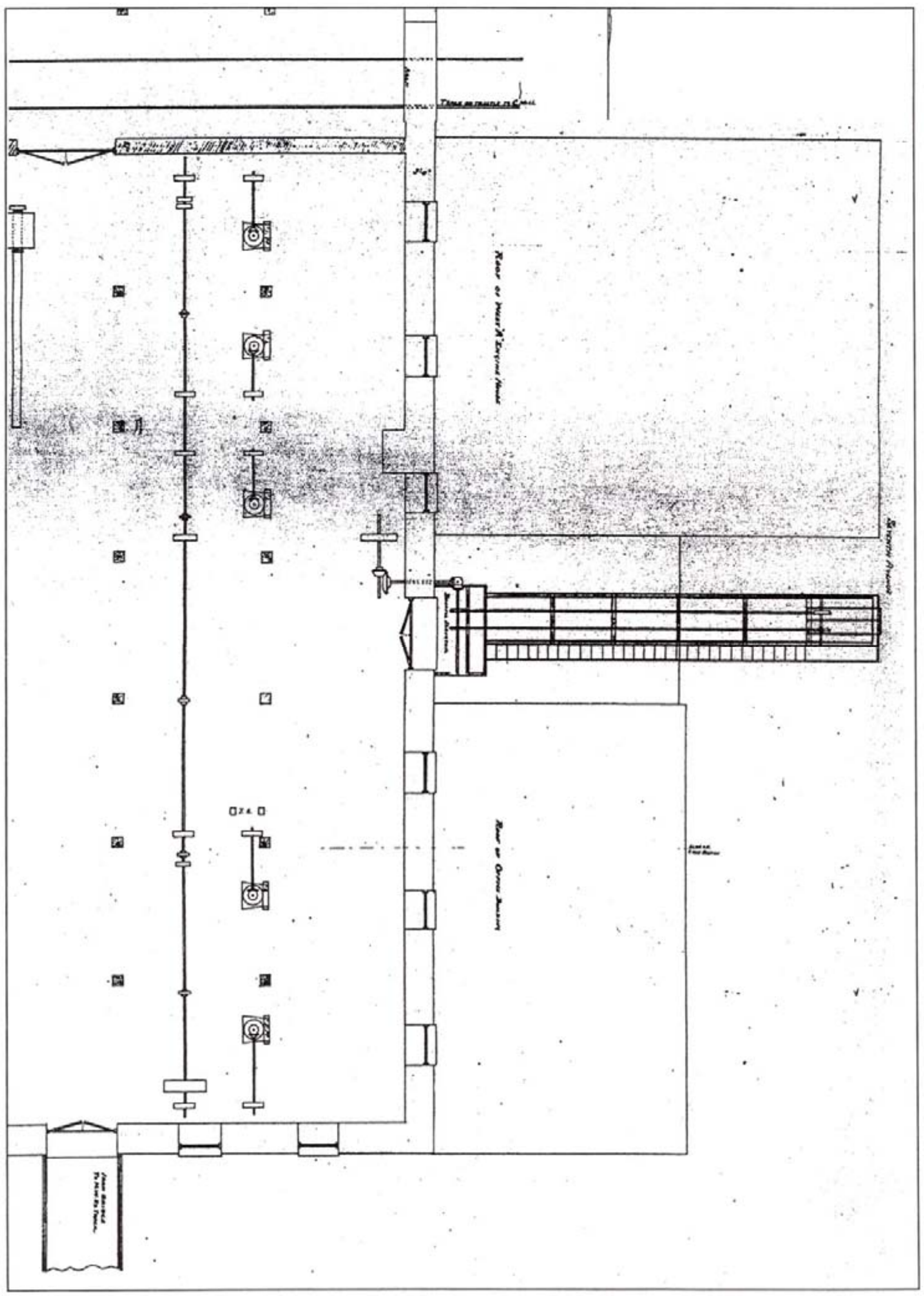

Figure 3. Xerographic copy of part of floor plan, C. C. Washburn's Flouring Mills Co., January 1898. (Complete, full-size xerographic copy available at Mill City Museum, Minneapolis.) "PLAN OF 3RD FLOOR 'A' MILL NORTH DIVISION FROM SURVEY MADE JANUARY 1898."

Figure 4. Xerographic copy of partial site plan, R. P. Wallis, March 1918. (Complete, full-size xerographic copy available at Mill City Museum, Minneapolis.) "MAP WASHBURN-CROSBY CO."

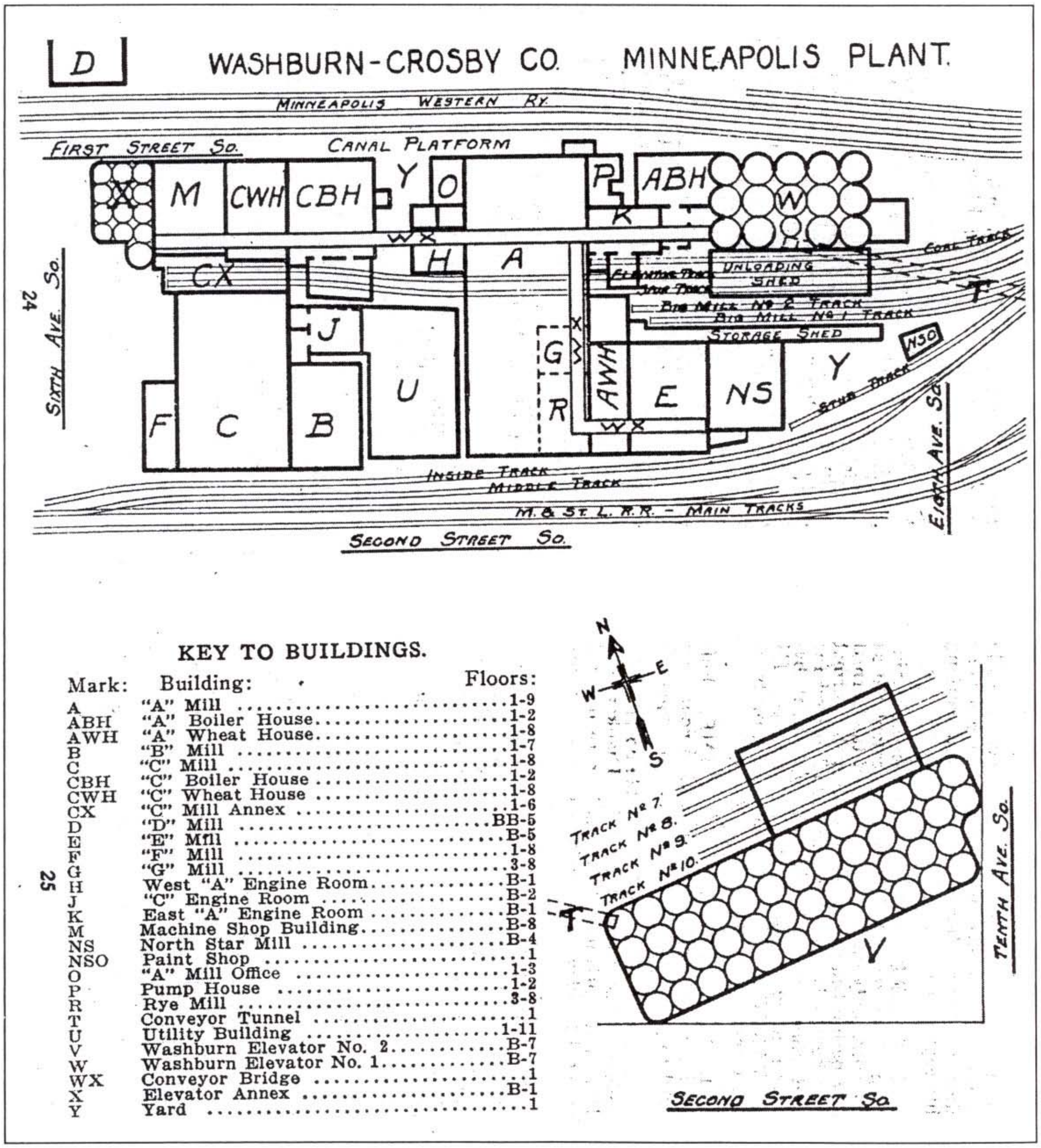

Figure 5. Xerographic copy of site plan and key printed in "Guidebook: Information for Employees" (Minneapolis: Washburn-Crosby Company Flour Mills, 1921). "WASHBURN-CROSBY CO. MINNEAPOLIS PLANT."

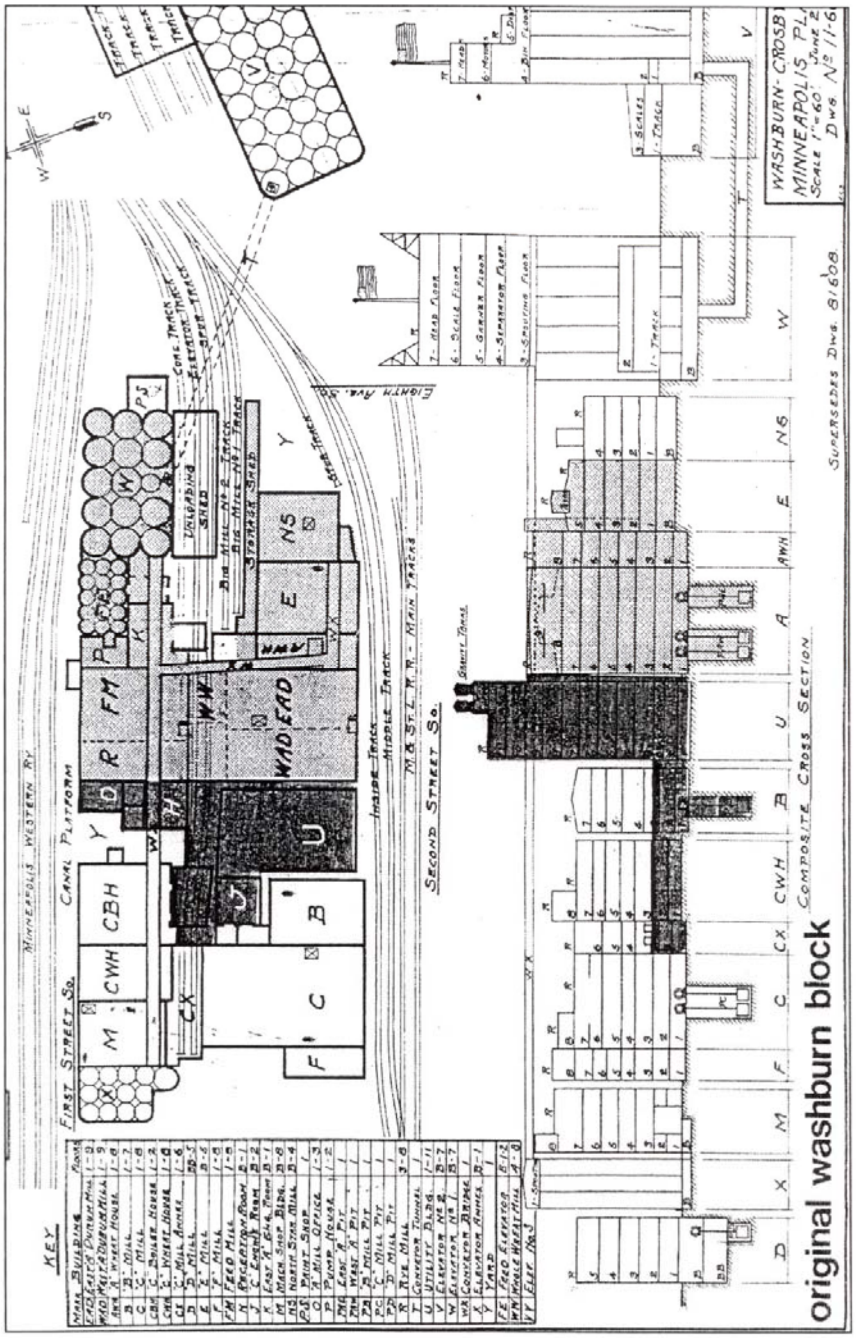

Figure 6. Xerographic copy of partial site plan, Washburn-Crosby Co., June 27, 1921. (Complete, full-size xerographic copy available at Mill City Museum, Minneapolis.) “WASHBURN-CROSBY CO. MINNEAPOLIS PLANT, JUNE 27, 1921, DWG. NO. 11-608-1.”

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