NPS Form 10-900 OMB No. 1024-0018

United States Department of the Interior
National Park Service

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NAT. REGISTER OF HISTORIC PLACES NATIONAL PARK SERVICE

National Register of Historic Places Registration Form

This form is for use in nominating or requesting determinations for individual properties and districts. See instructions in National Register Bulletin, *How to Complete the National Register of Historic Places Registration Form.* If any item does not apply to the property being documented, enter "N/A" for "not applicable." For functions, architectural classification, materials, and areas of significance, enter only categories and subcategories from the instructions. **Place additional certification comments, entries, and narrative items on continuation sheets if needed (NPS Form 10-900a).**

1. Name of Property

historic name Milwaukee Railroad Shops Historic District

other names/site number Station 4396 A: Sioux City Roundhouse, Repair Shops and Engine Terminal

Name of Multiple Property Listing

(Enter "N/A" if property is not part of a multiple property listing)

2. Location

street & number 3400 Sioux River Road N/A not for publication

city or town Sioux City N/A vicinity

state Iowa county Woodbury zip code 51109

3. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act, as amended,

I hereby certify that this x nomination ___ request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60.

In my opinion, the property x meets ___ does not meet the National Register Criteria. I recommend that this property be considered significant at the following level(s) of significance: ___ **national** x **statewide** x **local**

Applicable National Register Criteria: x A ___ B x C x D

30 AUG 2018

Signature of certifying official/Title: Deputy State Historic Preservation Officer Date

State Historical Society of Iowa

State or Federal agency/bureau or Tribal Government

In my opinion, the property ___ meets ___ does not meet the National Register criteria.

Signature of commenting official Date

Title State or Federal agency/bureau or Tribal Government

4. National Park Service Certification

I hereby certify that this property is:

X entered in the National Register ___ determined eligible for the National Register

___ determined not eligible for the National Register ___ removed from the National Register

___ other (explain:)

10/22/2018

Signature of the Keeper Date of Action

5. Classification

Ownership of Property
(Check as many boxes as apply.)

- [x] private
- [ ] public - Local
- [ ] public - State
- [ ] public - Federal

Category of Property
(Check only **one** box.)

- [ ] building(s)
- [x] district
- [ ] site
- [ ] structure
- [ ] object

Number of Resources within Property
(Do not include previously listed resources in the count.)

Contributing	Noncontributing	
6	3	buildings
16	0	site
6	2	structure
13	0	object
41	5	**Total**

Number of contributing resources previously listed in the National Register: 2

6. Function or Use

Historic Functions
(Enter categories from instructions.)

Transportation: rail-related

Current Functions
(Enter categories from instructions.)

Recreation and Culture: Museum

7. Description

Architectural Classification
(Enter categories from instructions.)

Other: Railroad Design

Materials
(Enter categories from instructions.)

foundation: Concrete
walls: Brick
Wood
roof: Wood
other: Metal: Steel; Metal: Iron; Cast Iron
Stone: Granite; Stone: Aggregate

Narrative Description

Summary Paragraph (Briefly describe the current, general characteristics of the property, such as its location, type, style, method of construction, setting, size, and significant features. Indicate whether the property has historic integrity.)

The Milwaukee Railroad Shops Historic District is associated with the industrial history and heritage of the steam railroad repair shop industry and the development of the Chicago, Milwaukee, St. Paul and Pacific Railroad, which is sometimes referred to as "the Milwaukee Road." The overall construction of the Milwaukee Railroad Shops Historic District is typical of steam-era railroad repair shops built during the late nineteenth century and the first two decades of the twentieth century. While the Milwaukee Railroad Shops terminal was in operation from 1917 to 1980, it saw many changes, including alterations to buildings and the razing of structures in response to technological changes undertaken by the railroad industry. However, the Milwaukee Railroad Shops Historic District, as a whole does retain its historical integrity for location, design, setting, materials, workmanship, feeling and association.

The Milwaukee Railroad Shops Historic District is a large property encompassing 29.53 acres that holds a comprehensive collection of buildings, structures, foundation sites, objects, and a rail yard. In total, the Historic District is composed of 41 contributing resources and 5 non-contributing resources. The Milwaukee Railroad Shops Historic District is home to Great Northern Railway Steam Locomotive No. 1355 and Tender 1451. Both the locomotive and tender are listed on the National Register of Historic Places at the national level of significance.

The Milwaukee Railroad Shops Historic district is located in the northwest quadrant of Sioux City, Iowa, and east across the Big Sioux River from North Sioux City, South Dakota. The entire site is bounded by the Big Sioux River to the west, the BNSF Railway mainline corridor to the south, and Iowa State Highway 12 to the east with farmland to the north just beyond the complex. The site plan arranges the buildings and structures parallel with the general line of yard tracks and locomotives enter or leave the shops on the center of three working tracks.[1] The Milwaukee Railroad Shops Historic District is currently the only known, preserved, comprehensive collection of historic resources in the nation utilizing the longitudinal site plan for steam-era railroad repair shops.

Narrative Description (Describe the historic and current physical appearance and condition of the property. Describe contributing and noncontributing resources if applicable.)

(**Iowa SHPO Additional Instructions:** After the main **Narrative Description**, discuss any physical alterations since the period of significance under the subheading **Alterations,** the seven aspects of integrity as it applies to the property in a **Statement of Integrity,** and any future plans for the property under the subheading **Future Plans**.)

The Milwaukee Railroad Shops Historic District is located in the extreme northwest quadrant of the City of Sioux City in Woodbury County, Iowa. The Sioux City Roundhouse, Repairs Shops, and Engine Terminal facility was constructed 518.4 miles from Chicago near the center point of its mainline that extended from Chicago to Mitchell, South Dakota. When the complex was opened in 1917, it was assigned Station Number 4396 A: Sioux City Repair Shops for use on company reports to indicate it was a repair shops facility.[2] It was established in the Riverside neighborhood, which is a flat, blue collar residential area on the west side of Sioux City; along the east bank of the 419-mile-long Big Sioux River as it flows north to south to its confluence with the Missouri River.

The Milwaukee Railroad Shops Historic District is sited in the valley formed by the First Bluffs of the Loess Hills landform and the Big Sioux River. This major river forms the natural border between the state of Iowa and the state of South Dakota. The Historic District occupies a generally flat landmass that is unprotected by any flood control system. However, the land does steadily slope upward as part of the Loess Hills landform base; rising out of the floodway into the five-hundred year flood plain. The elevation ranges from 1084 feet above sea level at the bank of the Big Sioux River to an elevation of 1115 feet above sea level along the eastern perimeter. The soil is composed of alluvial land, Blake silty loam, and Haynie silt loam.[3] These soil types made the land good for excavation and ground support to build the new Sioux City railroad terminal.

[1] Berg, Watler. *American Railway Shops Systems.* Digitized by Google Books. New York: Railroad Gazette, 1904.
[2] Advertising Department. *List of Station Numbers in Numerical and Alphabetical Order*. Chicago: The Milwaukee Road, 1940.
[3] City of Sioux City. Community and Economic Development Division. *Riverside Redevelopment Plan Executive Summary*. By Gretchen Schalge. Second ed. Sioux City: City of Sioux City, 1991.

Narrative Descriptions of Contributing Buildings, Sites, and Structures

There are 6 contributing buildings, 16 contributing sites, and 6 contributing structures in this district. The 13 contributing objects will be discussed separately following this section. Given the resources' association with being a railroad workplace, all share characteristics common to the role the historic district played in the servicing, inspection, repair, maintenance, and overhaul of steam locomotives, freight rolling stock, and passenger cars. The resources range from architecturally important buildings to several structures and foundation sites in varying degrees of condition.

The Milwaukee Railroad Shops Historic District houses the core collection of historic resources that once made up the Sioux City Roundhouse, Repair Shops and Engine Terminal of the Chicago, Milwaukee, St. Paul and Pacific Railroad Company. It is an industrial, railroad-related district, containing a concentration of buildings built of brick walls, wood frame windows and timber/wood roof style construction. Each of the structures is built upon solid concrete foundations. All the buildings were nearly identical to new, smaller repair shop complexes built in North McGregor and Atkins, Iowa, which opened in late 1918. This historic district also features the sophisticated technology and machining equipment of that time.

Resource 1: Six-Stall Roundhouse Building — Condition: Good

- **Contributing Building**

The roundhouse was originally built as a half donut-shaped building or half-circle structure in 1917, with minor alterations to stall 1 in 1947. Major alterations were made to the building in 1955, which led to the demolition of 24 locomotive stalls. With the transitioning to diesel electric motive power, those 24 stalls were obsolete and not needed. Approximately 20 percent of the building structure remains, equating to about a quarter of a donut-shaped building.

Because the Sioux City-based roundhouse is built in a semi-circular pattern, it is constructed in the radial segmental-arc configuration of railroad buildings. The six-stall roundhouse measures 86'-6" (front wall) by 154'-0" (back wall) by 98'-4" (side walls) with a total footprint of 12,123 square feet. The building encompasses 79 degrees of curvature. Both the north and south elevations are curved. The north elevation faces the 90-foot turntable with stalls 2, 3, 4, and 5 each having a 45' standard gauge railroad track that radiates from the turntable and leads to each stall's service track.

The roundhouse is comprised of six segmented engine stalls, numbered clockwise from east to northwest from 1 to 6,with one stall (east end, stall 1) currently being used for entrance, offices, and galleries. This stall is split into two stories. One of the remaining five stalls (west end, stall 6) is used for a workshop area, while the remaining four stalls contain tracks for exhibiting, storing, maintaining and restoring locomotives and rolling stock.

The predominant building materials for the building envelope are wood and brick. The east and south elevations are constructed of load-bearing brick laid in a common bond with 4" projection pilasters, varying in height along the elevations, topped with cast-in-place concrete caps. The east elevation features salt-glazed tile capping sitting on top of a set of 5 stair-stepped parapets. The north and west elevations are constructed of load-bearing wood-framed walls.

The roundhouse is built upon concrete foundations. The roundhouse footings are approximately 4' deep along the rear wall, tapering to 3.5' deep along the front wall. The concrete foundation of the demolished 24 stalls is visible and clearly defines their footprint.

The roundhouse's interior is dominated by open space except for stall 1, which houses a two-story area subdivided for museum offices, archives, and exhibit galleries. The interior floor is concrete with areas of paver bricks. The original drawings indicate this is probably the original flooring dating from the 1917 construction. Four of the stalls (stalls, 2, 3, 4, and 5) contain standard gauge track measuring 85 linear feet long. Three of the stalls (stalls 2, 3, and 4) contain concrete-lined pits between the rails for use in servicing locomotives and making wheel/running gear repairs.

The engine pits in stalls 2, 3, and 4 are standard gauge width (4'- 8½") by various lengths. Engine pits in stalls 2 and 4 are approximately 85’ long while stall 3’s pit is approximately 60’long. At the end of engine pit stall 3 is a concrete foundation that once supported a boiler for heating the roundhouse and adjacent machine shop/blacksmith shop building. The pits drain to a sanitary sewer that runs under the north elevation of the roundhouse building. The side walls of the engine pits are concrete and there is limited “spalling” or crumbling of the concrete along the upper edges.

The building’s roof structure is rendered in the double slope monitor style. The roof is carried in two sections with the second “back” roof elevated about 5’ above the adjoining front section to provide space for a clearstory facing north. The clearstory’s purpose is to provide spacing to house stationary and movable sash for day lighting and ventilation. The wood clearstory side consists of 5 twelve-pane windows. The overall roof framework is purlin spans over timber post and beam with knee braces; covered with tongue and groove decking and composition roofing.

The overall roof structure is supported on lines of timber posts as well as on the front and rear circle walls and the straight sidewalls. At each stall, three timber columns built in a radial line support the roof. The foundations of each column are concrete about 18” square at the base. The exterior roof structure contains 7 metal gravity roof vents with interior ventilation monitors (smoke jacks) lined in a row and penetrate the roof interior. The steam locomotives would be spotted inside the roundhouse with their stacks lined up below the smoke jacks to vent coal or oil smoke through the roof to the outside atmosphere.

The curved side of the south elevation consists of three bays (stalls 1, 3, and 6) with 12 sets of 9-pane fixed window sash. Stall 2 has one window bay consisting of 11 sets of 9-pane fixed window sash with an entrance door. Stall 4’s has one window bay of 8 sets of 9-pane window sash and a set of 2 large, hinged swinging wood doors. Stall 5 contains an extension area that once housed the large lathe for repairing locomotive driving wheels. The southeast and northwest sides of this extension each have one window bay each of 12 sets of nine-pane fixed window sash. The extension’s southwest facing side is boarded over with a timber wall. Originally, this was an opening with large hinged swinging doors that allowed for wheel sets to be moved in and out of the roundhouse building. All window sets are set upon concrete sills beneath timber lintels.

The east elevation consists of 5 sets of 9-pane fixed sash, consisting of 2 bays of 2 nine-pane sash, 1 bay with a set of 6 nine-pane sash, 1 bay with 1 nine-pane sash, and 1 bay with 4 nine-pane sashes. There is one bay of one-pane fixed sash. All bays of window sets sit upon a concrete sill. Projection pilasters capped with concrete are used to separate the window bays. The east elevation also includes a 36’ x 8’ metal entrance door. The east elevation has high aesthetic visibility from the state highway running along the historic district’s east property line.

The curved north elevation, facing the turntable, is rendered in a timber-frame construction. A series of timber door posts embedded along the inside circumference of the roundhouse building’s north elevation mark the location of each locomotive stall. Locomotive stalls 2 through 5 each have large, hinged swing out wood doors; stall 6 has a half-height swing out wood door. Only the swing door of stall 6 is perceived to be original, as its design matches original blueprint specifications. It is believed the wood clad doors for the other stalls were installed during the roundhouse alterations made in 1954.

The five large locomotive doors (stalls 2, 3, 4, and 5) and the smaller entrance door (stall 6) are hinged to pintle posts, which are entirely separate from the overall building construction. The posts are fastened to the building columns that support the roof structure in such a manner that the accidental wrecking of a door during the movement of a locomotive will not damage the remaining building structure.

The west elevation is a wood-framed exterior wall with car siding. There is one small entry door measuring approximately 10’ x 10’ with hinged swinging wood doors. There are no window openings. This exterior wall contains no trim elements or metal flashing to protect from moisture infiltration or infestation by insects, fungus or other pests. The interior wall has exposed wood framing and no insulation. This wall is not original to the building. The railroad’s construction crews installed the wall to seal the roundhouse building after the demolition of the other 24 other locomotive stalls in 1954. Today, this wall is suffering from severe deterioration of wood elements and wood rot from many decades of neglect.

Resource 2: Turntable and Pit **Condition: Good, Fully Operational**

- **Contributing Structure**

The Sioux City Engine Terminal is served with a 90' diameter deck turntable of heavy construction operated by a motor and gear system. The turntable and pit structure at the Sioux City-based Milwaukee Railroad Shops is representative of a standard design for the "90 ft. standard through-Type 'HI' center" turntables built for the Chicago, Milwaukee, St. Paul and Pacific Railroad Company by the American Bridge Company. A builder's plate reading "American Bridge Company – U.S.A" with a construction date of 1916 is affixed to one of the outer beams. A second plate displays the serial number "876" and identifies the Gary Plant as the fabrication center where the turntable components were manufactured.

The turntable is of the through type standard design constructed of two main girders, two center cross girders, floor-X-bracing and stringers. Overall the turntable, itself, weighs approximately 90 tons. The dead load is 1,800 lbs. per purlin foot (600 lbs. for track and 1200 lbs. for steel). This turntable is designed for handling steam locomotives with a live load of 325 tons and a total wheelbase of about 90' for both the engine and tender.

The turntable is operated by a tractor, hitched to one end of the turntable to create the swing on a center bearing, running on the pit rail. By means of a 5 horse power, 3-phase, 220-volt motor, the turntable revolves at a speed of one full revolution within five minutes. The rotation of the turntable, which can be reversed in direction, is under the control of an operator housed in a shanty at the center of the turntable. The wood-frame control booth features a forward and reverse control system with breakers and power disconnects on/after the meter on the pole and between the motor and controls for safe maintenance. Before moving the turntable, the operator safety signals with a bell before start.

The control shanty is not original, due to an extensive fire on the complex during the late 1970s that destroyed the original wood-framed structure. This shanty was rebuilt in 1999 by volunteers of the Siouxland Historical Railroad Association as part of the renovation effort to return the turntable back to an operational state. The shanty is wood frame with a dimension of 8 ft. long by 4' wide by 8' tall with a single roof face that slopes down the entirety of the structure towards the turntable side. The roofing materials consist of rolled roofing. The shanty is of constructed of studs, horizontal boxing, and layers of car siding. The wall facing the ends of the turntable consists of one single-pane sash for the operator to have an unobstructed view for aligning the turntable track with the surrounding radial tracks and main lead tracks. The wall facing the center of the turntable contains one 36" wide, wood panel door for entrance. The outer wall, facing away from the turntable is solid.

The two main longitudinal girders are 88'-10" long over all, with a depth of 8'-4in. at the center section tapering to 4'= 2" at the ends. The girders are spaced 7' center to center. This through-type standard designed turntable has floor beams, stringers, and lateral diagonals arranged in a floor system comparable with bridge floors. The turntable deck consists of 8"x10" ties, spaced between 12" to 14"center to center. For safety precautions, the turntable features a set of wood-framed railings anchored to the turntable decking, spaced 9' each way from the center.

The turntable is installed in a concrete 91'-1 in. diameter pit; approximately 4'-4" deep beneath rail level. Below is a soil base about 18" below the circle track shelf – originally concrete that was removed during previous alterations. The pit's outer circle wall is constructed of reinforced concrete 24" thick, with a footing of 6'-4" wide to carry the circle track. The pit wall radius is 45'-5" from center. The circle track in the pit has a radius of 42'-7" to center of pit. It has a 90-lb. rail; carried by 3' creosoted ties placed radially and spread approximately 18" center to center. The inside radius of the pit rail foundation is 41'-1½" from the pit's center point. When originally constructed, the floor of the turntable pit was most likely paved with vitrified brick land on edge with sand and grouted with cement mortar.

The four remaining radial tracks (originally 30 at this facility) to the roundhouse have full-length 90-lb. rail abutting the pit wall. Their ends are sawed squared to the pit wall and table track to provide a clearance not to exceed more than an inch; generally around ¾" is the clearance between the fixed radial track rail and the turntable rail. The fixed radial tracks are bolted to timber block sills (railroad ties) secured to the masonry pit wall. This makes a rigid, stable construction that is needed for moving locomotives and rolling stock over the fixed rails to the turntable rails.

The turntable center is of the disc type design by American Bridge Company. "The disc type consists of a bottom fixed disc of special steel which is surmounted by a saddle casting to which loads are transferred by means of loading brackets, the whole being enclosed between the main girders of the turntable and cross girders. A pair of cross girders between the main girders bear on the saddle block" that rests on a concrete foundation. The square-shaped foundation under the turntable center is constructed of concrete built upon a spread footing measuring 5'-9" x 5'-9" at top to 13' x 13' at the base. The total height of the foundation is approximately 4'with the bottom 3'embedded in the ground.

Resource 3: Machine and Blacksmith Shops Condition: Excellent

- **Contributing Building**

This building is rendered in the standard design practice of the Chicago, Milwaukee and St. Paul Railway to utilize the ordinary rectangular form in the design of its combination machine and blacksmith shop buildings. The predominant building materials are wood, timber, and brick; built upon a concrete foundation 4' deep by 2' wide. The total length of this building is 100' and its total width is 50', with a total height of 22' in the center of the north and south elevations and 21' at the outer walls of the east and west elevations. The original blacksmith shop area is separated from the original machine shop space by a load bearing fireproof brick wall approximately 18" thick.

The building's double slope roof was totally rebuilt in fall 2010 to winter 2011 due to severe deterioration and wood rot in the original roof structure. Like the roundhouse building, the overall roof structure is supported on a single line of timber posts as well as on the building's side walls and the interior separation fire wall. The overall roof framework is "purlin spans over timber post and beam" with knee braces; covered with tongue and groove decking and composition roofing. The two timber column posts supporting the roof are approximately 24" long by 15" wide, built in a radial line. The concrete foundations for each column are approximately 28" long by 18" wide, approximately 4'deep.

The current roof framework is designed to hold a monitor that will house heating, air conditioning, and ventilation equipment. This work is planned soon and will match the monitor style at the time of original construction. Please note – the original monitor was removed by the railroad in 1955 during alterations made to the complex; the machine shop and blacksmith shop were closed at that time.

The entire building is constructed of common brick. The brick façade was extensively repaired and tuck-pointed in spring 2011 to stabilize the building for preservation and adaptive reuse. The east and west elevations feature interior 4 inch projection pilasters, approximately 17'-9" tall with concrete caps. A concrete apron, approximately 4' tall, encases the base of the building. This apron was added to the building during the 1960s to provide stability to the building when it was converted to a store house. The building was rented by the City of Sioux City for storage of street salt. This reuse negatively impacted the structural integrity of the building, causing severe deterioration in the brick walls causing near-structural collapse. Through preservation work, this deterioration has been mitigated.

The north elevation side features 3 sets of nine-pane fixed sash: starting at the east end going west, a vertical 3 high by 2 wide bay with set of 6 nine-pane sash; one row with a set of 4 nine-pane sash positioned directly above 1 set of two large wood entrance doors measuring 13'-4" tall by 6'-4" wide (total span of 12'-8" wide) and two sets of nine-pane sash on the left (east side) of the doors forming a L-shape configuration for the sashes; and, a vertical 2 high by 2 wide set of six 9-pane sash. The sashes are set upon 4" concrete sills.

The side of the south elevation is comprised of two window bays of 3 high by 2 wide sets of 6 nine-pane fixed sash; and, a row of 4 nine-pane fixed sash positioned above two large wood entrance doors measuring 13'-4" tall by 8"-½" wide doors, with a total span of 16'-1" wide. The sashes are set upon 4" concrete sills.

The 100' east and west elevations are comprised of four window bays of 12 nine-pane fixed wood sash. However, on the east elevation, the first bay (south end) and the third bay from the south end each have one window sash removed to allow for a steel maintenance doors. The west elevation has two steel entrance doors in the south bay and second bay of window sets.

Resource 4: Car Department Mill Building (a.k.a. Car/Carpenter Shop) Condition: Excellent

- **Contributing Building**

The Car Department Mill Building, also known as the car/carpenter shop building was constructed in 1917 as a single-story, rectangular, common-brick structure upon a concrete foundation measuring 65'-6" x 40' and covering a land footprint of 2620 sq. ft. The height of the building is 17'-9" with the top of the foundation at a level of six inches about surface. The north and south elevations feature a 13' firewall with salt-glazed tile capping on the parapets. Prior to 2002, the building had an attached wood frame lumber shed clad in metal siding. The lumber shed was destroyed by a wind storm in spring 2002. A concrete slab measuring 40' x 24' defines the former floor area of the lumber shed.

The gable-style roof system is comprised of purlins over post and beam, with tongue and groove decking and composition roofing materials. The three timber columns that support the roof system are 24" long by 16" wide, built on a north-south radial line through the center of the building. The distance between the centers of the columns is 14'. The roof system was designed to handle the loads and vibrations of shafts, pulleys, belts, etc. which were suspended from the roof trusses[4]

Variations in appearance exist between side elevations; 4" projection pilasters measuring 15'-0" in height with concrete caps are used on the north and south facing elevations to separate the window bays. The side of the east facing elevation consists of 3 bays of 6 nine-light wooden sash windows and one four-light wood sash separated by three pilasters. The side of the west facing elevation consists of two four-light wood sash, two bays of 5 nine-light wood window sashes, and a main entrance consisting of a 4-panel, 6' wide wood sliding door. The side of north facing elevation consists of 2 five-panel wood entrance doors on each end with 4 four-light wood sashes. All window sashes in this building are set upon concrete sills. The side of the south facing elevation consists of one 9'-½" tall by 8'-0" wide metal clad door mounted on a sliding clip angle that was originally used as a main entrance to the original attached lumber shed. This door is located on the east end of the side and features a decorative half-circle, round arch at the top. A smaller opening to the building is located on the west end of the south facing window. This opening was used to feed plank lumber from the attached lumber shed into the mill building for sawing, milling, planning and piece work.

Resource 5: Toilet Building #2 (a.k.a. Water Closet) Condition: Excellent

- **Contributing Building**

The building, measuring 18'-1" x 14'-6", is constructed of common brick upon a 1' concrete foundation as a single-story structure. This structure is one of the eighteen buildings erected during the rail terminal's initial construction between 1917 and 1918.

The building features a gable roof with cornice construction sloping down in two directions with a center height of 14'-5" sloping to an outer wall height of 10'-5". The roof is comprised of open common rafters, ridge boards, tongue and groove plank roofing, and composition roofing materials. The interior is unfinished with a concrete slab floor and exposed roof truss system.

There are two window bays in the north and south sides with a five-panel wood entry door placed between windows in both ends. The east and west sides feature one window opening set high towards the end of the elevations. No windows are currently intact. The original windows were 12-light wood sash sitting on a 3'-3½" long concrete sill. The entry doors sit upon a 6" tall concrete sill and entrance is gained through the aid of two 6" tall concrete steps. The east and west elevations each have two open slot areas at the base that were used for ventilation. The slots were formed by setting four spaced bricks

[4] Haig, Maham. *The Railway Blacksmith Shops.* New York: Railway Master Mechanic XXXII, 1908.

as a soldier course separated by one-inch gaps. The slots are 8' high and are located between floor joists.[5]

Resource 6: Sand Drying House **Condition: Excellent**

- **Contributing Building**

Measuring 38'-2" x 20', the sand drying house was constructed in 1917 as a single story, rectangular building constructed of brick laid in a common bond pattern upon a concrete foundation with a gable roof sloping down in two directions. The building rests on a concrete foundation with the top of the foundation approximately six inches about surface level. The building features a chimney with a concrete cap that served as ventilation for the roasting stoves that were once housed in the building. The building's interior is open and stands unchanged from original construction.

The sand house features a gable-style, wood roof system comprised of open rafters with ridge boards and tongue-and-groove plank roofing and rolled roofing materials. The west facing side contains three openings for windows and an entrance door opening; all boarded over. The east facing side contains three openings for windows; all boarded over. The south facing side contains a large opening that once housed an entrance door leading to the sand hopper. This opening was used to transfer sand into the roasting stoves and drying kiln. The north facing side contains one opening for the main entrance door for workmen to enter the sand house. Above the entrance door was an opening for a window sash. According to documentation in original erection drawings, the windows were four-light wood sashes similar to the smaller windows found in the car shops' mill building. Like the architecture of all the buildings, the window sashes were built upon concrete sills.

Resource 7: East Wood Sand Tower **Condition: Excellent**

- **Contributing Structure**

The sand tower is a 19'-6" tall structure comprised of a cylindrical reservoir tank supported by four 8"x8" wood columns anchored to a 10" x 10" concrete foundation at the base of each column. The wood columns are supported by three "X-beams" constructed of 2" x 12" blanks, each with a height of 5'-5" and spaced every 5'-11 ¼"

The sand reservoir's construction is in the form of a barrel-shaped wood tank with vertical staves designed to store up to 13.5 tons of dry silica sand. The height of the tank is 8' tall and its diameter measures 8'-10"; giving it a holding capacity of 636 cubic feet of storage space.

The tank or reservoir is capped with a squared, pyramid-hip, wood framed roof measuring 11'-9" x 11'-9" with asphalt shingle material. The roof contains one ventilation box, approximately 12" x 12", to assist with gravity movement of the sand into the locomotive sand boxes.

Resource 8: Engineers Tool House **Condition: Excellent**

- **Contributing Building**

The building has one window sash on each of the east, north, and west sides. The primary entrance is a single, five-panel wood door opening in the south end. Decorative elements include concrete sills to support the windows and Rowland arches above the entry door and all window openings except for the window in the east elevation. The window sashes are fixed, four-light on north, west and south elevations, and six-light on east elevation.

The north, west, and south elevations feature salt-glazed tile capping on parapets. The roof is of the shed-style with a single roof face that slopes from west to east along the entire building. The roof is similar in construction to the sand house and water closet, consisting of open common rafters, ridge boards, tongue and groove plank roofing, and composition roofing materials.

[5] Engineering Department. *Drawing A269B*, Chicago: Chicago, Milwaukee & St. Paul Railroad Company, 1917

Resource 9: Cinder Ash Pit **Condition: Unknown**

- **Contributing Structure**

According to the railroad's standard blueprints, the rectangular cinder ash pit measures 100' long. The total width of the structure is 22' between pit walls. According to original construction documents, the depth of the pit was 14' below the top of the rail; which afforded greater storage of ash to handle the volume of locomotives serviced at this complex, and to facilitate routine maintenance work under the steam locomotive.

The dimensions of the cinder ash pit allowed coal ash, clunkers and cinders to drop readily from the steam locomotive to the pit below. It is located under the western-most main lead track to the turntable, with a siding track that allowed ashes and coal cinders to be loaded on cars without causing delay in movement of locomotives to main-line trains. Like a service pit in the roundhouse, the wide configuration of the cinder ash pit most likely facilitated engine hostlers working under the steam locomotive for oiling and making some light repairs. [6]

When originally constructed, according to construction documents, the floor of the cinder ash pit was most likely paved with vitrified brick land on edge with sand and grouted with cement mortar. Its walls were most likely built of hard fire brick, from 18" to 24" thick, laid in cement mortar to prevent deterioration from the heat. Visual evidence shows that the coping of the cinder ash pit side walls is made with timber stringers. A water line and water column were located nearby to assist with cooling of cinder clunkers and ash. The water column is intact, as documented in the attached photographic research.

According to railroad blueprints published in 1954, the cinder ash pit was retired. It was filled with aggregate materials when the railroad ceased maintenance and repair of steam locomotives at the complex in 1954.

Resource 10: Wood Timber Shipping Dock with Ramp **Condition: Poor**

- **Contributing Structure**

The surviving shipping dock is constructed of various thicknesses and lengths of large dimensional timbers and planks. The loading and unloading dock features a deck height of 4' above track level to allow for the unloading and loading of railroad boxcars. The shipping dock deck sets upon eight timber columns built upon concrete foundations. The dock runs in a north-south linear pattern with the ramp lowering to ground level on the south end.

The visual assessment of the timber loading dock's condition is exhibiting signs of significant deterioration of the wearing surface of the wood plank deck, the supporting wood deck beams, and the timber supports. Major causes of deterioration are wood rot resulting from many years of weathering the freeze-thaw cycles, damaged sustained by the 1965 fire, and termite infestations.

Foundation sites **Condition: Poor to Good**

Scattered throughout the historic district are above-ground evidence of buildings, structures and other infrastructure that were once housed in the Historic District. The buildings and structures were razed in 1954 by the railroad's engineering department to prepare the steam-era railroad repair shops conversion to a diesel locomotive servicing terminal.

Resource 11: 24-Stall Roundhouse Foundation (Contributing Site)

Attached to the roundhouse is the foundation remnants of the 24 stalls razed by the railroad in 1954 when the engineering department converted the facility to service diesel locomotives. The concrete foundation measures 353" x 616'x 98' with much of the concrete showing deterioration. This site is the largest foundation remnant in the complex.

[6] Berg, Walter. *Buildings and Structures of American Railroads.* New York: John Wiley & Sons, 1893.

Resource 12: Store House Foundation (Contributing Site)

The Sioux City-based Stores Department was originally housed in a 40’ x 55’ brick-framed warehouse structure with an adjoining 15’ x 55’ wood/timber shipping dock with ramp. Original construction documents delineate a track for the spotting of railroad freight cars that would be unloaded and loaded with materials and supplies. The warehouse structure was abandoned in 1954, according to railroad documents, and was demolished in 1963 after a fire engulfed the structure that year. It is assumed the supply track was removed sometime between 1955 and 1963. The extant remnants of the stores warehouse system are the shipping dock with ramp, the foundations of the warehouse building, and the concrete pad that was used for outside storage of materials and supplies. The stores department was strategically located to serve the needs of several work areas: the roundhouse, the machine and blacksmith shop, the car shops, and the oil house. To support the easy movement of large quantities of materials and supplies through the use of hand trunks and forklifts, there was a network of work walkways that radiated from the stores house to the other areas. These concrete walk ways could be used all four seasons and were wide enough to allow motorized and non-motorized forklifts and hand trucks.

Resource 13: Iron Rack Foundation (Contributing Site)

The iron rack was a uniquely designed structure for the storage of iron. Because of the volume and weight of the iron stored, the iron rack was built upon concrete footings. The iron rack consisted of a framework of vertical iron columns and horizontal beams, constructed in a square footprint, to from a rigid structure. The storage rack was built of 5 vertical frames, spaced evenly apart with 4 tiers to divide the rack into storage sections for sorting and holding 16 different sizes of iron pieces. The proper size of the iron was stenciled over each section for easy identification by the shop workers. The 16 sections were spaced equally and held together by longitudinal bracing to form the complete framework of the rack. The iron rack was covered by an arched, steel roof to help strengthen the structure and to protect the iron from rain and snow.

Resource 14: Power House Foundation (Contributing Site)

According to railroad blueprints, the building originally measured 50’ x 80’ and was rendered in the monitor style; similar to the machine and blacksmith shop building. The surviving foundation site is approximately 24” wide and 3’deep.

Resource 15: Oil-Mixing House Foundation and Concrete Pad (Contributing Site)

The mixing-house was a one-story brick building originally measuring 20’” x 60” with a concrete floor pad. The foundation remnant is approximately 24” wide. According to railroad site plans published in 1954, the railroad abandoned the operation of the oil-mixing house in 1955 and demolished the structure, leaving the foundation and concrete pad for outdoor storage uses. The surface of the concrete platform is about 3 feet above grade.

Resource 16: Coal Station/Tower Foundation (Contributing Site)

The introduction of the diesel-electric locomotive led to the demise and eventual demolition of the coal tower during the retirement of buildings and structures in 1954-1955. What remains of this massive structure is the foundation that illustrates the footprint of the coaling station. The concrete foundation measures 66’-6” x 35’-5” with a height of 48” above grade level. The foundation is in a state of “poor to fair” repair, showing age from weathering with evidence of concrete spalling and flaking.

Resource 18: Wheel Shop - Casting Platform (Contributing Site)

The wheel shops’ casting platform is constructed of concrete with rebar, measuring 50’ x 100’ with a depth of 6”. The platform is in a state of good to fair repair, showing age from weathering with some spalling and flaking.

Resource 18: Toilet Building No. 1 Foundation (Contributing Site)

This restroom facility was located on the north end of the complex to serve railroad employees engaged in work at the roundhouse, machine and blacksmith shop and warehouse. The surviving square-shaped concrete foundation footings, built to the same dimensions as Toilet Building #2, are located directly southeast of the roundhouse building and east of the machine and blacksmith shop. The foundation footings are in a state of fair repair with some spalling and crumbling occurring on the exposed surfaces. There is visual evidence of some minor cracking in the concrete as well.

Resource 19: West Sand Tower Column Support Foundation (Contributing Site)

Located directly adjacent and on the north side of the sandy drying house are a set of four 10" by 10" concrete base foundations that once were used as the foundational base for the second wood sand tower structure. The top of the foundation bases are elevated about 2" above ground level. Visual condition assessments find there is some spalling and crumbling or deterioration of the concrete materials that form the foundations.

Resource 20: Car Shops Lumber Shed Slab Floor and Foundation (Contributing Site)
A reinforced concrete slab measuring 40'-0" x 50'-0" is located adjacent to the Car Department Mill Building on the south side. This area was used for the storage of lumber to be planed and milled in the building. The concrete slab and foundation once supported a one-story metal and wood framed building. The building was destroyed in 2004 by a major wind storm.

Water Works System Remnants **Condition: Poor**

Resources 21, 22, and 23: Water Well Foundations (Contributing Sites)

The general layout schematic for the complex identifies the location of three water wells. The well head apparatuses for these wells were supported by concrete foundations, each measuring 14'-6" by 14'-6" in a square pattern. Each well was dug approximately 30' deep with a 14"diameter wells. No physical alterations were made to the water well foundations; original integrity was protected. The foundations are in a state of fair to poor repair with spalling and crumbling concrete due to weather extremities and a general lack of maintenance.

Resource 24: 150,000 Gallon Soft Water Tank Column Foundations (Contributing Site)

The surviving foundation consists of six square column footings, each constructed of concrete, measuring 6'x 6' and protruding about 3' above grade. The footings are in a state of fair repair and exhibit some concrete crumbling and spalling.

Resource 25: 60,000 Gallon Hard Water Tank Foundation Base (Contributing Site)

The surviving foundation is a circular concrete foundation with an outer footing that forms a rim around the base that protrudes about 2' above grade. The base has a diameter of 30' and the circumference of the outer rim footing 188.5'. The base occupies a total footprint of nearly 2,827.5 sq. ft. The concrete base and outer rim footing are in a state of fair repair with some crumbling and spalling in the concrete. The reservoir base and foundation footings have a significant historical value to the complex to provide evidence of the defunct waterworks system that existed at this site and to illustrate the industrial nature of the site.

Resource 26: Water Column Box Area (Contributing Site)

The water column box area is a remnant of the water works system that was utilized in railroad and locomotive operations at the Sioux City Roundhouse, Repair Shops and Engine Terminal facility. The water column box area is located towards the geographic center of the complex, directly east of the oil house foundation. The concrete box area contains a below ground shut-off valve with evidence of a water column for filling locomotive tenders once protruding above ground.

Resource 27: Worker Walkways **Condition: Poor**

- **Contributing Structure**

Although approximately 13,052 linear feet of worker walkway segments currently exist throughout the complex, they have (for a variety of reasons) not been adequately managed or maintained over the years. The worker walkways are constructed of poured concrete at various widths and lengths with depths ranging from 4” to 6”

The worker walkways are suffering distress and severe deterioration. All surviving worker walkway segments are in a state of “poor” repair. The worker walkways exhibit signs of “spalling”, crumbling, and cracking. The cause of deterioration of the concrete in the worker walkways is related to ready ingress of water because of the exposure of the walkway system to drainage and ground water runoff. Once cracking occurred in the walkway structure, the integrity of the concrete was compromised; allowing pathways for the ingress of water. As this water saturated the weakened concrete and froze during winter and snow melt periods, further damage from ice formation may have caused pressure on the concrete structure and hastened the deterioration.

Resource 28: Yard Tracks **Condition: Poor**

- **Contributing Structure**

The surviving track elements contribute to the designation of this resource as a railroad yard historic district. This track network remains in the original road bed location from when the complex was built between 1917 and 1918. A field inspection found that a few pieces of steel rail date to their manufacture date of 1888, 1900, 1903 and 1907 as illustrated in the attached photo documentation.

A field inspection shows that all the tracks, including frogs and switches, are either in a state of “marginal” or “poor” condition. Much of the steel rail and track hardware are heavily rusted; and the original ties heavily degraded and suffering wood rot as documented with the attached photos. Ballast for the roadbed is non-existent, and in some places there is vegetation and over growth.

Narrative Descriptions of Non-Contributing Resources

The non-contributing properties include 3 buildings and 2 structures. At the time of the nomination, the Milwaukee Railroad Shops Historic District is undergoing extensive historic preservation and rehabilitation work to redevelop and transform this historic transportation facility into a regional railroad industrial heritage museum. The following non-contributing structures are directly related to the new reuse of the site.

- **Resource 29: Security Fencing (Non-Contributing Structure)**

This structure should be considered noncontributing to the historic district because it is not directly associated with the built environment of the Milwaukee Railroad Shops Historic District. A 10-ft. high chain link fence, approximately 3,450 linear feet in length, currently surrounds the nominated historic district. This fence is used for security purposes to protect the site during non-operating hours.

- **Resource 30: Scale Pit (circa early 1970s) (Non-Contributing Structure)**

This structure should be considered as noncontributing to the historic district’s integrity because it is not original to the Milwaukee Railroad Shops facility and was not used for railroad-related operations.

The Scale Pit measures 16’-8” x 63’-0” x 12’-0” with the walls and base floor constructed of 12” reinforced concrete. During the 1970s, the city of Sioux City leased the Machine Shops building from the railroad for the purposes of housing and supplying snow removal trucks and plows with street salt to combat icy conditions in the Riverside and Westside neighborhoods of Sioux City during the winter inclement weather. A scale pit with an electronic commodity weighing scale was installed directly adjacent to the Machine Shop for the purposes of weighing the salt loads carried by the trucks and plows, which allowed the City to maintain compliance for weight restrictions on state and city roadways. When the City abandoned its use of the building upon the abandonment of the site by the railroad in 1980, the electronic commodity scale was removed and the pit was filled with dirt.

- **Resource 31: Maintenance Building (circa 2009) (Non-Contributing Building)**

This single-story metal structure should be considered as noncontributing to the historic district's site because it was constructed and installed in 2009, outside the period of significance. The building houses equipment, tools, and machinery used in the maintenance of grounds that comprise the Milwaukee Railroad Shops Historic District. The maintenance building is a custom-built, steel building constructed by Morton Industries. Allied Design Architectural & Engineering Group designed the structure to Morton Standard Building Plan #306. The building's rectangular dimensions are 48' x 80' built on a 12" x 4' deep foundation. The building has a 5" deep fiber mesh concrete floor with no rebar. The building envelope consists of a gable roof with the side comprised of steel siding with a steel wainscot. The east and south elevations have no openings in the side. The north side has a large 12' wide by 12' high roll up door and one small entry door. The west elevation has four openings consisting of a metal entry door and 3 large 12' wide by 18' high roll up doors.

- **Resource 32: Model Railroad and Civil Engineering Exhibit Center (circa 2010) (Non-Contributing Building)**

This building should be considered as noncontributing to the historic district because it was constructed in 2010, outside the period of significance. The newly constructed Railroad and Civil Engineering Exhibit Center is a single-story building measuring 80'-0" x 50'-0" x 18'-0" with a gable roof slanting east and west built upon a 4" thick finished concrete slab on grade. The building is of wood-framed construction with wood trusses, common wood rafters, and rough framing. The windows are custom wood frame and wood sash. The building contains 16 gauge hollow metal doors and frames, non-asbestos fiber siding, and asphalt saturated felt and roofing shingles. The structure is painted gray with two coats of latex enamel and one coat galvanize primer. This building is used to house interpretative exhibits on railroad engineering and to display an 18' wide by 68' long HO-scale model railroad depicting an urban/rural Midwestern topography of cities, prairies, farmsteads, small towns, and the Black Hills. The model railroad illustrates the Union Pacific route from Omaha, Nebraska to the Black Hills.

- **Resource 33: Restroom Facility (2015) (Non-Contributing Building)**

This structure is considered as noncontributing to the historic district's historic vertical infrastructure because it is not an original structure of the Milwaukee Railroad Shops facility and was prefabricated by the Public Restroom Company at their manufacturing plant in Minden, Nevada. The building measures 22'-10" x 19'-6" with the side walls constructed of an engineered concrete block wall system. The building features a "gabled" plank and beam roof system supporting a 26 gauge metal roof. The restroom building features a family-oriented design of four secure, single-occupant compartment restrooms. Entry doors are constructed of 14 gauge reinforced galvanized steel. Commercial grade, wall mounted, vitreous china plumbing fixtures are installed in each bathroom compartment. The restroom facility is mounted to an 8" thick concrete slab that is oil and stain resistant. The entire structure sits upon an 18" wide by 42" deep foundation.

Narrative Descriptions of Contributing Locomotives and Other Moving Rolling Stock

Each of the locomotives and other moving rolling stock contributes to the Milwaukee Railroad Shops Historic District and is individually eligible under Criterion C in the area of engineering as intact examples of distinct types of equipment operated by the nation's railroad companies and the United States Armed Forces. The period of significance for each fits within the period of significance for the Milwaukee Railroad Shops Historic District. Each object was evaluated for its significance and integrity based upon its representation of a type or style of construction used by specific railroad companies for interchange purposes. All of the locomotives and pieces of rolling stock operated on the nation's railroad network or in logistical services for the United States Armed Forces.

Since acquiring the Milwaukee Railroad Shops in 1995, the Siouxland Historical Railroad Association has acquired an assortment of locomotives, freight rolling stock, passenger cars, and cabooses to aid in the interpretation of the historic district. The collection, which reflects the typical type of equipment that would have been cared for at this facility, contributes to the historic character of the resource by helping to convey the vital role the Milwaukee Railroad Shops played in railroading during the district's period of significance.

Resources 34: Milwaukee Road Diner Car #121 (Contributing Object)

This is a 48 seat diner with a full kitchen. This car was originally built in 1947 for the Olympian Hiawatha passenger train. In 1956, it was repainted to match the Union Pacific paint scheme, Armour Yellow, and Harbor Mist Gray. This car has since been restored to its original look including original paint scheme and wallpaper.

After its initial use on the Olympian Hiawatha was transferred for use on the following Milwaukee Road named passenger trains; the Twin Cities Hiawatha (Chicago-Minneapolis), the Arrow (Chicago–Sioux Falls, SD through Sioux City, IA), and the North Woods Hiawatha (Chicago-Minocqua, WI). After being repainted in 1956 to the Union Pacific Yellow and Grey this diner found itself in joint service on the Union Pacific named trains of The City of Los Angeles (Chicago-Los Angeles), The City of San Francisco (Chicago-San Francisco), and The City of Everywhere.

Resource 35: Milwaukee Road Baggage/Dormer #1313 (Contributing Object)

This car is an 85 foot long car with a 36 foot baggage/mail sorting compartment at one end and 4 crew sleeping compartments and hygiene area at the other end. This car was used by the porters, cooks and other crew members on the long distance passenger trains. This car is intact and was never modified by the railroad. After it was repainted in 1956 to the Union Pacific Yellow & Grey it found itself in joint service on the Union-Pacific-named trains of The City of Portland (ChicagoPortland, OR) and The City of Denver (Chicago-Denver).

Resource 36: United States Navy Diesel Locomotive No. 17797 (Contributing Object)

Except for its location during its period of significance, Diesel Locomotive No. 17797 appears today as it was built in 1943. The locomotive retains its center-cab structural character and features as it was designed and constructed. The locomotive shell is built of steel. On each side of the cab is a 150-hp Cummins 6 cylinder engine, which combined produce a maximum tractive effort of 27,000 lbs. per federal surplus donation guidelines, the motor car's livery was repainted to the colors of orange with black trim. The unit is fully operational. Displayed below are the locomotives specifications.

This 45-ton diesel locomotive is associated with a class of standard industrial switching engines that were affectionately known called "Critters" by railroad workers. This class of diesel locomotive proved popular in industrial and yard switching duties. Because of their ability to run on lightly-built track and their ability to minimize the danger of a derailment during switching moves, the United States Navy ordered a series of 45-ton diesel locomotives – using the standard design plans with modifications for military use – during World War II to support the war effort.

45-TON DIESEL LOCOMOTIVE SPECIFICATIONS AND FEATURES	
Class	B-B-90/90-2GE733
Builder	General Electric Company, Erie, Pennsylvania
Build Date	February 1943
Builder Number	17797

U.S. Navy Number	65-00388
Original Assignment	Pocatello Research Center | U.S. Navy Ordnance Plant | Pocatello, Idaho
U.S. Marine Corps Number	206 – Marine Corps Logistics Depot, California | 112345 – Camp Joseph G. Pendleton, California
Engines	2 each: Cummins Model HB1, 6 Cylinder Diesel Engines
Tractive Power	27,000 lbs.
Horsepower	300 hp
Length	28'-4"
Width	9'-6"
Height	12'
Weight	45 tons
Maximum Speed	20 mph maximum speed permissible
Source: "G-E Diesel-Electric Locomotives for Industrial Use", *1950-52 Locomotive Cyclopedia of American Practice*, New York, NY: Simmons-Boardman Pub.	

Resource No. 37: U. S. Army 8 Man Motor Car Spec. M466 (Contributing Object)
Except for its location during its period of significance, Motor Car M466 appears today as it was built in 1961. The motor car retains it's the structural character and features as it was designed and constructed. Per federal surplus guidelines, the motor car's livery was repainted to the colors of safety yellow with blue stripping. The unit is fully operational.

Motor Car M466 was built to military design specifications, outlined in defense contract DA-36-022-TC-6788, modeled after the Kalamazoo 27AW-G Heavy Duty Gang Car. This model was one of the standard designs offered by the company. The 27 AW-G Gang Car was designed for heavy use, with the ability to transport 10 to 24 workers with their tools to their job site along the tracks. U.S. Army Motor Car M466 was specifically designed for a seating capacity of 8 soldiers, which is a section of troops.

As part of the military design specifications, Motor Car M466 was equipped with a tool tray on each side of the top seat. The tool trays measured 13¾" wide by 95¾" long by 6" deep. The tool tray was located between the top seat and the foot rests. The size of the tool trays provided enough space to haul track tools or military cargo such as ammunition, small bombs, and food supplies.

The body and frame are constructed as an all-steel unit. The seat housing covers the gasoline engine and has side panels that can be easily removed for minor engine servicing and tune-ups. The top seat assembly can be quickly and easily removed as well for engine repairs and refueling. The following table outlines the construction specifications and features of Motor Car M466.

MOTOR CAR M466 SPECIFICATIONS AND FEATURES	
Make and Model	MILR 10651 | Model 27AWG
Build Date	11-1951
Builder Number	7698
Builder	Kalamazoo Manufacturing Company | Railway Supply Division | Kalamazoo, Michigan
Contract Number	DA-36-022-TC5786 | 220-01-0019 | 0-2470-13
Gauge	56½" Standard Gauge
Load Capacity	3,000 lbs.

Engine	Ford, Model 134, four-cycle, four-cylinder, vertical, water cooled | Engine Number 2454836
Ignition	6 volt battery, starter, generator, and distributor
Horsepower	48 horsepower at 2800 r.p.m.
Fuel /Tank Capacity	Gasoline | 40 gallons
Frame	Deep section steel channels | Draw heads front and rear
Length	110”
Width	65”
Height	34” from top of rail to top of seat
Weight	2000 lbs.
Transmission	Automotive type, geared, selective speed transmission coupled to heavy duty reverse transmission allowing four equal speeds in either direction
Clutch	Dry Plate Clutch
Final Drive	Totally enclosed, Kalamazoo geared drive from automotive type drive shaft direct to rear wheels.
Bearings	Spring mounted on 1-11/16” Timken axle bearings
Truck Configuration	1 Four-Wheel Truck
Wheels	16 x 5/16” demountable pressed steel, forged steel hubs | A.R.E.A. standard
Axles	Front: 1-11/16” S.A.E.1045 Steel. Differential Type | Rear: 1¾” S.A.E. 1045 Steel
Source: Kalamazoo Motor Cars 1956 Catalog / Army A-A-50218 Valid Notice 2: Railway Motor Cars, Maintenance 8-Man	

Resource No. 38: Burlington Northern Fruit Express Refrigeration Car #469 (Contributing Object)

The all-steel structural car body of Burlington Northern Fruit Express Refrigeration Car #469 appears today as it was built in February 1957 and maintains its location of integrity. The reefer car is the last known railcar to be serviced at the Sioux City Repair Shops facility at the time of the closure and abandonment. The refrigeration mechanical unit was scrapped by the railroad for cash in 1980 after it had been removed for repairs by workers. Proceeds from the sale of the mechanical refrigeration unit were pooled together with other scrap sales to repay the railroad companies creditors. Future plans call for the refrigeration car to be repainted to its “Great Yellow Fleet” livery and placed on display as an example of the type of cars repaired at the site.

SPECIFICATIONS AND FEATURES	
Series Code	Mechanical Reefer | Total number of reefer cars produced in the lot: 160
Built	Feb. 1957
Average Load Limit	104,880 lbs.
Car Length	57’
Average Daily Miles	140
Door Opening	10’-6 | Roof Hatches
Wall Insulation	1-½” Flexinum
Roof Insulation	2” Hairfelt
Floor Insulation	2” Cork

Resource No. 39: Chicago and North Western Boxcar #160970 (Contributing Object)

The all-steel structural car body of Chicago and North Western Boxcar #160970 appears today as it was built. It maintains integrity of location because of its last known assignment was for train service in and out of Sioux City. This type of boxcar is representative of a specialized boxcar built by Pullman-Standard during the 1960s to replace the general-purpose boxcar model that dominated the North American railroad market since before World War I. Boxcar #160970 was built at a cost of about $15,200

SPECIFICATIONS AND FEATURES	
Series Code	CB180 | Total number of cars produced in series: 2000
Builder	Pullman Standard
Average Load Limit	152,900 lbs.
Cubic Capacity	5050 cu. ft.
Inside Length	50'-6"
Inside Width	9'-5"
Inside Height	10'-6"
Door Opening	10'-0"

Resource No. 40: Chicago and North Western Boxcar #162571 (Contributing Object)

The all-steel structural car body of Chicago and North Western Boxcar #162571 appears today as it was built. It maintains integrity of location because of its last known assignment was for train service in and out of Sioux City. This type of boxcar is representative of a specialized boxcar built by Pullman-Standard during the 1960s to replace the general-purpose boxcar model that dominated the North American railroad market since before World War I. Boxcar #160970 was built at a cost of about $15,200

SSPECIFICATIONS AND FEATURES	
Series Code	CB185 (lot 1059) | Total number of cars produced in series: 300 boxcars
Builder	Pullman Standard
Cubic Capacity	5,077 cu. ft.
Average Load Limit	159,700 lbs.
Inside Length	50'-6"
Inside Width	9'-5"
Inside Height	10'-6"
Door Opening	10'-0" | Youngstown 47 Sliding

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Resource No. 41: Chicago and North Western Caboose # 11168 (Contributing Object)

Caboose #11168 was one of 50 cabooses built for the Chicago and North Western in 1968 to use in freight service. This caboose was assigned to the Sioux City terminal. The structural car body is constructed of steel. While it appears today in an orange livery, it still maintains structural integrity as it did when built for the railroad company. The caboose maintains integrity of location for its associations with an operating history in Sioux City. It's location at the Milwaukee Railroad Shops Historic District maintains that linkage. The integrity of setting is maintained by its location in a railroad facility and placement within an active railroad corridor.

Caboose #11168 features the modern Stanray roof designed, which uses an X pattern instead of diagonal raised patterns. Interior furnishings include a vapor-monogram toilet, Gloekler ice box, 55-gallon oil stove, a single hi-back walkover seat for the conductor and two hi-back walkover seats for the brakemen.

CABOOSE #11168 SPECIFICATIONS AND FEATURES	
Series Code	CC170 | Total number of cars produced in the series: 50 | Bay-Window Style Caboose
Year Built	1968
Capacity	88
Total Length (End to End)	39'-1¼"
Total Width	10'-7¼"
Total Height (Rail to Roof)	13'-10 13/16"

Inside Length	30'-0"
Inside Width	8'-11'
Inside Height	6'-11"
Total Car Weight	48,500 lbs.
Wheels	33' diameter
Brakes	AB 1012 W/QRB. ABD1012 W/QRB. No. 10 Brake Beam
Handbrakes	Non-Spin Vertical Type
Underframe	Waugh Cushion 10½" travel
Draft Gears	Waughmat CG-5
Couplers	BE, 60-AHT, W/Y40 Yoke
Roof	Stanray
Trucks	Con. Int. Box for End of Axel Drive
Springs	Double Elliptic
Bay Side	Horizontal Sliding VN500
Bay	Fixed and Door VN916
Door	Metal-L-Wood
Floor	¼" Benelex
Ceiling and Walls	3/8" Plywood Laminate with .04 White Fiberclass
Source: Chicago and North Western Final Freight Car Roster	

Resource No. 42: Chicago and North Western Caboose #11009 (Contributing Object)

Caboose #11168 was one of 50 cabooses built for the Chicago and North Western in 1968 to use in freight service. This caboose was assigned to the Sioux City terminal. The structural car body is constructed of steel and appears today as it did when built for the railroad company. The caboose maintains integrity of location for its associations with an operating history in Sioux City. It's location at the Milwaukee Railroad Shops Historic District maintains that linkage. The integrity of setting is maintained by its location in a railroad facility and placement within an active railroad corridor.

Caboose #11168 features the modern Stanray roof designed, which uses an X pattern instead of diagonal raised patterns. Interior furnishings include a vapor-monogram toilet, Gloekler ice box, 55-gallon oil stove, a single hi-back walkover seat for the conductor and two hi-back walkover seats for the brakemen.

CABOOSE #11009 SPECIFICATIONS AND FEATURES	
Series Code	CC150 | Total number of cabooses produced in the series: 150 | Bay-Window Style Caboose
Year Built	1960
Builder	Thrall Car Company
Capacity	88
Inside Length	30'-0"
Inside Width	8'-1"
Inside Height	6'-11"
Total Car Weight	48,500 lbs.
Wheels	33" Diameter
Brakes	AB1012 No. 18 Brake Beam
Handbrakes	Non-Spin Vertical Type
Draft Gears	Miner CR-3 (rubber)
Couplers	BE 60 AHT
Roof	Stanray
Trucks	Con. Int. Box for End of Axle Drive
Springs	Double Elliptic
Bay Side	Raised VN500
Bay	Fixed and Dorr – VN916
Door	Metal-L-Wood

Floor	¼" Benelex
Ceiling and Walls	3/8" Plywood Laminate with .04 White Fiberglass
Source: Chicago and North Western Final Freight Car Roster	

Resource No. 43: Northern Pacific Railway Caboose #1318 (Contributing Object)

The car body of Northern Pacific Railway Caboose #1318 appears today as it did during its period of significance. Built in 1913, the caboose car body is constructed of wood and the frame and running gear are constructed from steel. While the caboose was in service on rail lines between St. Paul and Puget Sound, the caboose retains integrity of location with its placement in the Milwaukee Railroad Shops Historic District. This caboose is representative of a series of wood-style cabooses built for freight service. The caboose is painted in the historic red paint scheme for Northern Pacific cabooses.

SPECIFICATIONS	
Year Built	1913
Road Number	1318 | original number 1877 | Cupola Style Caboose
Builder	Northern Pacific Railway | South Tacoma Shops
Length	24'
Width	9'-6$^{1}/_{8}$"
Height	14'-11" from top of rail to top of cupola
Total Weight	29,400 lbs.
Source: Caboose Diagrams, Northern Pacific Railway Historical Society	

Resource No. 44: Chicago, Burlington & Quincy Generator Coach #7207 (Contributing Object)

The car body and interior of Coach #7207 are in need of major repairs. This coach was stored in a rail yard near the stock yards during the 1980s. The Burlington Northern had sold the coach to the KD Station, the former Swift Packing Plant. While in storage, the car was disassembled in hopes of being restored for use in an excursion train operation out of Sioux City. The owner experienced some financial troubles and entered into bankruptcy. As a result of a lack of financial capital, the coach was never renovated. To help pay back creditors, the owner salvaged and sold the electric generator that provided power to this car and other cars that were coupled to it. The Siouxland Historical Railroad Association purchased the car and has it scheduled for future restoration. The seats have been upholstered. The coach retains integrity of location and setting by its placement in the Historic District and the active railroad corridor.

SPECIFICATIONS AND FEATURES	
Series	Steel Combination Generator & Passenger Sub Car
Year Built	1929 | Rebuilt: 1950
Seating Capacity	68 passengers
Length (Inside Couplers)	81'-8"
Car Width	9'-6"
Car Height (from top of rail)	13'-4$^{3}/_{15}$"
Car Weight	117,500 lbs.
Trucks (2 sets)	12,600 lbs. each
Total Weight with Trucks	142,700 lbs.
Source: Passenger Car Diagrams. Chicago, Burlington & Quincy Railroad Company. Railway Production Classics: Chicago, Illinois	

Resource No. 45: Northern Pacific Diner Car #1677 (Contributing Object)
After serving for many years in passenger service for the Northern Pacific Railway Company, it was converted into training car #1677 for the Burlington Northern Railroad when the company ended passenger service during the early 1970s. The interior of the car was modified with blanked-out windows and a video projection system. The car kept its arch top windows along the car's clearstory. After its retirement in 1980, the car was sold to KD Station for potential use in an excursion train. Unfortunately, the car fell into a derelict condition and an arson fire in 1983 totally engulfed the interior of the car. The car is currently housed at the Milwaukee Railroad Shops Historic District, along with the Chicago, Burlington & Quincy Generator Coach. Car #1677 maintains integrity of location and setting with it placement on a track in the complex where passenger cars were repaired and renovated. The car creates a feeling of the condition of equipment the railroad workers would have had to renovate and rebuild at the Sioux City facility.

Resource No. 46: St. Louis Iron and Machine Works Corliss Stationary Steam Engine (Contributing Object)

Except for its changed surroundings, the St. Louis Iron and Machine Works Corliss Stationary Steam Engine looks today as it did when it was built around 1890. It is one of the oldest, authentic Corliss Stationary Steam Engines of its make and model in existence. It was built in St. Louis, Missouri and transported for installation in the Swift Meat Packing Plant in Sioux City. With the demolition of the former meat packing plant building in 2005, the Corliss Engine was donated to the Milwaukee Railroad Shops Historic District for the purpose of replicating the make and model of Corliss Engine that the railroad had installed at the site to assist with the distribution of steam throughout the plant to power machining equipment. The railroad building that housed the Corliss Engine for the complex was razed in 1954 and the site's Corliss Engine was salvaged and scrapped. The St. Louis Corliss Engine was transported from the KD Station and set up in the machine shop building. At this location, the Corliss Engine will illustrate how the historic district's collection of machining equipment was powered during the site's period of significance.

St. Louis Corliss Stationary Steam Engine	
Make	Corliss Type
Model	Duplex Configuration with Single Flywheel
Builder	St. Louis Iron and Machine Works, St. Louis, Missouri
Total Weight	35 tons
Height	10' above grade
Width	12'-6"
Length	20'
Steam Pressure	125 lbs.
Horsepower	100 horsepower
Governor Type	Fly-ball
Cylinder Bore	20"
Cylinder Stroke	48"
Flywheel Height	12' diameter
Flywheel Weight	10 tons
Source: Bob Sweeny	

Assessment of the Seven Qualities of Integrity for the Locomotives and Rolling Stock

The integrity of the collection of nominated locomotives and other moving rolling stock is cumulatively assessed below by examining the seven principle aspects of integrity that affect significance alongside the instructions outlined in the ***National Register Policy Clarification: Integrity Requirements for Locations and Settings of Locomotives and Other Rolling Stock*** published in 2009.

1. **Location:** The collection of locomotives and moving rolling stock consists of 13 objects whose integrity of location is assured by their placement in the Milwaukee Railroad Shops Historic District. As moving railroad equipment, the elements of the locomotive and rolling stock collection had no fixed location during their period of historic significance. They served throughout the nation's railroad network along the lines of their native railroad company, or were interchanged with other railroads for long-haul traffic moves. Each moved continuously, assigned to trains or new locations, on an as needed basis throughout its operation life.

   For the freight rolling stock, the movement also entailed being interchanged with another railroad to be part of train consists so that its cargo could be shipped to its destination point. So it is a common practice in railroading to have one railroad's rolling stock traveling over another railroad company's lines. When accepting another railroad company's rail car, the carrier assumes the responsibility of making inspections and running repairs to the rolling stock. Those repairs would be made at the carrier's shop locations.

   Recognizing the importance of Integrity for the placement of historic movable resources, ***National Register Policy Clarification: Integrity Requirements for Locations and Settings of Locomotives and Other Rolling Stock*** explains "if Criterion C applies, locomotives generally do not have to be in original locations, referring to the place where built or housed for a significant part of their productive life. Such locomotives were intended to move from place to place."[7] Based on this principle, the location meets the policy's requirements.

2. **Setting:** Locomotives and rolling stock are the most maintenance-intensive part of the railway system. As moving vehicles, they are the most vulnerable to wear and tear from heavy hauling if maintenance is neglected. The setting of the Milwaukee Railroad Shops Historic District still reflects the type of repair facility all the locomotives and movable rolling stock would have accessed during their periods of historic significance for the inspection, repair, and overhaul of worn parts. The equipment is housed either in the roundhouse building or on the tracks that comprise the rail yard.

   The setting of the Milwaukee Railroad Shops Historic Districts is appropriate based on the conditions outlined in the "National Register Policy Clarification," which states "locomotives, whether sited alone or as part of a collection, must be placed in an appropriate railroad-related setting. They must be situated on railroad track … Inside a historic roundhouse, repair shop, or other rail-related building or structure … It must be located on tracks in a setting that does not detract from an appreciation of the locomotive as a vehicle designed to travel within the nation's rail system …A setting should not be contrived to create an appearance that never existed historically."

3. **Feeling:** The sense of railroading is most clearly evoked in the collection of locomotives and rolling stock. The ability to move the locomotives and rolling stock along the historic district's rail yard are the most effective images of historic railroading at this complex. By periodically changing the placement of the locomotives and rolling stock within the historic district's rail yard and roundhouse, the site is able to enhance the understanding of operational practices used by railroad workers during the period of significance. The size and scale of the locomotives and movable rolling stock are tangible objects that aid in the mental comparison for measuring the massiveness of the roundhouse building and the rail yard.

[7] Wyatt, Barbara. *Integrity Requirements for Settings and Locations of Locomotives and Other Rolling Stock*. National Register Policy Clarification. Washington, D.C.: National Register of Historic Places, 2009.

4. **Association:** All of the locomotives and pieces of rolling stock were built to operate within the United States railroad network or in logistics services for the United States Armed Forces, which operated its own railroad terminals and rail lines at military bases across the country. It is not uncommon for the railroads or the military to decommission and sell their equipment as surplus when the pieces of rolling stock and locomotives are nearing the end of their operational lifecycles. By their placement within the Milwaukee Railroad Shops Historic District, the locomotives and rolling stock are tangible reminders of why the steam-era railroad repair shops terminals were vital to railroad operations.

5. **Design:** All the locomotives, freight rolling stock, passenger cars, and cabooses maintain a high level of design and reflect their historic character at the time of construction. Each element was manufactured to standard design plans drafted by the railroad locomotive builder or car factory in collaboration with the motive departments of the historic owner. Each class of locomotive and rail car, while constructed to standard design plans, was made-to-order in quantities according to the specifications and operating environments of its owner.

6. **Workmanship:** Each element of the locomotive and movable rolling stock collection was manufactured in a locomotive shop or rail car factory by a team of specialized, skilled craftsman following standardized design plans. Except for the CB&Q commuter coach and the NP Dining Car, each element held up well during their heavy use period. Thus, each displays a high level of craftsmanship and assembly practiced by the construction workers.

7. **Materials:** Since the locomotives and movable rolling stock were built, parts of the locomotives, freight rolling stock, passenger cars, and cabooses have been replaced and repaired. This is a normal practice for railroad motive power and movable rolling stock as parts wear out from the forces of train movements. The most frequent repairs and exchanging of parts are associated with the couplers and running gear (wheel sets, brakes and journals). The use of standardized replacement materials allowed for repairs to be made easily, as all parts were accessible because they were in-stock in the repair shops' store house. The railroad's inventory of replacement materials were fabricated or assembled to the original design specifications for the specific railroad equipment. Each repair shops terminal maintained a library of diagrams and schematics to identify the associated repair materials needed to make repairs to a specific type of locomotive or rolling stock. This business practice ensured the replacement materials were identical to the original parts.

   The bulk of repairs and overhauls center on the running gear (wheels and air brakes) and couplers. These two areas experience the most wear and tear due to the stress from moving along the rail line. All replacement parts have been compatible with the original materials. The locomotives and rolling stock are constructed from durable, riveted steel plates.

Contributing objects previously listed in the National Register

The Milwaukee Railroad Shops Historic District is home to Great Northern Railway Steam Locomotive No. 1355 and Tender No. 1451. Both the locomotive and tender are listed in the National Register of Historic Places (#04001352) at the *national level of significance* under Criterion A and Criterion C. They are not included in the contributing objects count for the present nomination.

Steam Locomotive No. 1355 and Tender No. 1451 are on permanent display in the roundhouse building. As a unit, both are periodically brought out of the roundhouse building and placed on the turntable to aid in illustrating the role the turntable played in sorting locomotives for repairs and major overhauls in the roundhouse. The visual effect of the steam locomotive's and tender's placement at this site evokes the strong relationship the Historic District has to steam-era railroading and the mission-critical role the facility played in keeping locomotives and rolling stock in running condition.

Great Northern Railway Steam Locomotive No. 1355 and Tender No. 1451 retain integrity of location in association with their period of historic significance. The steam locomotive and tender operated in and out of Sioux City pulling trains over the Wilmar Division (southwest Minnesota, southeast South Dakota, and northwest Iowa). Upon its retirement from active rail service, the locomotive and tender were donated to the City of Sioux City for public display in the community. By its location at the Milwaukee Railroad Shops Historic District, the locomotive and tender are on public display in their last known home base of active railway operations. Both appear today as they did during their period of significance. Both are restored to historic company specifications for when they pulled the named passenger trains of the Great Northern Railway (1909 to 1950).

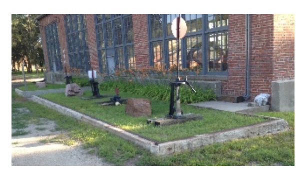
Inventory of Contributing and Noncontributing Resources by Resource Number

Resource Number	Resource Name	Construction Date Alteration Date	Resource Type	National Register Status	Thumbnail Photo
1	Six-Stall Roundhouse Building	1917 1954	Building	Contributing	
2	Turntable and Pit	1917	Structure	Contributing	
3	Machine and Blacksmith Shops	1917	Building	Contributing	
4	Car Department Mill Building (Car/Carpenter Shop)	1917	Building	Contributing	
5	Toilet Building #2 (Water Closet)	1917	Building	Contributing	
6	Sand Drying House	1917	Building	Contributing	

Resource Number	Resource Name	Construction Date / Alteration Date	Resource Type	National Register Status	Thumbnail Photo
7	East Wood Sand Tower	1917	Structure	Contributing	
8	Engineers Tool House	1917	Building	Contributing	
9	Cinder Ash Pit	1917 / 1954	Structure	Contributing	
10	Wood Timber Shipping Deck with Ramp	1917 / 1954	Structure	Contributing	
11	24-stall Roundhouse Foundation	1917 / 1954	Site	Contributing	
12	Store House Foundation	1917 / 1955	Site	Contributing	

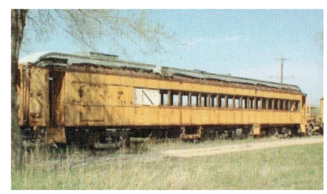
Resource Number	Resource Name	Construction Date / Alteration Date	Resource Type	National Register Status	Thumbnail Photo
13	Iron Rack Foundation	1917 / 1955	Site	Contributing	
14	Power House Foundation	1917 / 1954	Site	Contributing	
15	Oil-Mixing House Foundation and Concrete Pad	1917 / 1954	Site	Contributing	
16	Coal Station/Tower Foundation	1917 / 1954	Site	Contributing	
17	Wheel Shop - Casting Platform	1917 / 1954	Site	Contributing	
18	Toilet Building No. 1 Foundation	1917 / 1954	Site	Contributing	

Resource Number	Resource Name	Construction Date Alteration Date	Resource Type	National Register Status	Thumbnail Photo
19	West Sand Tower Column Support Foundation	1917 1954	Site	Contributing	
20	Car Shops Lumber Shed Slab and Foundation	1917 2004	Site	Contributing	
21	Water Well Pump House #1	1917 1954	Site	Contributing	
22	Water Well Pump House #2	1917 1954	Site	Contributing	
23	Water Well Pump House #3	1917 1954	Site	Contributing	
24	150,000 Gallon Soft Water Tank Column Foundations	1917 1954	Site	Contributing	

Resource Number	Resource Name	Construction Date Alteration Date	Resource Type	National Register Status	Thumbnail Photo
25	60,000 Gallon Hard Water Tank Foundation Base	1917 1954	Site	Contributing	
26	Water Column Box Area	1917 1954	Site	Contributing	
27	Worker Walkways	1917 1954	Structure	Contributing	
28	Yard Tracks	1917 1954	Structure	Contributing	
29	Security Fencing around Perimeter	1997	Structure	Noncontributing	
30	Scale Pit	circa 1970s	Structure	Noncontributing	

Resource Number	Resource Name	Construction Date Alteration Date	Resource Type	National Register Status	Thumbnail Photo
31	Maintenance Building	2009	Building	Noncontributing	
32	Model Railroad and Civil Engineering Exhibit Center	2010	Building	Noncontributing	
33	Restroom Facility	2015	Building	Noncontributing	
34	Milwaukee Road Diner Car #121	1947	Object	Contributing	
35	Milwaukee Road Baggage/Dormer #1313	1947	Object	Contributing	
36	United States Navy Diesel Locomotive No. 17791 / Marine Corps Locomotive #206	1943	Object	Contributing	

Resource Number	Resource Name	Construction Date Alteration Date	Resource Type	National Register Status	Thumbnail Photo
37	U.S. Army 8 Man Motor Car Spec. M466	1951	Object	Contributing	
38	Burlington Northern Fruit Express Refrigeration Car #469	1957	Object	Contributing	
39	Chicago and North Western Boxcar #160970	1969	Object	Contributing	
40	Chicago and North Western Boxcar #162571	1973	Object	Contributing	
41	Chicago and North Western Caboose #11168	1968	Object	Contributing	

Resource Number	Resource Name	Construction Date Alteration Date	Resource Type	National Register Status	Thumbnail Photo
42	Chicago and North Western Caboose #11009 (Renumbered SLHX 1984)	1960	Object	Contributing	
43	Northern Pacific Railway Caboose #1318	1913	Object	Contributing	
44	Chicago, Burlington & Quincy Generator Coach #7207	1929 1950	Object	Contributing	
45	Northern Pacific Diner Car #1677	1936	Object	Contributing	
46	St. Louis Iron and Machine Works Corliss Stationary Steam Engine	circa 1890	Object	Contributing	

HISTORIC RESOURCES PREVIOUSLY LISTED IN THE NATIONAL REGISTER OF HISTORIC PLACES

Listed 2004 04001352	Great Northern Railway Steam Locomotive No. 1355 "National Level of Significance"	1909 1924	Object	Contributing	

Listed 2004 04001352	Great Northern Railway Tender No. 1451 “National Level of Significance”	circa 1920	Object	Contributing	

The location of these contributing and noncontributing resources are identified on the Historic District layout map displayed on pages129 and 130.

Assessment of the Seven Aspects of Integrity for the Historic District

The question of this historic district's integrity involves an assessment as to whether the Milwaukee Railroad Shops maintains the physical characteristics today that existed during its period of significance. During this study of integrity, data was collected and evaluated through extensive research of railroad company documents and construction drawings; a Phase IA Geoarchaeological Reconnaissance and Phase I Intensive Archaeological Investigation; a Photographic Inspection that inventoried features and artifacts visible on the ground surfaces; review of geospatial historical records; and the integration of GPS technology with GIS mapping during a Phase I reconnaissance survey. The Siouxland Historical Railroad Association worked with two archaeologists and one historian (Cultural Heritage Associates, the Office of the State Archaeologist, and Tallgrass Historians) to carry out these investigations.

The assessment findings supported the premise that the Milwaukee Railroad Shops Historic District maintains a high degree of integrity in all seven respects: location, design, setting, materials, workmanship, feeling, and association. The justification for this finding is presented below.

1. **Location:** The Milwaukee Railroad Shops Historic District remains in the same location in which it was initially constructed, thus integrity of location is excellent.

   The Milwaukee Railroad Shops Historic District is located adjacent to the mainline corridor of the BNSF Railway (the historic railroad line of the Chicago, Milwaukee, St. Paul and Pacific Railroad). This mainline corridor is active with over three unit trains and a local switching train passing by the historic district each day.

2. **Design:** Close examination of historic images with the photographic inspection of the prominent architectural features present today in the surviving buildings, structures, foundation sites and the rail yard documents the Historic District retains the historic integrity of design and site planning. The district consists of an industrial complex layout formally designed to standard construction plans that were developed by the railroad company's motive power and engineering departments. The design of the buildings was created around large, open workspaces with large bays of windows to allow daylight to reach most areas of the buildings. The facility is modeled after a comprehensive design from site plan to individual standardized construction plans for each element. Archival review of historic construction plans found planning addressed local issues such as access to the water table, topography, the adjacent natural environment, and weather impacts such as storm water runoff, snow melt, and flooding.

   The arrangement of the buildings, structures, and rail yard form a longitudinal style of steam railroad repair shop terminal. All contributing buildings, structures, and sites (foundational remains of nonextant buildings and structures) were designed under the direction of Charles F. Loweth as an interrelated system; as evidenced by their placement in the landscape for the purpose of servicing, inspection, maintenance, repair and overall of steam locomotives, freight rolling stock, and passenger cars. Archival research of design documents shows that all of the buildings and structures were built to standard design plans drafted by the civil engineers and architects employed by the railroad. A high degree of architectural design work is represented in the engineering that guided the design and construction of the Milwaukee Railroad Shops complex. Visual inspections of the buildings today, when compared to original construction drawings and blueprints, show that the architectural features incorporated during the three-year construction period (1916-1918) are still present and are easily identified.

   Archival research of the historic construction documents found that the design and construction of this railroad shops terminal was carried out by the engineering department of the Milwaukee Road under the general direction of Charles F. Loweth, chief engineer; A. G. Holt, assistant chief engineer; H. C. Lothholz, engineer of design; and C. N. Bainbridge, office engineer. The construction was under the immediate onsite direction of C. H. Buford, assistant engineer; F. C. Loweth, assistant engineer; and J. E. Weston, assistant engineer. The surviving portions of the district represent the expertise of these engineers in adapting standard building plans in arranging the site layout to the local geography. Archival research with the American Society of Civil Engineers found that each of these engineers had extensive professional careers in the railroad industry. Both Charles F. Loweth and F. C. Loweth were published authors and presenters at engineering conferences during their career.

3. **Setting:** The Milwaukee Railroad Shops Historic District's 29.53 acres are located on flatland within the flood plain of the Big Sioux River. Historic images and city documents show that prior to its period of significance the Milwaukee Railroad Shops Historic District was a Riparian/river floodplain habitat with some timber & scattered fields/trees. An historic image shows the area being cleared for railroad land use in 1916. Portions of the woody vegetation have tried to reestablish themselves in recent decades, with some of the historic resources now located among a growth of mature trees. Despite the minor ecological changes, the historic district retains integrity of setting. The core clustering of the buildings, structures, foundation sites, and rail yard still evoke the sense of railroad land use; thus maintaining the integrity of setting well into the future.

4. **Materials:** The integrity of historic materials is good. Building facades incorporate brick and wood framed roofs and windows and have features such as parapets, pilasters, and smaller arched windows. An examination of the 1917-1918 construction documents found that many of the materials used were from local or regional sources. Aggregate, sand, gravel, and other granular material for track ballast and mixing concrete was extracted from quarries and gravel pits in Hawarden, Iowa. Portland cement powder was produced at a plant in Des Moines, Iowa and transported by rail to Sioux City in large rail cars. Brick for the structures were furnished by Sioux City Brick & Tile Company plants that were located in the Riverside neighborhood. The brick was manufactured out of the clay mined from the First Bluffs of the Loess Hills. The wood windows and doors were manufactured by Curtis Sash and Door of Sioux City.

   Where necessary the utilitarian buildings and structures of the Milwaukee Railroad Shops Historic District have been rehabilitated using modern but compatible materials. All due care was exercised to maintain and address contextual appropriateness in compliance with the Secretary of the Interior's Standards. Railroad buildings of brick and wood frame construction have been repaired using materials and techniques similar to the original.

   When the property was acquired by the Siouxland Historical Railroad Association in 1995, all the buildings, structures, foundation sites, and the rail yard were in a "state of severe disrepair" and slated for demolition. Over the past two decades, the Siouxland Historical Railroad Association, in consultation with the State Historic Preservation Office and the Iowa Department of Transportation, have researched archival construction plans and documents to ensure all materials and techniques used in the historic preservation work are similar to the original specifications. This commitment to detail is ensuring the historic district retains integrity of materials well into the future.

5. **Workmanship:** The Milwaukee Railroad Shops Historic District is a representative example of the workmanship associated with late 19th Century and early 20th Century railroad construction, from 1880 to 1930. During construction there were several bricklayers employed. The building facades demonstrate the workmanship achieved by the bricklayers in detailing industrial buildings with decorative features (mortar joints, lintels, round window arches, pilaster columns, and parapets with cement caps). This high level of craftsmanship resulted in brickwork of consistent appearance among the extant buildings. The surviving buildings also demonstrate the care taken by the bricklayers to adopt the same jointing and finishing techniques to retain a high level of uniformity in the joint profiles.

   The extant buildings retain a high degree of workmanship across the interiors that relied on wood-frame construction. The interiors demonstrate workmanship in roof construction by utilizing tongue and groove boarding (roof decking), heavy wood trusses, and timber beams and support columns.

Subsequent alterations, such as the razing of several buildings and structures, left foundation sites that serve as a physical record of the historic district's evolution in response to changing locomotive maintenance and repair needs. The foundation sites are examples of reinforced concrete workmanship.

6. **Feeling:** The Historic District's industrial railroad character is expressed in extensive features such as the railroad tracks and switches that form the rail yard. The cluster arrangement of the surviving buildings, structures, and foundation sites along the longitudinal layout of the rail yard add to the industrious feeling of the Historic District. Additionally, the historic district is located adjacent to the mainline corridor of the BNSF Railway (the historic railroad line of the Chicago, Milwaukee, St. Paul and Pacific Railroad). This mainline corridor is active with over three unit trains and a local switching train passing by the historic district each day. The Milwaukee Railroad Shops historic district provides a "front porch" view of the trains as they cross the bridge over the Big Sioux River traveling in and out of South Dakota. This modern day railroad activity with trains passing by the site as they did during the period of historic significance. Thus, the historic district does retain integrity of feeling.

7. **Association:** The property encompassed all facets of operations for the divisional shops terminal built by the Milwaukee Road in Sioux City. Archival sources and an archaeological survey establish clear associations between the surviving buildings, structures, foundation sites, and the rail yard with the historic land use that would become the Sioux City Roundhouse, Repair Shops and Engine Terminal for the railroad's Sioux City & Dakota Division. The contributing buildings, structures, foundation sites, and the rail yard date from the three-year construction period of 1916 to 1918, and were placed into full operations at the startup of this railroad terminal in 1918. Consequently, the Historic District retains integrity of association.

Alterations

Alterations to the buildings, structures, foundation sites, and rail yard reflect the changes in the scope of work the Milwaukee Railroad Shops performed in the servicing, inspection, maintenance, and repair of locomotives, freight rolling stock, and passenger cars. Most of these alterations took place during the period of historic significance, and now contribute to the historic character of the district. They tell the story of evolution of the steam-era railroad repair shops terminal to contemporary motive power and rail car servicing facilities.

The Siouxland Historical Railroad Association has found the need to construct and install some new non-contributing buildings and structures to bring the historic district up to environmental standards, disability/access regulations, and building codes. This new construction has been carried out to ensure the buildings conform to the aesthetic environment of the historic resources and blend in with the feeling of the railroad terminal. The placement of these new amenities is within the conveyance shadow of the historic resources to minimize the visual and aesthetic impact.

Future Plans

The Milwaukee Railroad Shops Historic District is owned by the Siouxland Historical Railroad Association, a private non-profit 501(c)(3) museum and educational organization. This organization's development plans call for the preservation, rehabilitation and transformation of the historic district into the museum campus of the Sioux City Railroad Museum, an operating division of the Siouxland Historical Railroad Association. To assist with funding the historic preservation work and transformation activities, the Siouxland Historical Railroad Association will be applying for a mix of state historic preservation tax credits and Brownfields Tax Incentive; federal transportation enhancement funds; state Historical Resource Development Program funds; and private foundation and corporate grants.

8. Statement of Significance

Applicable National Register Criteria
(Mark "x" in one or more boxes for the criteria qualifying the property for National Register listing.)

- [x] A Property is associated with events that have made a significant contribution to the broad patterns of our history.
- [ ] B Property is associated with the lives of persons significant in our past.
- [x] C Property embodies the distinctive characteristics of a type, period, or method of construction or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components lack individual distinction.
- [x] D Property has yielded, or is likely to yield, information important in prehistory or history.

Criteria Considerations
(Mark "x" in all the boxes that apply.)

Property is:

- [ ] A Owned by a religious institution or used for religious purposes.
- [ ] B removed from its original location.
- [ ] C a birthplace or grave.
- [ ] D a cemetery.
- [ ] E a reconstructed building, object, or structure.
- [ ] F a commemorative property.
- [x] G less than 50 years old or achieving significance within the past 50 years.

Areas of Significance
(Enter categories from instructions.)

Transportation
Industry
Engineering

Period of Significance

1917-1980

Significant Dates

1917
1918
1925
1954
1965

Significant Person
(Complete only if Criterion B is marked above.)

N/A

Cultural Affiliation (if applicable)

Architect/Builder

Chicago, Milwaukee, St. Paul & Pacific Railroad
Motive Power and Engineering Department
Loweth, Charles Frederick
Fenstermaker, DeWitt Clinton

Statement of Significance

Statement of Significance Summary Paragraph (Provide a summary paragraph that includes level of significance, applicable criteria, justification for the period of significance, and any applicable criteria considerations).

The Milwaukee Railroad Shops Historic District is eligible for its statewide and local significance under Criteria A, C and D. It derives its significance from its association with several important eras of railroad development across Iowa and in Sioux City. The period of significance begins in 1917 when the bridge and building department set up their materials yard and began operations at the repair shop facility; and ends when the Milwaukee Road embargoed operations in Sioux City and across much of Iowa, and when the facility was finally abandoned in late 1980. Its historic associations with one of the nation's most prominent railroads in the Midwest and Pacific Northwest regions, together with its character-defining features, such as utilitarian design, one-story brick and wood construction, and large open workspaces, help to convey the specific time and place of its construction and its unique use within the state's railroad network. The Milwaukee Railroad Shops Historic District meets Criterion Consideration G for exceptional significance this property achieved in 1980 as one of the most important and rarest surviving examples in the country that represents the largest corporate railroad collapse; which significantly altered the physical make-up of the nation's railroad network and the operating landscape of the Chicago, Milwaukee, St. Paul and Pacific Railroad Company.

Narrative Statement of Significance (Provide **at least one paragraph for each area of significance**.)

(**Iowa SHPO Additional Instructions:** For properties not nominated under Criterion D, include a statement about whether any archaeological remains within or beyond the footprint of the property were assessed as part of this nomination under the subheading **Archaeological Assessment**.)

The Milwaukee Railroad Shops Historic District is eligible at the state and local levels under Criterion C for its engineering significance and Criterion A for its significance in transportation and industrial history associated with the Chicago, Milwaukee, St. Paul and Pacific Railroad Company, often known as the Milwaukee Road. Incorporated in 1842 by merging together several smaller fledging railroad companies that had laid rail lines in Wisconsin, the Milwaukee Road evolved into the nation's last transcontinental railroad, stretching from Chicago to Puget Sound. From 1881 to the late 1960s, the railroad company was a prominent force in the states of Iowa and South Dakota. Like its competitors, the railroad company bought land, laid tracks, built depots, constructed industrial facilities, promoted settlement, and platted farm towns. Though the Milwaukee Railroad Shops Historic District is eligible for the National Register of Historic Places at the state and local levels of significance, it is worth noting that its significance extends beyond the boundaries of Iowa. The historic district showcases the principal themes of regional railroading in the nation's heartland during the first half of the twentieth century.

One of the many industrial facilities built by the Milwaukee Road across its system was the Sioux City Roundhouse, Repair Shops and Engine Terminal, also known as the Sioux City Repair Shops. This type of industrial facility was categorized as a steam railroad repair shop. Simply stated, the purpose of a steam railroad repair shop terminal is to service, inspect, maintain, repair and overhaul locomotives, freight rolling stock, and passenger cars.

As a steam railroad repair shop, the Milwaukee Railroad Shop complex was vital to the development and operations of one of the nation's prominent steam-era railroad networks that crossed the Iowa and Dakota Territories. Its construction took over three years (1916-1918) to complete. For over 60 years, the Milwaukee Railroad Shops served as an important transportation facility for the railroad company. During its first three decades it was a vital hub for employment and the repair and maintenance of steam locomotives, rolling stock and passenger cars.

The Milwaukee Railroad Shops Historic District in Sioux City is one of the nation's best-preserved specimens of the steam-era railroad repair shops built during the late nineteenth century and early twentieth century. This site is the only surviving steam-era railroad repair shops of the 121 built by the Milwaukee Road across its 14,000-mile system spanning 14 states where it played a major transportation and land development role. The physical remains of the Milwaukee Railroad Shops Historic District epitomizes and documents physical changes in industrial workplaces during three distinct eras in the evolution of railroading: the *Golden Age of the Steam-Era Railroad (1880s – 1930s);* the *Transition Era* when the industry changed technology in motive power from steam locomotives to diesel engines during the 1940s and 1950s; and the *Decades of Struggle and Crisis (1960s – 1970s).*

While there are numerous roundhouse buildings and other rail-related structures listed in the National Register of Historic Places; there are only five known, preserved steam-era railroad shop complexes to exist today in the United States. This inventory includes the Spencer Shops (North Carolina); Sacramento Shops (California); Baltimore and Ohio Shops (Maryland); and Central of Georgia Shops and Terminal (Georgia). The Milwaukee Railroad Shops Historic District will join the Spencer Shops as one of the few listed steam-era railroad repair shop in the nation to be designed and constructed during the early 20th Century.[8]

Striking physical changes occurred over time in the work life of the Sioux City Repair Shops facility. The impacts of the technology shift from steam locomotives to diesel locomotives during the mid-1950s and the Milwaukee Road's financial struggles and eventual bankruptcy in 1980 altered the facility's land use and physical appearance. While there are other railroad roundhouses and repair shops across Iowa and the western half of the United States, there may be none so closely tied to the direct impact of the railroad network's large scale liquidation of the Milwaukee Road. Nor are there any so well preserved; given that this proposed historic district was never built over by substantial modern railroad development. A Brownfield cleanup took place in 1997 to remove an underground fuel storage tank.

Applicable National Register Criteria

The Milwaukee Railroad Shops Historic District is eligible for listing in the National Register of Historic Places at the statewide and local levels of significance under Criterion A, C, and D. Under **Criterion A**, the Milwaukee Railroad Shops Historic District is eligible because of its associations with transportation history. It reflects the development patterns and technological evolution of steam-era railroad repair shops. The district is also eligible under Criterion A for the role once played in the railroad industry through the technology and process of managing and maintaining equipment for the Chicago, Milwaukee, St. Paul and Pacific Railway Company during the period of significance.

With respect to **Criterion C**, the Milwaukee Railroad Shops Historic District is eligible because it is an excellent example of the distinctive characteristics and construction methods related to steam-era railroad repair shops that populated the nation's railroad network during the steam locomotive era. The buildings and rail yard designed by the Chicago, Milwaukee, St. Paul and Pacific Railway Company, under the direction of chief engineer Charles F. Loweth, embody the distinctive characteristics of the railroad company's architectural style, construction, and period of operation.

The district is also significant under **Criterion D** because it has the potential to yield archaeological information about (1) daily activities, (2) spatial use, (3) chronology of construction, (4) use of non-extant buildings and structures, and (5) the experiences of the shopmen who worked here during the period of significance.

Period of Significance

The period of significance begins in 1917, when the bridge and building department began operations with its material yard and offices. The period ends in 1980, when the complex ceased locomotive and rail car servicing and repair operations; and was used by the company as a reclamation site to liquidate the physical assets of the railway company.

The period of significance, which spans 63 years, is subdivided into three major eras of railroad development as defined by railroad historians and industry experts: the *Golden Age of Steam-Era Railroading*, the *Transition Era*, and the *Decades of Struggle and Crisis*; with each further subdivided in epochs and stages of industrial change. A complete chronology of key dates can be found on pages 132 and 133 of this nomination.

[8] National Register of Historic Places Digital Archive. Accessed August 22, 2017. https://npgallery.nps.gov/nrhp.

Criterion Consideration G: Assessment of Exceptional Significance

The Milwaukee Railroad Shops Historic District is one of the most important and rarest surviving examples in the country that represents the largest corporate railroad collapse, which significantly altered the physical make-up of the nation's railroad network and brought about sweeping changes in employment within the industry. The district possesses exceptional significance within its historical context for its association with the company's financial struggles during the 1970s and the eventual demise of the Chicago, Milwaukee, St. Paul and Pacific Railroad Company in the 1980s. For this reason, the ultimate departure of this company from the nation's railroad network is an important episode in late 20th Century railroad development.

The rate of survival - with integrity - for railroad repair shops terminals and railway roundhouse buildings from the post-diesel locomotive transitioning era to modern day railroading is very low. Many of the complexes saw wholesale razing of buildings and structures after the steam-era railroad that resulted in the loss of historic engineering qualities, original materials, and vertical infrastructure. As a whole, within the National Register of Historic Places, most listings of railroad roundhouses and repair shops terminals are tied to the period of significance prior to 1950 – the generally accepted end of the steam railroad era. Roundhouses and repair shops complexes are generally tied to this time period for a building type, architectural style, and method of construction.

The National Register of Historic Places database offers comparative sites to assess the uniqueness of the Milwaukee Railroad Shops Historic District under **Criterion Consideration G**. This comparative study identified a nationwide, cumulative total of 15 railway roundhouses recorded in the National Register of Historic Places database. Included in this list are three significant steam-era built railroad repair shop terminals comparable in scale to the nominated Milwaukee Railroad Shops Historic District.[9] The group of comparison subjects are all located in the eastern area of the United States. The nominated Milwaukee Railroad Shops Historic District illustrates the creative-approaches to cost control the building of railroad repair shops through the standardization of building plans, use of common materials, and site plans based on the local geography as the railroad industry developed its network through the Middle West section of the country.

The Baltimore and Ohio Railroad Martinsburg Shops, for example, which is located in northeast West Virginia, houses a nationally-renowned collection of three contributing and six non-contributing resources.[10] The three contributing resources are (1) the Machine and Woodworking Shop, (2) the West Roundhouse, and (3) the Car Shop. This railroad repair site represents in terms of history, 19th Century railroad engineering and industrial architecture. In particular, the West Roundhouse features a cast-iro structural framing system devised by renowned civil engineer, railroad manager, and economist Albert Fink. The Martinsburg Shops period of significance stretches from 1850 to 1899. The Martinsburg Shops facility is exceptionally significant in the early development of the railroad industry labor relations.

The Central of Georgia Railroad Savannah Shops and Terminal Facilities, located along the East Coast of Georgia, includes nine historic resources consisting of a partial roundhouse with an operating turntable, partial machine shop building, tender frame shop, blacksmith shop, boiler house, store house, print shop, lumber and planing sheds, coach and paint shops, and a partial carpenter shop building.[11] The Savannah Shops and Terminal Facilities possesses significance under Criteria C as one the finest examples of a Victorian architecture in railroad engineering and design. As the most intact antebellum railroad repair shops terminals in the county, the Savannah Shops and Terminal Facilities period of significance begins in 1825 and ends in 1949 at the dawn of the diesel locomotive era of railroading. The Southern Railway purchased the Central of Georgia Railroad in 1963, at which time it closed the shops terminal.

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[9] For comparative purposes, the other 12 listed roundhouses were not evaluated. These properties do not have the intact collections of historic resources to compare to the type found in the Milwaukee Railroad Shops Historic District. However, it should be noted that all the roundhouses listed in the National Register of Historic Places are significant because they represent critical aspects of locomotive and rolling stock repair, servicing, and maintenance.
[10] Caplinger, Michael. "The Baltimore and Ohio Railroad Martinsburg Shops." National Historic Landmark Nomination. West Virginia University, Martinsburg, Berkley County, West Virginia, October 2003. National Register #03001045.
[11] DeLony, Eric. "Central of Georgia Railroad: Savannah Shops and Terminal Facilities." National Register of Historic Places Inventory/Nomination Form. Historic America Engineering Record, Savannah, Chatham County, Georgia. National Register #76000610.

The Southern Railway Spencer Shops complex has a period of significance that runs from 1896 to 1949; the period of greatest prosperity and productivity for the facility.[12] With its location in Spencer, North Carolina, the shops complex became a heavy repair and light repair center for steam locomotives – similar to the Milwaukee Railroad Shops Historic District. In addition, the Spencer Shops housed a passenger coach and freight car repair shops department, just like the Milwaukee Railroad Shops Historic District. The Southern Railway Company vacated the Spencer Shops in the fall of 1978. The surviving physical components of the Spencer Shops include a 37-stall roundhouse, the backshop (erecting shop), flue shop, paint shop, and parts storage buildings.

The Milwaukee Railroad Shops Historic District shares some similar and identical physical qualities with the comparison group of a steam-era railroad repair shops complexes. What differentiates the Milwaukee Railroad Shops Historic District is its remarkably well-preserved cluster of railroad structures and archaeological remnants that reflect the striking physical changes that occur over time in the work life of railroad repair shops. The research indicates the archaeological sites of the Milwaukee Railroad Shops Historic District are stronger than the comparison properties. The collection of nominated archaeological resources (sites) is more illustrative of change in historical contexts over time.

On a broad national and statewide scale, the 1960s and 1970s were characterized by weak railroad traffic across most middle western freight railroads, which negatively affected their operating revenues. Over that time frame, the Milwaukee Road considered several merger partners in hopes of building a more agile railroad company. Ultimately, no merger could be brokered. Federal and state officials raised worries about the deal's potential competitive effects on farmers and commodity shippers. By 1977, the size of the Milwaukee Road's rail network could not be supported by the revenues it was generating. At that time, the railroad owned 10,074 miles and with 36% of that mileage producing a mere 14% of the company's yearly revenue. The railroad filed for bankruptcy in December 1977.

Todd Schultz' Dakota Rails: Oral Histories of Milwaukee Road Employees in South Dakota and Northwest Iowa aids in the examination of the site's exceptional significance under Criterion Consideration G in regards to the changing pattern of use and employment at the site. The major theme that emerged from the interviews was the employees working in the shops were faced with increasing numbers of locomotive failures because of the lack of access to parts. Their perspectives were supported by federal statistics gathered by the Federal Railroad Administration. In 1970 about 5% of the Milwaukee Road's locomotives were out of service; by 1979 nearly 50 percent were out of service awaiting parts for repairs. The Sioux City Repair Shops felt the stress of the lack of resources to fix locomotives and rail cars. Employment fell from 61 workers in 1970 to only 9 employees in 1979 and finally to just two workers at the time of the embargo on March 1, 1980. That year, site usage changed from repair to a reclamation facility to handle the large amounts of salvaged materials and waste generated from the deconstruction of the company's Iowa and South Dakota rail lines.

The exit of the Milwaukee Road in 1980 and the change in site usage negatively affected the lives and economic vitality of railroad workers, commodity shippers, and farming communities across a broad swath of the country, from the Midwest states to parts of the Pacific Northwest states. On the national scale, the demise of the railroad company affected 14 states; a region of the country that represented about 29 percent of the contiguous 48-states.

The 20th Century development, heyday, and eventual demise of the Milwaukee Railroad are evident today in the physical characteristics of the Milwaukee Railroad Shops Historic District in Sioux City, Iowa. The historical contributions of the complex from 1917 to 1980 are exceptionally significant not only to the history, heritage and departure of the Milwaukee Road, but also to the broader physical makeup of the nation's late 20th Century railroad network and therefore the historic district meets **Criterion Consideration G**.

[12] Paul, Allen. "Southern Railway Spencer Shops," National Register of Historic Places Inventory/Nomination Form. Division of Archives and History, Spencer, Rowan County, North Carolina, National Register #78001972.

Criterion A: Historic Context, Development, and Significance

- *The Steam-Era Railroad Repair Shops Trade*

The Milwaukee Railroad Shops Historic District is significant for its associations with the steam-era railroad repair shops trade that was considered a sub-sector of the railroad industry. The steam-era railroad repair shops trade involved an extensive workstation comprised of smaller job shops that combined the work of servicing and repairing steam locomotives and rail cars in one large location. The railroad repair shops facility was commonly anchored by a roundhouse or engine house. A roundhouse is a sheltered workstation where steam locomotives were serviced. Accompanying the roundhouse were smaller workstations or job shops like a machine shop or blacksmith shop. Within the railroad repair shop environment, the roundhouse was engaged in making running repairs and overhauls to locomotives. Railroad repair shops facilities were mostly located at the railroad company's division terminal, while roundhouses were scattered throughout the system where there was a concentration of steam locomotives for switching and servicing local industries.

In the period between 1890 and 1929, the number of steam railroad repair shops in the country increased from 797 to 1,851 facilities. Railroad repair shops were generally placed at major terminals and interchange points. Depending upon the overall size of a railway system, a 10,000+ mile railroad system may have built 10 to 30 repair shops to service its fleet of steam locomotives and rail cars. This huge expansion reflects the gains in steam locomotive technology. It also reflects the trend in larger steam locomotives that were being produced with more pulling power and speed, and larger rail cars with more hauling capacity. Several important production processes made it possible to build, service, maintain, repair, and overall locomotives and freight rolling stock in greater numbers and at lower costs. Most important was building locomotives and rail cars in lots for each railway carrier based on their individual company's designs. Mass construction of steam locomotives and rolling stock also stimulated the standardization of the repair process, the interchangeability of parts, and the increased use of machinery and skilled and unskilled labor in the repair process.

The decline of the steam-era railroad repair shops trade is often thought to have occurred after World War II when the railroads made their wholesale conversion to diesel engines as the industry's preferred motive power. However, research shows the fall of the steam-era railroad repair shops trade began in the early 1930s.

The collapse of the steam-era railroad repair shops trade. A combination of factors brought about an end to the steam-era repair shops trade in the 1950s. Steam locomotives had a huge appetite for fuel and water and the need for labor-intensive maintenance on a continuous basis. The efficiency of diesel locomotives encouraged the railroads to begin their flirtation with this new power technology in the mid-1930s. Eventually, the reliability and productivity of the diesel engine would force the railroads to switch over to this source of motive power during the early 1950s.

To quantify the impact on the historical patterns of the steam-era railroad repair shops trade, the *Census of Manufacturers* provides detailed statistics that are important for understanding the scale and scope of the steam-era railroad repair shop sub-sector. The *1929 Census of Manufacturers* showed there were 1851 steam-era railroad repair shop establishments operating across the county. The census indexes 61 located in Iowa and 14 in South Dakota. In Sioux City, there were four large railroad repair shops facilities operated by The Milwaukee Road, Chicago and North Western, Great Northern, Illinois Central. The Milwaukee Road, itself, had owned and operated at least 147 roundhouses and repair shops by 1925. In Iowa and South Dakota, The Milwaukee Road had 18 roundhouses and repair shops in each state.

Relatively few additional new railroad repair shops were built after World War I. According to an article on railroad repair shop and engine house developments written by E. L. Woodward in a 1922 issue of *Railway Age*, no big shop construction programs were being undertaken because of the general financial condition of the railroads. Financial capital was tightening, freight and passenger traffic was down, and the depreciation in the state of repair of infrastructure was accelerating.

The Milwaukee Road reported to stockholders through its annual reports on the building of only 7 such repair facilities during the 20th Century. All were built prior to 1942, with 5 being built between 1905 and 1918. Only the Sioux City Repair Shops facility survives today.

By 1935, the same *Census* enumerated only 416 railroad repair shop establishments still in operation nationwide. The Milwaukee Road was operating 11 railroad repair shops across its system in 1936, including three facilities in Iowa: Ottumwa, Perry, and Sioux City. These numbers demonstrate the rapid contraction that took place in the railroad repair shop industry as roundhouse work was transitioning to servicing and repairing diesel locomotives.

Repair Shops Closing Ends an Era for the Shopmen. Along with the industrial facility came the need for a skilled and unskilled workforce, classified as shopmen, to operate it. The shopmen workforce consisted of a variety of occupations spread across many crafts and trades. Major occupational groups within the skilled workforce included machinists, mechanics, blacksmiths, boilermakers, tinsmiths, sheet metal-fabricators, carmen, electricians and carpenters.[13] The unskilled workforce consisted of engine wipers, engine hostlers, car cleaners, and lubricators.

The systemization and mechanization of work in the Sioux City Repair Shops is illustrative of the division of job responsibility in the ranks of labor. When railroad repair shops were small during the early years of railroad development and all the workers knew each other, the shopmen knew each other's job assignments and their levels of skills. But when the railroads built bigger repair shops terminals like this one in Sioux City, and they hired a larger workforce of skilled craft workers and unskilled laborers numbering in the hundreds, the shop workers became strangers to one another. In the railroad repair shop work environment, tradesmen and skilled workers would often rub shoulders with unskilled laborers and management personnel.

Within the Sioux City Repair Shops, there was a hierarchy that was used to identify the worker's specialty craft trade, as well as what functional areas the shop workers were assigned to, and the levels of authority if they were in management. The Sioux City Shops terminal utilized different colors of hard hats for the ease of quickly identifying who did what. Within the boundaries of the roundhouse terminal, the following color chart was used:[14]

White Hard Hat – Management/Foreman
Yellow Hard Hat – Sheet Metal Workers and Steam Pipe Fitters
Orange Hard Hat – Boilermakers
Green Hard Hat – Machinists
Red Hard Hat – Electricians
Caucasian or Flesh Color Hard Hat – General Laborers and Engine Hostlers

The work life of Shopmen involved a lot of long hours involving lifting and manual labor, as well as grimy and gritty work. The filthiest and heaviest work took place in the roundhouse and car department's repair-in-place tracks. Shopmen were often exposed to unsafe or risky conditions. The environment within the roundhouse and other buildings was often dusty, dirty, smelling, and noisy as hammers and other tools were used. During the summer the buildings were hot and humid; and during the winter very cold. Accidents routinely occurred in the machine and repair shops and the roundhouses. Exploding boilers, crude tools, unreliable machines, primitive forges, scattered pieces of metal, and the very bustle of activity in the shops took their toll. Shopmen received serious burns and bruises and were in constant danger of losing limbs.[15]

U.S. Census Bureau statistics published in 1920 show there were approximately 2,236,000 people were working for the railroads across the nation in a variety of occupations and trades. Among all railroad workers across the county, approximately one in five – or roughly 400,000 people - worked as *shopmen*.

According to statistics published in 1925 by the Sioux City Chamber of Commerce, a total of 2,431 people were employed in the four steam railway repair shops being operated in Sioux City. Among those 2,400 shopmen, nearly one-quarter of

[13] Stromquist, Shelton. *A Generation of Boomers: The Pattern of Railroad Labor Conflict in Nineteenth-Century America*. Chicago, IL: Univeristy of Illinois Press, 1987.
[14] Brown, Ken. "Milwaukee Shops Hard Hat Colors Explain What Job You Do." E-mail message to author. September 24, 2014.
[15] Licht, Walter. *Working for the Railroad: The Organization of Work in the Nineteenth Century*. Princeton, NJ: Princeton University Press, 1983.

them were employed at the Milwaukee Railroad Shops – Sioux City Roundhouse, Repair Shops and Engine Terminal facility in Riverside.

There are two significant periods of structural employment changes in the railroad industry. Railroad employment peaked in the mid-1920s and declined substantially with the Great Depression. Between 1920 and 1930, the nation lost 42 percent of its railroad jobs due to the intense competition among railroads resulting from the severe economic downturn of the late 1920s and the consolidation of railroad companies through mergers and acquisitions of less profitable companies.

In 1928, the annual report of the Chicago, Milwaukee, St. Paul and Pacific Railroad reported an average daily workforce of 48,129 employees across its company. In 1930, the annual report reported an average daily employment of 42,326 workers system wide. This reduction of 5,803 workers in the railroad's labor force equated to 12 percent job loss rate. Between 1920 and 1995, national railroad employment dropped by 89 percent. Employment across the fourteen-state system of the Chicago, Milwaukee, St. Paul and Pacific Railroad declined from 48,129 workers in 1928 to 16,470 workers in 1966; a job loss rate of 65.8 percent over that 38-year time frame.

The structural changes in railroad employment affected shopmen working in Sioux City. Railway shops employment underwent an 11 percent decline during the 1920-1930 period compared to what was occurring at the national level. Despite the local railway shops eliminating 269 jobs during the 1920-30 timeframe, the railway repair shops industry remained a critical class of work in the local economy until the late 1940s.

Trend Table 1: Steam Railroad Shops Employment

	1925	**1928**	**1929**
Total Railroad Shops Employment	2,431	2,253	2,162
Total Railroad Shops Payroll Value	$4,499,562.95	$4,043,129.00	$3,987,812.51
Total Number of Railroad Shops Establishments	4	4	4

Source: Sioux City Chamber of Commerce *Sioux City Spirit of Progress*, 1925, 1928 and 1929 editions.

The Milwaukee Road hired thousands of workers for the Sioux City Repair Shops over its sixty-three years of operations. At its peak, the railroad repairs shops complex was one of Sioux City's largest railroad employers with more than 865 people staffing three shifts a day during the 1920s and 1930s. By 1948, the repairs shops employed just over 550 workers with nearly sixty percent of the workers employed in the car shops section. By 1970, there would be only eight employees (two employees for engine servicing and six employees working a shift repairing railcars). When the complex closed in 1980, only two workers were employed at that time – one employee for railcar repairs and one employee for engine fueling.

- *Property Ownership Background and History*

The Sioux City Repair Shops complex has its origin to the Chicago, Milwaukee, St. Paul and Pacific Railroad Company. The enterprise was created in 1842. The railroad company would grow in size through several acquisitions and mergers of other smaller railroads in Wisconsin, Illinois, Iowa and Minnesota during the last half of the 19th Century. The map displayed on page 124 shows the railroad company's system as it appeared in 1917 at the time of construction of the Sioux City Repair Shops terminal.

The Milwaukee Road eventually evolved into a Class 1 railroad that operated under the name *Chicago, Milwaukee and St. Paul Railroad Company* across 14 states spanning the Midwest and Pacific Northwest. A last-spike ceremony in western Montana on May 14, 1909 commemorated the completion of its final extension into the Pacific Northwest and its place in railroad history as the last transcontinental railroad company. By 1920, its rail system reached its maximum size, stretching from Chicago, Illinois and Louisville, Kentucky to Puget Sound. The total miles of track owned and operated by the railroad at this time was 14,642 miles. This large operating territory was the longest, end-to-end network of any United States railroad; making the Milwaukee Road one of the most prominent grid systems inside the nation's railway network. The map displayed on page 125 captures the evolution of the Milwaukee Road's growth into the nation's last great transcontinental railroad.

The real heart of the Milwaukee Road's operating territory was the homesteader and farmers who would settle the Dakota-Iowa territories and beyond into the frontiers of the Pacific Northwest. The Milwaukee Road helped rein in this region by utilizing the land grants it received from the federal government to provide farmsteads to the settlers. As they settled in the region, the farmers wanted churches, schools, and goods from the East. Small farm towns soon followed along with some large businesses moving in to serve the new emerging markets. The homesteaders and farmers used the rich land and bounty to produce agricultural products, harvest grain, and raise livestock. Hauling and transporting this bounty to market became the backbone of the Milwaukee Road's revenue-producing traffic. The advertisement displayed on page 126 highlighted agriculture as a significant part of the railroad's revenue streams. This linkage with the farmer earned the railroad company the reputation as *The Farmer's Route*.

Over the course of its operating history, The Milwaukee Road was continually challenged by cash flow struggles, revenue setbacks, and a lot of debt to finance growth. The rivalry between railroad companies for market share in the Milwaukee Road's operating territory was intense. It had to battle with the other four transcontinental railroads and numerous trunk line railroads for the highly competitive Midwestern agricultural business and the lucrative Pacific Northwest transcontinental passenger and freight traffic.

The railroad entered bankruptcy in 1925 because it was cash-strapped from its capital investments of $234 million over the previous two decades when it completed its transcontinental route through the Rockies to the Pacific Northwest. The company emerged from reorganization as the Chicago, Milwaukee, St. Paul and Pacific Railroad Company to reflect its transcontinental status. The new operating company that emerged from the bankruptcy was very successful for a while, trying to be more agile. Unfortunately, the railroad entered a second bankruptcy in 1935. Through the late 1930s and early 1940s the railroad introduced new innovations in passenger train travel that were very successful in generating revenue to sustain operations. During this time period, the railroad company became simply known as the Milwaukee Road. World War II and the postwar boom generated substantial revenue increases in both freight and passenger traffic that brought The Milwaukee Road out of bankruptcy. For the next several decades the railroad would be agile and financially healthy.

During the 1960s, the railroad struggled with market changes and stiff competition from the airlines and trucking industry for passenger and freight traffic. The Milwaukee Road's most important financial struggle in its history took place during the 1970s. At this time many of The Milwaukee Road's very astute senior leaders and highly experienced managers began to retire. Unfortunately, the company ended up suffering from the same issues that affect many companies going through senior leadership turnover without planning for the transition. The new upper management made a series of unexpected decisions that negatively impacted revenues. Industry experts have blamed the demise of the railroad company on management refusing to invest in much-needed capital improvements, turning away new business, and remaining committed to maintaining its unprofitable transcontinental status. Eventually the revenue loss caused by poor decision-making culminated in the railroad's final bankruptcy in 1980.

With the exit of The Milwaukee Road from the United States railroad network, a big void was left in the Midwest and Pacific Northwest regions. Over 4,600 total miles of tracks and right-of-way for railyards, shop terminals, sidings, and industrial spurs were removed from the railroad network. What's left today of the Milwaukee Roads railway grid is chopped up among different railroads. Its transcontinental right-of-way, which was once the best engineered route through the Rockies and Cascades, is no longer existing and accessible to shippers.

The Milwaukee Railroad Shops Historic District represents one of the most intact physical records of the Chicago, Milwaukee, St. Paul and Pacific Railroad Company (The Milwaukee Road) and its prominence in regional railroad history. The district is a subject for demonstrating how geographic context shaped railroad development.

- *Organizing Railroads Around Geographic Regions*

The historic district's location in Sioux City speaks to those regional geographies that gave the dynamic railroad network of the Milwaukee Road its distinctive characteristics as a whole system. Once its construction was complete, the Milwaukee Railroad Shops served several operating rail lines of between 100 and 160 miles each that radiated in and out of Sioux City across the Dakotas, Minnesota, and Iowa.

By the time the United States entered World War I in 1917, the nation's extensive railroad network was well established. There were 2,905 steam railroad companies operating 397,014 miles of track (main line, passing tracks, sidings, and switching rail yards). By 1960, the nation's railroad network would be consolidated into fewer than six hundred companies operating around 220,000 miles of main line track. (In 1930 the mileage of all tracks – main line, passing tracks, sidings, and rail yards – reached it maximum size of 430,000 miles).

As the country's railroads adopted a standard gauge for track width (4'-8-$^{1}/_{2}$") and networked their lines together into a larger grid system, they recognized the role that geographic locations would play in the grid, the economy, and in feeding traffic from other industries into their own rail system. The North American railroad grid developed during the last half of the nineteenth century and early twentieth century as an interconnected network that generated traffic and distributed goods throughout the continental United States and parts of Canada and Mexico.

The nation's railroad grid evolved in stages across geographic regions. From 1862 to 1869, the United States government provided federal funds for the construction of a long-distance rail line from Council Bluffs, Iowa and the Missouri River to Sacramento, California. This transcontinental line allowed the creation of a railroad grid in the nation's middle section to link the railroads of East and South with the new railroad point at Council Bluffs. Later, the construction of new long-distance railroad companies in the West, coupled with financial incentives from the federal government, allowed the creation of a railroad grid system throughout the United States.

One of the fundamental philosophies behind the development of the nation's railroad grid system was that they could not develop the railroad sector without paying attention to the manufacturing sector, agricultural sector, or the tourism (vacation) sector. Somehow the railroad enterprises needed to generate revenue to earn a profit for investors. If you have the settlers to farm the land and a healthy farming season, then they need the railroads to move the crops and livestock from the fields to the markets.

What made the nation's railroad network feasible was having the ability to interchange passenger and freight traffic in one place at several major terminal locations across the network. The purpose of the hub terminals was to enable the free flow of traffic between railroad companies. With all the logistics worked out in scheduling trains into the hub terminals, the railroads could interchange locomotives and rail cars with minimal time delays in the movement of people and goods.

Due to the size of the grid and the complexity of moving passenger and freight traffic across so many different railroad companies, the grid was arbitrarily divided into four primary, regional sections: the East, the South, the Midwest, and the West. Throughout the grid system there are hub (terminal cities) where the interconnections and interchange of traffic take place. It is important to note here that each individual railroad company managed their own rail system and lines, and their own individual points of interconnection with adjacent railroad companies.

The Midwest region covers the nine states of Indiana, Illinois, Iowa, Michigan, Minnesota, North Dakota, South Dakota, Wisconsin, and the northern section of Missouri. This region houses three great rail centers: Chicago, St. Louis and the Twin Cities (Minneapolis and St. Paul). Because of the scale of operations that take place in the nation's railroad system and the need to provide a method for its operators to more easily spot cars and interchange with a connecting railroad company, the railroad engineers developed a system based on smaller hub cities that would allow the system to gather rail cars and distribute them to the larger rail centers. Because the Milwaukee Road's rail network crisscrossed two regions it was classified as a *middle western carrier*.

- *Birth of the Sioux City and Dakota Division*

The Milwaukee Road became one of the 17 largest railroad conglomerates to emerge during the 1870s and 1880s. The railroad built, rented, and acquired rail lines from Chicago into the Dakotas as part of their corporate aspirations to evolve into a transcontinental railroad.

Like all major railways, the Milwaukee Road's system was divided into operating regions and then further subdivided into operating divisions and districts, anchored by a division point and a superintendent. The division system was designed to bring managerial efficiencies for better movement of trains across the entire railroad system. "The divisional system came into being early in the history of railroading, or about the time any line grew to much more than 100 miles in length. Understandably, as a railroad grew physically, so did the problem of managing it properly, especially at the operational level."[16]

Each division would have a central headquarters for divisional management staff for each department: train operations, mechanical, motive power, car repair, maintenance of way, bridges and buildings, signals and telecommunications, dispatching, and sales. The divisional management structure was usually overseen by a divisional superintendent followed by a chain of middle managers consisting of a general manager, a couple of trainmasters, a road master, a chief dispatcher, several yardmasters, a roundhouse foreman, and a car repair shop supervisor.[17]

The division point was where the locomotives were serviced and fueled – sometimes repaired; where rolling stock was overhauled; where freight cars were switched and made up into trains or switched out of trains for local delivery; and where train crews came on and off duty. At its peak in 1927, there were 31 major divisions that comprised the Chicago, Milwaukee, St. Paul and Pacific Railway system. The Milwaukee Road placed division points approximately every 100 to 150 miles apart. The railroad's division towns in Iowa were Cedar Rapids, Mason City, and Sioux City.

The Sioux City & Dakota Division came about as a result of the Chicago, Milwaukee & St. Paul Railway's purchase of the fledging Sioux City & Dakota Railroad in 1881. At that time, the Sioux City & Dakota Railroad was sufficiently developed for operations with 114 total miles of track, a few locomotives, about six passenger cars, and a few freight cars. The line ran from Sioux City, IA through Elk Point, SD to Yankton, SD with a branch line extending from Elk Point to Calliope, IA (i.e. Hawarden).

The Sioux City & Dakota Railroad actually began in 1871 as the Dakota Southern Railway Company for the purposes of connecting Yankton with the Sioux City & Pacific Railroad in Sioux City – thus connecting the Yankton trade territory with the emerging rail networks in Iowa. At that time, Yankton was the capital city of the Dakota Territory. The Dakota Southern Railway became the first railroad to operate in the South Dakota Territory. During the next several years, financial constraints from limited traffic and revenue growth would cause the Dakota Southern Railway to reorganize under the new company, the Sioux City & Dakota Railroad. Much of the Dakota Territory at that time was unoccupied by settlers. The new railroad company brought about stability by promoting settlement in the state to aggressively build passenger and freight traffic into the Dakota Territory.

A second challenge was that the Sioux City & Dakota Railroad was geographically isolated from a nearby connection to the Chicago, Milwaukee & St. Paul Railway's mainline in Iowa. A trunk line needed to be built to connect Sioux City to the mainline at Manilla, Iowa. This construction was completed in 1886. In 1887, the railroad established a 15-stall roundhouse and machine shop near the stockyards area to repair steam locomotives.

When the smaller Sioux City & Dakota Railroad was connected into the larger Chicago, Milwaukee & St. Paul Railway system, its identity was changed to an operating division under the banner Sioux City & Dakota Division. By 1927, the Sioux City & Dakota Division consisted of 548 track miles with rail lines extending from Manilla, IA to Mitchell, SD; Elk

[16] White, John H. *American Railroad Freight Car: From the Wood-car Era to the Coming of Steel*. Baltimore: Johns Hopkins University Press, 1995.
[17] White, John H. *American Railroad Freight Car: From the Wood-car Era to the Coming of Steel*. Baltimore: Johns Hopkins University Press, 1995.

Point, SD to Sioux Falls and Egan, SD; Sioux Falls, SD to Madison, SD; Yankton, SD to Platte, SD; and Tripp, SD to Stickney, SD. The divisional headquarters were set at Sioux City.

This division would eventually lose this identity during the 1950s and merged with other contiguous divisions to form the Iowa, Minnesota and Dakota Division, and finally bear the name of the Dakota Division in 1976. The operating territory was identified as the railroad's Twenty-Second Subdivision in timetables and books listing station numbers.

- *Sioux City's Prominence in the Midwest Region's Railroad Grid*

The convergence of six trunk line railroads at Sioux City ensured the city's national prominence as a railroad hub city for The Milwaukee Road and five other railway companies. At the turn of the 20th Century, the local railroad network in Sioux City was dominated by the competitive rivalry of six trunk line railroads; all of which evolved from the merging of nine railway companies that were running trains in and out of Sioux City in 1880. The map displayed on page 127 shows the rail line connections running in and out of Sioux City in the 1920s. The following six trunk line railroad established Sioux City as a division terminal within their larger railroad network. As a division terminal, the city saw each of the major railroads constructing major repair shops, depots, freight houses, sales offices, and switching yards for making up and breaking apart trains.

- The **Chicago and North Western Railway Company (C&NW)** served nine states in the Midwest. These states were Iowa, Nebraska, Illinois, Minnesota, Wisconsin, South Dakota, Wyoming, Michigan, and North Dakota. This railroad known as *The Northwestern* had a total mileage of 8,298 traversing these states and provided Sioux City with the west and east; giving access to markets in Omaha, Chicago, and the Twin Cities (Minneapolis and St. Paul). The Chicago and North Western Railway Company's main line through Sioux City extended south to Omaha and north to the Twin Cities.

- The **Chicago, St. Paul, Minneapolis and Omaha Railway (the Omaha Road)** was a small regional railroad that operated independently until 1957 when it was leased by the Chicago and North Western until it was finally merged as part of the larger railroad in 1972. The Omaha Road operated approximately 1,700 miles of trunk, main and branch lines through the granger states of Nebraska, Iowa, Minnesota, Wisconsin, and South Dakota. Main commodities hauled by this railroad were lumber, fish, dairy products, grain, and sugar beets. The Omaha Road entered Sioux City from Northeast Nebraska via crossing the Missouri River. This railroad built the Missouri River railroad bridge between Sioux City, Iowa and South Sioux City, Nebraska; granting trackage rights to the other railroads to allow those roads access and connections to either Sioux City or Northeast Nebraska (The Milwaukee Road did not participate in the trackage rights).

- The **Chicago, Burlington & Quincy Railroad (the "Burlington Route" or CB&Q)** was a system known as "the Burlington" that operated over 8,670 miles of rail line through the states of Illinois, Iowa, Missouri, Nebraska, Wyoming, and Colorado. The "Burlington" entered Sioux City from the southwest through South Sioux City (i.e. Ferry), Nebraska by crossing the Missouri River using a bridge controlled by the Chicago, Minneapolis, St. Paul & Omaha Railroad.

- The **Chicago, Milwaukee, St. Paul and Pacific Railroad Company (The Milwaukee Road)**, affectionately referred to as "the Milwaukee Road," operated 10,600 miles of railroad lines in fourteen states with a transcontinental mainline extending from Chicago to the Pacific Northwest. This railroad had an extensive system of main and branch lines in the agricultural states of Wisconsin, Iowa, Minnesota, South Dakota, and Montana. In terms of miles of track operated by the railroad, the largest state served by the railroad was Iowa. The main line through Sioux City extended east to Chicago and northwest to Mobridge, South Dakota and north to Sioux Falls, South Dakota.

- The **Great Northern Railway (GN)** provided Sioux City with main line connections to its transcontinental main line from the Twin Cities to the Pacific Northwest, as well as markets in Canada. The Great Northern operated 8,288 miles of track; traversing the states of Wisconsin, Minnesota, North Dakota, Montana, South Dakota, Northwest Iowa, Idaho, Washington, Oregon, and California. The railroad also operated main and branch lines in the Canadian provinces of Manitoba and British Columbia. Sioux City was the southern-most terminal east of the Rocky Mountains. The railroad's main line ran north out of Sioux City to the Twin Cities.

- The **Illinois Central Railroad (IC)** operated 6,500 miles of railroad across fourteen Midwestern and Southwestern states; and is sometimes considered the nation's only north-south transcontinental railroad. Its system of rail lines earned it the moniker as the "Main Line of Mid-America." This railroad's principal main lines were a north-south route from Chicago to the Gulfport, Mississippi and New Orleans; and an east-west route from Chicago to Fort Dodge, where the lines split into three routes - to the west to Sioux City, northwest to Sioux Falls, and southwest to Council Bluffs.

In addition to these six trunk line railroads, the homegrown Sioux City Terminal Railway Company operated within Sioux City as an industrial switching road. This railroad operated 10.6 miles of yard tracks and 2.5 miles of main tracks in the city's stockyards and meatpacking district. The railroad was owned by the Sioux City Stock Yards Company to perform switching services between the Union Stock Yards, meatpacking houses, and the six connecting railroads.

Sioux City and its surrounding regional trade area characterized the competitive rivalry among the six trunk line railroads. Each was seeking a competitive advantage in gaining a larger share of the region's agricultural trade. Because Sioux City was strategically located in the center of an agricultural region, the rapid growth of the regional economy influenced the development of Sioux City as both a major market and railroad terminal city. The town took on the moniker as being the *home market of the great northwest*.[18] Sioux City would emerge as the tenth largest railroad center in the nation during the 1920s and 1930s.

One of the community's major industries during the early 20th Century that benefited from the railroad connections was the wholesale distribution trade (i.e. warehousing and jobbing). This Sioux City-based wholesale industry supplied the countless number of small independent grocery, hardware, clothing and general stores, as well as other "mom and pop" businesses and trading posts scattered throughout the country side in Iowa, Nebraska, and South Dakota. Sioux City-based jobbers were even able to supply business operations in North Dakota and parts of western Minnesota. Many of the products were distributed to these small enterprises after arriving in Sioux City via train for unloading in the many warehouses.

According to a 1923 article published by in the Chamber of Commerce's newsletter *Sioux City Spirit of Progress*, there were over 300 jobbing warehouses operating in Sioux City. Many of these jobbers also had their own factories or imported products into the community from other market cities or foreign countries. Chief among the products sold by the jobbers was foodstuffs, hardware, plumbing supplies, and merchandise lines such as cigars, tobacco, drugs, paper, paints, dry goods, leather, electrical supplies, and clothing. Automobile and auto supplies were, at this time, emerging as major product lines hauled by the railroads.

A second leading industry to emerge locally and regionally as a result of the connections offered by the regional railroad network was the livestock and meatpacking industry, including the stockyards. The meatpacking industry started in Sioux City around 1871 when James E. Booge opened a small plant to slaughter hogs. A steamboat full of wheat had sunk in the Missouri River. James Booge bought the water-soaked wheat and found it had no value other than being used for feeding several hundred hogs. Thus, after feeding the hogs, he slaughtered them for meat and then retailed the meat. The slaughtering processes required Booge to build a small plant and import butchers from St. Louis. This accidental start in 1871 launched Sioux City's bustling livestock and meatpacking industry as the community's economic anchor industry.

The industry had grown to such proportions that in 1920 there were eight major meatpacking facilities in Sioux City slaughtering over 2,000,000 million animals (cattle, hogs, and sheep) annually. In 1923, over 27,000 rail cars of livestock were shipped out of Sioux City to be slaughtered and processed in other markets. This production ranked Sioux City as the

[18] *Sioux City: A Great Power in the Great Northwest*. Sioux City: Sioux City Chamber of Commerce, 1920.

sixth largest livestock and meat packing center during the 1920s. Over 4,000 people were employed by the packers and stockyards; and the industry was producing over $107-million worth of meat products annually.[19]

In her history of the Stock Yards and meatpacking industry, *A Second Century Begins: A History of the Sioux City Stock Yards,* local historian and author Jolene Stevens credits the railroads with the growth of the industry: "A good share of the credit for growth of the Sioux City Stock Yards in its beginning must be credited to the availability of railroads….An abundance of rail lines assured western ranchers of a means of transporting their stockers and feeders to feedlots in the area…..The Yard's territory at this time, at its inception and for a number of years to come, was vast indeed, extending to the northeast and east and southeast within a radius of 100 miles or more and to the west to include North and South Dakota, Nebraska, Colorado, Montana and Wyoming, and northeastward to include Wisconsin…..The railroad was the Yards' link to these areas."

Among the six trunk-line railroads serving Sioux City, the Milwaukee Road played a significant role in the transporting of livestock and meat products in and out of Sioux City. With its lines extending to Chicago, the Dakotas, and the Pacific Coast; The Milwaukee Road provided the Sioux City-based stock yards and meat packing companying with access to live stock all the way into Montana and to the commodity trade market cities in the east.

The Milwaukee's business with the stockyards and meatpacking industry grew phenomenally. For the four years 1896 to 1900, the road handled an average of 5,625 car loads per year of livestock, and enjoyed 36 percent of the traffic market. In the 1911-15 period, the average cars climbed to 11,746 carloads per year, or about 40 percent of the total traffic for all railroads. Also at this time, the Milwaukee's less-than-carload lot (LCL) merchandise business was running about 50 cars per day at the freight house. In 1922, there were over 100,000 cars of freight shipped out of the city.[20] The following statistics illustrate the livestock traffic generated by the division.

Trend Table 2: Receipts of Livestock Carloads from the Milwaukee Road

Years	Total	Per Year	Per cent of total Receipts of all roads
1896-1900	28,116	5,625	36
1901-1905	58,732	11,746	40
1906-1910	65,114	13,022	38
1911-1915	70,476	14,093	34
1916		20,170	37

The steady development of livestock and grain markets in Iowa and the Dakotas helped feed the railroad's freight business, along with the growth of the stockyards, meat packing industry and food processing firms in Sioux City. Livestock became the largest commodity to be hauled by the railroad. While some cattle were destined for slaughter in Sioux City, a large percentage were placed on trains bound for the Chicago packing houses. All livestock not slaughtered at Sioux City, needed to be unloaded, fed, watered, and reloaded into stock cars at the stockyards. To accommodate this task, the railroad needed to build loading/unloading rail yard adjacent to the stockyards.

Besides access to the livestock markets and meatpackers, area farmers gained access to the terminal grain elevators and processing mills housed in Sioux City through the railroads. With its strategic location on the western border of Iowa and contiguous to northeast Nebraska and southeast South Dakota, and just a short distance from southern Minnesota; Sioux City emerged as one of the nation's fastest growing grain markets during the first three decades of the 20th Century.

The community was located in the heart of America's richest grain producing territory. The countryside surrounding Sioux City enabled farmers to raise a variety of grain crops such as wheat, corn, and oats. Of these four states, over 40% of the area is within Sioux City's trade territory. The establishing of terminal elevators here did away with the clogging of small

[19] Sioux City Chamber of Commerce. "Sioux City - The Home Market of the Great Northwest." *Sioux City Spirit of Progress*, 1921.
[20] Clark, R. M. "Sioux City and the Milwaukee Road: Part 2." *The Milwaukee Railroader*, 2005

town elevators due to rail car shortage. The shorter haul released more cars that can be returned to country towns, thereby enabling country elevators to handle grain more rapidly. Formerly, all grain had to be shipped to the larger city for storage, nowhere else was there sufficient room for storage.[21]

The strategic location of Sioux City in the heart of the grain country placed the community on a price parity with other the other larger grain markets in the Midwest. In 1917, the Interstate Commerce Commission granted proportional grain shipping rates by rail which recognized Sioux City as a grain market. This designation spurred the construction of several large grain terminals like Terminal Grain Corporation, Western Terminal Elevator, The Flanley Grain Company, and Farmers Terminal Elevator Corporation.

Along with the buildup of elevators for storing grain came the construction of milling operations to process the gain. Companies like Akron Mills, American Pop Corn Company, and Martens & Ketels Milling Company erected milling operations in Sioux City. Many of the elevators and mills built industrial railroad sidings into their complexes for the receiving and shipping of grain and process grain by rail. The *1927 Census of Manufacturers* showed Sioux City had 14 milling operations employing an annual average of 352 workers; generating $593,755 in payroll and over $5,753,027 in processed products.

The rail traffic generated by the grain elevators and milling operations was substantial. Sioux City Chamber of Commerce statistics published for 1920 showed there were 721 railroad cars of wheat, 3,278 cars of corn and 1,536 cars of oats shipped via rail to the elevators. Those numbers equated to a total of 5,535 car loads carrying over 8,000,000 bushels of grain being received at the elevators. During the first half of 1921, grain traveling to the terminals in Sioux City increased substantially. Statistics published by the Chamber of Commerce showed the elevators had already received 3,800 rail cars of grain, carrying 4,752,500 bushels by mid-year 1921.[22]

Grain hauling was the initial business strategy of the Chicago, Milwaukee, St. Paul and Pacific Railway. For much of its history, grain was the traffic king of the railroad – which led to the railroad earning the moniker as a “Granger Line.” An analysis of the railroad’s annual reports between 1880 and 1977 show that grain hauling accounted for approximately 17% of all traffic over the railroad and 15% of all revenue earned by the railroad.[23]

The improvements in standards of design for steam locomotives and freight car equipment were enabling the railroads to move greater tonnage trains and longer trains. The railroad realized it was increasingly more difficult to handle the heavy traffic of over 100 locomotives a day in switching, passenger and freight train service on approximately 548 miles of track assigned to the Sioux City and Dakota Division. Added to that were the thousands of freight and passenger cars traveling in and out of the Sioux City terminal. The greater reliability and regularity of movement for the increasing train loads called for increased capacity for servicing, maintaining, and overhauling the fleet of locomotives and rail cars in operating condition. The railroad company found a need for new larger repair shops facilities in or around Sioux City to replace the smaller, aging roundhouse in the Sioux City.

- *Site Selection and Construction of the Sioux City Railroad Repair Shops Facility*

From the very beginning of planning for the construction of a new steam railroad repair shop terminal for the Sioux City and Dakota Division, there was a concern about where the terminal would be located. The Milwaukee Road needed a new, larger division terminal to serve its main line segment from Manilla, Iowa to Mitchell, South Dakota; and the connected lines from Manilla to Sioux City; Sioux City to Elk Point, SD; Elk Point junction to Sioux Falls, SD; Elk Point junction to Yankton, SD; Yankton to Mitchell, SD. The main line was fed by these South Dakota branch lines: Tripp to Stickney; Napa to Platte; Renner to Madison; Marion Junction to Running Water.

[21] Sioux City Chamber of Commerce. "Sioux City - The Home Market of the Great Northwest." *Sioux City Spirit of Progress*, 1921.
[22] Sioux City Chamber of Commerce. "Sioux City - The Home Market of the Great Northwest."*Sioux City Spirit of Progress*, 1921.
[23] *Annual Financial Report of the Milwaukee Road Railroad*. Report. Chicago, IL: Chicago, Milwaukee, St. Paul & Pacific Railway, 1916-1950.

Repair shops facilities built in 1887 along the Floyd River were becoming antiquated and under resourced. The railroad was deploying larger steam locomotives with the hauling power to carry more cargo and pull heavier trains at the desired train speed over the tracks. The need to replace their aging, 15-stall roundhouse and back shops was essential to servicing and maintaining the locomotives and rail cars needed in sustaining their growing traffic along the rail lines of the Sioux City and Dakota Division. In addition, the Floyd River often flooded, creating a lot of down time for the repair shops.

The railroad engineers back in Chicago began to examine whether to renew and expand the current facilities in Sioux City or whether to construct new facilities elsewhere along the railroad right-of-way. Railroad engineers identified several limitations and factors that made the expansion at the current facilities less favorable.

Site selection depended upon the size and layout of the facility, future ability to expand, and access to a skilled workforce. The difficulty in acquiring the land for expansion, the ability to acquire additional land in the far future if needed, the utility requirements, water access, and the ability to transport materials and personnel to build the facility posed additional challenges. The land beneath the current facility along the Floyd River was landlocked by the rail yards of competing railroads, the stockyards and meat packing districts, and a residential neighborhood known as the South Bottoms.

The site selection process began in 1910. The process, which lasted two years, unveiled a short list of two sites. One site was located in Sioux City and the other site was situated in the nearby South Dakota community of Elk Point, a railway junction town located approximately 15 miles northwest of Sioux City. The Elk Point site provided an advantage over Sioux City because of its natural breaking point for rail traffic traversing the railroad based on the existing hours of service agreements with the trainmen and their trade unions. By relocating the shops in Elk Point, the railroad could save up to four hours of labor on every train that ran over the Sioux City and Dakota Division.

Despite Elk Point's labor cost savings potential, railroad management selected a site in the Riverside neighborhood of Sioux City for the location of the new repair shops facility. The Sioux City location turned out to be the slightly better option for the railroad with the access to interchange connections with the other railroads. The Riverside location also gave the railroad access to a viable workforce. In addition, the City of Sioux City offered economic development incentives such as utilities. Riverside was the site of original land holdings of the first European-American settler in the territory and it had developed a strong industrial heritage. By 1890, there were three brick yards operating in the neighborhood, which mined the clay from the Loess Hills for the manufacture of bricks and building tiles.

In 1912, company officials confirmed they were in the process of buying land in the Riverside neighborhood of Sioux City and planned to start construction of the new roundhouse terminal and repair shops in the near future. A *Sioux City Journal* article published on August 22, 1912 under the banner headline "Milwaukee Line to Build Here: Shops, Station and Roundhouse Contemplated" reported that a contingency of railroad officials including the president of line, A. J. Earling, were in town to confirm the railroad's intent to build major shops and a new switching yard in the Sioux City area. He also announced the railroad's intent to build its transcontinental line expansion to the Pacific Northwest. As part of his announcement to the news media, Earling reported the railroad had closed a deal with property owners in Riverside and North Sioux City for the purchase of land to build the shops complex, roundhouse terminal and railyard. Earling estimated the construction improvements would exceed a million dollars in Sioux City, making it one of the largest business expansions in the history of the railroad. Newspapers around the state of Iowa and across the Midwest made announcement of the railroad's planned capital improvement project by publishing articles produced by the Associated Press, which included *The Desert Evening News*, *Pella Chronicle*, and *Albert City Appeal*. Planning, engineering, preparation of construction documents, and local permitting for the Sioux City improvements would take nearly four years to complete because of the project's comprehensive scope of work.

The construction of the new Sioux City Roundhouse, Repair Shops and Engine Terminal facility was initiated in 1916 with the purchasing of final land options. The property's abstract shows the Chicago, Milwaukee & St. Paul Railway Company purchased 22.85 acres owned by M. L. Flinn for $18,280; a second 20-acre parcel owned by the Isacc Pendleton Estate for $15,382.50; and a third larger parcel of 29.3 acres owned by Sioux City Brick & Tile Company for $1.00 and other considerations.

According to the Field Engineer's report filed with the Interstate Commerce Commission in 1918, the land clearing work required construction crews to clear trees and timber away from 9.7 acres of land. The construction company was able to cut and harvest trees, mostly cottonwoods and burr oaks, with trunk widths ranging from 1' to 2' in diameter. The Field Engineer's Report stated the contractor cleared the land for the salvage of the timber for processing into lumber. Following the felling of the timber and the clearing of trees, the contractor grubbed and hauled away a cumulative total of 3 acres of tree stumps, debris, and shrubs from the land. Necessary fill material for cleaning, grading and shaping the roundhouse terminal landscape was obtained from the Loess Hills located alongside the railroad's right-of-way. Once the site preparation work was completed in late 1916, the railroad immediately began construction of the buildings, structures, and rail yard that would comprise the physical plant of roundhouse terminal. The entire building process was completed over two construction seasons with the complex becoming fully operational in July 1918.

According to the usual practices of the Chicago, Milwaukee, St. Paul and Pacific Railway, the construction work was carried out during the timeframe of 1917 to 1918 by company forces under the immediate direction of D. C. Fenstermaker, assistant engineer in charge of construction. Assisting Fenstermaker in the management of the construction forces were E. L. Sinclair, an assistant engineer based out of Marion, Iowa. According to construction documents maintained by the railroad, the local construction foreman was Louis Larsen.

Immigrants and other minority groups made up sizeable portions of the construction workforce for the Sioux City Repair Shops complex, including refugees from Italy and the other worn-torn European nations.[24] Foreign workers and minorities were a cornerstone of the railroad construction dating to the 1830s when Irish workers were recruited to build the Baltimore & Ohio Railroad (first common carrier in the United States) and the Erie Railroad in New York. The most prominent use of immigrant labor occurred during the 1860s and the building of the First Transcontinental Railroad. The Union Pacific hired Irish workers for the building of their line westward and the Central Pacific hired Chinese workers for the building of their line eastern.

The westward expansion of the Milwaukee Road spurred the company to construct tracks, passenger stations, and repair shops along its right-of-way. The company actively recruited targeted ethnic groups for its track gangs and building crews – workers whom railroad officials believed to be skilled and industrious because of their physical features. According to a study by Van Auken, the Milwaukee Road recruited Italian workers because of the perception that their physical characteristics enabled them to be well versed in the use of shovels and similar tools that were used in clearing land, track laying, and constructing buildings.[25]

As the Milwaukee Railroad expanded westward, they would set up a rough and temporary spaces (camps) to provide housing for the workers. These settlements were not permanent housing - instead comprised of canvas tents, plain board shanties and specially designed railroad camp cars – and the living conditions were dismal. In setting up the camps, race dictated segregation and the setup of multiple camps at one construction site. Whites would have first access to the railroad camp cars. According to anecdotal evidence gathered through oral histories, the Italian worker camp was setup in Sioux City on the Iowa side of the river near today's intersection of Military Road and Riverside Boulevard. The African American camp was established on the west bank of the Big Sioux River in the town of North Sioux City.

- *World War I shapes the Sioux City Steam-Era Railroad Repair Shops Complex*

The Milwaukee Railroad Shops complex was at its height of construction when the United States entered the World War I in April 1917. For three years prior to the deployment of troops to the European war front, President Wilson pledged neutrality for the United States. The clear majority of Americans supported this position. American manufacturers, food processers, farmers, and the railroads benefited economically from the war.

[24] Johnson, Stab. *The Milwaukee Road's Western Expansion: The Building of a Transcontinental Railroad*. Coeur D' Alene, ID: Museum of North Idaho, 2007.
[25] Van Auken, Kenneth L. "Handling Laborers of Different Nationalities." *Railway Review*58 (February 19, 1916): 269-78.

The breakout of World War I in 1914 created a huge traffic market for meat products, grain products, and other food items for export to Europe created an unlimited opportunity for the railroads to generate revenue. European farmers were serving in the war front and the farmland was scarred by bombing and ground battles. Keeping the population fed in Europe, both civilian and military, was a key factor in the upsurge of U.S. railroad traffic. In 1914, Britain was importing over 60% of its total food supply and 80% of it wheat.[26] The needs of those nations fighting Germany led to substantial increases in the export of raw materials – coal, iron, and steel – all of which required hauling to port cities along the U.S. East Coast.

The entry of the United States military into the war effort in Europe presented an opportunity to substantially increase the traffic volume along the nation's railroad network and improve their revenue streams. Unfortunately, the nation's railroad network was not up to the task.

With the increased demands on the nation's railroad network, it became critical to continually monitor train movements and maintain timely connections between competing railroad companies. The traffic demands of the war effort coupled with domestic rail traffic created bottlenecks in the nation's railroad system. Train connections were missed, hampering the seamless movement of soldiers, munitions and other cargo for export to the war front. The eastern rail lines were badly blockaded by the congestion of unloaded rail cars at the terminals and elsewhere.

The railroad companies, voluntarily, attempted to coordinate their efforts to support the war effort by creating the Railroads War Board. But this private action faced challenges with anti-trust regulations, price fixing, and predatory pricing practices. Finally, after many months of poor management, President Woodrow Wilson sought relief by nationalizing the nation's 185 Class 1 railroads through Executive Orders signed on December 26, 1917. He further sought relief by securing Congressional passage of legislation that created the United States Railway Administration. This new agency was headquartered at Washington under the oversight of W. G. McAdoo, Director General.

When the 185 Class 1 railroads came under federal control, the United States Railway Administration faced challenges with the condition of the nation's railroad infrastructure. Even though many of the Class I railroads had made massive investments in infrastructure during the first decade of the 20th century, there remained a large backlog of deferred investments in rail terminals, track, modern locomotives, and rail cars. The shortage of motive power and rail cars limited the hauling capacity of the railroads. One of the first influxes of federal monies into the railroad network by the newly created United States Railway Administration (USRA) was the purchase of 1,930 standard-designed steam locomotives and over 100,000 new rail cars. The total investment in just these two expenditures was $380 million.

The successful mobilization of the railroads for the war effort depended upon the cooperation of the shopmen in the repair shops to keep the locomotives and rolling stock in running condition. In an effort to solicit labor's cooperation and to avoid any workplace turbulence, President Wilson and the United States Railway Administration increased wages and established an 8-hour work day for shopmen and operating train personnel. The shop workers saw other improved working conditions and the right of union membership for all railroad employees.

As part of the federal takeover of Class 1 railroads, all railroad companies were directed to prepare and send to the USRA their current large-scale construction projects underway, new construction projects planned, and the associated budgets for those infrastructure improvements. For each project, the engineers for the railroad companies needed to complete and submit a valuation report detailing the scope of work to be accomplished and the estimated expenditures needed to carry out the construction project. The USRA would then assess the project to deem the project as a necessary asset to "increase capacity and efficiency in the movement of traffic and to promote safety in operations."[27] The USRA then had the ability to modify, delay or halt any current infrastructure projects under construction, or to authorize any new construction.

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[26] Moore, Julie. "Farming in the First World War." Everyday Lives in War. March 23, 2015. Accessed February 22, 2017. https://everydaylivesinwar.herts.ac.uk/2015/03/farming-in-the-first-world-war/.
[27] "Records of the United States Railroad Administration." National Archives. 1917. Accessed January 20, 2016. https://www.archives.gov/research/guide-fed-records/groups/014.html.

With the Milwaukee Railroad Shops complex under construction in Sioux City, the USRA evaluated this construction project for its merit. Archival searches found the valuation documents for the Sioux City Repair Shops facility that were submitted to the USRA for consideration. After the federal review, the USRA deemed the construction of the shops was necessary for the "development of the required transportation facilities to meet the present and prospective needs of the country's business under war conditions."[28]

- *Tight Labor Market creates Opportunity for Women to enter the Railroad Shops Workforce*

As the War progressed, the county's cache of steam-era railroad repair shops were being asked to increase productivity in servicing, repairing, and overhauling steam locomotives, passenger coaches, and freight cars with fewer and fewer workers. More and more workers employed in the shops were being drafted for service in the Army's railway battalions overseas or for military service as soldiers, marines or sailors. Given the larger number of positions vacated by workers on military duty, the railroad companies in collaboration with the federal government developed a plan to recruit women and minorities to backfill some of the open general laborer jobs.

The high demand to keep railroad locomotives and rolling stock in running condition resulted in the railroads hiring approximately 101,785 women by October 1918 to backfill jobs by men who had gone to fight in the war.[29] The Milwaukee Road found the need to actively advertise across the state of Iowa for women to backfill the vacant jobs at the new steam railroad repair shops facility in Sioux City. In August 2018 the railroad company carried out a two-week recruiting campaign across the state of Iowa. An examination of newspapers from across the state found the railroad's recruitment activities included posting job openings and getting news stories published in the *Sioux City Journal*, *Sioux City Daily Tribune*, *Pella Chronicle, Postville Herald, Waterloo Times-Tribune and Omaha World Herald*. The railroad company hired an initial workforce of nearly 50 women to fill a variety of jobs in the car repair shops and the roundhouse at Sioux City. The first callout appeared on July 30, 1918, for 10 female workers followed by a call for an additional 40 women in early August.

The new Sioux City Repair Shops started operations in July 1918 with about five African-American women working in the coach cleaning yard and two white women working in the roundhouse as engine wipers and greasers. A photo appearing in the Sioux City Journal shows one female worker standing on the locomotive's running board wiping down the boiler shell. As the women were trained in more technical skills, they were assigned to jobs such as working in the machine shop operating engine lathes, boring machines, milling machines and tapping machines. In the car shops area the female workers were trained to operate planers, jointers, and sanders to condition the wood for rebuilding the interiors of boxcars and passenger cars. In the roundhouse, the vacant jobs they filled involved repairing cab cocks, globe valves, and other general tinsmith work. On the steam locomotive itself, the railroad employed women to reclaim waster form the journal boxes, pack journal boxes, and lubricate the running valve gears. [30]

On the Milwaukee Road, women received the same rate of pay as the men doing the same job. The vast majority were required to work full time. However, women with children under the age of 15 were limited to part-time employment. No women were allowed to work the night shift. These working conditions were in alignment with the general practices of all Class 1 railroads and regulations of the Women's Service Section of the United States Railway Administration.

Across the Milwaukee Road System, the standardized uniform of the female workers assigned to repair shops was khaki overalls with close fitting caps to confine their hair. The accommodations for the women consisted of a separate restroom facilities and a cloak room. A review of the blueprints for the toilet buildings at the Sioux City Repair Shops facility shows that the original standard building blueprint had modifications to the original design to subdivide the building into two separate restrooms based on gender. This modification was made in anticipation of women playing a much bigger role in the operations of the Sioux City Repair Shops complex.

[28] "Records of the United States Railroad Administration." National Archives. 1917. Accessed January 20, 2016. https://www.archives.gov/research/guide-fed-records/groups/014.html.
[29] Greenwald, Maurine Weiner. *Women, War, and Work: The Impact of World War I on Women Workers in the United States*. Ithaca: Cornell University Press, 1990.
[30] Kendall, Carpenter, ed. "The Women of the Car and Machine Shops." *The Milwaukee Magazine: The Milwaukee Road*.

After the War, the vast majority of female workers left their employment at the Sioux City Repair Shops, returning to work in the home. This was a common trend in railroad and factory work across the nation. With the majority of men returning home from service overseas, many women returned to domestic work in the home. In addition, the postwar recession and flagging revenues in the railroad industry resulted in worker furloughs and layoffs. A 1925 company photograph of the Sioux City Repair Shops employees shows only 5 women employed at that time in the car shops department. The Milwaukee Road would do a similar call for women and minority shop workers at the Sioux City Repair Shops during World War II.[31]

- *Work Life in the Sioux City Repair Shops was Undeniably Difficult*

Working in and around the roundhouse or car shops was dirty and dangerous. Shopmen always faced the likelihood of death or injury. Working on and around locomotives and rail cars of all types exposed the rail workers to hazards such as exploding boilers, scattered pieces of metal, unreliable belt-driven machines, primitive forges, and crude hand tools. Shopmen would often receive serious burns and bruises and were in constant danger of losing limbs. It was not uncommon for the workers to sustain struck-by injuries or fall from the locomotives and rolling stock while climbing on and off of them. The vast majority of injuries or fatal accidents would involve only one or two workers in a single incident. Like all railroad repair shops across the country, the Sioux City-based shops of the Milwaukee Road experienced more than a few such dreadful incidents:

- One of the worst fatal accidents took place on Thursday, October 4, 1928. A newly hired railroad laborer, on his second day of work at the roundhouse, died when he climbed down from a steam locomotive and drowned in the cinder pit. Charles Crawford, age 35, was working as a "fire knocker" cleaning a steam locomotive of its ashes and fire as it was parked over the cinder pit. Crawford was climbing down from the locomotive cab when instead of stepping on solid ground, he stepped on a "coal scum" floating on the surface of the water that was in the pit to cool the ashes and coal clunkers. He drowned in eighteen feet of water and coal slurry. He was submerged in the water for about a half-hour before other workers realized he was not working and discovered that Crawford had fallen into the cinder pit. Grappling hooks had to be used to search the cinder pit and recover Crawford's body.[32]

- An experienced railroad worker, Frank Sheets, was critically injured on May 25, 1923, while he was engaged in breaking up coal for the steam locomotives. Sheets was assigned work at the coal tower that day. The coal had become compressed together and needed to be broken apart into smaller briquettes before moving the coal from the bunker through the chutes to the steam locomotives. Sheets and another railroad employee were working inside the coal bunker when Sheets became injured. The other employee was shoveling the coal to break it up. When he was throwing one of the large lumps of coal, he struck Sheets' foot. The force from the lump of coal hitting Sheets' foot caused several broken bones and toes, injuring the entire foot. Sheets lost the use of his foot and became permanently disabled after the injury.[33]

[31] By the spring and summer of 1942, the Sioux City Repair Shops began to hire women to backfill vacant positions created by the acute labor shortage during World War II. The story of Marie Franken, a young woman who started working as a roundhouse clerk in 1943, illustrates the dynamics of women entering the workforce to support the war effort. She was hired by the roundhouse foreman to track payroll for the shop workers, write letters for the Master Mechanic and Roundhouse Foreman, and prepare the mandatory month locomotive inspection reports for the federal government. The majority of her work concentrated on completing paperwork for the hiring and termination of roundhouse workers. Because of the war effort, there was a high turnover among the laborers. Franken worked a grueling schedule. She was required to work six days a week, with at least an hour overtime every day. Unlike most women at this time who returned to a domestic life when the War ended, Franken elected to pursue a nearly 40-year career with the railroad. Franken would retire in 1980 when The Milwaukee Road ceased operations in Sioux City.

[32] "Rail Employee Is Drowned In Cinder 'Dugout": Grappling Hooks Used To Recover Body Of C. Crawford." *The Sioux City Journal* (Sioux City, IA), October 5, 1928.

[33] "Coal Crushes His Toes: Asks $5,000 Damages." *The Sioux City Journal* (Sioux City, IA), August 15, 1923.

- *The Shopmen Strike of 1922*

The 400,000 highly skilled shopmen industry-wide began a nationwide strike on July 1, 1922. The labor unrest directly threatened the nation's economic stability and social life after World War I. Railroad trades and craft workers walked off the job in response to the decision of the Railroad Labor Board to institute a nationwide 12% wage cut during July 1922. The July wage cuts were the second wage adjustments made since the railroads were returned to their owners after the World War I federal takeover of the Class 1 railroad companies. Besides the shopmen, wage cuts were made in the pay of railroad clerks, signal men, stationary firemen, and maintenance of way employees. The executives of the railroad companies also wished to be released from the requirement that they limit the shopmen's work shift to eight hours.[34] The economic downturn after World War I and the large volume of returning veterans needing employment provided the railroads with justification to make the workforce adjustments.

During the strike, the railroads continued to operate their trains by filling positions with management personnel and forcing non-unionized railroad employees to fill the labor gaps around the repair shops. In addition, the railroad companies recruited and hired replacement workers (strikebreakers or scabs) for the job positions vacated by the striking shopmen. The nation's high unemployment at the time enabled to the railroad companies to easily recruit and hire replacement workers. Their efforts allowed the companies to fill nearly 75% of the jobs vacated by the strikers.

The impact of the strike in Iowa, Sioux City and at the Milwaukee Roads shops complex was highlighted by their position within the railroad industry. Across the state of Iowa, some 12,000 shopmen representing 62 shops participated in the strike. Locally, the walkout affected nearly 2,400 shopmen working across six roundhouse terminals in Sioux City. At the Milwaukee Road's roundhouse terminal in Sioux City, at least 300 workers walked off the job to participate in the nationwide strike. These workers would stay off the job for several months, returning to work on September 18, 1922. Railroad officials were determined to keep the shops operational and the trains rolling in and out of Sioux City. To accomplish that feat, the companies employed a large number of strikebreakers. Railroad executives placed recruitment ads in the local newspapers, like the one displayed to the right for the Milwaukee Road, to target retired shopmen, former workers, and local residents.

The railroads also recruited outside of Sioux City with ads targeting African Americans and immigrants to fill positions in their Sioux City Repair Shops. For those workers brought in from out-of-town to cross the picket lines, railroad officials authorized the construction of camps near the shops to house and feed the strikebreakers. In addition to hiring temporary workers to fill worker slots created by the strike, the railroad company assigned management to tasks involved with servicing and maintaining locomotives, passenger cars and freight rolling stock. Clerical workers were also assigned to work short shifts in the shops.

With the hiring of strikebreakers, a bitter struggle ensued nationwide with violence against strike breakers and railroad property. There were several lynchings, bombings, and beatings – including the tarring and feathering of strikebreakers. In many places, governors called in the state militia to keep the peace and control deadly situations. The federal government also responded by recruiting and deputizing new deputy U.S. Marshals and dispatching them to potential hot spots. While in Sioux City, things were relatively calm, many of the strikebreakers were threatened with harm when crossing the picket line. At the Milwaukee Road shops in Sioux City, strikebreakers and company property were protected by federal marshals. The railroad company stationed its force of special police officers at the Sioux City Repair Shops, passenger station and rail yards to protect company property and other railroad workers not participating in the strike.

In addition to the use of federal law enforcement, the Chicago, Milwaukee, St. Paul and Pacific Railroad Company sought the assistance of the court system and obtained an injunction against the striking shopmen in Sioux City. The railroad

[34] The successful mobilization of the railroads for the war effort depended upon the cooperation of the shopmen in the repair shops to keep the locomotives and rolling stock in running condition. In an effort to solicit labor's cooperation and to avoid any workplace turbulence, President Wilson and the United States Railway Administration increased wages and established an 8-hour work day for shopmen and operating train personnel. The shop workers saw other improved working conditions and the right of union membership for all railroad employees.

received a temporary restraining order prohibiting violence and limiting picketing activities to one picket at each entrance point to the repair shops complex in Sioux City. The injunction limited the strike activities by restraining strikers from interfering or harassing those employees crossing the picket lines to resume work or new employees hired by the railroad.

Local law enforcement also weighed in on the strike to ensure picketing was peaceful without any violence. The police department stationed special patrolmen on duty at each of the six railroad shops complexes. And the city attorney asserted (1) the prevention of strikers and strike sympathizers from carrying arms or assembling in numbers on or near railway company properties, and (2) the establishment of armed camps by railroad companies would be expected. He cautioned both sides that violations of local laws and ordnances would lead to prosecution by the City.

After nearly 75 days, the shopmen ended the strike and returned to work in the Sioux City Repair Shops when the prolonged labor conflict began to die out. On September 12th, shop craft union leaders voted to approve a labor agreement with one-fourth of all the railroad companies affected by the strike, including the Chicago, Milwaukee, St. Paul and Pacific Railroad Company. The workers settled for a 5 cent an hour pay cut, which was substantial money at the time. Even though the strike did not work in the favor of the shopmen, it did pave the way for the Railway Labor Act of 1926, which governed labor relations in the railroad industry for decades.

- *Massive Fire Destroys Half the Roundhouse in 1925*

A major fire destroyed half of the 30-stall roundhouse on August 4, 1925. The blaze broke out at 3:15 a.m. and had apparently started when shop employee Charles Legget ignited a fire-up gun, which is a portable oil tank used to start fires under the boilers of steam locomotives. Firefighters found the blaze hard to fight because of low water pressure and an overwhelmed water supply system. Because of the complex's isolation from the city utility system, the only water supply for fighting the fire was the water stored in the site's water tanks. At the time there were 20 steam locomotives housed in the roundhouse for repairs. Workers were only able to save 10 because the extreme heat from the fire caused the rails between the roundhouse and turntable to expand out of gauge and buckle. Eyewitness accounts of workers, published by the Sioux City Journal, told of hearing the boilers bursting apart from the extreme heat as the steel expanded.

Immediately after the fire, a section of 15 stalls of the roundhouse were a giant field of rubble. The wood and timber roof system was a complete loss, as well as the north elevation that held the large wood doors. The east and south brick elevations survived. Wood ties underneath the tracks to the turntable were destroyed by the fire. The wood turntable also sustained some fire damage. The rebuilding of the fifteen stalls started immediately. The following day after the fire, the railroad company deployed a force of 25 workers and laborers to clear away debris. The cleanup task took one week. The railroad engineers utilized the original building drawings and construction documents from 1916-1918 to undertake the reconstruction effort. Materials were secured locally. Brick was furnished by Sioux City Brick and Tile Company. Curtis Sash and Door Company was awarded the contract for manufacturing new wood window frames, doors, and other special woodwork needed in the reconstruction. Timbers and lumber for the roof system were secured from local lumber yards. The reconstruction of the roundhouse section was completed within 45 days by the railroad company's bridge and building crew.

- *Technology and Competitive Forces Standardize Railroad Operations and Passenger Train Services*

During the years from 1930 to 1945, the North American railroad industry entered a new era in its industrial heritage. Both industry-wide and in the marketplace, America's railroads had to grapple with new and formable changes in their operating environment. The big structural challenge industry-wide for steam-era railroad repair shops was driven by a new source of energy. Prior to the 1930s, the traditional source of energy for the machinery in a repair shop was steam. The enormous access to coal needed to power the steam locomotives was available in almost unlimited amounts. But the use of steam to power machinery and equipment for the repair of locomotives and rail cars was just as labor and maintenance intensive as the steam locomotive. As electrical energy became increasingly abundant and new and older machines were developed to make use of this power, the railroad industry started to make the conversion.

In 1930, the railroad company modernized the Sioux City Repair Shops with its conversion to a power electrification system. The conversion consisted of the installation of electric motors for the machining equipment, replacing steam pumps and steam-driven air compressors with electrically-driven pumps and air compressors, and the substitution of electric blowers instead of steam blowers to fire up the steam locomotives. The conversion project also meant the elimination of the stationary boiler to heat the water for washing out and refilling locomotive boilers. The railroad utilized new technology for a hot water washout plant that reclaimed the hot water and steam contained in the locomotives when they come in for repairs to heat the fresh water for washing out and refilling the boilers of locomotives sitting in the shops for repair. The power electrification project was completed at a cost of $80,000. This upgrade made the Sioux City Repair Shops one of the most modern repair and maintenance units on the Milwaukee Road.

The bigger problem in the marketplace was driven by the automobile. Cars, trucks, and buses had almost completely replaced horse-drawn vehicles by 1930. As a result, the railroads started to confront the formidable competition of the gasoline-driven motor vehicles of cars, buses and trucks. The growing popularity of car travel galvanized a fierce competition between the automobile industry and the railroads for passengers. To stave off the competition that was emerging from the automobile, the railroads west of the Mississippi River spawned several great regional train routes offering exemplary passenger train service from the Middle states to the Pacific Coast. During this time the Sioux City Repair Shops took on the task of daily inspection, servicing and maintenance of locomotives and passenger coaches for several named trains of the Milwaukee Road.

The Arrow, for example, was introduced by The Milwaukee Road in 1926 as a regional intercity train operating between Chicago and both Omaha and Sioux City-Sioux Falls. This train provided overnight service between the cities by featuring sleeping cars. *The Arrow* operated through Sioux City until 1965.

The Midwest Hiawatha was part of the family of regional passenger trains operated between 1939 and 1956. The Midwest Hiawatha was assigned to the mainline running from Chicago to Omaha, with a section splitting off at Manilla, Iowa to ling Sioux City and Sioux Falls with the Hiawatha network. The standardized train consist included a Super Dome observation car, the Tip-Top-Tavern dining car, and the Beaver Tail lounge car on the rear of the train.

- *The Transition Era – The Milwaukee Road is 100% Diesel and Electric*

The growing popularity of coast-to-coast travel by automobile, vacations by car, and air travel – these were only part of the story of North American railroad operations between 1945 and 1960. Equally important was the large-scale deployment of the diesel locomotive across the entire railroad industry. Throughout North American railroad history there have been certain periods when changes came with speed and transformed so many different aspects of development that they became revolutionary. This time period is such an age. This time period became known as the Transition Era in Railroading.

During the closing years of the 1940s, the railroad industry rapidly shifted from wartime to peacetime operations. As a result, there was no serious lack of work or labor interruptions at the Sioux City Repair Shops. Instead of a postwar traffic decline that many had expected to come, the Sioux City Repair Shops enjoyed a high degree of operation. One rough measure of the productivity was a 1948 year-end report that was published in a *Sioux City Journal* new brief. The data showed the following outputs for the railroad:

- 6,317 freight cars repaired and serviced
- 8,316 steam locomotives serviced and repaired
- 561 people employed out of the shops with an annual salary of over $2.1 million
- 6,541 freight trains in and out of the city for an average of 18 trains per day
- 4,380 passenger trains arrived and departed for an average of 12 passenger trains per day

Things stayed this way until the early 1950s, when the steam locomotive lost its edge to the diesel locomotive. By the end of 1954, the Milwaukee Road had operated its last steam locomotive in Sioux City. By February 1955, no steam locomotives were in regular service along the entire system of the Milwaukee Road. Through data collected from the annual company reports of The Milwaukee Road, the following trend table illustrates how diesel locomotive technology was a hugely a disruptive force on the railroad over the twenty-four year period of 1930 to 1954. The table also illustrates the decline in the demand for passenger coaches as the railroad industry was faced with dwindling passenger traffic.

Trend Table 3: Census of Equipment Operating on the Milwaukee Road (1918 to 1958)

Fiscal Year	Steam Locomotives	Diesel Electric Locomotives	Freight Cars	Passenger Train Coaches	Cabooses
1918	1,795	N/A	60,506	1,565	1,046
1920	1,917	N/A	61,183	1,604	1,006
1930	1,655	N/A	66,730	N/A	945
1940	1,085	43	54,152	939	770
1945	1,047	103	55,930	966	784
1950	838	232	58,787	1,119	786
1951	665	316	58,248	1,092	802
1952	600	349	57,023	971	757
1953	418	379	56,306	973	694
1954	104	493	56,229	937	635
1955	104	683	56,229	939	635
1956	8	763	54,616	932	583
1957	1	807	52,897	858	555
1958	0	807	53,188	765	524

The major driving forces behind the shift to diesel-electric locomotive power was efficiency and cost control. Steam locomotives were very labor and capital intensive. The general rule of thumb was that for every engineer and fireman operating the steam locomotive, the servicing, maintenance and heavy repairs demanded an additional four workers for a total of eight workers in the shops. The operation of steam locomotives required enormous facilities and infrastructure to house fuel, water, and repairs.

Steam locomotives, because they needed numerous daily and monthly inspections and repairs, were only available for service about 6,000 hours annually. The diesel powered locomotive, on the other hand, was available for more than 8,000 hours annually. The diesel could operate 330 days of 24-hour continuous service before needing repairs. And the diesel-electric was far more fuel efficient; it could operate up to 5 days of 24 hour work days on a tank of fuel oil or diesel fuel.

In 1954, the railroad's engineering department unveiled construction plans and documents (displayed on page 121) for converting the roundhouse terminal into a diesel locomotive servicing and maintenance center. The plans called for demolishing and razing 24 stalls of the roundhouse. These stalls housed workers and equipment that were utilized for boiler and fire box inspection, repair, and other related work on coal and oil fired steam locomotives. With the conversion to diesel locomotives, these areas would become obsolete and dead space. Conversion of the roundhouse eliminated the usage of several other structures. The construction plans called for the retirement of the sand drying house, stores warehouse building, a toilet building, and the machine and blacksmith shop building. These structures were not demolished, but were converted to storage use. However, several backshop buildings and structures were razed in 1954: power generation and steam plant, water treatment plant, a toilet building, several office areas, water tower, water reservoir, a sand tower, and the coaling tower. Also eliminated from service were the cinder/ash pit, which was filled in with ballast and dirt materials.

The six stalls of the roundhouse that survived were set up as the diesel servicing and maintenance center. These stalls were originally dedicated to wheel replacement and light running repairs for steam locomotives. With their inspection pits and hydraulic lifts for wheel replacement work on steam locomotives, these stalls were appropriate for conversion to diesel locomotives at very minimal cost to the railroad.

The conversion did require the railroad to make minor alterations and renovations to the roundhouse building. Stall number one, which was used for wheel repair, was enclosed and subdivided into two floors. The ground level floor area was converted to two small machining workrooms and an office for the roundhouse foreman and his clerk. The top level was converted to a locker room and washroom for the shopmen – the toilet building and locker room area located adjacent to the roundhouse building were razed during the conversion.

With the demolition of the power generation and steam plant building, the downsized roundhouse building needed a new source to heat the interior of the building. The railroad reduced the size of the inspection pit and the repair track in stall three and built an area to house a boiler for heat generation. The railroad, according to local building permits, brought in a boiler from the Mitchell, South Dakota roundhouse (recently razed) and set it up in the Sioux City roundhouse. At this time, the railroad site was plumbed to city utilities, which were later severed in 1980.

As part of the conversion process, the railroad also increased the size of its gasoline fueling station to also hold a large diesel fuel tanks to fuel diesel locomotives. In 1934, the railroad built a "divisional" gasoline fueling station and pump house on a berm along the eastern edge of the roundhouse terminal. This fueling station was used to fuel up maintenance-of-way motor cars, right-of-way weed trimming equipment, and various power tools.

- *The Sixties – First Decade of Struggle and Crisis*

By 1960 the country was crisscrossed with arteries of railroad lines, roadways, highways and air lines. All major airlines started to replace their turbo-prop planes with jet aircraft that were capable of faster speeds and longer distance hauling. Close to 70 million automobiles, buses, and trucks were rolling over the roadways and highways. At this time, about 90 percent of all inter-city traffic was being carried by private automobiles. By 1966, less than 2 percent of all intercity passengers were traveling by rail. In addition, the United State Post Office ceased operations of their Railway Post Office mail cars that were revenue generators for passenger trains.

Even though the railroads still carried nearly half of the inter-city freight traffic, their total share was decreasing. The efficiency and convenience of the modern truck and the publicly-funded investments and maintenance of high quality roadways, highways and interstates caused much of the freight and grain traffic, which had moved by rail, to be diverted. As a result of declines in both passenger and freight traffic, many of the railroads started to struggle financially or flirt with bankruptcy in the 1960s. The Sixties led to a prolonged decline in railroad economic activity that lasted well into the early 1980s. In the annuals of railroad history, historians have identified this time period as the Decades of Struggle and Crisis.

The Sioux City Shops facility was kept busy with exchanging out the "first generation" diesels that had replaced steam locomotives during the 1940s and 1950s with the newer "second generation" models. The 1960s also saw the railroads investing in new types of rolling stock and equipment to increase the hauling capacity of the railcars. And, the railroad companies went to a "freight-only" business model and retreated from intercity passenger train service. The railroad industry could not compete with the increasing ownership of private automobiles and the high-speed interstate system. In addition, the United States Postal Service removed their railway Post Office cars from the rails and canceled mail contracts with the railroad companies. Employment dropped rapidly from about 200 workers in 1960 to about 60 employees working out of the repair shops by 1970.

- *Three Alarm Fire Destroys Vacant Store House Building (Resource #12)*

Fire crews responded to a well-involved three alarm fire at the Sioux City Repair Shops complex on April 29, 1965. Three fire crews arrived to the site in the late afternoon. Upon arrival, the firefighters worked to contain the fire to the store house building and a boxcar docked on a siding track for unloading. Railroad workers evacuated diesel locomotives, a wrecker, and the wrecker train to minimize the risks to the equipment. There were no reported injuries to workers or firefighters.

The fire consumed the entire store house building, the supplies inside the store house, and the boxcar. At the time of the fire, the store house was warehousing around 100 barrels of oil asphalt, roofing materials, and several acetylene gas cylinders. These flammable materials fueled the fire and produced intense heat and caused numerous explosions. Fire crews spent four hours fighting the blaze. The store house and boxcar were a complete loss. The fire's cause was undetermined.

- *The Second Decade of Struggle and Crisis*

Change is often disruptive and in no period of railroad development was change more disruptive to The Milwaukee Road and the Sioux City Repair Shops than the 1970s. The major cause of disruption was the competitive forces pushing the financial stability of the big Class 1 railroads. Railroad historians have pinned various labels on the 1970s – among them is The Decade of Struggle and Crisis.[35] This label suggests the period of the 1970s was characterized by negative market conditions.

This was a time of excessive governmental regulations, fierce coast-to-coast intermodal competition between trucks and trains, and an over-built physical network of rail lines developed to carry a great volume of freight traffic. With the railroads confronted with the steady lessening in the volume of freight traffic, their prosperity was reflected in declining railway earnings. As a way to combat these market forces and to right-size the rail network's capacity, many railroads abandoned money-losing main and branch lines. According to governmental statistics, the railroad network decreased by 20 percent during the 1970s.[36]

In addition to the abandonments, many railroad companies sought relief through mergers with railroads who were once their competitors. Two longtime rivals, the New York Central Railroad and the Pennsylvania Railroad merged in 1968 to form the Penn Central. At that time, the Penn Central became the sixth largest corporation in the nation. Unfortunately, this marriage of railroads would not survive. The Penn Central went into bankruptcy in 1970. Its rail lines were saved when Congress created the Conrail as a government-funded private railway company.

Another mega-railroad formed in 1970 from the merger of the Great Northern Railway, Northern Pacific Railway, Portland and Seattle Railway, and the Chicago, Burlington and Quincy Railway. The new railroad company became known as the Burlington Northern. This merger would have the most direct impact on the Milwaukee Road. The Burlington Northern operated in the backyard of the Milwaukee Road. The competitive strength of the Burlington Northern made it difficult for the Milwaukee Road to compete for the freight traffic traversing the Upper Midwest and Pacific Northwest territories.

By 1977, the size of the Milwaukee Road's rail network could not be supported by the revenues it was generating. At that time, the railroad owned 10,074 miles and with 36% of that mileage producing a mere 14% of the company's yearly revenue. The railroad filed for bankruptcy in December 1977.

On a local scale, the late 1970s decline in rail traffic in the western states was the predominant cause of decreasing revenue outputs and employment for workers in Sioux City. Oral testimony collected in 2003 by University of South Dakota honor student Todd Schultz contributed a great deal of information on how the declining rail traffic financially impacted the Sioux City facility. While many remembered working for the railroad fondly, some testimonies were openly critical of senior management during this time; attributing the decline of the railroad to rerouting traffic in Sioux City off the Milwaukee Road to the Burlington Northern. Many of these same workers emphasized specific observations of a hostile work environment when employees questioned this practice of management.[37]

[35] McGonigal, Robert S., William R. Hough, and H. Roger Grant. *Trains of the 1970s: Crisis and Rebirth for America's Railroads*. Waukesha, WI: Kalmbach Publishing, 2015.
[36] McGonigal, Robert S., William R. Hough, and H. Roger Grant. *Trains of the 1970s: Crisis and Rebirth for America's Railroads*. Waukesha, WI: Kalmbach Publishing, 2015.
[37] Todd S. Schultz. (2003). Dakota Rails: Oral Histories of Milwaukee Road Employees in South Dakota and Northwest Iowa. Department of History: The University of South Dakota

The impact of the long drawn out bankruptcy dealt a death blow to the Sioux City Railroad Repair Shops complex on March 1, 1980; and a very personal blow to the 61 furloughed workers who were working out of the terminal when the railroad's embargo shut down 4,700 miles of track across Iowa, the Midwest, and the West. The exit of the railroad company negatively affected the lives and economic vitality of railroad workers, commodity shippers, and farming communities across a broad swath of the country, from the Midwest states to parts of the Pacific Northwest states. On the national scale, the demise of the railroad company affected 14 states; a region of the country that represented about 29 percent of the contiguous 48-states.[38]

In 1980, the bankruptcy trustees announced an embargo on parts of the railroad's Midwestern rail lines and the bulk of its Western lines. Operations were suspended west of Miles City, Montana and on designated lines in southern South Dakota, central and western Iowa, as well as other line segments in Wisconsin, Illinois, upper Michigan, Minnesota, and North Dakota. [39] This action reduced the railroad to a third of its size that it was in 1977. In 1985, the Soo Line Railroad Company would acquire the remaining Milwaukee Road network, and would eventually merge it into the Soo Line network in 1986.

This embargo situation was unique to this railroad company. It was the most extensive track abandonment program and asset liquidation project undertaken by any major railroad company at that time in the nation's history. The lasting impact of this event has been looked upon negatively by railroad historians, industry executives, and former employees. The turmoil created by The Milwaukee Road insolvency was included in the list of the 13 biggest blunders in railroading (published by TRAINS magazine in September 2015).

The collapse of the railroad company had more far-reaching consequences than any other preceding corporate bankruptcy. Few of its rail terminals, rail yards and other large physical plants survived the liquidation of the company's physical assets. The vast majority were destroyed by the railroad company in an attempt to make land more sellable to future buyers and to pay off debts by scrapping and selling off what they could. Railroad management was bent on clearing the landscape as fast as possible. The most common structures to survive the large-scale clearance were depots and stations. They could be easily sold and repurposed by local buyers and communities. For other sites and properties, the railroad looked to recover and salvage what they could. Railroad management knew they could make money by deconstructing the rail lines and other infrastructure, and reselling the salvaged materials such as rail, ties, and equipment.

The amount of destruction from the cleanup of rail lines was quite large. No one anticipated a deconstruction project of the magnitude carried out by one of the nation's most prominent railroad companies. It had never happened before. Writing about the effects of the deconstruction, railroad historian Joe Welsh noted "Unlike the other six original transcontinental railroads built in North America, there are no contemporary operations of the majority of the Milwaukee Road's western rail lines."

In 1980, the historic district played a vital role in the railroad's liquidation program. The railroad company established the Sioux City Repair Shops complex as a reclamation facility to handle the large amounts of salvaged materials and waste generated from the deconstruction of its Iowa and South Dakota rail lines. The salvaged materials were deconstructed, handled, and transported to the Sioux City through a third-party contractor. Salvaged materials included railroad ties, rail, and bridge components. A selection of photographs taken by Robert Schlag in 1980 show the gradual collection of materials held at the Sioux City facility for liquidation.

Harold J. Mahoney was assigned to Sioux City and appointed by the bankruptcy trustee as special project director to oversee the reclamation facility and the liquidation of assets. His job was to sell of company property and liquidate all salvaged equipment and materials, including bridge components that had been brought to Sioux City. Mahoney, an Iowa native, was a career senior manager with the Milwaukee Road before his appointment by the bankruptcy trustee.

[38] Clark, R. M. "Sioux City and the Milwaukee Road: Part 2." *The Milwaukee Railroader*, 2005.
[39] Clark, R. M. "Sioux City and the Milwaukee Road: Part 2." *The Milwaukee Railroader*, 2005.

In November 1980, the State of South Dakota purchased 764 route-miles of the former Milwaukee Road tracks, including the Sioux City-Elk Point- Aberdeen line and the Elk Point-Sioux Falls-Dell Rapids lines. South Dakota paid $18.7 million dollars for these rail lines. The rail lines were then leased to the Dakota-Iowa Railroad Company owned by L. G. Everist Company (Elk Point-Sioux Falls-Dell Rapids) and the BNSF Railway Company (Sioux City-Elk Point-Aberdeen). As part of the lease agreements, the Dakota-Iowa Railroad Company was granted trackage rights over the BNSF Railway segment from Sioux City to Elk Point.

The 20th Century development, heyday, and eventual demise of The Milwaukee Railroad are evident today in the physical characteristics of the Milwaukee Railroad Shops Historic District in Sioux City, Iowa. The historical contributions of the complex from 1968 to 1980 are exceptionally significant not only to the history, heritage and departure of The Milwaukee Road, but also to the broader physical makeup of the nation's late 20th Century railroad network.

Criterion C: Distinctive Characteristics of a Type, Period and Method of Railroad Construction

The expansion of the steam-era railroad in the late 19th Century and early 20th Century called for the design and engineering of specialized facilities to keep trains moving. Two types of specialized facilities were developed to support the maintenance and repair of locomotives and rolling stock – roundhouses and railroad repair shops. At one time, there were over 3000 roundhouses and railroad repair shops operating across the nation's railroad network. Within this tally, approximately 1,872 were classified as railroad repair shops. Roundhouses and Steam-Era railroad repair shops facilities are differentiated by the different degrees or scale of work that takes place on locomotives and rolling stock in each type of facility.

The Sioux City Repair Shops complex was designed and engineered as a complete railroad repair shop. The facility was uniquely built in its arrangement of the buildings and departments to address several factors. The Sioux City site was adapted to the physical restrictions of its location, both with respect to the mainline of the railroad and to the characteristics of the part of the city in which it was located. In addition to the three main departments, the Sioux City Repair Shops also incorporated the engine servicing terminal, bridge and building department, the wrecker train, and a caboose storage yard. The 1917 site layout plan displayed on page 120 shows the uses and structures that were built on the parcel of land that housed the Sioux City Repair Shops. A complete listing of all the buildings and structures constructed at the site can be found on page 131.

The roundhouse or engine house was a sheltered workspace for the daily maintenance and minor running repairs of locomotives in service. Work also included regular greasing and oiling, cleaning of the alkali from the boiler tubes, and cleaning soot out of the flues. There was usually a turntable built with the roundhouse for the turning of steam locomotives.[40] A general practice of the railroad industry was to locate roundhouses or engine houses at points along their rail lines where there was a cluster of locomotives needed for road work or yard switching. The number of stalls in a roundhouse building depended upon the number of locomotives working in that portion of the railroad. Generally, roundhouses were built approximately one hundred miles apart along the railroad right-of-way. The roundhouse was generally arranged close to the freight car classification yard where rail cars were interchanged and switched to form trains.[41]

A steam-era railroad repair shops facility included a roundhouse with turntable or transfer table, containing the best and most complete equipment and yard facilities, to service and make major repairs and overhauls to locomotives and rolling stock. A complete railroad repair shops facility contained three repair departments – locomotive, passenger coaches, and freight car. There was also, in every facility, sub-departments – a machine shop, a power house, a store house, a blacksmith shop, a planing mill; and in some designs, a wheel shop and an iron foundry.[42] Railroad repair shops facilities were generally

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[40] The New York Central Railroad advertisement displayed on page 128 provides a cross sectional, visual representation of the types of work undertaken in a railroad roundhouse.
[41] Editor, ed. "Notes on the Roundhouse." *Railway Master Mechanic*, August 1908, 212-15.
[42] Kingsley, F. "Railroad Shop Layouts: A Discussion of the Features That Influence the Relative Location of Structures That Make up an Average Railroad Shop Plant."*American Engineer and Railroad Journal*, June 1910, 201-03.

located at major division points where several divisions would converge, or if the location was a major interchange connection with other railroad companies.

The site arrangement of the buildings, structures, and rail yards that formed a complete railroad repair shop facility adhered to a set of common design approaches which reflected the accumulated knowledge and experiences of railroad (civil) engineers. Design principles were aimed at enhancing convenience in the handling of parts and materials needed to make repairs to locomotives, passenger coaches, and freight cars. Although the site layouts followed fundamental principles, no two repair shop complexes were built identical in their site arrangement.

- *Engineering and Arranging the Sioux City Repair Shops as a System Around the Longitudinal Design*

The Milwaukee Railroad Shops Historic District is a typical example of comprehensive industrial site planning in the railroad industry. The engineering and architectural quality exhibited in the structural detailing and the general arrangement of the buildings, structures, foundation sites, and rail yard; cumulatively convey the longitudinal design principles utilized by The Milwaukee Road.

One of the main goals of a railroad repair shops facility was the maximization of productivity in the maintenance and repair of steam locomotives and rolling stock. This ability depended upon factors, such as the kind and complexity of the repairs needing to take place, and the arrangement of the workstations involved with the repair process. The challenge of determining the best arrangement of the workstations for the Sioux City Repair Shops complex was one of the elements that had a great impact on the repair shops performance. The arrangement chosen for the location of the buildings, structures, and rail yard produced a railway operational system efficient enough to operate around the clock.

When compared to other known steam-era railroad repair shops, the Milwaukee Railroad Shops Historic District is one of only two known preserved sites in the nation with a *complete* arrangement of the railyard, buildings, structures, and foundation sites to characterize the utilization of the longitudinal design layout for site layout.[43]

The longitudinal design "groups separately the buildings and facilities belonging to each of the three principal classes of work, viz.: locomotives, passenger cars, and freight cars" along a set of longitudinal tracks for each class of work.[44] The longitudinal design achieves economy of scale and efficiency by "grouping the several departments or special branches of work belonging to each group in one large building or in a series of closely connected buildings".[45] The designers of the Sioux City Roundhouse, Repair Shops and Engine Terminal made use of the longitudinal design through the construction of a series of one-story utilitarian buildings and several large-scale structures to carry out the functions of inspecting, maintaining, servicing and repairing locomotives and rolling stock.

The layout of the Sioux City Repair Shops terminal and the location of the buildings reflect many of the recommendations offered by the design principles of the time. The site is situated on what was and still is the outskirts of the city of Sioux City. The Sioux City Repair Shops were moved away from the retail downtown and industrial area as not to be a smoke nuisance. At the turn of the 20th Century, smoke produced by industries located next to the nearby major commercial and warehousing districts was considered a major public health risk. Newspapers across the country often noted the nuisance of smoke in their communities to help build awareness of the health hazards. As public opinion grew to favor new public policies to regulate the smoke, many cities were passing municipal codes to abate the smoke nuisance. To avoid issues with the city of Sioux City, the railroad company decided to build its new Sioux City Repair Shops on the outskirts of town.

The Milwaukee Railroad Shops Historic District represents one method of general site plan layout and building construction the railroads used to reduce the impacts of flooding. The Sioux City Repair Shops was located in close proximity to the Big Sioux River to take advantage of the water table. Water was readily available for cleaning out locomotives and rail cars, and to fill the water tanks on the steam locomotive tenders. Unfortunately, one of the problems with the Big Sioux River

[43] List of Roundhouses Still Standing in 2010.
[44] Berg, Walter G. *Buildings and Structures of American Railroads*. New York, NY: John Wiley & Sons, 1893.
[45] Berg, Walter G. *Buildings and Structures of American Railroads*. New York, NY: John Wiley & Sons, 1893.

was the high risk of flooding after intense rain storms or during the spring snow melt when there was a lot of water runoff. The distribution and spacing of the numerous shop buildings throughout the terminal presented a methodology to mitigate long-term damage and down time caused by flooding. Each of the buildings is built upon an elevation to raise the floor level above the flood stage to minimize inundation of flood waters into the shop buildings. The site engineers used the spacing between buildings to create retention areas for the ponding of water away from the various workshops. When a major flood occurred, the buildings inundated with water could drain and dry quickly. The workers could reclaim the use of the buildings; thus, minimizing the time span the repair shop terminal would be out-of-service. According to records kept by the National Weather Service, there were 10 major floods between 1917 and 1980 that inundated the Sioux City Repair Shops that caused the facility to shut down during the flooding event.

The buildings that are contributing resources to the historic district were designed and engineered to work together as a system that makes up a longitudinal railroad repair shops facility. The following narrative descriptions help illustrate how each building was planned as a system element.

Resource #1: Six-Stall Roundhouse Building
Resource #11: 24-Stall Roundhouse Foundation

The roundhouse building, also known as an engine house, is a large-scale, single story vernacular structure that is the primary character-defining building of the Sioux City Roundhouse, Repair Shops and Engine Terminal facility. This building was the core of the railroad's steam and diesel locomotive maintenance functions. The roundhouse building is larger than its neighbors in size and scale; but it is similar in building materials and functional style. The other buildings gain their significance in association with the roundhouse's and car shops' architectural appearances and functional histories.

> "The usual style of an engine-house, known in this country as a roundhouse, consists of a house built in a circular form around a turn-table, with track leading from the turn-table radially into the house. The building can either be built as a full circle, known as a closed or full-circle roundhouse, or it can be a segment of a circle, known as an open or segmental roundhouse. The walls of the building are not actually built circular, but in the shape of a polygon, the circle being divided up into stalls or panels, the walls in each panel being built on the chords connecting the panel points."[46]

The roundhouse is significant for its functionality as a "repair shops for the maintenance of locomotives in service. As such, its efficiency depends upon the facility, with which locomotives may be received, turned, repaired and dispatched with minimum detention. The Sioux City Engine Terminal was originally built to care for steam locomotives used in passenger and freight service on the Chicago, Milwaukee, St. Paul and Pacific Railroad; but was converted in the 1950s to care for and maintain the railroad's fleet of diesel locomotives. Industrial railroad growth in the early 20th Century and in the upper Midwest required the construction of a major railroad terminal in Sioux City in 1917.

As a sheltered area, the roundhouse building was subdivided into several functional work areas. The type of work performed on the locomotives was the factor that classified those specific work areas: boiler work; running gear/wheel work; steam appliances; air and electrical system work; and tender repair.

Resource #2: Turntable and Pit

The turntable is a revolving structure, designed like a swing bridge, for turning locomotives and cars. The turntable is made long enough to balance a locomotive with an empty tender while turning. The turntable is essentially a single track swing span (i.e. bridge) on a central pivotal bearing surrounded by a roller or disc turning device, and on two end trucks, each having two flangeless tandem wheels on a circumferential mono-rail track in a circular bowl-shaped pit enclosed by means of a vertical masonry wall, the level coping supporting the rail ends of radial yard tracks with any of which the turntable track will connect when the span rails are brought into line. In this way there is no open or significant gap between the fixed

[46] Berg, Walter G. *Buildings and Structures of American Railroads*. New York, NY: John Wiley & Sons, 1893.

rails and the turntable rails; and no significant tilting of the table, the rails being held rigidly at the same level.

The center of the turntable is placed on a carefully prepared foundation usually constructed of reinforced concrete. Rail locks are usually provided at the ends of the turntable track to keep them in alignment with the rails of the approach track while locomotives and rolling stock are being transferred and to protect the ends of the rails at the temporary joint that is formed with the turntable is aligned with the radial tracks leading to the roundhouse.

The turntable center and its turning device are placed in a circular pit depressed below the surface of the ground. This below ground structure, called a turntable pit, contains a wall and floor constructed of masonry, preferably concrete. The outer circle wall is built upon footing while an inside concrete step is built attached to the outer circular wall. This step carries the circle rail, sometimes laid on ties or chairs securely attached to the concrete step. The visible vertical face of the outer circle wall is equal distant at all points from the center.

A turntable is generally operated by a tractor running on the pit rail driven by an electric motor. This tractor is hitched to one end of the turntable; but at the end with the electric motor there is a counterweight so that when the table is empty (no locomotive or rolling stock on the table) the carrying wheels of the truck are always down on the pit rail and the table rails are aligned level with the fixed radial rails leading into the roundhouse or with them terminal’s main tracks when the turntable is spotted. In other words, the empty turntable is always tilted with its motor end down.

Resource #3: Machine and Blacksmith Shops

The Machine Shop and Blacksmith Shop/Foundry were side by side, with a common brick fire wall between them; and tributary to the car repair shops and the locomotive roundhouse. Located directly south of the roundhouse, the Machine and Blacksmith Shops is a large-scale, single story brick building, rectangular in shape. This structure is the second largest resource within the Milwaukee Railroad Shops complex. The building is subdivided as a sheltered work area into two parts: the north portion housed the machining area. The south portion of the building was constructed for housing the blacksmith shop and foundry. The building is significant for its original functionality for housing equipment needed in the fabrication and machining of new locomotive and rolling stock parts by skilled craftsmen and tradesmen.

The convenient proximity of the machine shop and blacksmith shop sited between the roundhouse and the car shops mill building allows the scope of work to support the functions of heavy and light repairs to both the locomotive fleet and rolling stock. The machine shop is approximately 68’ by 50’ and is in the north end of the building toward the roundhouse. The machine shop was originally fitted with machining tools and equipment to handle locomotive running and emergency repairs, together with wheel work, metal fabrication, and machining work required by the car repair shops. The arrangement and array of machine tools and equipment is shown by the accompanying line drawing exhibited in the supporting documents section. Power to operate the machinery was powered by steam piped from the power plant to this building through the roundhouse.

The blacksmith shop is situated in the south end of the building nearer the foundation remnants that supported the structures for the iron rack, coal shed, and wheel casting platform. The area for the blacksmith shop is 32’ by 50’, and was used for housing hand forges, furnaces, swinging jib cranes, tool racks, benches, and ventilation equipment for removing smoke and gases from the forges. From the standpoint of shop production, the blacksmith shop is looked upon as a feeder for the other shops. The blacksmith shop turns out the forgings entering into the construction of new cars, the bulk of the car forgings required in keeping up the repairs of both freight and passenger car equipment on the line, as well as the forgings for locomotive repairs, and on some systems a certain amount of switch and frog work, together with other repair work for the road department.[47]

[47] Haig, Maham, ed. "The Railway Blacksmith Shop." *Railway Master Mechanic* XXXII (1908): 87-91.

Resource #4: Car Department Mill Building (a.k.a. Car/Carpenter Shop)
Resource #20: Car Shops Lumber Shed Slab and Foundation

This structure is one of the eighteen buildings built during the rail terminal's initial construction between 1917 and 1918. Like many of the remaining structures in the district, the Car Department Mill Building gains its significance from its original functionally for railroad use. Typical of the industrial, utilitarian style in which it is rendered, the building was designed as a sheltered workplace for the sawing, cutting, planing and assembly of the wood components used for repairing the car siding, doors, and interior walls of freight and passenger cars. Actual car repairs were performed outside in all kinds of weather on the parallel tracks that ran adjacent to the mill shop. This building's functionality was an essential part of the terminal's maintenance operations for The Milwaukee Road's Sioux City and Dakota Division.

The building features an open interior that was used to accommodate the usual equipment of wood-working machinery needed for piece-work to repair passenger and freight cars, as well as the interior of steam locomotive cabs. This equipment once housed in the building consisted of a heavy planer and continuously and intermittently operated machines such as saws, shapers, jointers, mortisers, tenoners, band saws and borers.[48] The original drawings show an office area for the car shops foreman that was located in the north end of the building and partitioned off from the rest of the area by a wood stud wall... This wall was removed sometime during the building's lifecycle.

Resource # 5: Toilet Building #2 (a.k.a. Water Closet)
Resource #18: Toilet Building #1 Foundation

The Toilet Building, also known as the water closet, was built during April 1918; and it is rendered in the railroad's standardized plans for restroom facilities at its major shop complexes. As the name implies, this building functioned as one of the two restroom facilities constructed in the complex for workforce. It is the sole-surviving toilet building. The toilet building functioned as a washroom with water closets, sinks, and lavatories to be used by more than one worker at a time. The 1918 blueprints show this building was originally subdivided by an east-west gypsum, construction block partition into two equal sections for use by men and women. The north side subdivision was used for housing the women's restroom, while the south side subdivision was used to accommodate the men's restroom. The men's section featured a trough-style urinal. The toilet building made use of running water draining into a sewer system to flush human waste and waste water.

Resource #6: Sand Drying House

The sand drying house is one of the eighteen buildings built during the rail terminal's initial construction between 1917 and 1918. The sand house, with its accompanying wood sand tower, is located at the south end of the terminal, just north-west of the concrete foundation that once supported the coaling station. The terminal's south end was used for servicing locomotives with coal, water, fuel oil and sand. The sand house had three distinct functions: the storage of wet sand, the drying of the same, and the storage of dry sand.[49]

This particular building's original functionality was for the drying of sand that was used in locomotive operations for traction and cleaning flue tubes in the boiler. Sand was used on locomotives to increase the friction of the driving-wheels on the rails on heavy grades or when the rails were in a slippery condition. The sand had to be dry in order to run freely through the pipes leading from the sand-box of the engine to where the sand is spouted on the rails in front of the driving wheels. Sand was also used in the cleaning of the steam locomotive's boiler tubes. Sand, freshly dug, is always more or less moist and it absorbs moisture from the air very easily, even when properly stored under cover, so that artificial drying becomes a necessity.[50]

This building once housed a steam drier kiln and several roasting stoves for sand to be thoroughly dried and roasted. Sand

[48] Haig, Maham, ed. "The Railway Blacksmith Shop." *Railway Master Mechanic* XXXII (1908): 87-91.

[49] Berg, Walter G. *Buildings and Structures of American Railroads*. New York, NY: John Wiley & Sons, 1893.
[50] Berg, Walter G. *Buildings and Structures of American Railroads*. New York, NY: John Wiley & Sons, 1893.

originally arrived wet in gondola or hopper cars. It was unloaded into a big hopper adjacent to the sand house. The sand passed through holes in the hopper and was fed into the dryer and stove. After being dried in the stove and furnace that were sheltered in the sand house, the sand was placed in a screening hopper that sat above a sand drum. Air was applied to the sand drum from a compressor; forcing the sand to move through supply pipes from the sand drum to one of the two elevated sand towers. The sand drum was located below ground level with the sand screen above ground. A valve system was used to route the sand to the appropriate sand tower.

Resource #7: East Wood Sand Tower
Resource #19: West Sand Tower Columns Support Foundations

The wood sand tower is cylindrical structure located to the northeast of the sand drying house. Originally built as one of two sand towers within the locomotive servicing area, this tower was rebuilt during 2008. The sound tower had been heavily damaged by fire in 1963 and by subsequent wood rot and infestations by termites.

Located near by the sand house and adjacent to the ready track, the sand tower's function was to hold and distribute dry sand from an elevated reservoir or storage-bin to the locomotives. From this elevated storage-bin the sand is drawn through spouts directly into the sandbox of the engine, similarly in the manner that water is drawn from a water-tank through a gooseneck or grain is spouted from a grain-elevator into barges/ boats or rail cars.[51] From the sand tower tank, the sand was loaded by gravity to the locomotive's sand dome and sand box through a 4-inch pipe and controlling valve.[52]

Resource #8: Engineers Tool House

This structure is one of the eighteen buildings built to a standard design during the rail terminal's initial construction between 1917 and 1918. This building gains its structural significance in association with the roundhouse building and its functional relationship with the work life of the railroad engineer and locomotive fireman. The building once housed supplies used by engineers and fireman in the field when operating their locomotives. Those supplies consisted of oil, lubricates, oil cans, etc. Often times, engineers and fireman would need to oil driving rods and fill mechanical lubricators while the steam locomotive was in operation, generally stopped for filling water and fuel. At those times when taking on water and fuel, the engineer and fireman would perform the routine operational tasks. The engineer's tool house is where locomotive engineers and fireman would pick up their supplies before taking their locomotive out on the road. The engineers and fireman would report to work at the Sioux City Engine Terminal.

The building is changed from original construction. Currently, the building is half the size it was at the time of original construction. According to 1954 site drawings, the south half of the building was retired and demolished. The south elevation wall now existing was originally a fire wall constructed during the building's erection in 1917. With the transitioning of motive power to diesel electric locomotives, the need for oil and lubricants was limited. The building was used for general supply storage after 1954.

Resource #9: Cinder Pit

Coal-fired (fueled) steam locomotives all produced waste in the form of ash or coal cinders. As coal burned in a steam locomotive, the burnt cinders fell into an ash pan at the base of the locomotive's fire box. To keep the steam locomotive in a state of good operating repair, this ash pan would need to be emptied periodically to remove the ash waste. The Sioux City Engine Terminal has a specialized area that was built for the specific purpose of quick and economical removal of the ashes from the locomotive and the pit itself. The steam locomotive would be driven over the open ash pit or bin where the hot coal embers or cinders would be dumped from the locomotive to cool. The cooled cinders were the removed by a steam shovel and loaded in to gondola rail cars for removal from the complex. Ash then could be used by the railroad as material for building roads in their complexes or in ballast for road bed. In some cases, the cinders were sold to contractors.

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[51] Berg, Walter G. *Buildings and Structures of American Railroads*. New York, NY: John Wiley & Sons, 1893.
[52] Haig, Maham, ed. "The Railway Blacksmith Shop." *Railway Master Mechanic* XXXII (1908): 87-91.

Resource #10: Wood Timber Shipping Dock with Ramp
Resource #12: Store House Foundation

Within the general layout of the Sioux City Repair Shops complex, the storehouse was engineered to serve as the central parts distribution center and the general offices of the shops facility. This department not only provided materials and supplies for the Sioux City-based operations, but for smaller engine houses and repair facilities throughout the broader railroad division. The Stores Department was responsible for the purchasing and warehousing of materials and supplies needed for the complex to carry out its work. Generally, the stores department would purchase and warehouse a standard supply of materials that would be consumed within a 30-day period – that is, a month of supply is ordered at time. The general storekeeping rule was to prevent losses and shrink from an oversupply of materials, and to keep materials and supplies moving and not remain in stock longer than absolutely necessary. The Stores Department acts as clearing house for loading and unloading of materials, and for distributing the materials to the appropriate areas of the complex or at an ancillary site. Its location within the complex made it central to all departments housed at the facility, but close in proximity to the major departments (locomotive repair, machine shop, freight car department and passenger coaches) requiring supplies. Provisions of a loading dock were made for loading and unloading cars with materials. Outdoor storage of materials was accommodated by a wood/timber platform adjoining the storehouse.

The general offices for the entire Sioux City Repair Shops complex was connected with the store house. The office area was built at the north end of the building. This office housed the offices for the superintendent of motive power equipment, mast mechanic, master engineer, general storekeeper, clerks, and vaults and recordkeeping files.

Resource #13: Iron Rack Foundation

At a complete railroad repair shop facility the size of that at Sioux City, a great deal of scrap material was produced and accumulated. The iron rack was engineered for storing wrought and second-hand iron. The iron rack was part of the materials storage yard that was located directly south of and adjacent to the blacksmith shop. The materials storage yard, according to company blueprints, consisted of the iron rack and storage bins for the storing, separating and classifying castings, bolts, nuts, washers, angle irons, frame rods, and the recovered second-hand iron.

Materials and parts were as important as manpower and equipment at the Sioux City Repair Shops. The big problem was to stimulate the production and fabrication of replacement parts and to prevent waste. To achieve this goal, the shop workers and blacksmiths would reclaim iron and steel that could be used in the fabrication of new parts for locomotives and rolling stock. The iron rack was strategically located within the complex near the machine and blacksmith shop, store house, wheel casting platform, and the car department.

Resource #14: Power House Foundation

The power house was an isolated one-story brick building with timber roof structure positioned next to the roundhouse and the water treatment facilities. The power house featured a boiler room and an engine room housing a Corliss Stationary Steam Engine and generators for the creation of electricity needed throughout the entire facility.

Resource #15: Oil-Mixing House Foundation and Concrete Pad

The oil-mixing house was an isolated building near the car repair shops to the northeast, where it was conveniently situated for the delivery of oil, waste, etc. to engines and rail cars repaired and maintained at the Sioux City-based terminal. This facility housed tanks for oil to be dumped and mixed when barreled crude and mixed oils were purchased. However, the usual method employed by the railroad was to buy ready-mix oils from refineries and manufacturers. So this facility also housed an area for storage of barreled ready-mix oils.

Because the oil-mixing house was located just south of the stores building, it also provided for the storage and distribution of oils and waste for the smaller engine terminals situated throughout the division. Its location provided for delivery of supplies to the roundhouse, machine shop, and car shops where oil could be distributed.

Resource #16: Coal Station/Tower Foundation

One of the functions of the Sioux City Roundhouse, Repair Shops and Engine Terminal was to serve as a fueling station for the railroad's fleet of steam and diesel locomotives. The fuel servicing areas, located in the south east quadrant of the complex, provided for water, coal, petroleum, and diesel fuel. The Sioux City Engine Terminal housed a large coaling station to coal locomotives en route, which necessitated facilities to rapidly distribute coal into the tender, or to coal locomotives for the start of their runs.

The Sioux City Engine Terminal made use of a standard coal-chute style tower system designed by the railroad as its method to coal locomotives. The design chosen by the railroad was an adaptation of the *coaling station with vertical bucket elevator with center covered supply track*. Most likely, the railroad engineers chose this design because of the limited ground-space and compactness associated with the pocket area that defines the entire engine terminal and car repair shops.

The coaling station at Sioux City was a timber structure 66'-6" by 35'-5" by 110'-0" high with two upper storage bins holding a combined total capacity of 300 tons of coal. The storage bins sloped westward and eastward for delivery of coal to the locomotive's tenders. The coal-supply track was located in the middle of the structure. A hopper or gondola car full of coal would be spotted on this track for unloading. Under this center coal-supply track was a large below ground pit for the discharge and emptying of the coal from the hopper or gondola car. The pit was designed to allow for the flow of goal to the vertical buckets that made use of an elevator system to hoist the buckets to the top of the storage bins. The coal would then be dumped by the elevator buckets into the storage bins for eventual gravity loading into the locomotive tenders. The timber structure was crowned by two elevator cupolas/towers that clearly marked the hosting elevators.

Resource #17: Wheel Shop - Casting Platform

The Sioux City terminal featured a wheel shop located between the car shops area and the machine/blacksmith shop. Wheels are fundamentally critical to railroad rolling stock, passenger cars, and maintenance of way equipment. They are necessary to allow movement over the rails and must always be in a state of good repair to prevent derailments. The operational demands of wheels are enormous, making them the one component with the highest stress levels. Wheels are load bearing and support the weight of the car and its cargo; they steer the train and its car along the track; with their flange they keep the train and its cars on the tracks; and they must withstand the heat stresses caused by friction between the rail and wheel as well as the braking systems used to stop the train. Wheels need to be inspected daily and replaced often.

Water Works System Remnants

The maintenance, repair and servicing of a steam locomotive requires access to and usage of large quantities of water. Besides the functionality of filling the tenders (i.e. tanks) to supply locomotives with water for steam generation will in train service, water was needed for washing out a locomotive's boiler and firebox, for cooling ash and cinders removed from the locomotives firebox, and for cooling metal work and iron casts in the machine and blacksmith shop. As a result, the water supply system within the Sioux City Engine Terminal played an important role in the resource's utility and functionality. In order to guarantee a continuous supply of water that was cost effective and not dependent upon municipal water services, the railroad constructed its own waterworks. Original construction documents show there were basically two waterworks systems at the Sioux City facility. One of the railway waterworks provided water for the steam locomotives and shop work. The second system supplied potable water for the employees to use for drinking or to access in the restrooms. The water system was also used for fire protection and firefighting within the complex. There are approximately three fire hydrants spread throughout the system.

The water was extracted from ground sources feed by the Big Sioux River and springs running from the adjacent Loess Hills Bluffs. Because the water needed for operating steam locomotives would have to be of high quality, the railroad had a filtering system to treat the water to the appropriate softness to meet the design standards of its locomotive fleet. The water was pumped into either the complex's soft water tower or hard water reservoir, depending upon the filtering and treatment the water received.

At one time, the complex possessed its own laboratory for monitoring the water processing and regularly testing the preparation of the feed water needed to supply the steam locomotives. The laboratory personnel would specify the salt content needed to treat the water, the pH value and the composition of feed water. Enginemen and hostlers would bring samples of the feed water to the laboratory for testing, as well as samples of oils and greases used as well in locomotive service. There is speculation the laboratory was a wood structure located near the roundhouse and machine shop buildings; and that it was demolished during the 1950s.

The waterworks was equipped with several systems for delivering water to various points throughout the complex: wells, pumps, pipes, storage tanks, softening plants, take-off points, and distribution columns. The Sioux City Roundhouse, Repair Shops and Engine Terminal were serviced by a water works consisting of three wells with pumping apparatus, two water storage tanks, two water columns, and a water treatment plant.

Resources 21, 22, and 23: Water Well Foundations

The general layout schematic for the complex identifies the location of three water wells. The well head apparatuses for these wells were supported by concrete foundations, each measuring 14'-6" by 14'-6" in a square pattern. Each well was dug approximately 30' deep with a 14-inch diameter wells. While the railroad never officially abandoned the wells, the pumping mechanisms were removed in the 1950s when the complex was downsized. At that time, the complex was connected to the city's water system with a 4" line. However, when the railroad abandoned the complex in 1980, the complex was severed from the city's water system. The wells were officially abandoned in July 2009 and were capped with concrete in accordance with regulations enacted by the Iowa Department of Natural Resources. No physical alterations were made to the water well foundations; original integrity was protected.

Resource 24: 150,000 Gallon Soft Water Tank Column Foundations

The soft water tank was utilized for the storage and distribution of water that was treated for use in steam locomotive operations. The circular water reservoir (tank) sat upon columns with several up and down direction supply pipes. The soft water tank was located adjacent to the roundhouse building near locomotive stalls 14 through 16, about at the halfway point of the donut-shaped roundhouse building. The surviving foundation consists of six square column footings, each constructed of concrete, measuring 6' by 6'. and protruding about 3 feet above grade.

Resource 25: 60,000 Gallon Hard Water Tank Foundation Base

The hard water tank was a ground storage reservoir used to store water extracted from the ground water table. This water was distributed to shop areas for use in metal work, locomotive cleaning, portable uses on the site, or for distribution to the water treatment plant. The surviving foundation is a circular concrete foundation with an outer footing that forms a rim around the base that protrudes about 2 feet above grade. The base has a diameter of 30' and the circumference of the outer rim footing 188.5'. The base occupies a total footprint of nearly 2,827.5 sq. ft.

Resource 26: Water Column Box Area

The water column box area is a remnant of the water works system that was utilized in railroad and locomotive operations at the Sioux City Roundhouse, Repair Shops and Engine Terminal facility. The water column box area is located towards the geographic center of the complex, directly east of the oil house foundation. The concrete box area contains a below ground shut-off valve with evidence of a water column for filling locomotive tenders once protruding above ground.

Resource 27: Worker Walkways

The complex contained an internal employee transportation system consisting of defined worker walkways and pathways for motorized and non-motorized travel. The worker walkways and pathways provided connectivity between buildings, as well as connections with the citywide sidewalk system and street car stop. The bulk of the traffic was foot traffic, however

The worker walkways also played an important function besides providing for worker foot traffic. The walkways were used for the distribution of materials:

> "The prime motive of the shop is to make repairs with maximum expediency and to return equipment to service in minimum time. Each building stand much in the same relation to the entire shop plan as the several component parts of a machine bear to the completed mechanism. This signifies the requirement of effective inter-communication among buildings. Distribution of material rapidly, economically and with least unproductive movement, then, is the keynote in the general arrangement of buildings, facilities and equipment."[53]

The worker walkways were constructed at a width that allowed for the usage of hand trucks and forklifts to help move fabricated parts between buildings and work areas. These walkways enabled buildings, such as the machine shop/blacksmith shop buildings to perform dual work – supplying new fabricated components and repaired parts for locomotive and rolling stock repairs.

Resource 28: Yard Tracks

The original track system that supported the functionality of the Sioux City Roundhouse, Repair Shops and Engine Terminal formed a rail yard consisting of a set of 15 tracks, with some of the track leads stretching a mile and a half in length, for a cumulative total trackage of ten miles within the complex. All tracks within the complex were built to the standard gauge of 8'- 4.5" in section lengths of 40". Today, the rail yard consists of a set of 5 tracks totaling 1.65 miles of total trackage – these five surviving tracks served the core functional areas of the complex: locomotive repair, locomotive fuel servicing, and rolling stock repair. A majority of the tracks were retired and removed during the late 1950s when the railroad transitioned from steam operations to diesel operated trains and the need for storage of equipment was in decline.

Rail yards are collections of side tracks and necessary buildings at terminal, division, or junction points. Their purposes are to provide housing for idle locomotives, repair shops for cars and locomotives, storehouses of various kinds, storage tracks for temporarily idle cars, and to facilitate the receiving and dispatching of freight.[54]

Most of the rip tracks that were used for rolling stock repair and locomotive storage were removed by the railroad as part of a strategy to reclaim and scrap to local steel companies excess track materials (rail, fasteners, and spikes) to help offset the times of financial stress. The lead tracks to the car shops, roundhouse, turntable, and fuel servicing areas of the complex.

[53] Haig, Maham, ed. "The Railway Blacksmith Shop." *Railway Master Mechanic* XXXII (1908): 87-91.
[54] Berg, Walter G. *American Railway Shop Systems*. Digitized by Google Books. New York, NY: Railroad Gazette, 1904.

Criterion C: Locomotives and Movable Rolling Stock

The overarching purpose of the railroad is to reliably and economically haul people and large quantities of goods over long distances within a reasonable amount of time. The only thing railroads sell is transportation. Specific transport jobs require the right kinds of locomotives, rail cars and other equipment to carry cargo across the railroad network. The contributing objects described below are significant under **Criterion C** as representative examples of movable locomotives and rolling stock that are based on standardized technology, design, and engineering for enabling the interchange of railway equipment across the industry to improve efficiency and financial savings.

The premise behind the interchange of locomotives, freight cars, and passenger cars is the ability to move railway equipment as components of a train from one railroad company's (railroad company A) tracks to another railroad company's (railroad company b) tracks. This ability to move equipment freely along the railroad network, allows the railroad company and the shipper or passenger to save time and the expense of loading and unloading from one car or coach on railroad company A to a different car or coach on railroad company B. This joint use of rolling stock requires the equipment to be built to the standard gauge of 56" between rails. Technological aspects of rolling stock that need to be engineered and built to a standard design are running gear, couplers, and brake systems.

Locomotives are generally not interchanged between railroad companies as often as rolling stock. In contemporary railroading, locomotives are shared among Class I railroads for the purpose of pulling run-through trains such as 100-car grain trains, coal trains, oil trains, and intermodal container trains that travel great distances from origin to destination among two or three railroad companies. The railroad companies save time and money by not exchanging locomotives. They can switch crews quickly at connection points without delaying the train in the terminal. The second benefit for having the ability to interchange motive power is the ability to sell surplus and depreciated locomotives to other railroad companies or to donate them to railroad museums and tourist railway operations. Like rolling stock, some technological aspects that need to be engineered and built to standards are running gear, couplers, braking systems, and air systems. Also, there needs to be some uniformity in the basic design of electrical and lighting systems, and train controls.

Resource # 34: Milwaukee Road Diner Car #121

This post war (World War II) dining car is a representative example of one in a series of passenger coaches engineered by Karl F. Nystrom, chief mechanical officer, which was distinctive in appearance and sophisticated in design. The car was built by the car shop forces of The Milwaukee Road. The dining car's styling blends ultra-modern with a traditional design utilizing arched windows, portholes, and panel doors. The car's engineering features windows and doors that are mounted flush to the car body with few protrusions. Diner Car #121 consists of a truss carbody built on a girder deck. The car features no skirts and the contour is smooth. This car body is painted in The Milwaukee Road's trademarked orange, maroon, and gray; the underframe carries minimum gear.

After its initial use on the Olympian Hiawatha, the car was transferred for use on the following Milwaukee Road named passenger trains; the Twin Cities Hiawatha (Chicago-Minneapolis), the Arrow (Chicago–Sioux Falls, SD through Sioux City, IA), and the North Woods Hiawatha (Chicago-Minocqua, WI). By late 1954, the Union Pacific Railroad was unhappy with how long-time partner Chicago & North Western handled UP passenger trains between Omaha and Chicago. Work to find a new route began, and on September 20, 1955, Milwaukee Road president John P. Kiley announced that they would handle UP's trains, including the flagship City of Los Angeles, starting October 30th. The Union Pacific required cars in the Cities pool wear Armour Yellow and Harbor Mist Gray. The Milwaukee Road painted nearly 40 passenger coaches for the five trains operated in long-distance service with the Union Pacific.

Resource 35: Milwaukee Road Baggage/Dormer #1313

Similar to Milwaukee Road Diner Car #121, this Milwaukee Road combination baggage-dormitory car was designed with a distinctive appearance by Karl F. Nystrom and built to the specifications for the Hiawatha train set; it was one of the nine passenger coaches assigned to this named train. This car body is painted in The Milwaukee Road's trademarked orange, maroon, and gray; the underframe carries minimum gear.

This car is an 85-foot long car with a 36-foot baggage/mail sorting compartment at one end and 4 crew sleeping compartments and hygiene area at the other end. This car was used by the porters, cooks and other crew members on the long distance passenger trains. This car is intact and was never modified by the railroad. After it was repainted in 1956 to the Union Pacific Yellow & Grey it found itself in joint service on both The Milwaukee Road/Union Pacific named trains of The City of Portland (Chicago-Portland, OR) and The City of Denver (Chicago-Denver).

Resource #36: United States Navy Diesel Locomotive No. 17797

United States Navy Diesel Locomotive No. 17797 is a 45-ton, diesel-powered, center cab, industrial switching locomotive built in April 1943 by General Electric locomotive division. It was operated by both the United States Navy and the United States Marine Corps until it was declared surplus federal property in 1991. The Siouxland Historical Railroad Association purchased the locomotive from the federal government in 1991. It was transported to Sioux City from Barstow, California via flatcar on the Union Pacific Railroad and the Chicago and North Western Railway Company. The locomotive is housed in the roundhouse at the Milwaukee Railroad Shops Historic District. The locomotive is fully operational and is used in shunting and switching the other pieces of rolling stock within the Historic District's rail yard.

One of the most striking technological developments of the diesel locomotive age was the rise of a standard line of diesel-electric locomotives for industrial use. Locomotive No. 17797 is a 45-ton engine with a steeple cab in the center and low hoods for excellent visibility in all directions. In total, General Electric produced about 800 units of this model of diesel-electric between 1939 and 1975. During World War II, the United States Navy and Marine Corps purchased 50 of the center cab model for deployment during the war effort. While incorporating much of the standard design developed by General Electric, the United States Department of Defense modified the standard design to include specifications for military use.

The engineering of the most modern technology of the time into the design of the center cab 45-ton locomotive made them extremely efficient for military use. The locomotive is designed to slowly drag loads (such as large battleship guns) around the inside confines of a military base or ordnance plant, where slow speeds are fully sufficient to protect the cargo.

The locomotive is powered by two 150-hp (110 kW) Cummins HB1diesel engines that generates a maximum tractive effort of 27,000 lbs. and obtains a maximum permissible speed of 20 mph. The Cummins diesel engines were originally designed as an engine for highway trucks, but General Electric's locomotive department was able to incorporate the engine into the design of industrial switching locomotives. Further technological advancements incorporated into this locomotive's design are two heavy-duty, railway-type traction motors, one for each truck.

The 45-ton switch engine is a four-axle (B-B, with B indicating a two-axle tuck on each end) configuration, which allows it to take sharp curves common in industrial plants. The axles on this locomotive are connected by side rods – similar to the side rods connecting driver wheels on steam locomotives. With its equalized, swivel trucks and low weight per axle, the locomotive's operational benefit was in reducing track damage, and its ability to minimize the danger of derailments in military setting where clearances were tight.

Standard technology utilized in this locomotive's design is a traditional train air-brake system, with two compressors (one per each Cummins engine) and a straight-air locomotive brake. The cab utilizes a spacious design for maximum viewing in all directions by the train crew. Both the engineer's and fireman's/brakeman's seat are raised two feet on platforms above the cab floor. The platforms serve a dual purpose by housing the brake equipment.

Resource #37: U. S. Army 8 Man Motor Car Spec. M466

U.S. Army Motor Car M466 is individually eligible for listing in the National Register of Historic Places under Criterion C as the only known surviving motor car of its model and make that was built for military railway operations by the Kalamazoo

Railway Supply Company. While designed and engineered for use by the United States Army, this 8-man motor car is based on a standard motor car design that was in practical use on many of the nation's largest railway systems. This style of motor car was engineered by Kalamazoo Railway Supply Company for military use as the result of study and trail in devising a care capable of transporting a section gang to perform full duty tasks in track maintenance. It was designed for continuous operation at work. The motor car was engineered with a hump body between tracks with foot boards on the side. The car came equipped with a tow bar at the rear for attaching trailers. This feature gave the car the ability to form a train for moving large groups of men and track equipment to place.

U.S. Army 8 Man Motor Car Spec. M466 is significant as a rare example to help understand the history and heritage of military railway operations. During the Korean, the United States Department of Defense purchased a set of six 8-man railway motor cars from Kalamazoo Railway Supply Company in Kalamazoo, Michigan for the Transportation Corps of the United States Army. The Transportation Corps is a combat service support branch of the U.S. Army. Upon its delivery to the Transportation Corps, Motor Car M466 was placed into military railway operations at Fort Eustis, Virginia in 1951. The motor car was declared federal surplus in 1990 when several of the Army's railway battalions were deactivated. Motor Car 466 sold to the Siouxland Historical Railroad Association and transported to Sioux City upon its retirement from military service. The motor car was transported to the Milwaukee Railroad Shops Historic District in May 1997.

The Kalamazoo Railway Supply Company began manufacturing and assembling movable maintenance vehicles and other equipment for the railroad industry in 1883 as the Kalamazoo Railroad Velocipede and Car Company. Its 1956 product catalog lists a line of railway products that included velocipedes, hand cars, electric tie tappers, and gasoline engine motor cars. In 1968, the company was purchased by Tamper, Inc. of Columbia, South Carolina. Shortly after the purchase, all the manufacturing processes were moved to South Carolina with the rail products marketed under the Tamper brand. With the era of consolidation in the railroad industry during the late 1980s and early 1990s, Tamper would merge with Fairmont Gas Engine and Railway Motor Car Company (Fairmont, Minnesota). This new company would then be acquired by Harsco Companies.

When the United States entered the Korean War in June 1950, the U.S. Army Transportation Corps had two railroad battalions and a grand railroad division at Fort Eustis as part of the General Reserve. The U.S. Army began mobilized active duty railroad battalions from Fort Eustis to Korea for the purpose of using the Korean railway system to move troops, ammunition, and military equipment into Theater of operation. Previous war experience found that the host nation's railway systems were not as compatible or efficient with railroad logistics. However, the battalions were understrength and untrained in railway operations due to the defense budget cuts enacted by the Truman Administration after World War II. To meet this challenge, the Defense Department under a major training program at Fort Eustis to prepare soldiers for railway service overseas. The United States Army procured railway equipment like Motor Car M466 to aid in the training and other military railway uses.

Over its nearly 40 years of military railway service, Motor Car M466 was utilized for training soldiers, security patrols along the Army's railroad right-of-way, track inspection and in the maintenance of the Army's railway network at Fort Eustis. Motor Car M466 was capable of continuous running and moving a section of soldiers from place to place. Motor Car M466 was used not only for training soldiers in the maintenance of the tracks, but also for training the soldiers in the use of railway motor cars to move men and materials, such as ammunition and bombs from secure locations to aircraft.

Resource #38: Burlington Northern Fruit Express Refrigeration Car #469

Burlington Northern Fruit Express Refrigeration Car #469 is a representative example of freight rail car known as the "reefer." For many years, the railroads relied on a wood rail car that utilized ice bunkers to keep perishable loads cool. In these cars the railroads would transport fruits, vegetables, and meat products across the country. After World War II, technological advancements in refrigeration allowed the railroads to adapt that technology for greater cooling capacity. During the late 1940s and the 1950s, railcar manufacturers designed a mechanical refrigeration car that was capable of hauling frozen foods and dairy products in addition to fruits, vegetables, and meat products. These reefer cars were larger and capable of traveling greater distances than the wood ice cars.

Car #469 is associated with the Western Fruit Express who owned a fleet of yellow mechanical refrigeration cars in partnership with the Great Northern Railway and the Northern Pacific Railway (later merging together as the Burlington Northern). Upon the merger of the railroads, the new company repainted the car with the name Burlington Northern Fruit Express.

This car traveled throughout the railroad's network generating revenue and hauling perishables. It last known service was traversing the rails of The Milwaukee Road during February 1980 until its refrigeration unit broke down in Sioux City prior to March 1, 1980. The car was switched from its train and sent to the car repair shops in Sioux City. Work had begun on the car with the removal of the refrigeration units. Unfortunately, the embargo of the railroad on March 1 left the car landlocked in the repair shops terminal.

Resource #39: Chicago and North Western Boxcar #160970

Boxcars are used to haul large quantities of products and commodities in safe, weather-protected containers from the manufacturers and processors to consumer markets. The boxcar is a full enclosed, rectangular freight car with side doors for carrying merchandise and commodities that need to be sheltered from the weather. During the first part of the 20th Century, boxcars were also used to haul automobiles before a new type of railcar was designed for that specialized hauling service.

Boxcar #160970 is a representative example of the steel 50' production model, as built by Pullman Standard Company, featuring a larger cubic volume, waffle side, plug door design. The car is equipped with a cushion frame and a high cube for maximum strength, which made it ideal for handling one kind of commodity like paper and wood products. Other engineering designs include short ladders on the ends, single 10' door on each side, and no roof walk. The car incorporates the new technology of the time in car design: Hudrofram-40 draft gear cushioning. The boxcar was designed to meet Plate C clearance standards; for load heights just over 11' tall. This car was engineered to haul a capacity of loads exceeding 75 tons.

One of the car's unique engineering features is the post and waffle style car siding. The siding of the car is supported by 12 exterior posts to protect the products inside the car from damage due to shifting towards the walls while in transit. The car siding has 44 recessed portions called waffles that are designed for holding strap anchors and belt rail sections to hold loads such as paper. The Waffle style siding was the result of engineering studies that made it easier for fork lifting loads into the box car and securing the loads with straps and belts to prevent damage from load shifting.

Boxcar #160970 was used to ship paper and other large commodity items in and out of Sioux City. They were bad ordered for some minor running gear problems in 1993. The Chicago and North Western donated them to the Siouxland Historical Railroad Association to assist with the organization's interpretation programs covering the topics of freight cars.

Resource #40: Chicago and North Western Boxcar #162571

Boxcar #162571 is a representative example of the 50" Pullman Standard (PS-1) Steel Boxcar that was standardized in design for the ease of construction. The car's engineering is based on the Pullman Standard 40' designs of the 1950s and 1960s that were very successful in hauling merchandise from the processor to the market. This boxcar has insulated, smooth side walls that enable the car to carry canned goods and other foodstuffs that required protections from the extremes of temperature while in the product was in transit to its destination. However, it was not a refrigerated car. The car features a single plug door to ensure a tight body seal that maintains the interior temperature of the car and protects the merchandise from outside dust and dirt. The exterior of the car siding is smooth, supported by 12 vertical posts.

Resource #41: Chicago and North Western Caboose # 11168

Caboose #11168 was built in 1968 by International Railway Car as one in a series of 30 cabooses purchased to help alleviate the caboose shortage on Chicago and North Western System (C&NW). This caboose is the only known survivor from the series to endure the large-scale caboose scrapping undertaken by the railroad in 1988. This caboose operated out of Sioux City for a number of years in train service that required a caboose, such as unit trains or local freight runs that switched industries along the branch lines.

This caboose featured new technology such as axle-driven generators to power lighting and the electrical system for electric heaters, refrigerators, and two-way radios. It also featured the modern chemically-treated toilet. This modern caboose sported a vertical safety bar for the crew to grab and a conductor's valve that could be applied to stop the train in case of an emergency.

The caboose was sold to the Siouxland Historical Railroad Association in 1993. At the time of sale, the caboose was stored on the caboose track next to the C&NW roundhouse. A fire started by teenage vandals had damaged the entire interior of the caboose. The railroad company declared the caboose as railroad surplus. They sold the caboose to the Siouxland Historical Railroad Association at scrap value. The caboose was relocated to the rail yard at the former Swift Packing Plant for storage in preparation for its move to the Milwaukee Railroad Shops Historic District in May 1997.

Resource #42: Chicago and North Western Caboose #11009

Caboose #11009 is eligible for listing in the National Register of Historic Places under Criterion C at the level of Statewide and Local Significance **C** in the areas of rail-related transportation and engineering. This caboose is a representative example of the production model and style of railroad equipment that was engineered to provide shelter for the crew at the rear of the train so that they could monitor the train cars for loads that had shifted, overheating wheel journals, and dragging equipment. The caboose interior was also designed to serve as an office space for the conductor to check waybills, switchlists, wheel reports, and to manage the train crew.

Caboose #11009 is another Chicago and North Western Caboose to have an extensive operating history in train service out of Sioux City. The caboose saw extensive service on mixed freight trains that originated in Sioux City and would make return trips back to the Sioux City switching years. This modern caboose was built in September 1960 by Thrall Car Company as one in a series of 150 cabooses to replace wooden cabooses on the Chicago and North Western System with new modern style, steel cabooses.

Like Caboose #11168, this caboose survived the wholesale scrapping of cabooses by the railroad company in 1988. The Chicago and North Western declared the caboose surplus railroad property in 1993 and retired to the caboose track next to the Sioux City roundhouse. It was sold at scrape value to the Siouxland Historical Railroad Association. The caboose was relocated to the rail yard at the former Swift Packing Plant for storage in preparation for its move to the Milwaukee Railroad Shops Historic District in May 1997.

Resource #43: Northern Pacific Caboose #1318

Caboose #1318 is a representative example of the 24-foot wood caboose model built in 1913 by the Northern Pacific Railway Company at the South Tacoma Shops in western Washington. When the caboose emerged from the shops, it was numbered 1877. The caboose featured many worker amenities. Inside the caboose is a toilet, ice box, and storage cupboards. The work area houses a conductor's desk, pot-bellied stove, and sleeping bunks for the crew. This older style of caboose featured a straight-dump to the track kind of toilet for the train crew.

This style of caboose was engineered for both a working car and sleeping quarters. It was also designed to function as a storehouse for tools and supplies for when the train crew may need to make emergency repairs on rail cars in the train, including items such as spare coupler knuckles and pins, jacks and re-railing frogs.

Compared to the Chicago and North Western cabooses, Caboose #1318 was engineered as a cupola-style caboose. It has an upper level viewing area for the conductor and brakeman to watch the train and tracks. The cupola extends above the roof line of the caboose. Seating in the cupola faces both directions. There are four seats to allow the workers to change seats for viewing; two on each side facing each other. This caboose served in freight trains between the Twin Cities and Puget Sound.

Resource #44: Chicago, Burlington & Quincy Generator Coach #7207

Generator Coach #7207 is a representative example of the production model of a suburban commuter car engineered and built for the Chicago passenger market. The car was built in 1929 at the Aurora Shops by the shop forces of the Chicago, Burlington & Quincy Railroad Company. When it left the production line it was assigned the number 7149. In 1950, this car was returned to the Aurora, Illinois shops for modifications that included adding a Cummins six-cylinder diesel engine to drive a 40 kilowatt direct current generator. The shop forces also added a diesel fuel tank; cooling, intake, and exhaust grills; and some passenger amenities.

This car has seating for 70 passengers (2 three-person wall mounted bench seats and 32 two-person reversible bench seat styles. The car includes a cloak room and toilet facilities at one end while the generator room is at the opposite end of the car. When the car was in service in Chicago commuter service, the railroad company's practice was to place these style of cars on the outbound (west) end of the commuter trains in an effort to keep the noise and exhaust fumes at the far end of Union Station. The car was retired from service around 1980 and sold to the KD Station for potential use in an excursion train. The car was later sold to the Siouxland Historical Railroad Association for preservation and exhibition at the Milwaukee Railroad Shops Historic District.

Resource #45: Northern Pacific Diner Car #1677

Northern Pacific Diner Car #1677 is a representative example of the production model designed and built by the Pullman-Standard Company for the Northern Pacific Railway Company. The diner was part of a lot of six diner cars ordered by the railroad. This car's interior does not maintain the integrity of original construction. This car is representative of the all-steel design look of the Northern Pacific Railway that were applied based on the railroad's all-wood passenger car designs.

This dining car is also representative of prototypical practices of the railroads to convert passenger coaches and dining cars to new uses after the cars were retired from passenger service. This car's historic context is associated with the time period of the 1950s when the railroads cut back and annulled passenger trains due to the competitive climate with automobiles and trucks.

This dining car was built with a 40 seat capacity to serve passengers with meals while they traveled in one of the railroad's passenger trains. The dining car was engineered with 10 exterior arched windows on each side for maximum viewing by patrons. The car featured the railroad owner's logo, the Northern Pacific Yin-Yang etched in red glass windows in the roof monitor. The dining car was built with steel sheathing and engineered with the sophisticated technological advancements of the early 20th Century, including electric lights, steam heat, and luxurious interior for patron fine dining while en route to the destination. The car was painted in the railroad company's trademark Pullman green color.

During 1936 and 1937, the diner was modified and remodeled to include air conditioning and had its vestibule doors blanked. In 1948, the Northern Pacific Railway sold the diner to the Spokane, Portland & Seattle Railway Company. With the decline in passenger traffic during the late 1950s, the railroad remodeled the car in 1959 to serve as a railway training car and renumbered the car to Instruction Car #111. It later became Instruction Car #B-3 2 when the Burlington Northern Railway was formed from the merger of the Great Northern Railway, Northern Pacific Railway, and the Spokane, Portland, & Seattle Railway. This car is the only known surviving car of the six diner cars built in 1915.

Resource #46: St. Louis Corliss Stationary Engine

The St. Louis Corliss Steam Engine is eligible for listing under National Register Criterion C at the statewide and local levels of significance in the area of industry and engineering. Significance of the St. Louis Corliss Steam Engine is threefold: (1) as a specimen among preserved steam engines built to design specification by George Henry Corliss; (2) its survival as the only known specimen among preserved steam engines that was not manufactured by the Corliss Steam Engine Company but by the St. Louis Iron & Manufacturing Company; and (3) its role in the industrial development of Iowa and Sioux City. The Corliss Steam Engine is not original to the Historic District; but is a representative example of the style of stationary steam engine the railroad installed at the complex.

Named after inventor George Henry Corliss, the Corliss steam engine was considered revolutionary when it first appeared in 1849. According to historic blueprints, the Corliss Steam Engine was mounted in the powerhouse to provide mechanical power to pumps and machines around the complex.

Charles Frederick Loweth

The growth of American railroad engineering knowledge is represented in the Milwaukee Railroad Shops Historic District. The general arrangement and construction of the repair shops facility required advanced engineering skills and experience. Charles F. Loweth, a civil engineer, was one of the most influential railroad builders in North America. His engineering and design work helped expand rail lines west through the Midwest states into the Pacific Northwest states, which contributed to the settlement of both regions. The period of Loweth's association with the extant buildings, structures, foundation sites, and rail yard in the district extends from planning and designing the repair shops complex in 1912, until his death in 1935.

The Milwaukee Railroad Shops Historic District is the largest physical remnant directly associated with Loweth's professional work as a railroad engineer; and, this property is the only surviving example of his workmanship in designing land use plans and building projects for a steam-era railroad repair shop complex. This distinction is based on comparison with other extant railroad facilities designed by Loweth that are also listed in the National Register of Historic Places.

- Iron and Steel Bridges in Minnesota Multiple Property Listing
- Chicago, Milwaukee and St. Paul Railroad Grade Separation, Minnesota
- Bridge No. 12 – Bullard Creek Bridge, Minnesota; Edgerton Depot, Wisconsin
- The Milwaukee Depot, Montana.

Prior to starting college, in 1875, Charles F. Loweth began his work in the civil engineering field by taking an entry-level job as a chainman working on a railroad survey crew while attending college. In 1877, after the appeal of working on survey projects for the railroad, he left Oberlin College to take on work as a rodman for the Cleveland, Tuscarawas Valley and Wheeling Railway. Over the next three years he would learn civil engineering principles through self-study and practice the trade on-the-job by holding the position of draftsman for the railroad and the American Bridge Company. Following his employment with the American Bridge Company in 1879, the Wabash Railroad hired Loweth to make surveys and design the entrance route of the railroad into Chicago.

His design work and engineering reputation quickly flourished in the industry. By 1881, at the age of 24, he had joined the St. Louis, Des Moines and Northern Railway Company holding the title of Principal Assistant Engineer. In this position, he oversaw the construction of the High Bridge that was built by the Chicago and North Western Railroad over the Des Moines River near Boone, Iowa – a structure that was 2,020 ft. long and 101 ft. above water. This accomplishment further propelled his reputation in the railroad industry as a master project manager.

After this project, Loweth enjoyed a thriving private practice in St. Paul as a consulting engineer for several railroad companies with lines extending from Michigan to the Pacific Northwest. Loweth served as a consulting chief engineer for the Northern Pacific Railway; the Minneapolis, St. Paul and Sault Ste. Marie Railway Company; and the South St. Paul Belt

Railway Company. It was during this time of private practice that his engineering firm diversified into designing and supervising the construction of bridges, water-works and sewage systems for over one hundred municipalities across the country.

During his tenure in private practice, Charles Loweth was a principal engineer in the firm of Loweth and Wolff based in Minneapolis, Minnesota. One of the projects they worked on was the design and construction management for an elevated railroad in Sioux City. The elevated railroad project was conceived and promoted in 1887 by a group of nine Sioux City business leaders. They held aspirations to make Sioux City the "Chicago" or "New York" west of the Mississippi River. Sioux City was experiencing rapid growth at the time; during the ten year period preceding 1887, Sioux City grew from 10,000 residents to 30,000 people. The town started an eastern migration from the Missouri River into a neighborhood area known as Morningside. Unfortunately, traversing the community from downtown to the east was made difficult by the stockyards, railroad lines, and the often flooding of the Floyd River.

To overcome those land barriers, the nine investors conceived the idea of constructing an elevated "EL" street railroad. Each of the nine business leaders invested $1,000 each and contracted with King Iron & Bridge Company in the early 1890s to build a two-mile elevated railroad from the western limits of the Morningside neighborhood to a connection with the street car system in downtown Sioux City. The King Iron & Bridge Company subcontracted with Charles Loweth for the design of the elevated railroad.

His vast experience in railroad engineering brought him to the attention of the Chicago, Milwaukee, St. Paul and Pacific Railway Company. The railroad company was facing innumerable engineering challenges while planning the construction and execution of the 2,300 main line extension to Puget Sound, including crossing four mountain ranges (Rockies, Bitterroots, Saddles, and Cascades), some of the most varied topography that created steep grades and sharp curves, and the need to buy most of the land or acquire smaller railroads.[55] The company's management recruited and hired Loweth to fill the position of Engineer and Superintendent of Bridges and Buildings to oversee the planning and on-site construction of the Pacific Extension Line. Construction began in 1906 and was completed in 1909.

Based on his prior performance as engineer and superintendent of bridges and building, Charles F. Loweth began his duties as Chief Engineer on June 1, 1911. During his tenure as Chief Engineer, he was charged with improving and upgrading facilities and infrastructure on the railroad's older core lines in the Midwest states. He task was to replace aging wood timber bridges and trestles. This work lead him to become skilled at using reinforced concrete in bridge and trestle construction over major water and road ways, and reinforced concrete culverts for railroad lines traversing creeks and streams.

As part of this renewal of vertical infrastructure in the historic core, Loweth drafted new design plans and facility layouts for the replacement of several aging, obsolete and outdated locomotive and car repair shops along the mainlines in Iowa. His work included designing and constructing new repair shops in Sioux City, Atkins and North McGregor. To help minimize costs and to speed up construction, Loweth and his design teams developed a set of standardized building plans that could be configured and altered for the local environmental conditions.

Loweth's office was based in Chicago, Illinois. Within his Chief Engineer's office, he led a planning and design team consisting of an architect, an Engineer of Design, and several draftsmen. In the field were the Assistant Chief Engineer and Division Engineers, who had immediate personal supervision under the chief engineer of all the engineering force, construction crews and work projects.

In addition to his design and engineering responsibilities, Loweth was tasked with overseeing the railroad's own construction forces. During the railroad's period of greatest building activity (1906 to 1925), the construction labor force numbered more than two thousand workers. He and his team of engineers and construction workers were called upon to design and replace the aging bridges across the older parts of the system, while at the same time, undertaking new construction to infill along the Pacific Extension. Some of the major bridge work included crossing over the Mississippi,

[55] Middleton, W. D. *When the Steam Railroad Electrified*. Milwaukee, Wisc.: Kalmbach, 1976.

Missouri, Yellowstone, and Columbian Rivers, as well as trestles across many of their major tributaries. Loweth served 25 years as chief engineer for the railroad company. The table presented on the next page provides a brief resume of Charles F. Loweth's professional career.

Loweth developed a keen interest in utilizing concrete construction for railroad structures and municipal public works projects. He was one of the pioneers in the use of concrete in track elevations, concrete ballast, bridge deck floors, and reinforced concrete pipe for culverts. The district's remaining foundation sites and structures are specimens illustrating his design work with concrete. Architecturally, interesting concrete features include the coal tower foundation, the window sills of the buildings, and the parapet caps. The roundhouse and combination black smith shop and machine shop building are built upon heavy duty reinforced concrete foundations and large reinforced concrete slabs.

Charles F. Loweth was devoted to the field of civil engineering. He was an active member and leader of the American Society of Civil Engineers, Railway Civil Engineer's Association, and the Western Association of Railway Executives. The trade journals for these organizations periodically published his articles and writings relating to railway and general civil engineering principles and practices. The most valuable contribution to the profession was his paper "The Place of the Railroad in City Planning" presented at the Eighteenth National Conference of City Planning in March 1926. His contributions to the field of railway and general civil engineering were recognized with the conferring of two honorary degrees.

Charles Loweth's distinguished career as one of the industry's leading railroad engineers ended in late April 1935, when retired due to declining health. He would pass away a short two weeks later. Because of the exceptional importance of Loweth's engineering work, the *New York Times* published his obituary on May 16, 1935, with the headline: "Charles F. Loweth, Railroad Man Dies ⬩ Chief Engineer of the Chicago, Milwaukee, St. Paul & Pacific for 25 Years ⬩ Retired Two Weeks Ago ⬩ Designed Waterworks and Light Systems in More Than 100 Cities in Northwest". The American Society of Civil Engineers paid tribute to him in late 1935 by publishing a biography on his life and working career.

DeWitt Clinton Fenstermaker

A second prominent railroad civil engineer of the times who was actively involved with the construction of the Sioux City Repair Shops terminal was DeWitt Clinton Fenstermaker. He was born in 1873, graduated from high school, and studied civil engineering through private instruction and by attending night courses while he worked as a draftsman and engineer in Columbus, Toledo, and Cleveland, Ohio.

Fenstermaker entered the railroad civil engineering profession in 1890 as a rodman on the Toledo and Ohio Central Railway. He worked his way up the career path by serving as a rodman, instrument man, draftsman, and assistant engineer on various construction and maintenance projects undertaken by the railroad. Fenstermaker took a break from his railroad engineering work (1898 to 1899) to serve during the Spanish-American War as a captain in the Volunteer Engineers Company. After his wartime service, the Government of Cuba (1899 to 1901) hired him to serves as the assistance engineer on highway construction projects and topographical surveys.

He returned to the railroad civil engineering field in 1901 by serving as assistant engineer on construction for the Lake Erie, Alliance, and Wheeling Railroad Company. He would continue to craft his trade as a civil engineer serving in the field to oversee railroad construction project. In 1912, the Chicago, Milwaukee and St. Paul Railroad Company recruited and hired Fenstermaker to work with C. F. Loweth and assist with the oversight of the construction projects the railroad company had planned for the next several years. Between 1912 and 1921, he was named resident engineer, assistant engineer, and district engineer for The Milwaukee Road with the responsibility of overseeing the construction of new facilities and maintenance of current structures across the railroad's system of rail lines on its eastern territory.

Fenstermaker was the principal district engineer in charge of overseeing the construction of building the Sioux City Repair Shops between 1916 and 1918, directly reporting to C.F. Loweth. As the principle in-the-field engineer, Fenstermaker was responsible for siting and monitoring the construction of the buildings and structures according to the site layout plan developed by C. F. Loweth. Fenstermaker worked with Charles Buford to manage the development of the Sioux City Repair Shops complex. Buford was in charge of building the rail yards for the Sioux City Repair Shops in Sioux City and the new interchange switching yard in North Sioux City, South Dakota (located less than one mile across the Big Sioux River from the shops complex).

During the period of 1921 to 1929, the Milwaukee Road periodically granted Fenstermaker leaves of absences to assist other railroad companies with the building of their rail lines and facilities. He is most noted for his construction oversight of rail lines and facilities for the Montana Railroad; the Wyoming North and South Railroad Company; and the 52 mile rail line of the Atlantic Fruit Company in Oriente Province, Cuba. Fenstermaker served as chief engineer and design engineer for these railroad companies. Upon completion of this work, he returned full time to the Milwaukee Road with the assignment as principal district engineer. He continued in this capacity until late 1937 when he retired due to poor health.

In addition to his railroad career, Fenstermaker worked for the betterment of the Illinois village where his home was located. He used his engineering ability and experience to help the community prepare zoning ordinances and design standards for building projects. He was a life member of the American Society of Civil Engineers.

Criterion D: Assessment of Significance under Criterion D and Potential to Yield Archaeological Information

The district is significant under **Criterion D** because it has the potential to yield archaeological information about (1) daily activities, (2) spatial use, (3) chronology of construction, (4) use of non-extant buildings and structures, and (5) the experiences of the shopmen who worked here during the period of significance.

During the summer of 2014, the Siouxland Historical Railroad Association and the City of Sioux City engaged the Office of the State Archaeologist of the University of Iowa and Tallgrass Historians, L.C. to conduct a Phase IA Geoarchaeological Reconnaissance and Phase I Intensive Archaeological Investigation. Site identification data was gathered from documentary sources, oral histories, and informant interviews. To determine the impacts of planned new construction of a restroom facility and future historic preservation work on the resources of the historic district, field studies were conducted in known areas of historic resources, particularly standing structures and above-surface foundations. An area around each resource identified by the survey team was tested using shovel tests at regular intervals around the resource. This was done to assess the relationship between the resource and the subsurface archaeological record.

The field study included archaeological sampling involving shovel testing of 142 spots, auger testing 56 spots, and the backhoe trench excavations of nine spots. This sampling is the only controlled archaeological study in the historic district, other than the surface inventories. The Archaeological Assessment produced the following two summary recommendations:

1. Phase IA geoarchaeological reconnaissance and Phase I archaeological investigation occurred at the location of the Milwaukee Railroad Shops Historic District (a.k.a. 13WD206). Site 13WD206 is recommended NRHP-eligible under Criterion D. Geomorphic cores, auger and shovel tests, backhoe trenches, a pedestrian survey aided in the investigation. Thirty-four archaeological features were identified, with 16 archaeological resources recommended as contributing to the property's significance. Contributing resources include remnants of an iron rack shed, blow off boxes, a sand tower, two wells, a water softening bin, a hard water reservoir, a soft water tank, the powerhouse and electrical substation, a coal tower, the office building, two water closets, and the non-extant portion of the roundhouse. [56]

[56] Cynthia L. Peterson, Joe Alan Artz, and Leah Rogers. (2014) Phase IA Geoarchaeological Reconnaissance and Phase I Intensive Archaeological Investigations of Improvements at the Milwaukee Railroad Shops Historic District (Site 13WD206), City of Sioux City, Woodbury County, Iowa. Technical Report 8. Office of the State Archaeologist: The University of Iowa. Iowa City, IA p. 26

2. The University of Iowa's Office of the State Archaeologist conducted a Phase I archaeological survey at the location of a proposed restroom at the Milwaukee Railroad Shops Historic District. The entire historic district was designated archaeological site 13WD206, which is recommended NRHP-eligible under Criterion D.[57]

Gathering additional information and data on the 15 identified archaeological sites in the district can contribute to a further understanding of the operations of 20th century's steam-era railroad repair shops facilities in the Midwest. The 15 archaeological resources might also help provide data regarding the role of technological change and the adaptation of the site and the working conditions to the evolution of the North American railroad industry. The following themes and possible research questions might form the broad inquisitive framework for future investigations:

1. Industry and Technology

   What is the chronology of the railroad activity in this district? Are discrete historic activity/operational areas preserved at this site? Can this resource teach us about historic industrial technology and the skills and experiences of past shopmen and other railroad workers?

2. Patterns of Spatial Organization and Evolution Over Time

   What were the functions(s) of the features at this site? How did these functions change over time and affect the resource? Can the chronology of construction, alterations, and deconstruction episodes and changes in land use be reconstructed?

   How does the longitudinal design for steam-era railroad repair shops really work in the area? Are there any specialized structures not yet identified? Do buildings and structures concentrate solely in a longitudinal line along the rail yard? If so, what are the implications for function and status in the site's operational environment?

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[57] Cynthia L. Peterson. (2014). Phase I Intensive Archaeological Investigation of a New Restroom at the Milwaukee Railroad Shops Historic District, City of Sioux City, Woodbury County, Iowa. Office of the State Archaeologist: The University of Iowa, Iowa City, Iowa. P. 5

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Major Bibliographical References – Construction Documents and Blueprints Consulted Archive Collection: Milwaukee Road Archives, Milwaukee Public Library, Milwaukee, Wisconsin **Location of Digital Files:** Siouxland Historical Railroad Association, Sioux City, Iowa

CITY	STATE	TYPE	DWG_NO	DATE	Description
Sioux City	IA	Engine Term Facil	19541A	1917	Pipe lines
Sioux City	IA	Engine Term Facil	7730D	1904	Water softener layout
Sioux City	IA	Engine Term Facil	E1072	1917	Machine & blacksmith shop plan & elevations
Sioux City	IA	Engine Term Facil	E166	1917	Car department mill building elevations
Sioux City	IA	Engine Term Facil	E1831	1917	Substation plan & sections
Sioux City	IA	Engine Term Facil	E1837	1917	Power house coal bins
Sioux City	IA	Engine Term Facil	E1919	1918	Toilet building plan & elevations
Sioux City, Atkins	IA	Engine Term Facil	E356	1917	Brake repair & lunch room elevations
Sioux City	IA	Engine Term Facil	E394	1917	Roundhouse special foundation
Sioux City	IA	Engine Terminal	E1841	1917	Engine terminal, Handrailing at ash pit
Sioux City	IA	Engine Terminal	E1850	1918	Engine terminal, Power House Coal door, reinforcing plate
Sioux City	IA	Foundation	E1092	1918	Macine and Blacksmith machine foundation shop
Sioux City	IA	Ill Engine Terminal	J1064	1946	Plat: 145 ton coaling plant
Sioux City	IA	Machine/Blacksmith	E1072	1917	Engine terminal, Machine and Blacksmith Shop, plan and elevation
Sioux City	IA	Power House	E1068	1917	Engine terminal power house, Coal Hoppers and Coal Slides
Sioux City	IA	Power House	E1837	1917	Engine Terminal Power House, Coal bins
Sioux City	IA	Power House	E1839	1917	Engine Terminal Power House, Handrailing at pump pit
Souix City	IA	Power House	E658	1917	Engine terminal Power House Plan and Elevations
Sioux City	IA	Power House	E659	1918	Sioux City and Atkins engine terminal power house (foundations)
Souix City	IA	Power House	E659	1917	Engine terminal Power House foundations
Sioux City	IA	Pump House	9705C	1907	Layout of pump & pipe lines.
Sioux City	IA	Roundhouse	19025B	1917	Double driver removal pit.
Sioux City	IA	Roundhouse	D9904	1917	96' Standard Roundhouse, Track door details, 1917
Sioux City	IA	Roundhouse	E376	1917	Sections,standard 96'roundhouse.
Sioux City	IA	Roundhouse	E378	1917	Foundation,standard 96' roundhouse.

Previous documentation on file (NPS):

____ preliminary determination of individual listing (36 CFR 67) has been requested
____ previously listed in the National Register
____ previously determined eligible by the National Register
____ designated a National Historic Landmark
____ recorded by Historic American Buildings Survey #____________
____ recorded by Historic American Engineering Record #____________
____ recorded by Historic American Landscape Survey #____________

Primary location of additional data:

__X__ State Historic Preservation Office
____ Other State Agency
____ Federal Agency
____ Local Government
____ University
____ Other
Name of repository: ____________________

Historic Resources Survey Number (if assigned): ____________________

10. Geographical Data

Acreage of Property 29.53

(Do not include previously listed resource acreage; enter "Less than one" if the acreage is .99 or less)

Latitude/Longitude Coordinates

Datum if other than WGS84:

(enter coordinates to 6 decimal places)

	Latitude	Longitude
1	42.522869	-96.47514369314102
2	42.530416	-96.47516793638943
3	42.530336	-96.47849501361627
4	42.526140	-96.47768992019472

Verbal Boundary Description (Describe the boundaries of the property.)

The Historic District is a 29.53 acre industrial site is in the general form of a meat-clever-shaped property that is bounded by the Big Sioux River, the BNSF Railway mainline corridor, Iowa State Highway 12, and farmland. The boundary of the Milwaukee Railroad Shops Historic District is shown as a solid black line on the accompanying map entitled:

Boundary Justification (Explain why the boundaries were selected.)

The nominated boundary was drawn based on the ability of the 41 historic resources to convey the significance of the general layout of the Milwaukee Railroad Shops: Sioux City Roundhouse, Repair Shops and Engine Terminal during its period of historic significance (1917-1980). The boundary is also drawn based on the following legal description of the property found in the property abstract: "All Government Lot 1 & Lot 2 & Accretions lying west of the center line of road & Lot 2 NW SE Auditors subdivision 1 (except northeasterly part of Government Lot 1 lying west of highway being part of Accretion adjacent being 959.23 feet on south x 447.21 feet on west x 703.96 feet on east), all being located within Section 14, Township 89, Range 48 Woodbury County, Iowa."

11. Form Prepared By

name/title Larry Obermeyer, MPA, Principal Investigator date August 16, 2018
organization Siouxland Historical Railroad Association telephone 712.253.0069
street & number 3915 Fieldcrest Drive email lobermeyer@usa.net
city or town Sioux City state Iowa zip code 51103

Edited by: Laura Sadowsky, State Historian and National Register Coordinator, Iowa State Historic Preservation Office.

Additional Documentation

Submit the following items with the completed form:

- **GIS Location Map (Google Earth or BING)**
- **Local Location Map**
- **Site Plan**
- **Floor Plans (As Applicable)**
- **Photo Location Map** (Include for historic districts and properties having large acreage or numerous resources. Key all photographs to this map and insert immediately after the photo log and before the list of figures).

Photographs:

Submit clear and descriptive photographs. The size of each image must be 3000x2000 pixels, at 300 ppi (pixels per inch) or larger. Key all photographs to the sketch map. Each photograph must be numbered and that number must correspond to the photograph number on the photo log. For simplicity, the name of the photographer, photo date, etc. may be listed once on the photograph log and doesn't need to be labeled on every photograph.

Photo Log

Name of Property: **Milwaukee Railroad Shops Historic District**

City or Vicinity: **Sioux City**

County: **Woodbury** **State:** **Iowa**

Photographer (s): **Larry Obermeyer; George Lindblade; City of Sioux City Community Develop.**

Date Photographed: **June 2016**

Description of Photograph(s) and number, include description of view indicating direction of camera:

Photo 1 of 45 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0001)
Aerial View: looking east
Camera Facing: East
Photographer: George Lindblade

Photo 2 of 45 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0002)
View: looking down at roundhouse building, turntable, and roundhouse archaeological remnants
Camera Facing: down
Photographer: City of Sioux City Community Development Department

Photo 3 of 45 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0003)
Aerial View: looking down at roundhouse building, turntable, roundhouse archaeological remnants, machine shop and blacksmith shop building, and part of the rail yard.
Camera Facing: down
Photographer: City of Sioux City Community Development Department

Photo 4 of 45 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0004)
View: The Northeast elevation of the roundhouse building
Camera Facing: Southwest
Photographer: Larry Obermeyer

Photo 5 of 45 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0005)
View: The Southwest elevation of the roundhouse building
Camera Facing: Northeast
Photographer: Larry Obermeyer

Photo 6 of 45 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0006)
View: The East and Southeast sides of the roundhouse building
Camera Facing: Northwest
Photographer: Larry Obermeyer

Photo 7 of 45 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0007)
View: The Northeast and East sides of the roundhouse building
Camera Facing: Southwest
Photographer: Larry Obermeyer

Photo 8 of 45 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0008)
View: The Southwest and West sides of the roundhouse building
Camera Facing: Northeast
Photographer: Larry Obermeyer

Photo 9 of 45 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0009)
View: The East and North sides of the machine shop and blacksmith shop building
Camera Facing: Southwest
Photographer: Larry Obermeyer

Photo 10 of 45 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0010)
View: The South and East sides of the machine shop and blacksmith shop building
Camera Facing: Northwest
Photographer: Larry Obermeyer

Photo 11 of 45 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0011)
View: The North and West sides of the machine shop and blacksmith shop building
Camera Facing: Southeast
Photographer: Larry Obermeyer

Photo 12 of 45 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0012)
View: The South and West sides of the machine shop and blacksmith shop building
Camera Facing: Northeast
Photographer: Larry Obermeyer

Photo 13 of 45 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0013)
View: The North and West sides of the car shops/planning mill building
Camera Facing: Southeast
Photographer: Larry Obermeyer

Photo 14 of 45 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0014)
View: The South and West sides of the car shops/planning mill building
Camera Facing: Northeast
Photographer: Larry Obermeyer

Photo 15 of 45 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0015)
View: The South and East sides of the car shops/planning mill building
Camera Facing: Northwest
Photographer: Larry Obermeyer

Photo 16 of 45 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0016)
View: The North and West sides of toilet building number 1.
Camera Facing: Southeast

Photographer: Larry Obermeyer

Photo 17 of 45 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0017)
View: The South and West sides of toilet building number 1.
Camera Facing: Northeast
Photographer: Larry Obermeyer

Photo 18 of 45 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0018)
View: The South and East sides of toilet building number 1.
Camera Facing: Northwest
Photographer: Larry Obermeyer

Photo 19 of 45 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0019)
View: The South and East sides of sand drying house.
Camera Facing: Northwest
Photographer: Larry Obermeyer

Photo 20 of 45 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0020)
View: The South and West sides of sand storage tower.
Camera Facing: Northeast
Photographer: Larry Obermeyer

Photo 21 of 45 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0021)
View: The South elevation of sand storage tower and the two lead servicing tracks.
Camera Facing: North
Photographer: Larry Obermeyer

Photo 22 of 45 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0022)
View: The North side of sand storage tower, the two lead servicing tracks and the sand drying house.
Camera Facing: Southeast
Photographer: Larry Obermeyer

Photo 23 of 45 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0023)
View: The North and West foundation remnants for the wood coal tower structure
Camera Facing: Southeast
Photographer: Larry Obermeyer

Photo 24 of 45 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0024)
View: The east foundation remnant for the wood coal tower structure
Camera Facing: Northwest
Photographer: Larry Obermeyer

Photo 25 of 45 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0024)
View: The foundation remnant for the wood coal tower structure
Camera Facing: South
Photographer: Larry Obermeyer

Photo 26 of 45 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0026)

View: The foundation remnant for the wood coal tower structure
Camera Facing: Northwest
Photographer: Larry Obermeyer

Photo 27 of 45 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0027)
View: The wood structure loading dock
Camera Facing: Southeast
Photographer: Larry Obermeyer

Photo 28 of 45 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0028)
View: The wood structure loading dock
Camera Facing: Northeast
Photographer: Larry Obermeyer

Photo 29 of 45 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0029)
View: Foundation remnant of west, south and east wall portions of warehouse stores building
Camera Facing: Northeast
Photographer: Larry Obermeyer

Photo 30 of 45 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0030)
View: Concrete pad for outside storage area adjacent to warehouse stores building
Camera Facing: Northwest
Photographer: Larry Obermeyer

Photo 31 of 45 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0031)
View: North and east sides of the engineer’s tool shed building
Camera Facing: Southwest
Photographer: Larry Obermeyer

Photo 32 of 45 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0032)
View: Foundation remnant of the corner of south and east walls for toilet building number 2
Camera Facing: Northwest
Photographer: Larry Obermeyer

Photo 33 of 45 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0033)
View: Foundation remnant for the former brake shop building next
Camera Facing: Southwest
Photographer: Larry Obermeyer

Photo 34 of 45 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0034)
View: Foundation remnant for the former brake shop building next
Camera Facing: Southeast
Photographer: Larry Obermeyer

Photo 35 of 45 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0035)
View: Foundation remnant for wellhead number 1
Camera Facing: Northwest
Photographer: Larry Obermeyer

Photo 36 of 45 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0036)
View: Foundation remnant for wellhead number 2
Camera Facing: Northeast
Photographer: Larry Obermeyer

Photo 37 of 45 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0037)
View: Foundation base for treated water storage tank
Camera Facing: Southeast
Photographer: Larry Obermeyer

Photo 38 of 45 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0038)
View: Foundation for water treatment plant
Camera Facing: Northeast
Photographer: Larry Obermeyer

Photo 39 of 45 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0039)
View: Foundation for the bin that stored chemicals for treating water for steam locomotives
Camera Facing: Northeast
Photographer: Larry Obermeyer

Photo 40 of 45 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0040)
View: Foundation for the building that housed the power generation and steam plant for the complex
Camera Facing: Southwest
Photographer: Larry Obermeyer

Photo 41 of 45 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0041)
View: Column support foundations for the complex's water tower
Camera Facing: Northeast
Photographer: Larry Obermeyer

Photo 42 of 45 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0042)
View: Foundation remnant for the water treatment plant
Camera Facing: Northwest
Photographer: Larry Obermeyer

Photo 43 of 45 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0043)
View: Looking south, southwest at the turntable and roundhouse
Camera Facing: Southwest
Photographer: Larry Obermeyer

Photo 44 of 45 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0044)
View: Looking south, southwest at the turntable and roundhouse
Camera Facing: Southwest
Photographer: Larry Obermeyer

Photo 45 of 45 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0045)

View: Looking at foundation sidewall of the turntable pit with the inspection pit
Camera Facing: East
Photographer: Larry Obermeyer

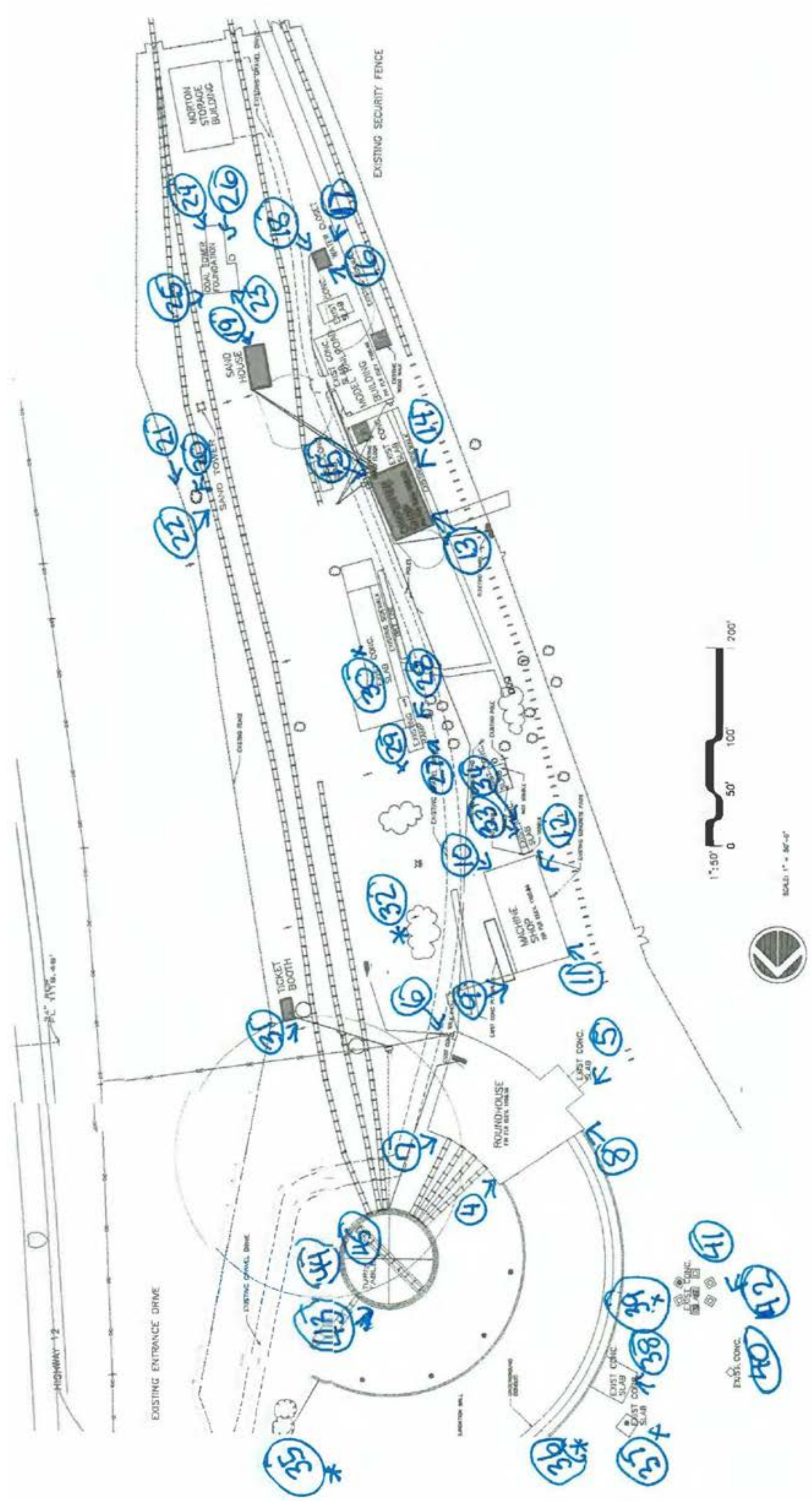
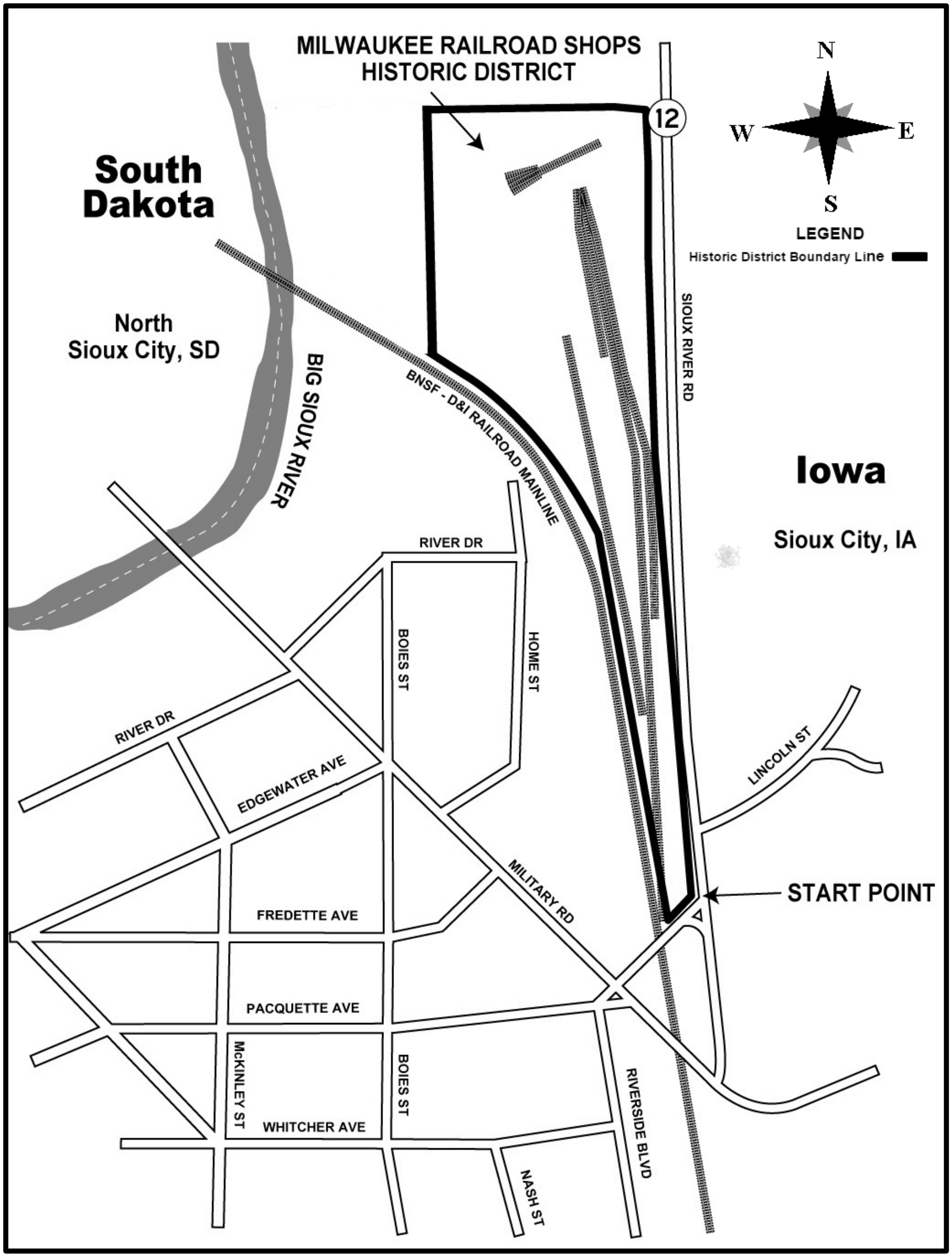
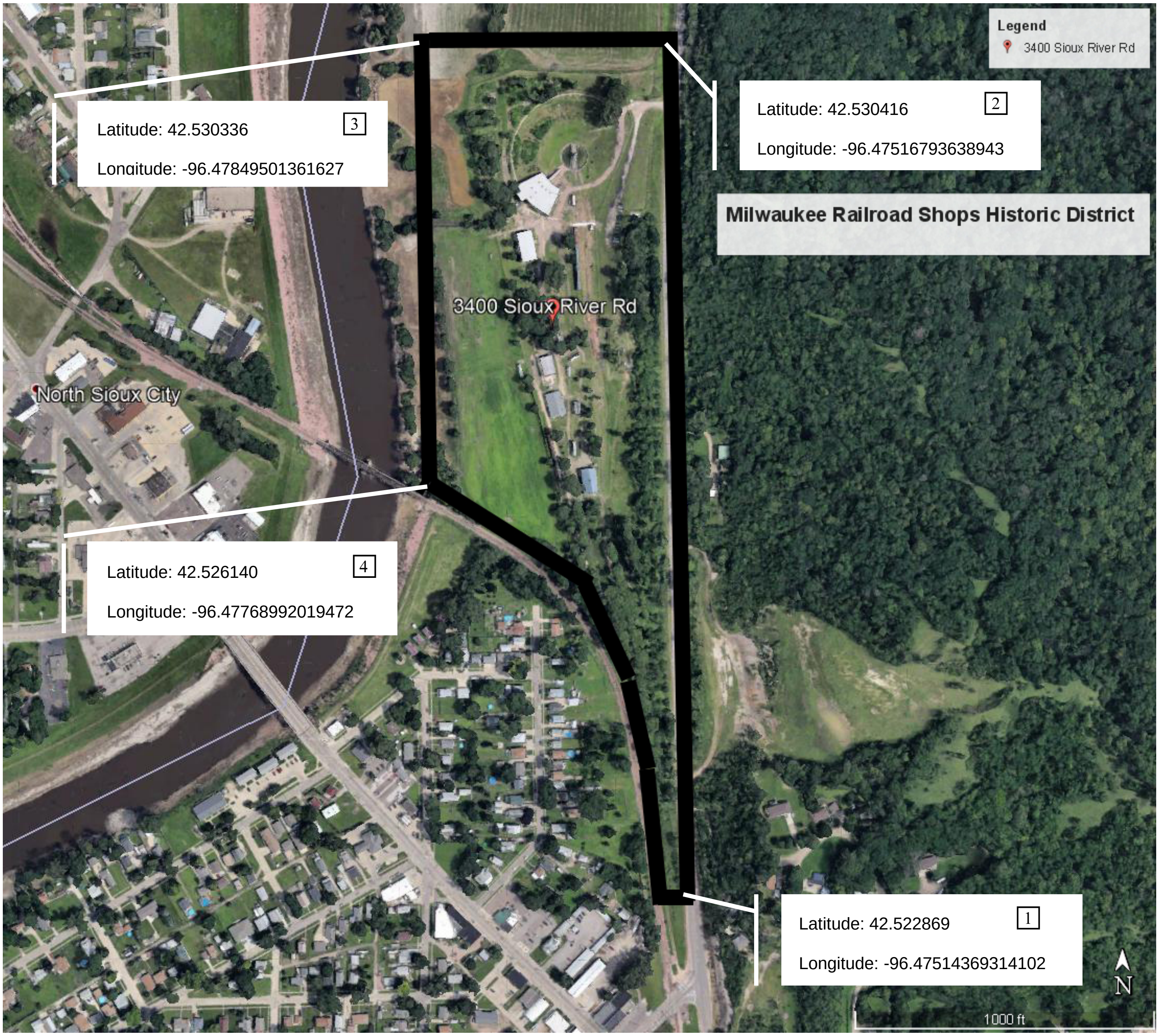


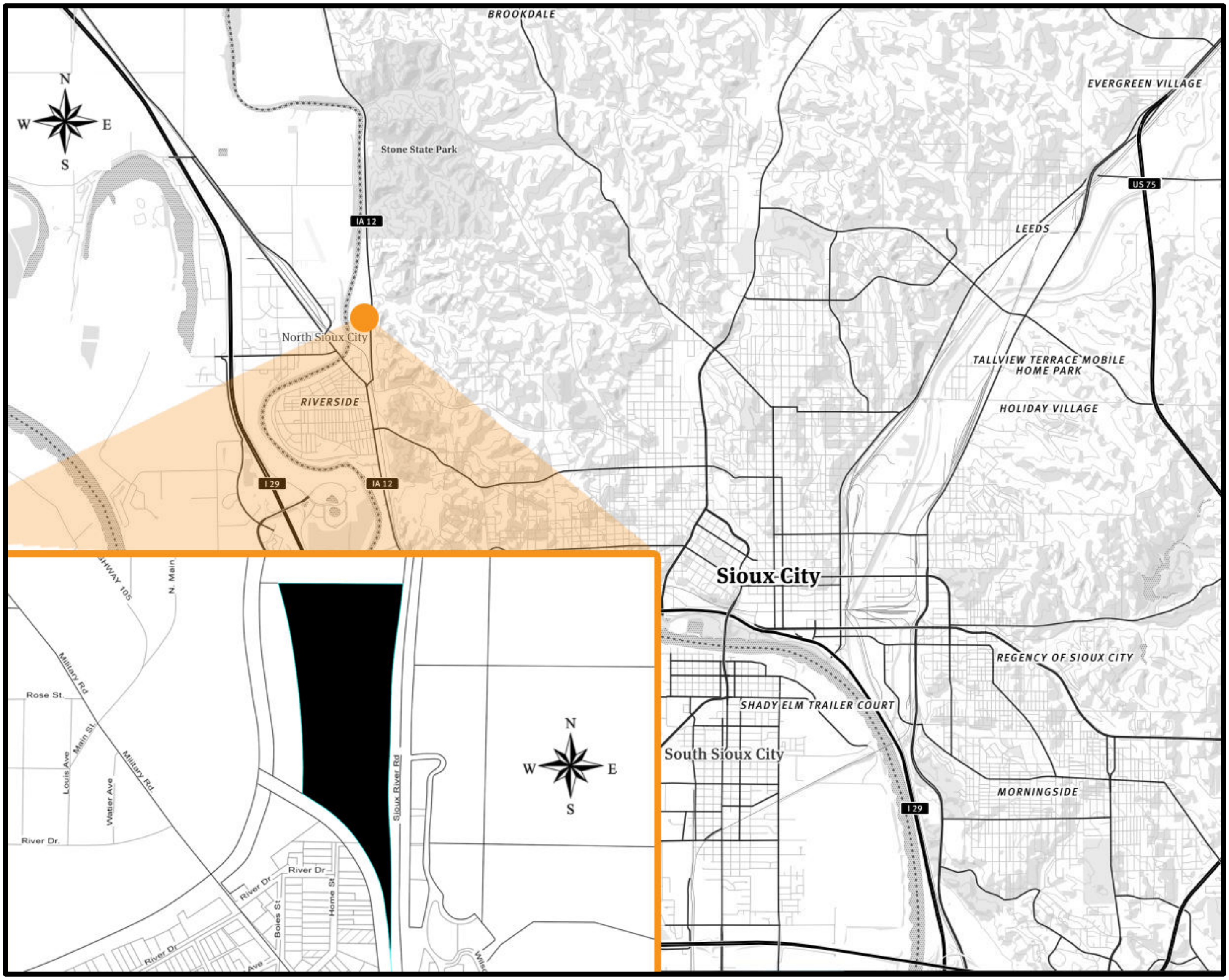
Photo Location Map: Photographs are keyed to this location map.



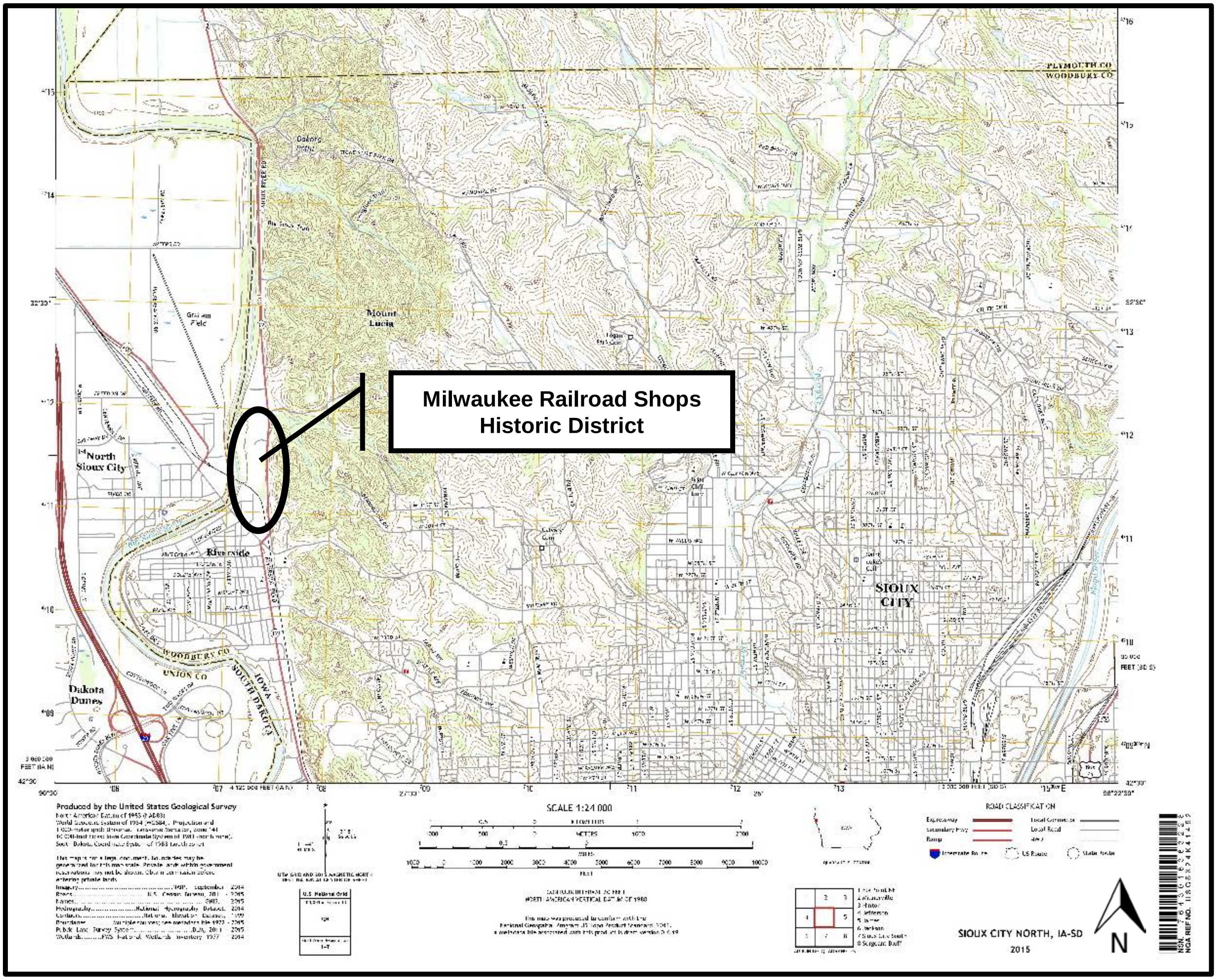
Map 1. Milwaukee Railroad Shops Historic District Boundary – Street Map.
Drawn by: Corey Vondrak. **Date:** 08/25/2014 **Scale:** Not to Scale



Map 2. Milwaukee Railroad Shops Historic District Boundary – Satellite View. **Source:** Google Earth. **Date:** 08-12-2017.
Retrieved from: https://www.google.com/maps/@42.52793,-96.47655,1642m/data=!3m1!1e3



Map 3. Location of Property – Placement within City Limits of the City of Sioux City. **Source:** https://www.mapbox.com. **Drawn by:** Tammy Scholl. **Date**: 07/12/2016 | Not to Scale



Map 4. Location Map - USGS Sioux City North Quadrangle Map, Iowa - South Dakota, 7.5-Minute Series. **Scale:** Approx. 1:24,000 **Source:** U.S. Department of the Interior, U.S. Geological Survey. **Date**: 2015

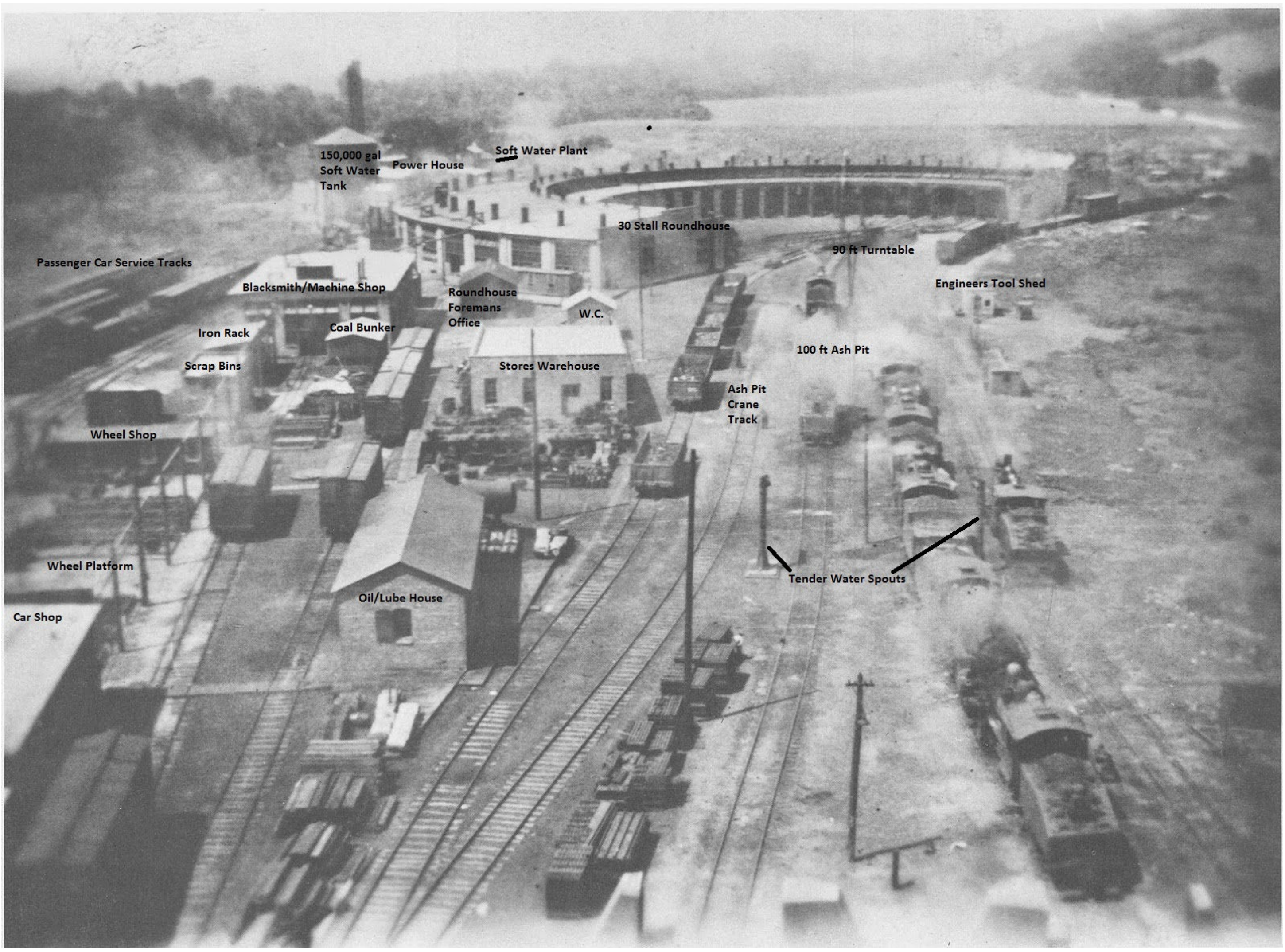


Figure 1. Identification of major buildings, structures and rail yard in 1918. **View:** Camera facing north. **Source:** Chicago, Milwaukee, St. Paul & Pacific Railway Archives, Milwaukee Public Library System. **Labeling** of Buildings by Ken Brown **Date:** 2016

Figure 2. The complete Sioux City Railroad Repair Shops complex is seen from above in 1930 with the railroad bridge over the Big Sioux River and the State of South Dakota nearby in the right portion of the photo. **View:** Camera facing south. **Photographer:** Unknown. **Source:** Digital Collection, Sioux City Public Museum, City of Sioux City.

Figure 3. An aerial view of the Sioux City Railroad Repair Shops complex in 1963. **View:** Camera facing south/southwest with the Big Sioux River nearby. **Photographer:** Real Estate Department; Chicago, Milwaukee, St. Paul and Pacific Railroad Company. **Source:** John W. Barringer III National Railroad Library, St. Louis, Missouri.

Figure 4. An aerial photo from 1982 shows the Sioux City Railroad Repair Shops complex shortly after abandonment by the Chicago, Milwaukee, St. Paul and Pacific Railroad Company. **View:** Camera facing north to south/southeast. **Photographer:** Real Estate Department; Chicago, Milwaukee, St. Paul and Pacific Railroad Company. **Source:** John W. Barriger III National Railroad Library, St. Louis, Missouri.

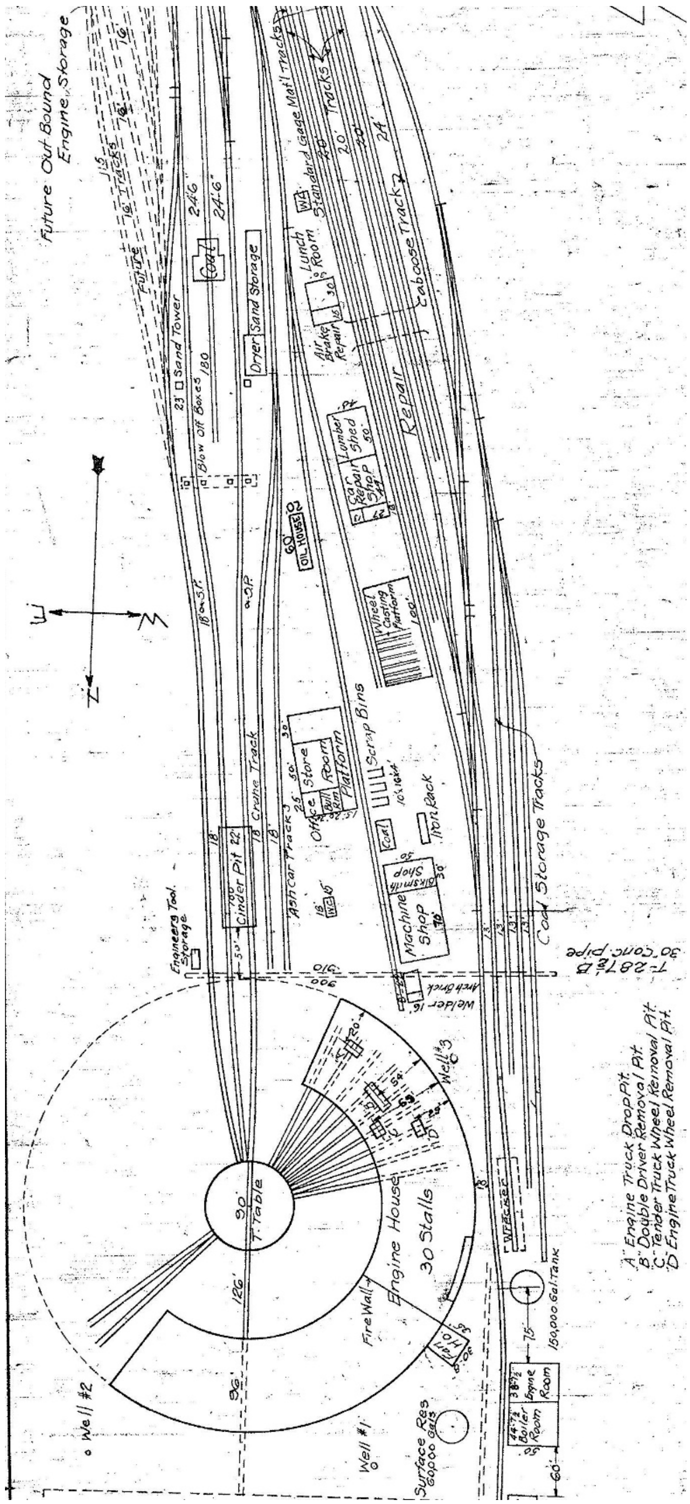
Figure 5: Aerial view of the Milwaukee Railroad Shops Historic District with the Loess Hills Bluffs in the foreground and the Big Sioux River in the distance (December 2017). **View:** Camera facing northeast to southwest. **Photographer**: Keaton Slaughter, Above Aspect Productions. **Source:** Siouxland Historical Railroad Association Digital Archives.

Figure 6: The Roundhouse building in 1920 anchoring the northern portion of the Sioux City Repair Shops. In the background are the various smaller repair shop buildings. **View:** Camera facing west (State of South Dakota in the background). **Photographer:** Woodworth Commercial Photos. **Source:** Sioux City Public Museum.

Figure 7: The center portion of the Sioux City Repair Shops in 1951. Buildings shown in this image (left to right) are the car department planing mill, oil house, store house and machine shop building. The new diesel fuel servicing terminal is in the foreground. Repair-in-Place (RIP) tracks and caboose storage area are in the background. **View:** Camera facing west. **Photographer:** George Berkstressor. **Source:** Archives of the Sioux City Railroad Museum.

Figure 8: South portion of the Sioux City Repair Shops in 1951. This image shows the coal tower structure, sand drying towers, and various smaller shop buildings for the car repair department. Part of the work train and staging yard for the bridge and building department are in the foreground. **View:** Camera facing west. **Photographer:** George Berkstressor. **Source:** Archives of the Sioux City Railroad Museum.

Figure 9: This photo of the Sioux City Repair Shops terminal captures the use of the railroad terminal as a reclamation facility in 1980. This photograph show the debris and waste generated by the deconstruction of the railroad lines in Iowa and South Dakota after the traffic embargo and abandonment of railroad lines. **View:** Camera facing south. **Photographer:** Robert Schlag.



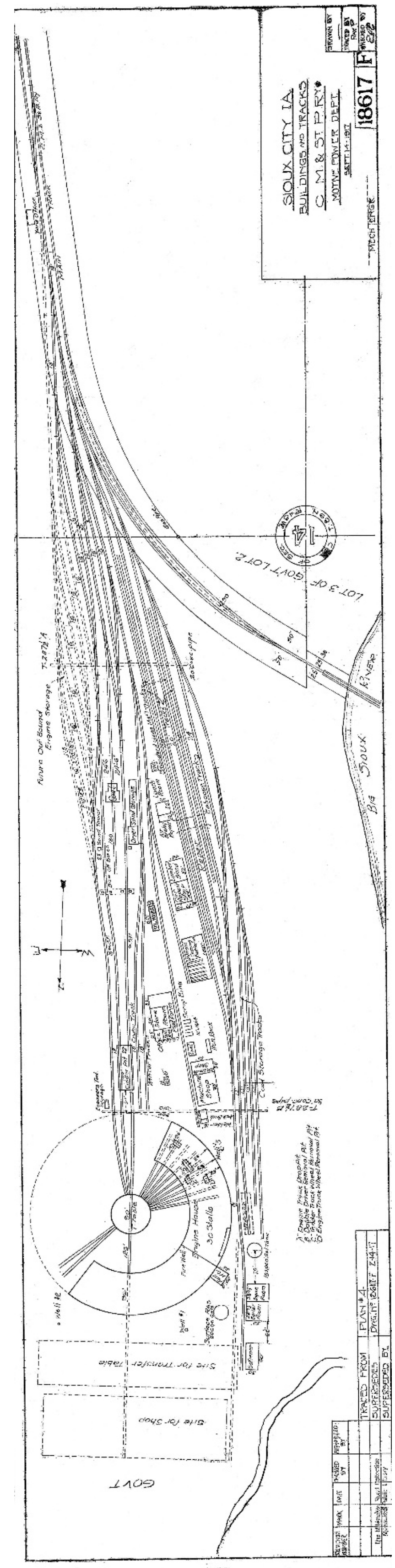
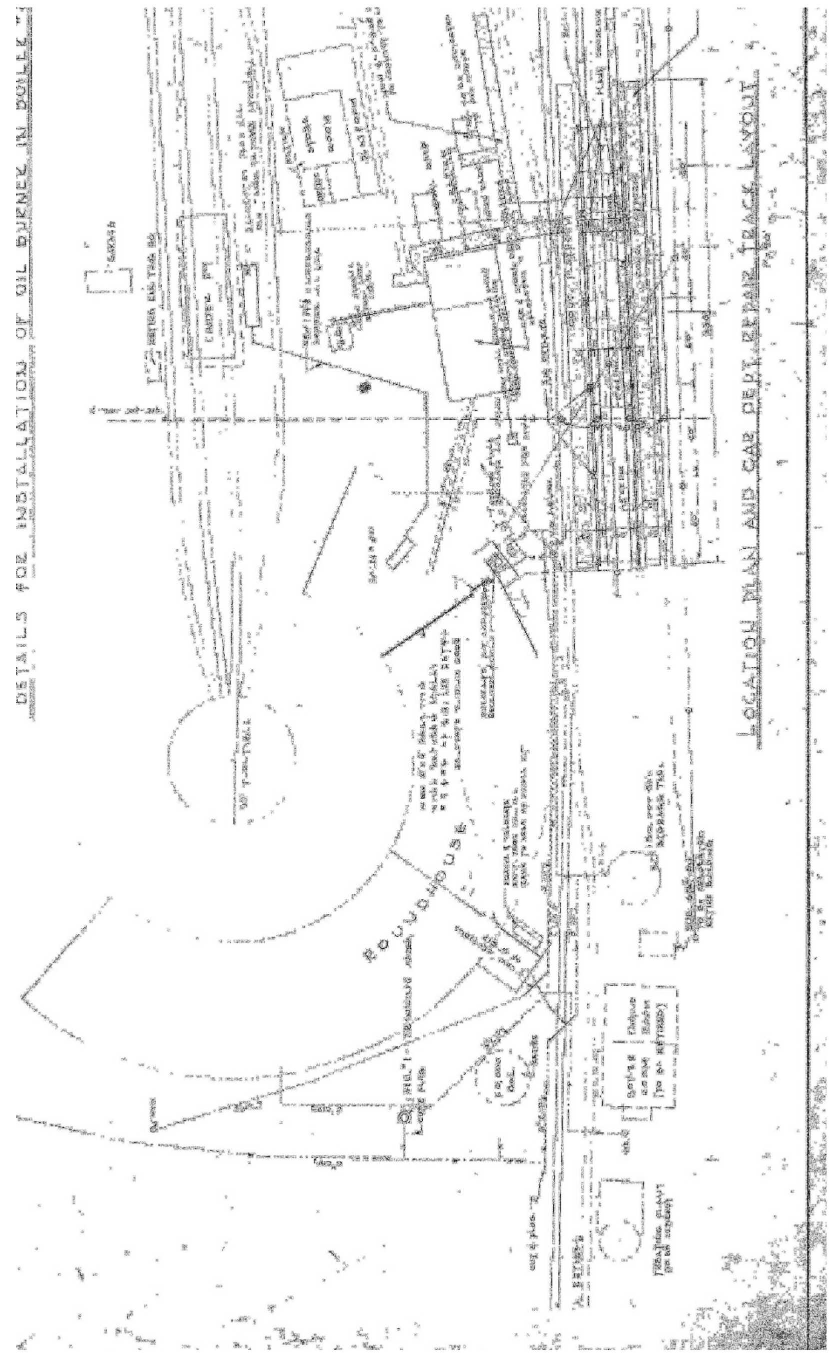


Figure 10: 1917 General layout and track plans of the Sioux City Repair Shops complex. **Drawn by:** Engineering Department, Chicago, Milwaukee and St. Paul Railroad Company. **Source:** The Milwaukee Road Archives, Milwaukee Public Library.



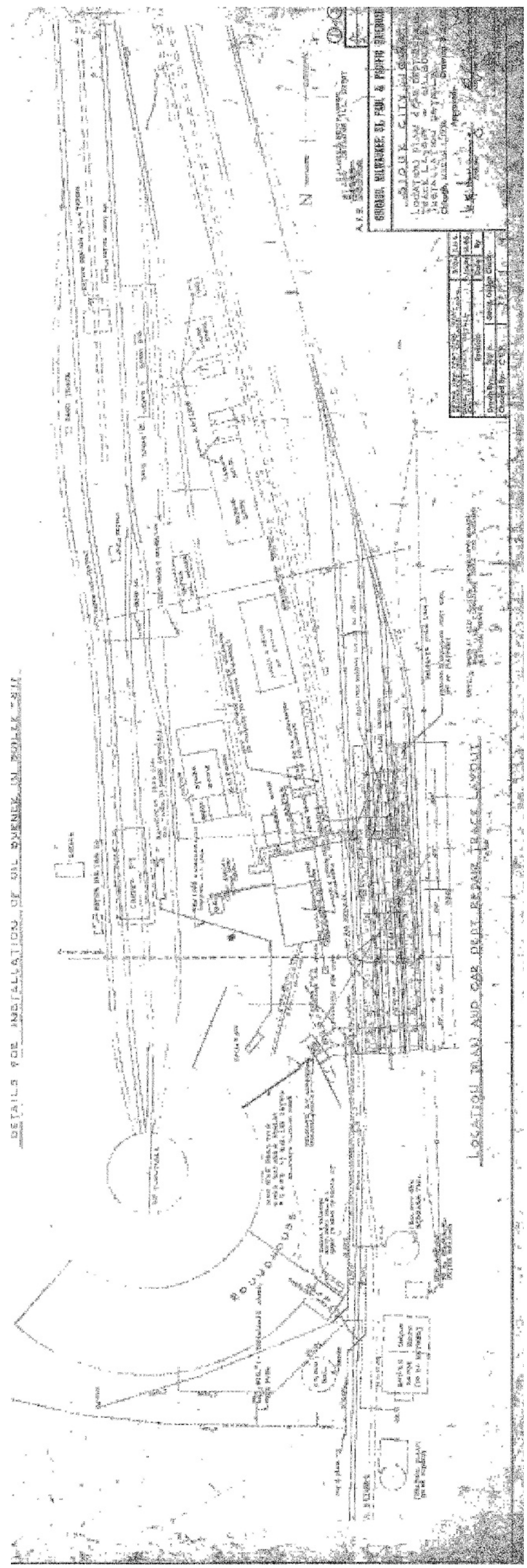


Figure 11: 1954 General layout and track plan showing the proposed retirement of buildings in preparation of the site transforming to the servicing of diesel locomotives. **Drawn by:** Engineering Department; Chicago Milwaukee, St. Paul and Pacific Railroad Company. **Source:** The Milwaukee Road Archives, Milwaukee Public Library.

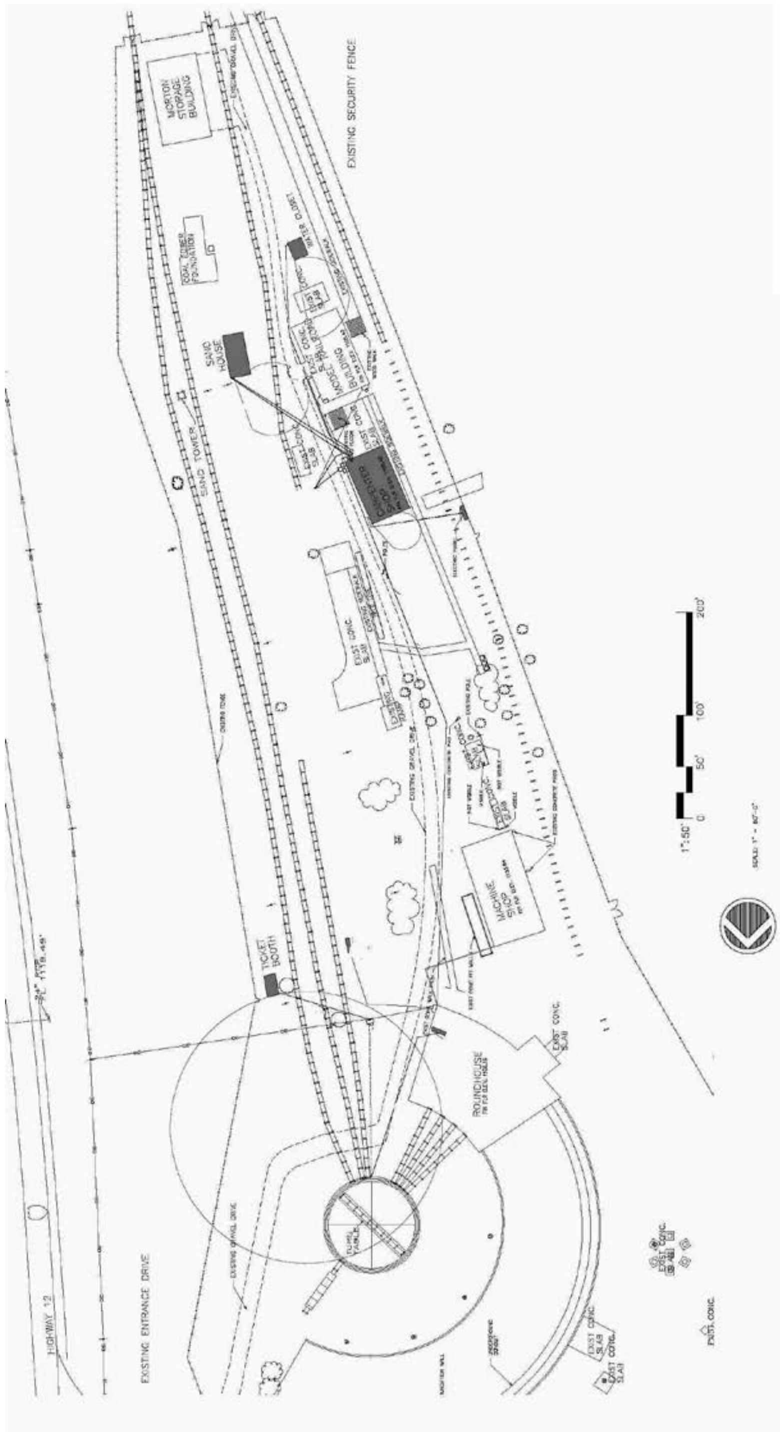


Figure 12: This site plan of the Milwaukee Railroad Shops Historic District captures the overall layout of the property as it appeared at the time of nomination. Major resources are identified in the layout. **Drawn by:** RML Architects, Sioux City. **Date:** December 10, 2016.

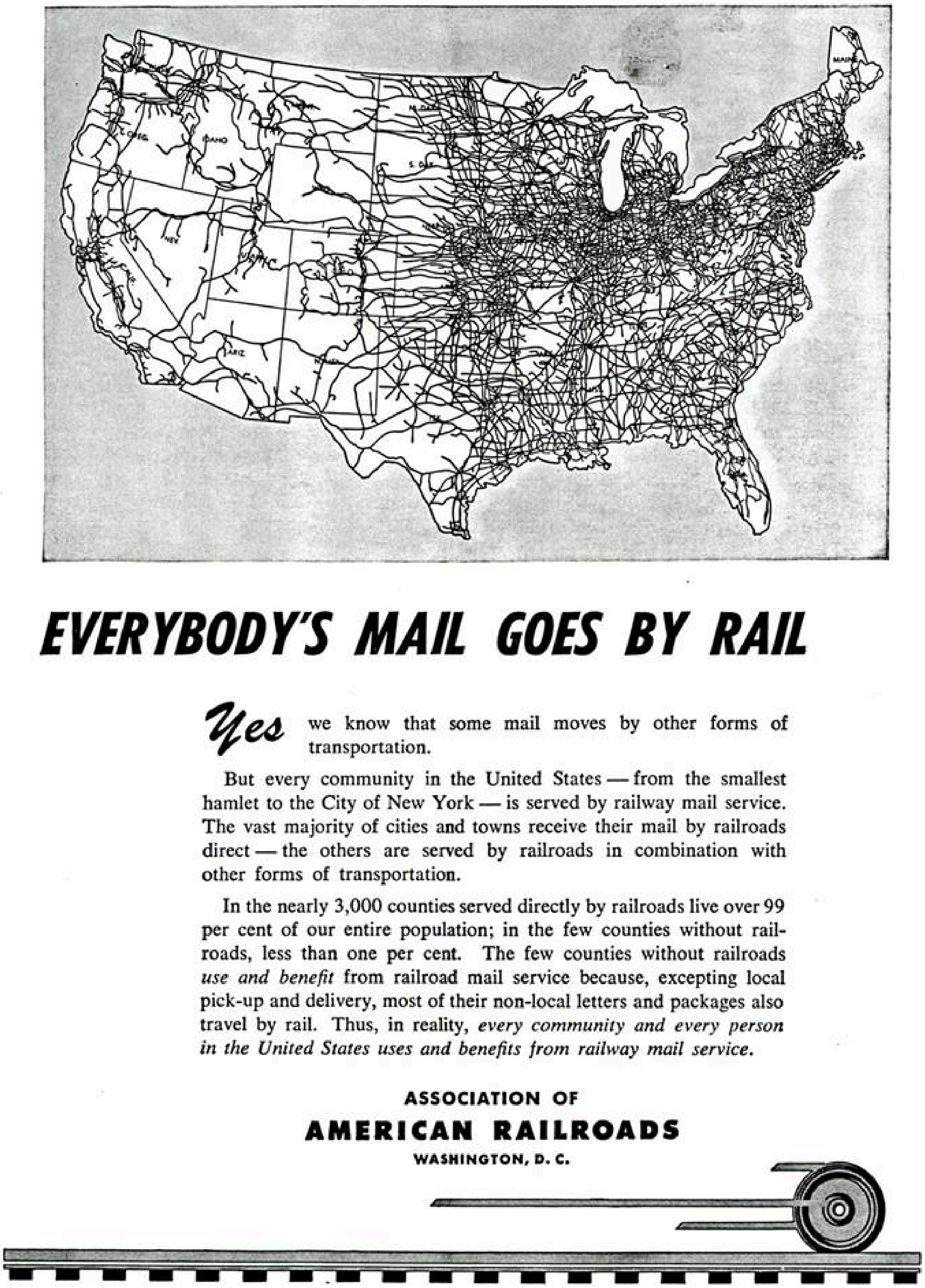


Figure 13: This circa 1940 print advertisement by the Association of American Railroads displays a map showing the massive railroad grid and network extending across the contiguous 48 states, from the Atlantic Coast to the Pacific Coast. **Graphic Designer:** Association of American Railroads Public Relations Department. **Source:** Archives of the Sioux City Railroad Museum, Larry Obermeyer Collection.

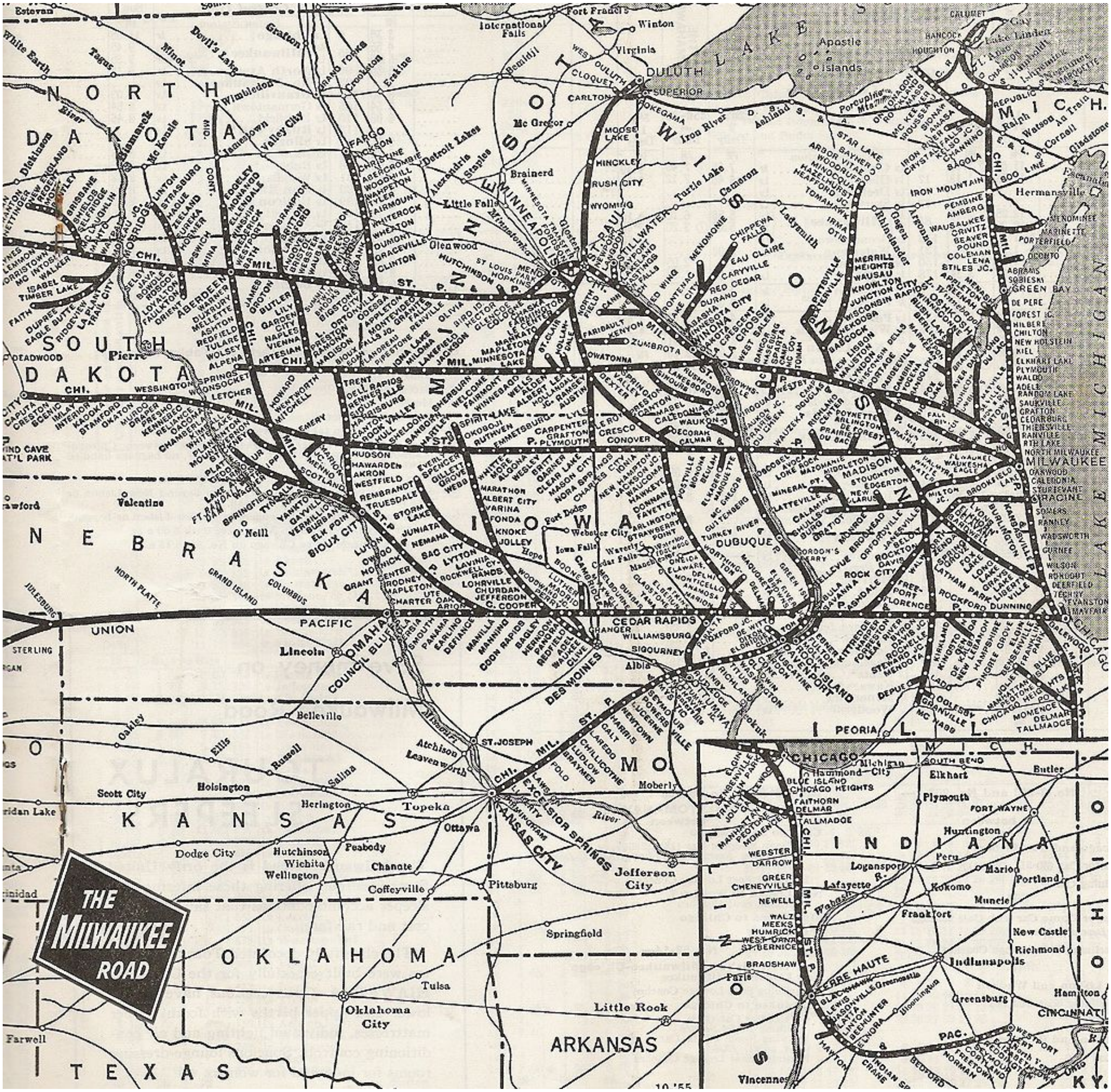


Figure 14: Map of the Chicago, Milwaukee and St. Paul Railroad Company network of rail lines in 1917. **Graphic Designer:** Chicago, Milwaukee and St. Paul Railroad Company – Public Relations Department. **Source:** Archives of the Sioux City Railroad Museum – Larry Obermeyer Collection.

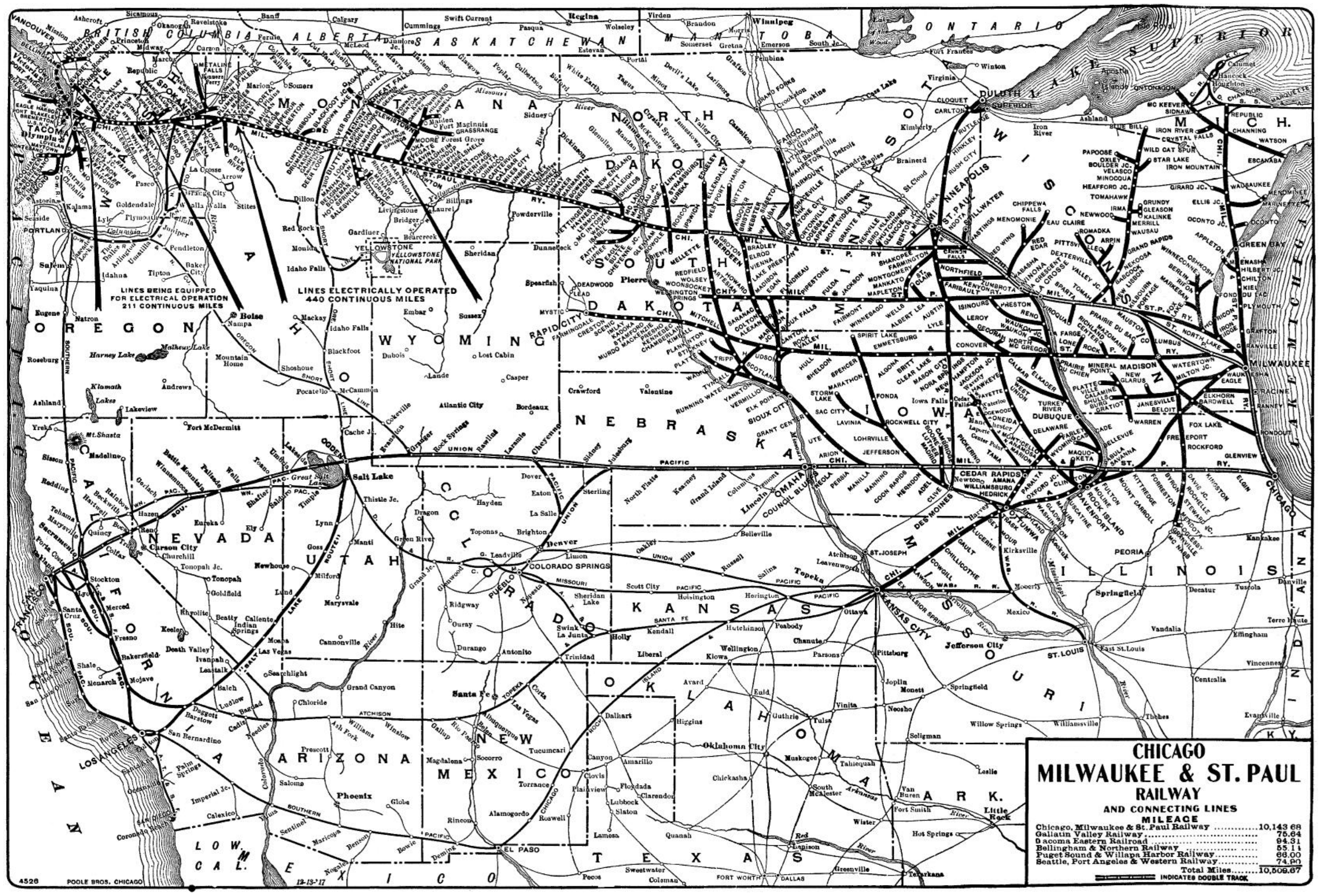


Figure 15: Map of the Chicago, Milwaukee and St. Paul Railroad Company illustrating its network of rail lines as a middle western carrier and transcontinental railroad system in 1930. **Graphic Designer:** Chicago, Milwaukee and St. Paul Railroad Company – Public Relations Department. **Source:** Archives of the Sioux City Railroad Museum – Larry Obermeyer Collection.

Figure 16: 1943 Map of the Chicago, Milwaukee and St. Paul Railroad Company illustrating the agricultural commodities, timber, and livestock hauled by the railroad company; positioning the railroad company as a dominant middle western carrier in the vast agricultural territory stretching from Illinois to Washington. **Graphic Designer:** Chicago, Milwaukee and St. Paul Railroad Company – Public Relations Department. **Source:** Archives of the Sioux City Railroad Museum – Larry Obermeyer Collection.

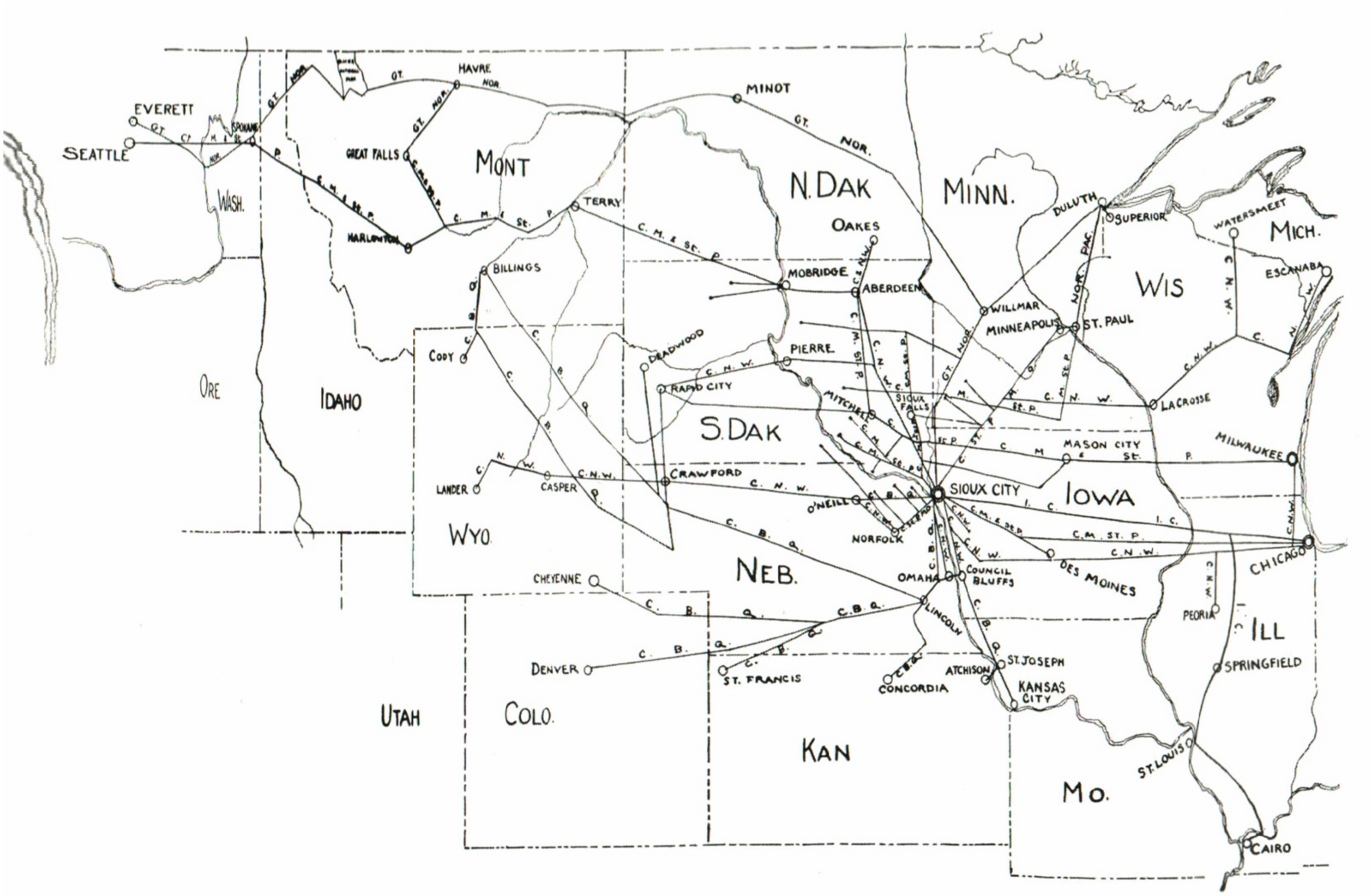


Figure 17: Map illustrating Sioux City's rail connections in 1923. At this time, Sioux City was the tenth largest railroad center in terms of rail passenger and freight traffic in and out of the hub. **Graphic Designer:** John Adams. *Three Quarters of A Century of Progress: A Brief Pictorial and Commercial History of Sioux City, Iowa*. Sioux City, IA: Verstegen Printing Company, 1923. **Source:** Archives of the Sioux City Railroad Museum – Larry Obermeyer Collection.

Figure 18: This 1945 print advertisement by the New York Center Railroad Company provides a cutaway infographic explaining the different types of work and repairs that are carried out by shopmen in the typical roundhouse building. **Graphic Designer:** New York Central Railroad Company Advertising Department. **Source:** Archives of the Sioux City Railroad Museum – Larry Obermeyer Collection.

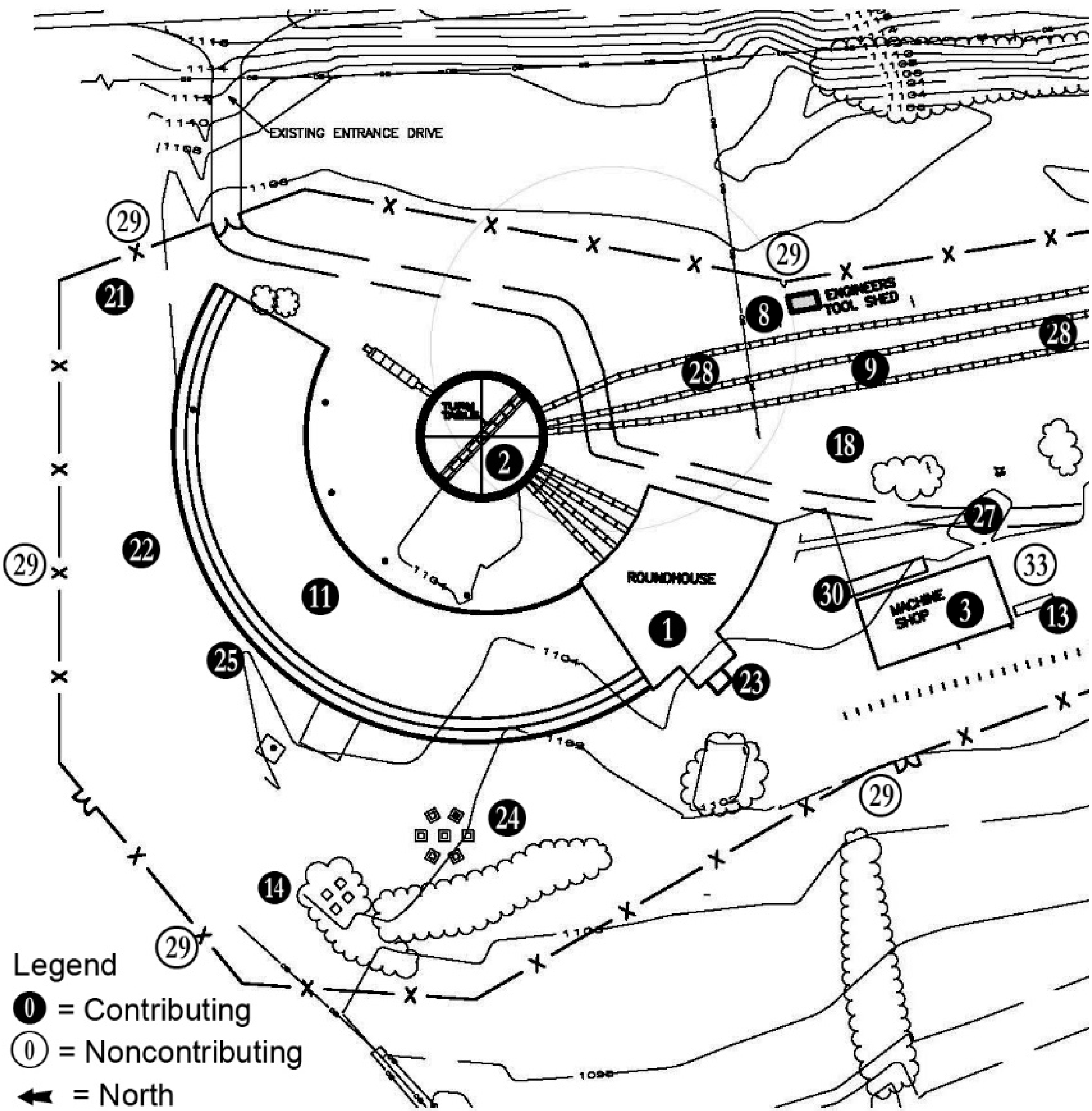


Figure 19: Map Identifying Major Buildings and Structures (North End Segment of Property). **Source:** RML Architects. **Date:** December 12, 2016. **Drawn** by Regina Smith, NCARB | Not to Scale

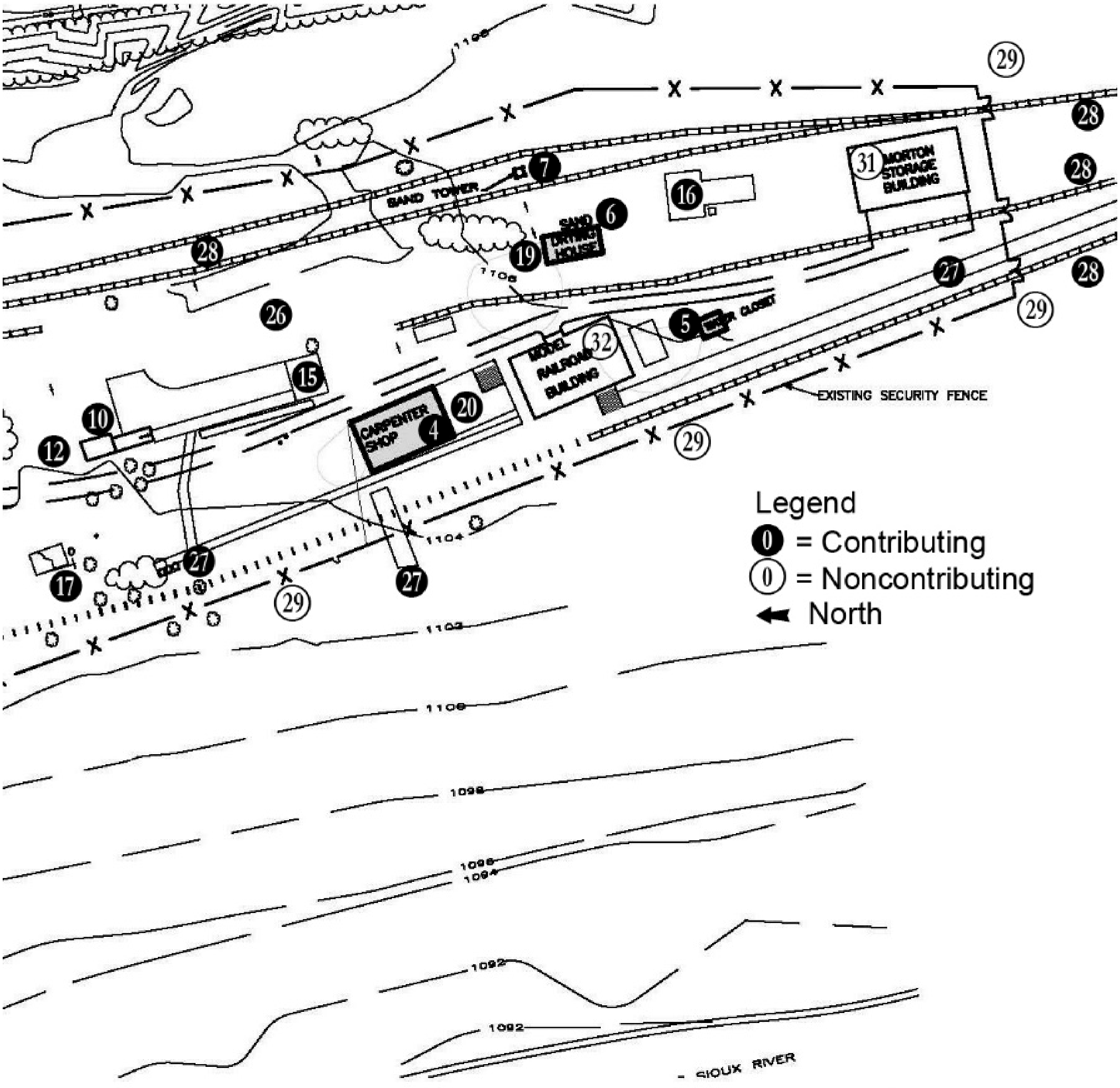


Figure 20: Map Identifying Major Buildings and Structures (South End Segment of Property). **Source:** RML Architects. **Date:** December 12, 2016. **Drawn by:** Regina Smith, NCARB | Not to Scale.

1917-1918 Built Environment of the Sioux City Railroad Repair Shops Terminal

List #	Building or Structure Identification
1	30-Stall Roundhouse
2	90-ft. Turntable
3	60,000 gallon Water Reservoir
4	150,000 gallon water storage tank on tower columns
5	Water Softener Treatment Building with Laboratory
6	Power Plant with Boiler House
7	Engineer Tool Shed
8	Garage
9	Welder and Arch Brick Storage Building
10	Water Closet-Toilet Building No. 1
11	Cinder/Ash Pit
12	Terminal Superintendent, Roundhouse Foreman and Clerks Office
13	Well and Pump #1
14	Well and Pump #2
15	Well and Pump #3
16	Sheet Metal and Materials Storage Building
17	Acetylene and Oxygen Welding Supply Storage
18	Machine and Blacksmith Shops Building
19	Coal Storage Building
20	Iron Rack
21	Scrap Bins
22	Store Room/House with Office
23	Loading Platform with Ramp
24	Wheel Casting and Trucks Storage Platform
25	Car/Carpenter Shops - Planing Mill
26	Lumber Storage Shed
27	Air Brake Repair with attached Lunch Room
28	Water Closet-Toilet Building No. 2
29	Sand Tower 1
30	Sand Tower 2
31	Sand Drying House
32	Sand Storage Bin
33	Water Column Locomotive Servicing
34	Coal Tower with Storage Bunker
35	Hoist
36	Yard Office
37	Optometrist/Doctor Shack
38	22 Track Railyard

Data Table 1: This data table identifies the buildings and structures that were built between 1917 and 1918 that formed the built environment and vertical infrastructure of the Sioux City Repair Shops terminal. **Compiled by:** Larry Obermeyer. **Source:** Blueprints and Construction Documents, Chicago, Milwaukee and St. Paul Railroad Company.

Chronology of Key Dates and Events Which Have Shaped the Milwaukee Railroad Shops Historic District and the Chicago, Milwaukee, St. Paul and Pacific Railroad Company in Sioux City

Year	Event Description
1862	The passage of the Pacific Railway Act of 1862 setting Sioux City as one of three starting points for connections with the Union Pacific Railroad near Fremont, Nebraska.
1864	The passage of the Pacific Railway Act of 1864 for the construction of the First Transcontinental Railroad to be built by the Union Pacific and Central Pacific railroads.
1869	The First Train into Sioux City arrives via the Sioux City & Pacific Railroad.
1872	Dakota Southern Railroad line constructed 30 mile rail line from Elk Point, South Dakota to Sioux City, Iowa.
1873	The incorporation of the Sioux City & Dakota Railroad, acquires assets of Dakota Southern Railroad Company. Constructs rail line from Elk Point to Yankton, South Dakota.
1876-78	Sioux City and Pembina Railroad constructs line from Elk Point to Sioux Falls, South Dakota.
1881-86	Chicago, Milwaukee and St. Paul Railroad constructs line from Yankton to Aberdeen, South Dakota.
1886-87	Chicago, Milwaukee and St. Paul Railroad constructs rail line from Manilla to Sioux City; builds rail yard and terminal in Sioux City, connecting with Chicago-Omaha main line.
1888	Chicago, Milwaukee and St. Paul Railroad builds 15-stall locomotive repair shops in Sioux City next to the Floyd River and the industrial stockyards districts.
1912	Chicago, Milwaukee and St. Paul Railroad announces plans for new repair shops terminal.
1916	Chicago, Milwaukee and St. Paul Railroad acquires land in the north Riverside Neighborhood for construction of its repair shops terminal and additional land in North Sioux City, South Dakota for a new interchange switching yard. Land is cleared.
1917	Construction begins on the 60-acre repair shops complex.
1917	The Bridge and Building Department and Maintenance of Way Department begin their staging operations out of the new shops terminal.
1918	Construction is complete and repair shops terminal becomes fully operational.
1922	The national Shopmen's Strike of 1922 temporarily halts operations; strikebreakers hired.
1925	Major fire destroys 15 of 30 stalls of the roundhouse; Damaged stalls rebuilt.
1920s	City of Sioux City earns designation as 10th Largest Railroad Center in the Nation.
1930	Sioux City Repair Shops modernized and converted to a power electrification system.
1954	Chief Engineer releases plans to retire many of the buildings and structures at the shops complex.
1954	The Milwaukee Road runs its last steam locomotive-powered train out of Sioux City.
1955	The railroad demolishes 75% of the roundhouse building and several other structures; buildings that are not razed converted to storage space.
1956	The Chicago, Milwaukee, St. Paul and Pacific Railroad Company announces its fleet of locomotives is 100% Diesel and Electric.
1962	Major Big Sioux River Floyd resulting from winter snow melt halts operations for several days.

1965	Fire destroys store house building.
1968	Major Big Sioux River Floyd resulting from heavy rains halts operations for several days.
1980	Chicago, Milwaukee, St. Paul and Pacific Railroad Company embargos large portion of its rail lines.
1980	The Sioux City Repair Shops terminal is shuttered; transitioned to a reclamation yard.
1981	Railroad company sells the Sioux City Repair Shops complex to farm machinery salvage operator.
1993	City of Sioux City declares complex blighted; placards the site for eventual demolition.
1995	Property acquired by the Siouxland Historical Railroad Association; site cleanup begins
1997	Placard lifted by the City of Sioux City; historic preservation work begins.
2000	Property listed as one of Iowa’s 13 Most Endangered Properties.

Date Table 2: This data table provides a list of key events in chronological order that shaped the Milwaukee Railroad Shops Historic District during it period of significance and after. **Compiled by:** Larry Obermeyer. Sources: The Sioux City Journal, Company Records and Annual Reports of the Chicago, Milwaukee, St. Paul and Pacific Railroad Company and the Chicago, Milwaukee and St. Paul Railway Company, and employee oral histories.

National Register of Historic Places
Memo to File

Correspondence

The Correspondence consists of communications from (and possibly to) the nominating authority, notes from the staff of the National Register of Historic Places, and/or other material the National Register of Historic Places received associated with the property.
Correspondence may also include information from other sources, drafts of the nomination, letters of support or objection, memorandums, and ephemera which document the efforts to recognize the property.

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

NATIONAL REGISTER OF HISTORIC PLACES
EVALUATION/RETURN SHEET

Requested Action: Resubmission

Property Name: Milwaukee Railroad Shops Historic District

Multiple Name:

State & County: IOWA, Woodbury

Date Received:	Date of Pending List:	Date of 16th Day:	Date of 45th Day:	Date of Weekly List:
9/5/2018			10/22/2018	

Reference number: RS100002243

Nominator: State

Reason For Review:

__X__ Accept ______ Return ______ Reject **10/22/2018** Date

Abstract/Summary Comments: The Milwaukee Railroad Shops Historic District are of state and local significance under National Register Criteria A, C and D, in the areas of Industry, Transportation, and Engineering. The Milwaukee Railroad Shops represent a significant collection of well preserved industrial buildings and structures associated with the maintenance and repair of American railroad rolling stock during the early twentieth century. Based largely on the plans and designs of Milwaukee Road Chief Engineer C.F. Loweth, the district resources illustrate the common industrial forms of steam-powered railroad shop construction. Increasingly rare, these particular resources also reflect the evolving nature of rail-related operations conducted by the Milwaukee Road line, as they transitioned from steam power to diesel power. The historic rolling stock found on the site contribute as a collection to the overall character of the district and its ability to convey its significance as a working industrial operation. The extant buildings and identified remnant sites have provided and are likely to continue to provide significant information regarding the design and operation of twentieth century railroad industrial facilities.

Recommendation/ Criteria: Accept NR Criteria A, C and D.

Reviewer: Paul Lusignan Discipline: Historian

Telephone: (202)354-2229 Date: 10/22/2018

DOCUMENTATION: see attached comments : No see attached SLR : No

If a nomination is returned to the nomination authority, the nomination is no longer under consideration by the National Park Service.

IOWA DEPARTMENT OF
CULTURAL AFFAIRS

KIM REYNOLDS, GOVERNOR
ADAM GREGG, LT. GOVERNOR

CHRIS KRAMER, ACTING DIRECTOR

IOWA ARTS COUNCIL

PRODUCE IOWA

STATE HISTORICAL SOCIETY OF IOWA

STATE HISTORICAL MUSEUM OF IOWA

STATE HISTORICAL LIBRARY & ARCHIVES

STATE HISTORIC SITES

STATE HISTORIC PRESERVATION OFFICE OF IOWA

IOWA HISTORICAL FOUNDATION

February 13, 2018

J. Paul Loether, Deputy Keeper and Chief
National Park Service
National Register of Historic Places
1849 C Street, NW, Mail Stop 7228
Washington, DC 20240

Dear Mr. Loether:

The following National Register nomination from Iowa is enclosed for your review and listing if acceptable.

Milwaukee Railroad Shops Historic District

The Milwaukee Railroad Shops Historic District, often referred to as the Sioux City Roundhouse, Repair Shops and Engine Terminal, is eligible for inclusion on the National Register for Historic Places for both statewide and local significance under Criterion A for its associations with many important developments in railroad technology and the evolution of the "divisional terminal system" of railroad operations; C because it is a rare and remarkably well-preserved example of a landscape that houses railroad structures and because of its associations with visionary civil engineer Charles F. Loweth who was widely recognized nationally as a major railroad builder and civil engineer; and D for archeological remnants tied to the servicing and repair of steam and diesel locomotives, passenger coaches, and freight rail cars that prevailed in the railroad industry during the "Golden Age of Railroading." It also falls under Criterion Consideration G for its continued significance through a period of less than fifty years before this nomination and represents the evolution of both transportation and industry. The Milwaukee Railroad Shops in Sioux City was a working railroad repair shops and engine terminal whose operations and functionality spanned 62 years. Its operational period between 1967 and 1980 is of particularly significance to the study of the modern-day period of railroad development and mergers.

Thank you for your consideration.

Sincerely,

Laura Sadowsky
Laura Sadowsky
State Historian and National Register Coordinator
State Historical Society of Iowa

Enclosures.

STATE HISTORICAL BUILDING • 600 E. LOCUST ST. • DES MOINES, IA 50319 • 515.281.5111 • IOWACULTURE.GOV

SG-2243

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NPS Form 10-900 OMB No. 1024-0018

United States Department of the Interior
National Park Service

National Register of Historic Places Registration Form

This form is for use in nominating or requesting determinations for individual properties and districts. See instructions in National Register Bulletin, *How to Complete the National Register of Historic Places Registration Form.* If any item does not apply to the property being documented, enter "N/A" for "not applicable." For functions, architectural classification, materials, and areas of significance, enter only categories and subcategories from the instructions. **Place additional certification comments, entries, and narrative items on continuation sheets if needed (NPS Form 10-900a).**

1. Name of Property

historic name Milwaukee Railroad Shops Historic District

other names/site number Sioux City Roundhouse, Repair Shops and Engine Terminal

2. Location

street & number 3400 Sioux River Road – Iowa State Highway 12 | N/A | not for publication

city or town Sioux City | N/A | vicinity

state Iowa code IA county Woodbury code 193 zip code 51109-1635

3. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act, as amended,

I hereby certify that this X nomination ___ request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60.

In my opinion, the property X meets ___ does not meet the National Register Criteria. I recommend that this property be considered significant at the following level(s) of significance:

__ national X statewide X local

Returned

Signature of certifying official/Title Date

State Historical Society of Iowa
State or Federal agency/bureau or Tribal Government

In my opinion, the property ✓ meets ___ does not meet the National Register criteria.

[signature] 14 FEB 2018
Signature of commenting official Date

DSHPO IOWA SHPO
Title State or Federal agency/bureau or Tribal Government

4. National Park Service Certification

I hereby certify that this property is:

__ entered in the National Register
__ determined eligible for the National Register
__ determined not eligible for the National Register
__ removed from the National Register
__ other (explain:) ________

Signature of the Keeper Date of Action

5. Classification

Ownership of Property
(Check as many boxes as apply.)

- [X] private
- [ ] public - Local
- [ ] public - State
- [ ] public - Federal

Category of Property
(Check only **one** box.)

- [ ] building(s)
- [X] district
- [ ] site
- [ ] structure
- [ ] object

Number of Resources within Property
(Do not include previously listed resources in the count.)

Contributing	Noncontributing	
6	3	buildings
16		sites
6	2	structures
13	0	objects
41	5	**Total**

Name of related multiple property listing
(Enter "N/A" if property is not part of a multiple property listing)

Advent & Development of Railroads in Iowa,

1850-1940, MPS

Number of contributing resources previously listed in the National Register

2

6. Function or Use

Returned

Historic Functions
(Enter categories from instructions.)

Transportation: rail-related

Current Functions
(Enter categories from instructions.)

Transportation: Railroad-Related

Recreation and Culture/Museum

7. Description

Architectural Classification
(Enter categories from instructions.)

Other: Railroad Design

Materials
(Enter categories from instructions.)

foundation: Concrete

walls: Brick

Wood

roof: Wood

other: Metal: Steel, Metal: Iron, Metal: Cast Iron,

Stone: Granite, Stone: Aggregate

Narrative Description

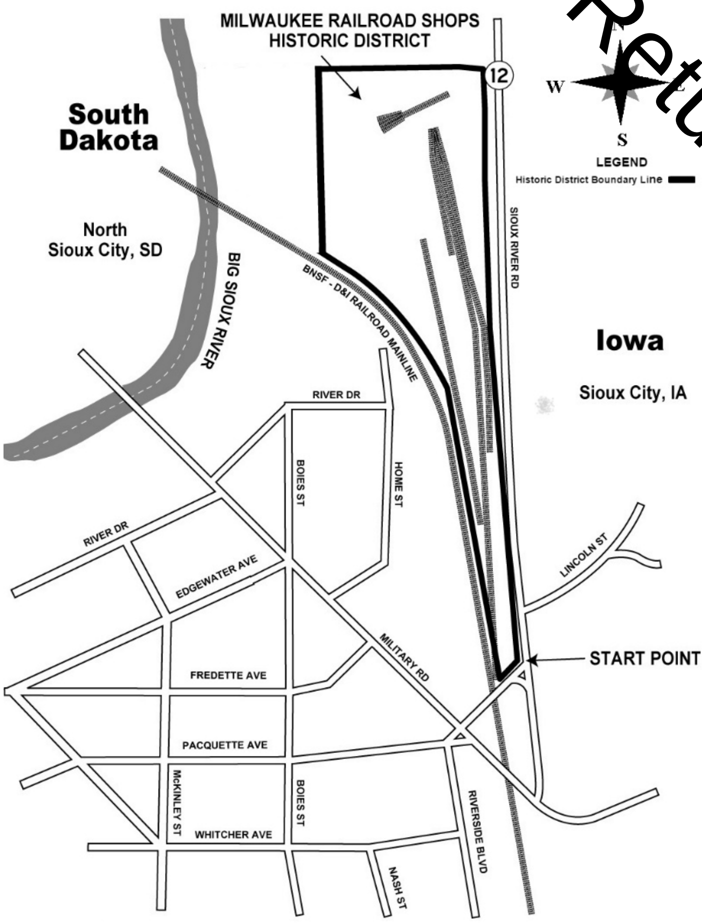
(Describe the historic and current physical appearance of the property. Explain contributing and noncontributing resources if necessary. Begin with **a summary paragraph** that briefly describes the general characteristics of the property, such as its location, setting, size, and significant features.)

Summary Paragraph

The Milwaukee Railroad Shops Historic District is **one** (29.5-acre) **site** containing **9** buildings, **8** structures (includes 1 contributing walking path transportation system with multiple non-contiguous segments; 1 rail trackage system with multiple sections that are laddered and joined to form a rail yard), **15** sites (includes remnant building foundations and the overall historic district site), and **13** objects (includes locomotives, rolling stock and other railway-related vehicles). The cumulative total number of contributing and non-contributing resources is **46** assets including the overall site.

The surviving resources of the Milwaukee Railroad Shops Historic District fully reflect the original site layout built by the Chicago, Milwaukee, St. Paul & Pacific Railway Company. This site has exceptional value because of the symbiotic relationship it portrays between structural design and the historical context of the functional role played by the steam-era railroad repair shops as industry within an industry. Moreover, because the site's landscape still maintains a high degree of integrity with its unique and rare mix of buildings, structures, and remnant foundations, the historic district stewards a synergetic relationship where all of the resources contribute to each other's existence. This historic district features a long history of behind-the-scenes railroad repair work as its predominant activity. This is a story that is often under-represented in railroad heritage.

Narrative Description



General Location Map Drawn by Corey Vondrak: Date 2011: Not to Scale

Location and Setting: The proposed Milwaukee Railroad Shops Historic District site is located within the city limits of Sioux City, Iowa. The property is sited adjacent to the Big Sioux River at the base of the first bluffs landform of the Loess Hills National Natural Landmark, in the city's north Riverside neighborhood.

As depicted in the map below, the boundary shape of the proposed historic site can best be described as taking the shape of a meat-clever. The entire real estate of the railroad shops site is bounded on the south to southwest by the shared mainline of the Dakota-Iowa Railroad and BNSF Railway. In addition, State Highway 12 (i.e. Sioux River Road) borders the railroad facility on the east. The Big Sioux River, which demarks the state border between Iowa and South Dakota, forms the site;s western boundary. Directly adjacent to the north is agricultural farmland. With over 32 acres of land area, the property of the Milwaukee Railroad Shops includes approximately 29.53 acres of developed property (the actual area of the historic district as defined by the heavy black line on the map to the left); and another 3 acres of undeveloped land lying between the Big Sioux River and the nominated historic district. The undeveloped area was originally land banked by the railroad.

The railroad shops terminal site is intact in regard to its original location where it was constructed in 1917 to 1918; however, its built environment and surroundings have changed gradually and significantly over its lifetime. Despite the changes, the proposed historic district's setting still reflects early 20th-century railroad industrial land use.

8. Statement of Significance

Applicable National Register Criteria
(Mark "x" in one or more boxes for the criteria qualifying the property for National Register listing.)

- [X] A Property is associated with events that have made a significant contribution to the broad patterns of our history.
- [ ] B Property is associated with the lives of persons significant in our past.
- [X] C Property embodies the distinctive characteristics of a type, period, or method of construction or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components lack individual distinction.
- [X] D Property has yielded, or is likely to yield, information important in prehistory or history.

Criteria Considerations
(Mark "x" in all the boxes that apply.)

Property is:

- [ ] A Owned by a religious institution or used for religious purposes.
- [ ] B removed from its original location.
- [ ] C a birthplace or grave.
- [ ] D a cemetery.
- [ ] E a reconstructed building, object, or structure.
- [ ] F a commemorative property.
- [X] G less than 50 years old or achieving significance within the past 50 years.

Areas of Significance
(Enter categories from instructions.)

Transportation
Landscape Architecture
Social History
Industry
Engineering

Period of Significance

1917 - 1980

Significant Dates

1917
1918
1925
1954
1965

Significant Person
(Complete only if Criterion B is marked above.)

N/A

Cultural Affiliation

Architect/Builder

Chicago, Milwaukee, St. Paul & Pacific Railroad
Motive Power and Engineering Departments
Loweth, Charles Frederick

Period of Significance (justification)

The period of significance, 1917 to 1980, encompasses the continuous 63-year time period the historic district functioned as a locomotive and rail car repair terminal and other rail-related operations at the Milwaukee Railroad Shops in Sioux City. The intact building types, foundation remnants, rail yard and architectural design remained consistent throughout this time period and represent the prevailing designs developed by the motive power and engineering departments of the Chicago, Milwaukee & St. Paul Railway under the direction of C. F. Loweth, chief engineer. The complex represents late 19th- century and early 20th-century design standards for railroad terminals based on economic conditions, human resources, and the sophisticated technologies of the times that were utilized in the repair and maintenance of steam locomotives, diesel-electric motive power, passenger cars, and freight rolling stock.

Criteria Considerations (explanation, if necessary)

The Milwaukee Railroad Shops Historic District meets Criterion Consideration G because it continued to achieve significance within and through a period of less than fifty years before this nomination. It continued major operations and represents the evolution of both transportation and industry. It is an outstanding example of an industrial design for a railroad landscape associated with the steam-era railroad repair shop – an industrial sub-sector within the railroad industry. The particular layout of this 29.5-acre site is unique to the Milwaukee Railroad Shops Historic District. The natural setting of the Big Sioux River and the First Bluffs of the Loess Hills Natural Landform were important factors in the site's selection, establishment and longevity of service. The site is an excellent example of the railroad blending the natural setting with the industrialism and functionalism of the industry. The site is also an outstanding example of a railroad landscape design that incorporates standard construction plans developed by railroad engineers based on the functionality for each individual building and structure and then formed together as an industrial ensemble in relationship to the natural setting of the site and its location along the mainline of the railroad. The site also bears exceptional testimony to a vanished industrial process and the craft and trades workmanship associated with those industrial activities.

Statement of Significance Summary Paragraph (Provide a summary paragraph that includes level of significance and applicable criteria.)

The Milwaukee Railroad Shops Historic District, built 1917-1918, meets the criteria for listing on the National Register as a product of the railroad engineering philosophy of "longitudinal design" for a comprehensive built environment associated with North American railroad development. It is an exceptional example of the workmanship of a nationally prominent civil engineer, Charles Frederick Loweth; who had enormous impact on the field of railroad engineering during the late nineteenth- and early twentieth centuries. Contextually, the physical plant of the Milwaukee Railroad Shops was subject to massive workplace shifts in response to the new sophisticated technologies of the times; and its surviving built environment and ruins are the illustrative scars of those technological impacts. Secondly, the Milwaukee Railroad Shops contextually relates to social changes within the railroad industry, including (1) the use of immigrant labor to construct the shops complex, (2) the active recruitment of women as part of the shops' labor force during World War I and World War II, and (3) the labor unrest during the Great Shopmen's Strike of 1922. Finally, the Milwaukee Railroad Shops Historic District is the sole surviving railroad repair shops of the Chicago, Milwaukee, St. Paul & Pacific Railway. This site presents contextual insights into this railroad company's long-term financial struggles and eventual demise – a story that had long-standing economic impacts on the nation's transportation system that eventually realigned the freight railroad industry across a great swath of the United States.

Narrative Statement of Significance (Provide at least **one** paragraph for each area of significance.)

The Milwaukee Railroad Shops Historic District meets the criteria for exceptional **significance under Criterion A** because its industrial landscape and functional lifecycle document transformational "periods of change" that played out across the nation in the railroad industry. Its operational lifespan personifies important historical themes tied to a series of events that had national impact during their time period; and because it's survival over the years pays tribute to a class of iconic trunk-line railroad companies that were known as "The Granger Roads."

The nominated Milwaukee Railroad Shops Historic District has unparalleled qualities as a visual history to show the transformational changes that impacted railroad landscapes and built environments over the last century. Its comprehensive collection of buildings, structures, and foundational remnants all remain in their original location; thus, within the boundaries of the Milwaukee Railroad Shops Historic District are located all the elements necessary to understand and express the outstanding value and historic context of the site under Criterion A. The nominated property is of sufficient size to adequately assure the complete representation of the features and functional processes that convey the steam-era railroad repair shop industry. The Milwaukee Railroad Shops Historic District weathered through a precarious journey of survival; through several decades of economic disinvestments by the railroad company and the technological changes that defined the different eras of development in the railroad industry.

The nominated Milwaukee Railroad Shops Historic District meets the criteria for **significance under Criteria Consideration G** because it's shuttering and final abandonment by the railroad company is associated with events relating to the demise of the Chicago, Milwaukee, St. Paul & Pacific Railway Company that occurred between 1967 (the fifty year cut off period) and 1980 when the facility was shuttered. The nominated Milwaukee Railroad Shops Historic District bears testimony to the largest railroad divestiture in American History that began with a bankruptcy filing in 1977 and an embargo of freight traffic and the final shut down of rail lines in 1980 across the states of Iowa, South Dakota, Montana, Idaho, Oregon, and Washington.

Developmental history/additional historic context information (if appropriate)

As the nation's last great transcontinental railroad, the Chicago, Milwaukee, St. Paul & Pacific Railroad affected the growth and development of the Upper Midwest, Great Plains and Pacific Northwest regions of the United States; creating economic opportunities for farmers, businesses and individuals to engage in trade and to find employment. Steam locomotive servicing terminals, like the Milwaukee Railroad Shops, served not only as maintenance and repair facilities for the railroad's fleet of locomotives and rolling stock, but took on the regional function as an employment center as area men and women sought employment and became rail craft and trades workers. Among the six railroad steam locomotive servicing terminals in Sioux City, which lead to Sioux City ranking as the 10th largest railroad terminal in the nation during the 1920s and 30s, the Milwaukee Railroad Shops were among the largest and continued in operation during the decline of the railroad industry throughout the 1950s; adapting to changing times and needs. The Milwaukee Railroad Shops Historic District forms one of the nation's most comprehensive collections of buildings, structures and foundation remnants associated with the steam locomotive era of the railroad industry, and particularly the Chicago, Milwaukee, St. Paul and Pacific Railway Company, a.k.a. *The Milwaukee Road* or the St. *Paul*.

All locomotives, passenger cars and freight rolling stock (rail cars) indexed in this nomination, while foreign and not necessarily native to this historic district, are rail-related vehicles designed for travel within the North American rail system. Various corporate names, initials, and numbering appear on the rolling stock. As with most rail vehicles, they were designed and standardized for interchange and operation over other railroads besides their own associated "native" corporate railroad carriers. All objects retain their original engineering and architectural integrity of materials, design, workmanship, and associations with their railroad functionality. Because the locomotive and rolling stock collection's original locations are not available, the objects are in an appropriate setting for preservation and interpretation. They are directly associated with the original and long-term functionality of the Milwaukee Railroad Shops Historic District as a type and style of motive power and rolling stock that would have been serviced and repaired at this facility during the period of significance (Wyatt, pp. 1-5).

9. Major Bibliographical References

Bibliography (Cite the books, articles, and other sources used in preparing this form.)

- Please see continuation sheet

Previous documentation on file (NPS):

____preliminary determination of individual listing (36 CFR 67 has been requested)
____previously listed in the National Register
____previously determined eligible by the National Register
____designated a National Historic Landmark
____recorded by Historic American Buildings Survey #____________
____recorded by Historic American Engineering Record # __________
____recorded by Historic American Landscape Survey # ___________

Primary location of additional data:

_X_ State Historic Preservation Office
____Other State agency
____Federal agency
____Local government
____University
____Other
Name of repository: ______________________

6

Historic Resources Survey Number (if assigned): ____________

10. Geographical Data

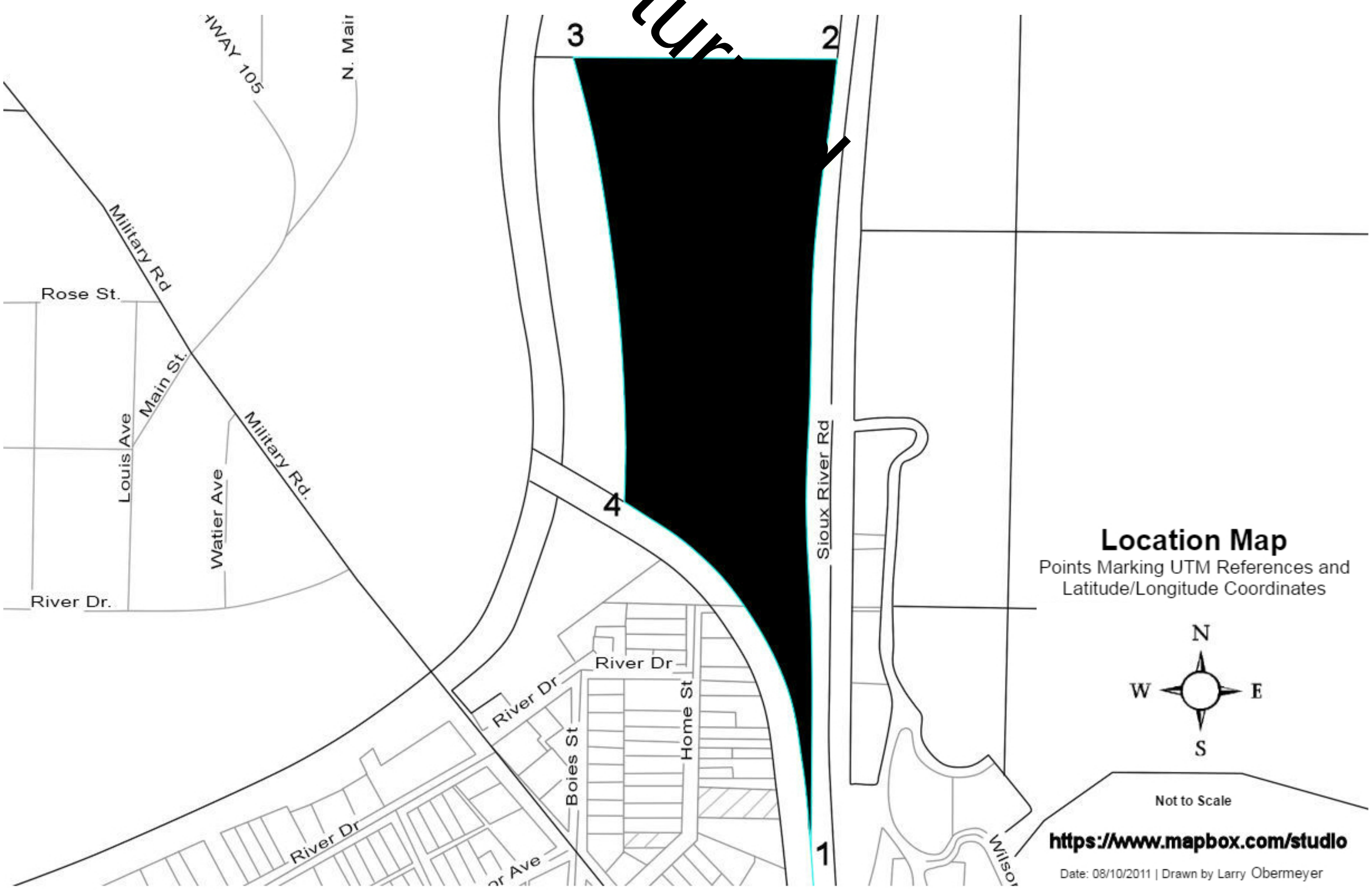
Acreage of Property 29.53 Acres;
(Do not include previously listed resource acreage.)

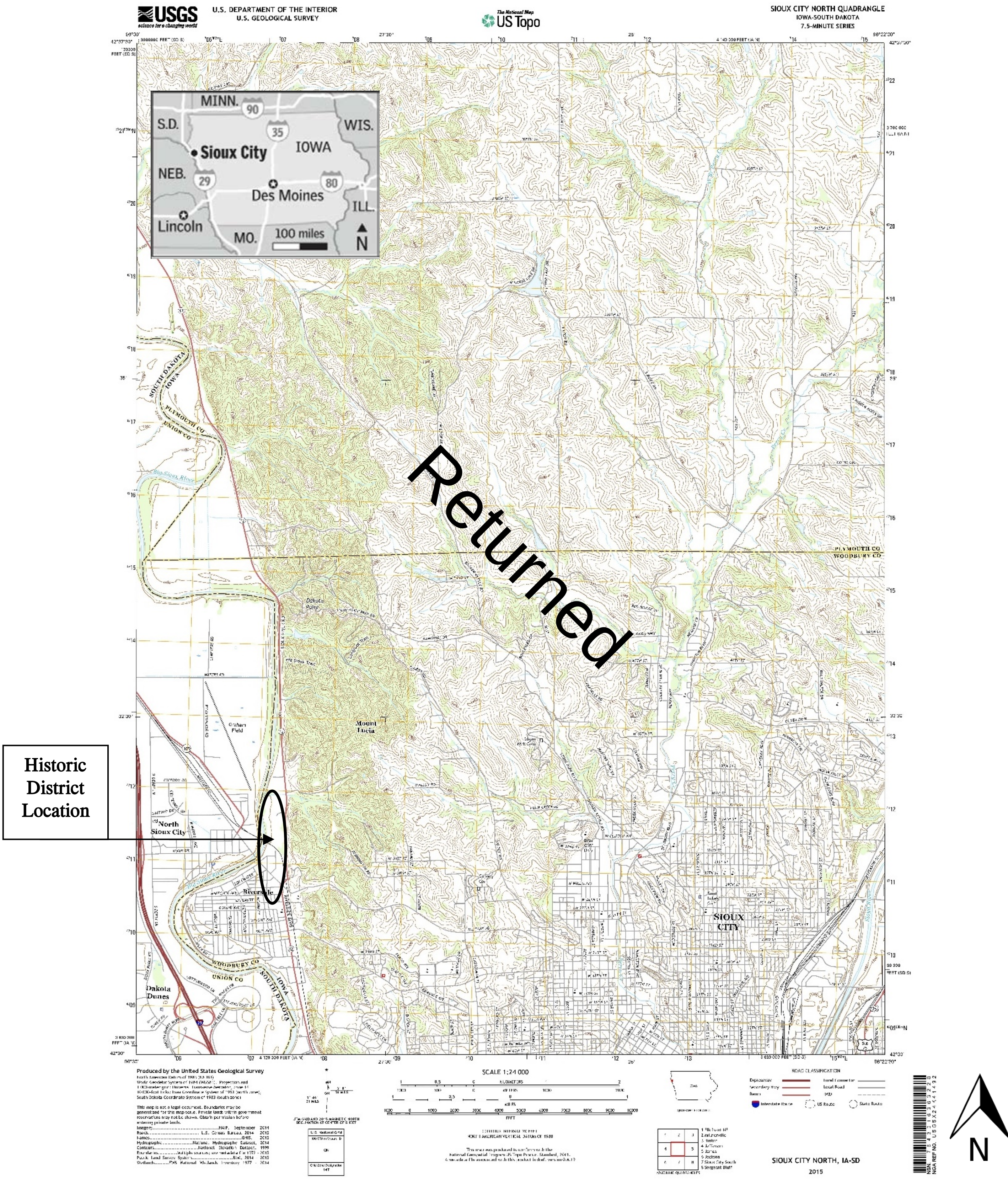
UTM References
(Place additional UTM references on a continuation sheet.)

	Zone	Easting	Northing
1	14	707388	4710921
2	14	707361	4711760
3	14	707088	4711743
4	14	707168	4711279

Latitude/Longitude Coordinates (decimal degrees)

	Latitude	Longitude
1	42.52286	-96.47514369314102
2	42.530416	-96.47516793638943
3	42.530336	-96.47849501361627
4	42.52614	-96.47768992019472




U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY
US Topo
SIOUX CITY NORTH QUADRANGLE
IOWA-SOUTH DAKOTA
7.5-MINUTE SERIES
MINN.
S.D.
WIS.
Sioux City
IOWA
NEB.
Des Moines
ILL.
Lincoln
MO.
100 miles
N
Returned
Historic District Location
North Sioux City
Riverside
SIOUX CITY
Dakota Dunes
Mount Lucia
PLYMOUTH CO
WOODBURY CO
SCALE 1:24 000
SIOUX CITY NORTH, IA-SD
2015

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8

Verbal Boundary Description (Describe the boundaries of the property.)

The following legal boundary description, detailed on the continuation sheet, is on file with the Woodbury County, Iowa Treasurer:

> All Government Lot 1 & Lot 2 & Accretions lying west of the center line of road & Lot 2 NW SE Auditors subdivision 1 (except northeasterly part of Government Lot 1 lying west of highway being part of Accretion adjacent being 959.23 feet on south x 447.21 feet on west x 703.96 feet on east), all being located within Section 14, Township 89, Range 48 Woodbury County, Iowa.

The Milwaukee Railroad Shops Historic District is located at 3400 Sioux River Road, also known as Iowa State Highway 12 North, in Sioux City, Iowa. The triangular-shaped property is bounded on the east by the first bluffs of the Loess Hills, a National Natural Landmark, and State Highway 12, a National Scenic Byway; on the south point and southwest by the mainline of the Burlington Northern Santa Fe Railroad and the Dakota and Iowa Railroad; on the west by the Big Sioux River; and on the north by farmland.

Boundary Justification (Explain why the boundaries were selected.)

The boundaries for the pocket-style, triangular-shape Milwaukee Railroad Shops Historic District encompass the original 29 acre “terminal” rail yard associated with the Chicago, Milwaukee, St. Paul and Pacific Railroad.

11. Form Prepared By

name/title Lawrence (Larry) L. Obermeyer, MPA, Principal Investigator
organization Railhouse Heritage Services date February 9, 2018
street & number 3915 Fieldcrest Drive telephone (712) 233-6996
city or town Sioux City state IA zip code 51103
e-mail Lobermeyer@usa.net

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Additional Documentation

Submit the following items with the completed form:

- **Maps:** A **USGS map** (7.5 or 15 minute series) indicating the property's location.

  A **Sketch map** for historic districts and properties having large acreage or numerous resources. Key all photographs to this map.

- **Continuation Sheets**

- **Additional items:** (Check with the SHPO or FPO for any additional items.)

Photographs:

Submit clear and descriptive photographs. The size of each image must be 1600x1200 pixels at 300 ppi (pixels per inch) or larger. Key all photographs to the sketch map.

- Please see continuation sheets

Property Owner:

(Complete this item at the request of the SHPO or FPO.)

name(s)/title(s) Larry Obermeyer, President-Board of Directors, and Matthew Merk, Executive Director

company name Siouxland Historical Railroad Association

street & number P O Box 1375: 3400 Sioux River Road telephone (712) 233-6996

city or town Sioux City state IA zip code 51102-1375

Paperwork Reduction Act Statement: This information is being collected for applications to the National Register of Historic Places to nominate properties for listing or determine eligibility for listing, to list properties, and to amend existing listings. Response to this request is required to obtain a benefit in accordance with the National Historic Preservation Act, as amended (16 U.S.C.460 et seq.).

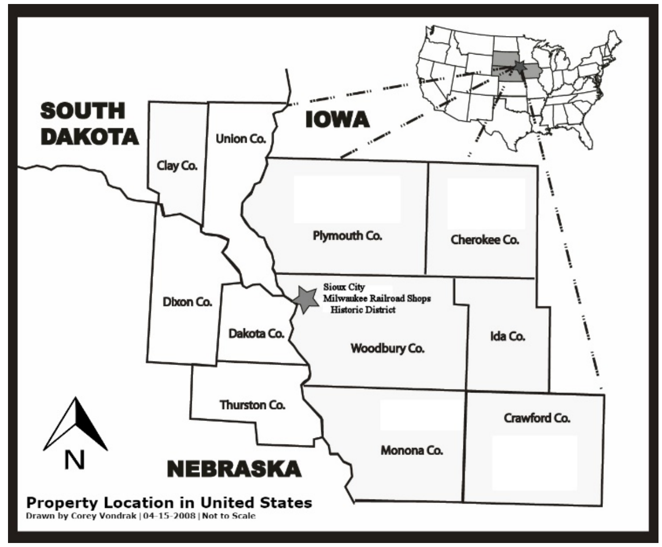
Estimated Burden Statement: Public reporting burden for this form is estimated to average 18 hours per response including time for reviewing instructions, gathering and maintaining data, and completing and reviewing the form. Direct comments regarding this burden estimate or any aspect of this form to the Office of Planning and Performance Management. U.S. Dept. of the Interior, 1849 C. Street, NW, Washington, DC.

Preparer Note

The following narratives are formatted to the 6th Edition of the APA (American Psychological Association) Publication Manual. The EasyBib Pro information literacy platform was used to provide citations and the bibliography.

DESCRIPTION

Introduction



The Milwaukee Railroad Shops Historic District is located on Iowa's western border at 3400 Sioux River Road in Sioux City, Woodbury County, Iowa. The nominated historic district's setting reflects early- to mid-twentieth century railroad land use; however, its surroundings have changed gradually and periodically significantly over the complex's lifetime of railroad use.

The proposed 29.53-acre Milwaukee Railroad Shops Historic District encompasses the former Sioux City Roundhouse, Repair Shops and Engine Terminal of the Chicago, Milwaukee, St. Paul and Pacific Railway. The complex was constructed during the timeframe of 1917-1918 by the railroad's motive power and engineering departments under the direction of C. F. Loweth, chief engineer. The facility served as a divisional roundhouse terminal and repair shops for servicing steam and diesel locomotives and refurbishing rail cars for sixty-three years until its closure by the railroad in 1980 and abandonment in 1981; the railroad was insolvent, had declared bankruptcy and was in receivership.

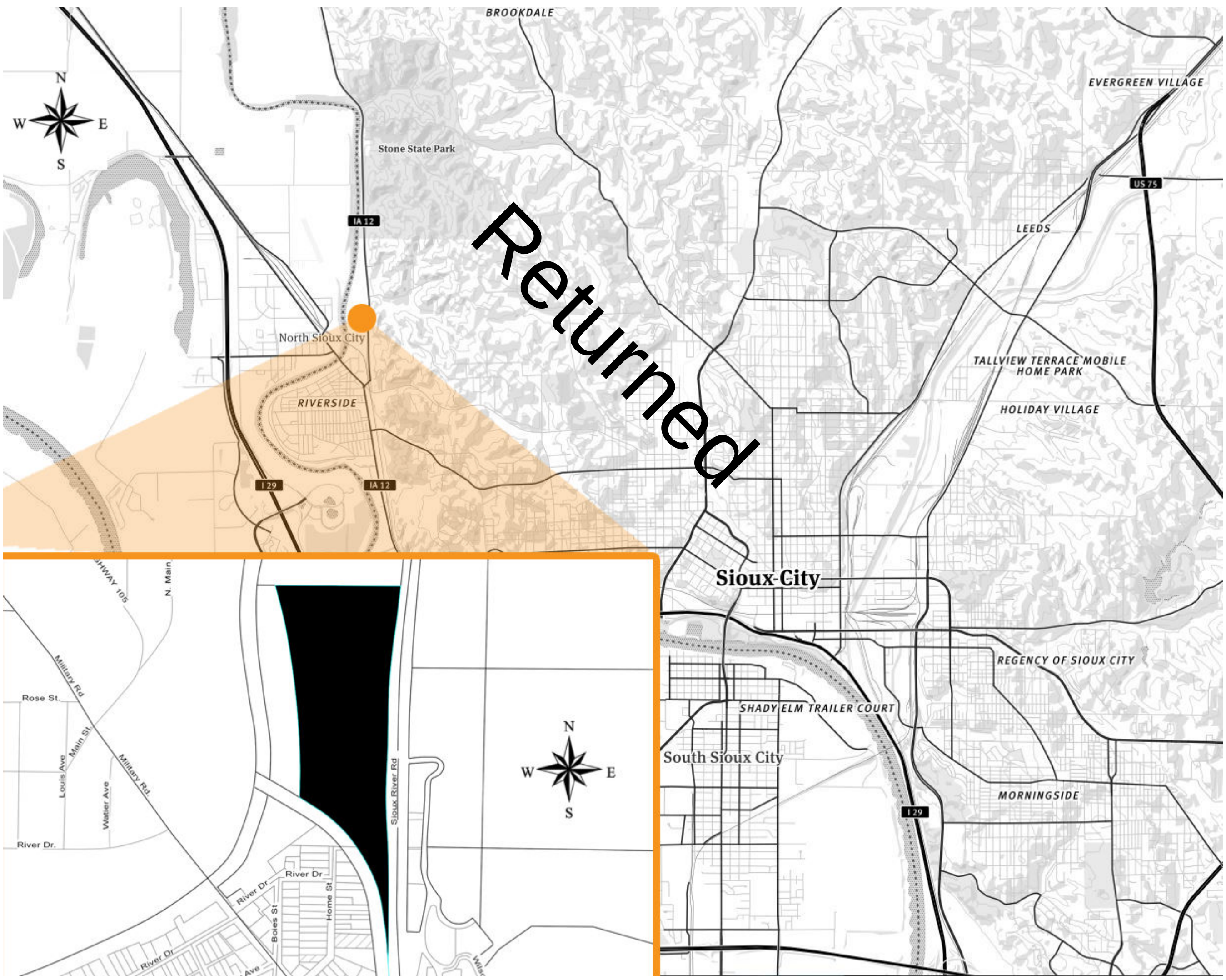
The meat cleaver-shaped district incorporates a cluster of buildings, structures, worker walkways, foundation remnants, tracks, switches, locomotives, and rolling stock that are associated with the site's historic functionality as the railroad's divisional locomotive servicing terminal and car repair shop facility. The proposed Milwaukee Railroad Shops Historic District is <u>one (29.5-acre) site</u> containing <u>9 buildings</u>, <u>8 structures</u> (includes 1 contributing walking path transportation system with multiple non-contiguous segments; 1 rail trackage system with multiple sections that are laddered and joined to form a rail yard), <u>15 sites</u> (includes remnant building foundations and the overall historic district site), and <u>13 objects</u> (includes locomotives, rolling stock and other railway-related vehicles). The cumulative total number of contributing and non-contributing resources is <u>46 assets</u> including the overall site. A complete inventory is provided in this section on page 31.

The visual effect of the historic resources still evoke a strong relationship to steam locomotive-era railroading and the complex's original functionality as an engine terminal and car repair shops. The complex exhibits an exceptional degree of original architectural and civil engineering integrity. While some of the building envelopes have superficial deterioration as documented in the accompanying photos, the buildings maintain their overall historic appearance and were the "hubs of work" during railroad operations. The extant foundation remnants contribute to the understanding of obsolesce in functionality of industrial land use by exhibiting the former presence of railroad buildings, structures, and infrastructure that were retired and removed– a common practice in railroad operations - as the shops complex and the railroad industry evolved.

The Milwaukee Railroad Shops Historic District is home to Great Northern Railway Steam Locomotive No. 1355 and Tender 1451. Both the locomotive and tender are listed on the National Register of Historic Places at the *national level of significance*.

▪ Physical Location of Nominated Property

The nominated Milwaukee Railroad Shops Historic District is located in the extreme northwest quadrant of the city of Sioux City in Woodbury County, Iowa. The historic district is sited along the east bank of the Big Sioux River just north of the residential neighborhood area known as Riverside. The following map illustrates the historic district's location within the city limits of Sioux City.



Location of Property within City Limits
Source: https://www.mapbox.com | Date: 07/12/2016 | Drawn by Tammy Scholl | Not to Scale

The Milwaukee Railroad Shops Historic District is roughly bounded by Sioux River Road (Iowa State Highway 12), Riverside Boulevard, Burlington Northern Santa Fe Railroad mainline, the Big Sioux River, and farmland.

The state boundary between Iowa and South Dakota also borders the historic district along its western property line. The historic district is located on the north side of the railroad's main line tracks. Entrance to the Milwaukee Railroad Shops Historic District is located at 3400 Sioux River Road in Sioux City, Iowa.

▪ Environmental Context: Topography Setting of the Historic District

The nominated historic district's typography consists of 29.53 acres of flat land lying within the Big Sioux River floodway, at the base of the first bluffs of the Loess Hills. The historic district is unprotected by any flood control device; however, as the land steadily slopes upward as part the Loess Hills landform, the property gradually rises out of the floodway into the one hundred year and five hundred year flood plain boundaries. The historic district's elevation ranges from 1084 feet above sea level along the district's western border to an elevation of 1115 feet above sea level along the historic district's eastern perimeter. During its period of historic significance, the Sioux City Roundhouse, Repair Shops and Engine Terminal complex was inundated by flood waters and historical river crests in 1951, 1952, 1960, 1962, 1969, 2011 and 2014.

The soil within the historic district is composed of Alluvial Land, Blake Silty Loam, and Haynie Silt Loam. The Alluvial Land soil occurs in the lower land area near the Big Sioux River and the Blake Silty Loam and Haynie Silt Loam comprise the land area that gradually rises into the Loess Hills. The location adjacent to the Big Sioux River makes the soils subject to seasonal soil conditions such as frequent high water tables (Schalge, p. 24).

The southern edge of the proposed historic district is overgrown with grasses, shrubs, prairie wildflowers, burr oak trees, and cottonwoods as nature has tried to reclaim the land as timberland after the railroad's abandonment. Tree species include burr oak, maple, cottonwood and ash. These natural areas are now nesting homes for several wildlife species including bald eagles, hawks, killdeers, turkey vultures, wild turkeys, deer and wood chucks. Thousands of Canada geese nest at the site in the early spring and late fall as part of their annual migration to and from Canada. Reptile and Amphibian species include prairie rattlesnakes, bull snakes, garter snakes, tree frogs, bullfrogs, leopard frogs, and toads.

▪ Summary Statement of Integrity

The Milwaukee Railroad Shops Historic District retains integrity for listing on the National Register of Historic Places as a rare surviving type and style of steam-era railroad repair shop and engine terminal not only in Sioux City, but also across the nation's railroad network. The Milwaukee Railroad Shops campus is comprised of distinctive buildings and structures that successfully survived obsolescence and transitioned from the steam-age railroad to the diesel-powered, modern era of railroading.

In addition, the buildings, structures, foundation remnants and rail yard are rare survivors of the type of railroad landscape commonly constructed (i.e. industry-wide) during the late 19th and early 20th Century by the motive power and engineering departments of the Chicago, Milwaukee, St. Paul & Pacific Railroad - during a time frame when this railroad was a dominant player in the agricultural Midwest and Dakotas as a trunk line railroad network that eventually grew into the nation's last transcontinental railroad. The booming agricultural business coming out of the heartland, and the increasing numbers of people traveling across the Midwest into Iowa and the Dakota territories and on to the Pacific Northwest, forced the Chicago, Milwaukee, St. Paul & Pacific Railroad to make substantial capital investments in building up its maintenance and repair facilities to better serve the traffic growth.

The historic district is roughly subdivided into five conservation zones based on original functionality, each of which is readily distinguishable by the surviving buildings and land features: (1) rail yard, (2) engine fueling and servicing terminal, (3) locomotive repair shops, (4) car repair shops area, and (5) the surrounding farmland and natural areas. The nominated historic district' resources represent a physical progression in the evolution of railroad land use at this particular site. The Milwaukee Railroad Shops Historic District underwent many changes from its construction in 1917-1918 until railroad operations ceased in 1980.

In spite of the changes, the Milwaukee Railroad Shops Historic District maintains a high degree of integrity in all seven respects: location, design, setting, materials, workmanship, feeling and association.

Location: With regards to location, the Milwaukee Railroad Shops Historic District is excellent. All surviving buildings, structures, remnant foundations, and rail yard remain at their original site, with their original orientation with the historic mainline of the Chicago, Milwaukee, St. Paul & Pacific Railroad (now operated by the BNSF Railway and the Dakota-Iowa Railroad) on the south-southwest border as well as the Big Sioux River along the western property line.

Design: The design of the historic district continues to reflect the historic function of a steam-era railroad repair shop layout. All buildings and structures reflect their functional use as dedicated utilitarian industrial workshops and outdoor work areas relating to the servicing, repairing and maintenance of locomotives, freight rolling stock, and passenger cars. All building interiors retain key aspects that define them as former giant, open workrooms (wood interiors and columns supporting wood roofs; large window bays for daylighting; and brick walls with large door openings).

Setting: The overall integrity of the setting is good. The entire 29.53-acre facility is located on the west side of the First Bluffs of the Loess Hills and Iowa State Highway 12 (i.e. Sioux River Road); north of the historic mainline of the railroad; and east of the Big Sioux River. The Milwaukee Railroad Shops Historic District has endured through decades as steam-era railroad repair shops closed their doors and were razed; conceding to the wholesale transition of the railroad industry to diesel locomotives. The loss of these types of facilities, including five other similar railroad landscapes in Sioux City and over 1,700 nationwide, elevates the importance of the historic district's surviving landscape and comprehensive collection of buildings, structures, foundation remnants, and rail yard that remain.

Materials: The integrity of materials is good to very good. Except for the wood windows, new metal doors, and several new roof structures, the buildings in the historic district complex retain their original building materials: clay bricks, concrete foundations and concrete window sills. The interiors are very good with their original wood support columns and concrete floors (roundhouse has a mixture of floors constructed of concrete, brick, and dirt). The rail lines are comprised of steel, wood ties and aggregate. Foundation remnants and portions of the worker walkways retain their original poured concrete, with some spalling and weathering obvious.

Workmanship: The integrity of original workmanship is excellent. The quality of craftsmanship is expressed through architectural and decorative features such as the semi-circular Rowland arches, parapets, cornices, and concrete sills. The walls of each building show patterns of quality brickwork in their laying pattern. Inside each building's interior the structural systems are exposed, such as loadbearing brick walls and wood roof trusses, posts, and beams. The workmanship helps to define each building's character. No two buildings have the exact same look or patterns of workmanship. So while all buildings have a relationship to each other in terms of the entire complex's functionality, each building has a unique stylistic character. The workmanship also pays homage to the utilization of standardized plans in construction.

<u>Feeling:</u> The integrity of the buildings to give a sense of industrialization and railroading is excellent throughout the 29.53-acre Milwaukee Railroad Shops Historic District. The outdoor rail yard look and the interiors of the historic buildings convey their prior railroad heritage, which continues today as the Siouxland Historical Railroad Association continues to transform the Milwaukee Railroad Shops Historic District into a railroad museum focused on the railroads that operated truck lines across the Granger States and the Dakotas, as well as the functionality of the complex in railroad operations.

<u>Association:</u> The integrity of association is very good. Because of proximity to an active railroad mainline. The Milwaukee Railroad Shops Historic District has survived a precarious journey on the road to becoming a property listed on the National Register of Historic Places and as a symbol of the North American railroad identity in the country's agricultural belt. The visiting public can easily identify the surviving buildings to their railroad heritage and functionality by their placement in the complex along a longitudinal line that runs parallel to the rail yard. In addition, the Milwaukee Railroad Shops Historic District holds a collection of locomotives, rolling stock, cabooses, and passenger cars that reflects the types of equipment that was once serviced and repaired by the complex when it was functional as a railroad repair shop and engine terminal.

<u>Future Plans:</u> The owner of the Milwaukee Railroad Shops Historic District is the Siouxland Historical Railroad Association, a private non-profit 501(c)(3) museum and educational organization. This organization's development plans call for the preservation, rehabilitation and transformation of the historic district into the museum campus of the Sioux City Railroad Museum, an operating division of the Siouxland Historical Railroad Association. To assist with funding the historic preservation work and transformation activities, the Siouxland Historical Railroad Association is interested in applying for an investment mix of state historic preservation and brownfield tax credits; federal transportation enhancement funds; state Historical Resource Development Program funds; and private foundation and corporate grants.

▪ List of Contributing and Noncontributing Resources

The inventory list displayed on page 31, along with the accompanying sketch map found on pages 33-35, identify the contributing and noncontributing resources within the nominated 29.53-acre historic district. The extant buildings, foundation remnants, and other resources illustrate important stage in the history of the complex and the complex has merit to interpret the broader history of the North American railway industry. Narrative descriptions of each of the contributing and non-contributing resources are presented below. Except where noted, all historic resources were built during the construction period of 1917-1918, as documented by original construction blueprints and engineering plans.

▪ Narrative Descriptions of Contributing Resources and Structural Details

The Milwaukee Railroad Shops Historic District houses the core collection of historic resources that once made up the Sioux City Roundhouse, Repair Shops and Engine Terminal of the Chicago, Milwaukee, St. Paul & Pacific Railway. This is an industrial, railroad-related district, containing a concentration of buildings built of brick walls, wood frame windows and roof style construction. Each of the structures is built upon solid concrete foundations.

The signature building within the complex is the roundhouse building. Each ancillary building gains its architectural significance from its aesthetic associations with the roundhouse building and its historic railroad use and functionality. The complex's concentration of buildings is characterized by the utilitarian style of construction, nature and form commonly found in early twentieth century industrial complexes. Each building was designed to be a sheltered workhouse for railroad employees engaged in specific occupations and craft trades. Each building remained functional throughout the complex's active use as a railroad facility; mainly as storage areas in the later years.

Resource 1: Six-Stall Roundhouse Building **Condition: Good**

- **Contributing**

The roundhouse was originally built as a half donut-shaped building or half-circle structure in 1917, with minor alterations to stall 1 in 1947. Major alterations were made to the building in 1955, which led to the demolition of 24 locomotive stalls. With the transitioning to diesel electric motive power, those 24 stalls were obsolete and not needed. Approximately 20 percent of the original building structure remains, equating to about a quarter of a donut-shaped building.

Because the Sioux City-based roundhouse is built in semicircular pattern, it is constructed in the "radial segmental-arc" configuration of railroad buildings. The six-stall roundhouse measures 86'-6" (front wall) by 154'-0" (back wall) by 98'-4" (side walls) with a total footprint of 12,123 square feet. The building encompasses 79 degrees of curvature. Both the north and south elevations are curved. The north elevation faces the 90-foot turntable with stalls 2, 3, 4, and 5 each have a 45-foot standard gauge railroad track that radiates from the turntable and leads to each stall's service track.

The roundhouse is comprised of six "segmented" engine stalls, numbered clockwise from east to northwest from 1 to 6,with one stall (east end, stall 1) currently being used for entrance, offices, and galleries. This stall is split into two stories. One of the remaining five stalls (west end, stall 6) is used for a workshop area, while the remaining four stalls contain tracks for exhibiting, storing, maintaining and restoring locomotives and rolling stock.

The predominant building materials for the building envelope are wood and brick. The east and south elevations are constructed of load-bearing brick laid in a common bond with 4-inch projection pilasters, varying in height along the elevations, topped with cast-in-place concrete caps. The east elevation features salt-glazed tile capping sitting on top of a set of 5 stair-stepped parapets. The north and west elevations are constructed of load-bearing wood-framed walls.

The roundhouse structure is built upon concrete foundations. The roundhouse footings are approximately 4 foot deep along the rear wall, tapering to 3 feet, 6 inches deep along the front wall. The concrete foundation of the demolished 24 stalls is visible and clearly defines the footprint of those structures.

The roundhouse building's interior is dominated by open space except for Stall 1 which houses a two-story area subdivided for museum offices, archives, and exhibit galleries. The interior floor is concrete with areas of paver bricks. The original drawings indicate this is probably the original flooring dating from the 1917 construction timeframe. Four of the stalls (stalls, 2, 3, 4 and 5) contain standard gauge track measuring 85 linear feet long. Three of the stalls (stalls 2, 3 and 4) contain concrete-lined pits between the rails, for use in servicing locomotive and making wheel/running gear repairs.

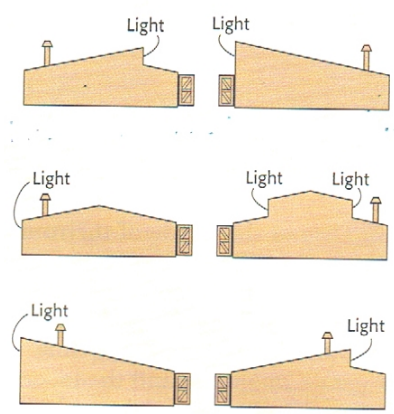
The engine pits in stalls 2, 3 and 4 are standard gauge width 4 ft. 8½ in. by various lengths. Engine pits in stalls 2 and 4 are approximately 85 ft. long while stall 3's pit is approximately 60 ft. long. At the end of engine pit stall 3 is a concrete foundation that once supported a boiler for heating the roundhouse and adjacent machine shop/blacksmith shop building. The pits drain to a sanitary sewer that runs under the north elevation of the roundhouse building. The side walls of the engine pits are concrete and there is limited "spalling" or crumbling of the concrete along the upper edges.

The building's roof structure is rendered in the double slope "Monitor" style. The roof is carried in two sections with the second "back" roof elevated about 5 feet above the adjoining front section to provide space for a clearstory facing north. The clearstory's function is to provide spacing to house stationary and movable sash for day lighting and ventilation. The wood Clearstory fenestration consists of five (5) 12-pane windows. The overall roof framework is "purlin spans over timber post and beam" with knee braces; covered with tongue and groove decking and composition roofing.

Common Roundhouse Profiles

Many railroad roundhouses were built in the days before the days of industrial plant electrification and powerful interior illumination (lighting) systems. To allow light into the sheltered workspaces, large banks of windows were installed in the building envelopes to allow for daylight to enter the structures. Gaining access to daylight affected the design of the roof structure and roundhouse profile. The railroads adopted three general design profiles for roundhouse construction: flat roofs, monitor-type roofs, or low types. The drawing to the right shows each of the types.

Source: *The Model Railroader's Guide to Locomotive Servicing Terminals*
by Marty McGuirk, p. 47



The overall roof structure is supported on lines of timber posts as well as on the front and rear circle walls and the straight sidewalls. At each stall, three timber columns built in a radial line support the roof. The foundations of each column are concrete about 18 inches square at the base. The exterior roof structure contains 7 metal gravity roof vents with interior ventilation monitors (smoke jacks) lined in a row and penetrate the roof interior. The steam locomotives would be spotted inside the roundhouse with their stacks lined up below the smokejacks to vent coal or oil smoke through the roof to the outside atmosphere.

The curved fenestration of the south elevation consists of three bays (stalls 1, 3, and 6) with 12 sets of 9-pane fixed window sash. Stall 2's fenestration consists of one window bay consisting of 11 sets of 9-pane fixed window sash with an entrance door. Stall 4's fenestration consists of one window bay of 8 sets of 9-pane window sash and a set of 2 large, hinged swinging wood doors. Stall 5 contains an extension area that once housed the large lathe for repairing locomotive driving wheels. The southeast and northwest fenestrations of this extension each have one window bay each of 12 sets of 9-pain fixed window sash. The extension's southwest facing fenestration is boarded over with a timber wall. Originally, this was an opening with large hinged swinging doors that allowed for wheel sets to be moved in and out of the roundhouse building. All window sets are set upon concrete sills beneath timber lintels.

The east elevation's fenestration consists of 5 sets of 9-pane fixed sash, consisting of 2 bays of two 9-pane sash, 1 bay with a set of six 9-pane sash, 1 bay with one 9-pane sash, and 1 bay with four 9-pane sash. There is one bay of 1-pane fixed sash. All bays of window sets sit upon a concrete sill. Projection pilasters capped with concrete are used to separate the window bays. The east elevation also includes a 36' by 8' metal entrance door. The east elevation has high aesthetic visibility from the state highway running along the historic district's east property line.

The curved north elevation, facing the turntable, is rendered in a timber-frame construction. A series of timber door posts embedded along the inside circumference of the roundhouse building's north elevation mark the location of each locomotive stall. Locomotive stalls 2 through 5 each have large, hinged swing out wood doors; stall 6 has a half-height swing out wood door. Only the swing door of stall 6 is perceived to be original, as its design matches original blueprint specifications. It is believed the wood clad doors for the other stalls were installed during the roundhouse alterations made in 1954.

The five large locomotive doors (stalls 2, 3, 4, and 5) and the smaller entrance door (stall 6) are hinged to "pintle" posts, which are entirely separate from the overall building construction. The posts are fastened to the building columns that support the roof structure in such a manner that the accidental wrecking of a door during the movement of a locomotive will not damage the remaining building structure.

The west elevation is a wood-framed exterior wall with car siding. There is one small entry door measuring approximately 10 ft. by 10ft with hinged swinging wood doors. There are no window openings. This exterior wall contains no trim elements or metal flashing to protect from moisture infiltration or infestation by insects, fungus or other pests. The interior wall has exposed wood framing and there is no insulation. This wall is not original to the building. The railroad's construction crews installed the wall to seal the roundhouse building after the demolition of the other 24 other locomotive stalls in 1954. Today, this wall is suffering from severe deterioration of wood elements and wood rot from many decades of neglect.

Resource 2: Turntable and Pit **Condition: Good, Fully Operational**

- **Contributing**

The Sioux City Engine Terminal is served with a 90-foot diameter deck turntable of heavy construction operated by a motor and gear system. The turntable and pit structure at the Sioux City-based Milwaukee Railroad Shops is representative of a standard design for the "90 ft. standard through-Type 'HI' center" turntables built for the Chicago, Milwaukee, St. Paul & Pacific Railway by the American Bridge Company. A builder's plate reading

"American Bridge Company – U.S.A" with a construction date of "1916" is affixed to one of the outer beams. A second plate displays the serial number "876" and identifies the Gary Plant as the fabrication center where the turntable components were manufactured.

The turntable is of the "through" type standard design constructed of two main girders, two center cross girders, floor-X-bracing and stringers. Overall the turntable, itself, weighs approximately 90 tons. The dead load is 1,800 lbs. per purlin ft. (600 lbs. for track and 1200 lbs. for steel). This table is designed for handling steam locomotives with a live load of 325 tons and a total wheelbase of about 90 ft. for both engine and tender.

The turntable is operated by a tractor, hitched to one end of the turntable to create the swing on a center bearing, running on the pit rail. By means of a 5 horse power, 3-phase, 220-volt motor, the turntable revolves at a speed of one full revolution within five minutes. The rotation of the turntable, which can be reversed in direction, is under the control of an operator housed in a shanty at the center of the turntable. The wood-frame control booth features a forward and reverse control system with breakers and power disconnects on/after the meter on the pole and between the motor and controls for safe maintenance. Before moving the turntable, the operator safety signals with a bell before start.

The control shanty is not original, due to an extensive fire on the complex during the late 1970s that destroyed the original wood-framed structure. This shanty was rebuilt in 1999 by volunteers of the Siouxland Historical Railroad Association as part of the renovation effort to return the turntable back to an operational state. The shanty is wood frame with a dimension of 8 ft. long by 4 ft. wide by 8 ft. tall with a single roof face that slopes down the entirety of the structure towards the turntable side. The roofing materials consist of rolled roofing. The shanty is of constructed of studs, horizontal boxing, and layers of car siding. The end walls' fenestration facing the ends of the turntable consists of one single-pain sash for the operator to have an unobstructed view for aligning the turntable track with the surrounding radial tracks and main lead tracks. The wall facing the center of the turntable contains one 36-inch wide, wood panel door for entrance. The outer wall, facing away from the turntable is solid.

The two main longitudinal girders are 88 ft. 10 in. long over all, with a depth of 8 ft. 4" at the center section tapering to 4 ft. 2 in. at the ends. The girders are spaced 7 ft. center to center. This "through-type" standard designed turntable has floor beams, stringers, and lateral diagonals arranged in a floor system comparable with bridge floors (A.R.E.A. pp. 283-284). The turntable deck consists of 8"x10" ties, spaced between 12 to 14 inches center to center. For safety precautions, the turntable features a set of wood-framed railings anchored to the turntable decking, spaced 9 feet each way from the center.

The turntable is installed in a concrete 91 ft. 1 in. diameter pit; approximately 4'-4' deep beneath rail level. Below is a soil base about 18 inches below the circle track shelf – originally concrete that was removed during previous alterations. The pit's outer circle wall is constructed of reinforced concrete 24 inches thick, with a footing of 6'-4" wide to carry the circle track. The pit wall radius is 45 ft. 5 inches from center. The circle track in the pit has a radius of 42'-7" to center of pit. It has a 90-lb. rail; carried by 3 ft. creosoted ties placed radially and spread approximately 18 inches center to center. The inside radius of the pit rail foundation is 41'-1½" from the pit's center point. When originally constructed, the floor of the turntable pit was most likely paved with vitrified brick land on edge with sand and grouted with cementitious mortar.

The four remaining radial tracks (originally 30 at this facility) to the roundhouse have full-length 90-lb. rail abutting the pit wall. Their ends are sawed squared to the pit wall and table track to provide a clearance not to exceed more than an inch; generally around ¾ inch is the clearance between the fixed radial track rail and the turntable rail. The fixed radial tracks are bolted to timber block sills (railroad ties) secured to the masonry pit wall. This makes a rigid, stable construction that is needed for moving locomotives and rolling stock over the fixed rails to the turntable rails.

The turntable center is of the disc type design by American Bridge Company. "The disc type consists of a bottom fixed disc of special steel which is surmounted by a saddle casting to which loads are transferred by means of loading brackets, the whole being enclosed between the main girders of the turntable and cross girders. A pair of cross girders between the main girders bear on the saddle block" that rests on a concrete foundation (A.R.E.A.). The square-shaped foundation under the turntable center is constructed of concrete built upon a spread footing measuring 5'-9" by 5'-9" at top to 13' by 13' at the base. The total height of the foundation is approximately 4 ft. with the bottom 3 feet embedded in the ground.

Resource 3: Machine and Blacksmith Shops **Condition: Excellent**

- **Contributing**

This building is rendered in the standard design practice of the Chicago, Milwaukee and St. Paul Railway to utilize the "ordinary rectangular form" in the design of its combination machine and blacksmith shop buildings. The predominant building materials are wood, timber, and brick; built upon a concrete foundation 4 ft. deep by 2 ft. wide. The total length of this building is 100 ft. and its total width is 50 ft., with a total height of 22 ft. in the center of the north and south elevations and 21 ft. at the outer walls of the east and west elevations. The original blacksmith shop area is separated from the original machine shop space by a "load bearing" fireproof brick wall approximately 18 inches thick.

The building's double slope roof was totally rebuilt in fall 2010 to winter 2011 due to severe deterioration and wood rot in the original roof structure. Similar to the roundhouse building, the overall roof structure is supported on a single line of timber posts as well as on the building's side walls and the interior separation fire wall. The overall roof framework is "purlin spans over timber post and beam" with knee braces; covered with tongue and groove decking and composition roofing. The two timber column posts supporting the roof are approximately 24 inches long by 15 inches wide, built in a radial line. The concrete foundations for each column are approximately 28 inches long by 18 inches wide, approximately 4 feet deep.

The current roof framework is designed to hold a monitor that will house heating, air conditioning, and ventilation equipment. This work is planned in the near future and will match the monitor style at the time of original construction. Please note – the original monitor was removed by the railroad in 1955 during alterations made to the complex; the machine shop and blacksmith shop were closed at that time.

The entire building is constructed of common brick. The brick façade was extensively repaired and tuck-pointed in spring 2011 to stabilize the building for preservation and adaptive reuse. The east and west elevations feature interior 4 inch projection pilasters, approximately 17'-9" tall with concrete caps. A concrete apron, approximately 4 ft. tall, encases the base of the building. This apron was added to the building during the 1960s to provide stability to the building when it was converted to a store house. The building was rented by the City of Sioux City for storage of street salt. This reuse negatively impacted the structural integrity of the building, causing severe deterioration in the brick walls causing near-structural collapse. Through historic preservation work, this deterioration has been mitigated.

The north elevation fenestration features 3 sets of 9-pane fixed sash: starting at the east end going west, a vertical 3 high by 2 wide bay with set of six 9-pane sash; one row with a set of four 9-pane sash positioned directly above 1 set of two large wood entrance doors measuring 13'-4" tall by 6'-4" wide (total span of 12'-8" wide) and two sets of 9-pane sash on the left (east side) of the doors forming a L-shape configuration for the sashes; and, a vertical 2 high by 2 wide set of six 9-pane sash. The sashes are set upon 4" concrete sills.

The fenestration of the south elevation is comprised of two window bays of 3 high by 2 wide sets of six 9-pane fixed sash; and, a row of four 9-pane fixed sash positioned above two large wood entrance doors measuring 13'-4" tall by 8"-½" wide doors, with a total span of 16'-1" wide. The sashes are set upon 4" concrete sills.

The 100 ft. fenestration of the east and west elevations is comprised of four window bays of twelve 9-pane fixed wood sash. However, on the east elevation, the first bay (south end) and the third bay from the south end each have one window sash removed to allow for a steel maintenance doors. The west elevation has two steel entrance doors in the south bay and second bay of window sets.

Resource 4: Car Department Mill Building (a.k.a. Car/Carpenter Shop) Condition: Excellent

- **Contributing**

The Car Department Mill Building, also known as the car/carpenter shop building was constructed in 1917 as a single-story, rectangular, common-brick structure upon a concrete foundation measuring 65'-6" x 40'-0" and covering a land footprint of 2620 sq. ft. The height of the building is 17'-9" with the top of the foundation at a level of six inches about surface. The north and south elevations feature a 13 ft. firewall with salt-glazed tile capping on the parapets. Prior to 2002, the building had an attached wood frame lumber shed clad in metal siding. The lumber shed was destroyed by a wind storm in spring 2002. A concrete slab measuring 40' by 24' defines the former floor area of the lumber shed.

The gable-style roof system is comprised of purlins over post and beam, with tongue and groove decking and composition roofing materials. The three timber columns that support the roof system are 24 inches long by 16 inches wide, built on a north-south radial line through the center of the building. The distance between the centers of the columns is 14 ft. The roof system was designed to handle the loads and vibrations of shafts, pulleys, belts, etc. – all sophisticated equipment of the time – which were suspended from the roof trusses (Haig & Benedict, p. 117).

While fenestration varies between elevations; 4-inch projection pilasters measuring 15'-0" in height with concrete caps on the north and south facing elevations separate the window bays. The fenestration of the east facing elevation consists of 3 bays of six 9-light wooden sash windows and one 4-light wood sash separated by three pilasters. The fenestration of the west facing elevation consists of two 4-light wood sash, two bays of five 9-light wood window sashes, and a main entrance consisting of a 4-panel, 6 ft. wide wood sliding door. The fenestration of north facing elevation consists of two 5-panel wood entrance doors on each end with four 4-light wood sashes. All window sashes in this building are set upon concrete sills. The fenestration of the south facing elevation consists of one 9'-½" tall by 8'-0" wide metal clad door mounted on a sliding clip angle that was originally used as a main entrance to the original attached lumber shed. This door is located on the east end of the fenestration and features a decorative half-circle, round Rowland Arch at the top. A smaller opening to the building is located on the west end of the south facing fenestration. This opening was used to feed plank lumber from the attached lumber shed into the mill building for sawing, milling, planning and piece work.

Resource 5: Toilet Building #2 (a.k.a. Water Closet) Condition: Excellent

- **Contributing**

The building, measuring 18'-1" x 14'-6", is constructed of common brick upon a 1'0" concrete foundation as a single-story structure. This structure is one of the eighteen buildings erected during the rail terminal's initial construction between 1917 and 1918.

The building features a gable roof with cornice construction sloping down in two directions with a center height of 14'-5" sloping to an outer wall height of 10'-5". The roof is comprised of open common rafters, ridge boards, tongue and groove plank roofing, and composition roofing materials. The interior is unfinished with a concrete slab floor and exposed roof truss system.

Fenestration consists of two window bays in the north and south sides with a five-panel wood entry door placed between windows in both ends. The east and west fenestrations feature one window opening set high towards the end of the elevations. No windows are currently intact. The original windows were 12-light wood sash sitting on a 3'-3½" long concrete sill. The entry doors sit upon a 6" tall concrete sill and entrance is gained through the aid of two 6" tall concrete steps. The east and west elevations each have two open slot areas at the base that were used for ventilation. The slots were formed by setting four spaced bricks as a soldier course separated by one-inch gaps. The slots are 8" high, and are located between floor joists (Drawing A269B p. 46)

Toilet Building No. 1 Foundation: This restroom facility was located on the north end of the complex to serve railroad employees engaged in work at the roundhouse, machine and blacksmith shop and warehouse. The surviving square-shaped concrete foundation footings, built to the same dimensions as Toilet Building #2, are located directly southeast of the roundhouse building and east of the machine and blacksmith shop. The foundation footings are in a state of "fair" repair with some "spalling" and "crumbling" occurring on the exposed surfaces. There is visual evidence of some minor cracking in the concrete as well. The remaining quality of the workmanship in this foundation is exceptional and has tremendous historical value to help illustrate the overall complex's industrial functionality and complexity.

Resource 6: Sand Drying House Condition: Excellent

- **Contributing**

Measuring 38'-2" x 20'-0", the sand drying house was constructed in 1917 as a single story, rectangular building constructed of common brick upon a concrete foundation with a gable roof sloping down in two directions. The building rests on a concrete foundation with the top of the foundation approximately six inches about surface level. The building features a chimney with a concrete cap that served as ventilation for the roasting stoves that were once housed in the building. The building's interior is open and stands unchanged from original construction.

The sand house features a double sloping gable-style, wood roof system comprised of open rafters with ridge boards and tongue-and-groove plank roofing and rolled roofing materials. The west facing fenestration contains three openings for windows and an entrance door opening; all boarded over. The east facing fenestration contains three openings for windows; all boarded over. The south facing fenestration contains a large opening that once housed an entrance door leading to the sand hopper. This opening was used to transfer sand into the roasting stoves and drying kiln. The north facing fenestration contains one opening for the main entrance door for workmen to enter the sand house. Above the entrance door was an opening for a window sash. According to documentation in original erection drawings, the windows were 4-light wood sashes similar to the smaller windows found in the car shops' mill building. Like the architecture of all the buildings, the window sashes were built upon concrete sills.

Resource 7: Wood Sand Tower **Condition: Excellent**

- **Contributing**

The sand tower is a 19'-6" tall structure comprised of a cylindrical reservoir tank supported by four 8"x8" wood columns anchored to a 10" by 10" concrete foundation at the base of each column. The wood columns are supported by three "X-beams" constructed of 2" by 12" blanks, each with a height of 5'-5 and spaced every 5'-11 ¼"

The sand reservoir's construction is in the form of a barrel-shaped wood tank with vertical staves designed to store up to 13.5 tons of dry silica sand. The height of the tank is 8' tall and its diameter measures 8'-10"; giving it a holding capacity of 636 cubic feet of storage space.

The tank or reservoir is capped with a squared, pyramid-hip, wood framed roof measuring 11'-9" by 11'-9" with asphalt shingle material. The roof contains one ventilation box, approximately 12" by 12", to assist with gravity movement of the sand into the locomotive sand boxes.

7(a): Sand Tower Column Support Foundations: located directly adjacent and on the north side of the sandy drying house are a set of four 10" by 10" concrete base foundations that once were used as the foundational base for the second wood sand tower structure. The top of the foundation bases are elevated about 2 inches above ground level. Visual condition assessments find there is some "spalling" and crumbling or deterioration of the concrete materials that form the foundations. The spacing, workmanship quality, and number of bases testify to the former presence of the wood sand tower structured and have historical value for the illustration of the functionality and complexity of the work centering on the general servicing of the steam and diesel locomotive fleets. The foundation bases also are important for documenting the historical evolution of this site from a steam locomotive servicing terminal through the dieselization area and complex downsizing to complete obsolescence when the railroad became defunct.

Resource 8: Engineers Tool House **Condition: Excellent**

- **Contributing**

The building's fenestration consists of one window sash in the east, north, and west sides. The primary entrance is a single, five-panel wood door opening in the south end. Decorative elements include concrete sills to support the windows and Rowland arches above the entry door and all window openings except for the window in the east elevation. The window sashes are fixed, 4-light on north, west and south elevations, and 6-light on east elevation.

The north, west, and south elevations feature salt-glazed tile capping on parapets. The roof is of the shed-style with a single roof face that slopes from west to east along the entire building. The roof is similar in construction to the sand house and water closet, consisting of open common rafters, ridge boards, tongue and groove plank roofing, and composition roofing materials.

Resource 9: Cinder Pit **Condition: Unknown**

- **Contributing**

According to the railroad's standard blueprints, the rectangular cinder pit measures 100'-0" long. The total width of the cinder pit is 22'-0" between pit walls. According to original construction documents, the depth of the pit was 14 ft. below the top of the rail; which afforded greater storage of ash to handle the volume of locomotives serviced at this complex, and to facilitate routine maintenance work under the steam locomotive.

The dimensions of the ash/cinder pit would allow cinders to drop readily from the steam locomotive to the pit below. The depressed cinder pit is located under the western-most main lead track to the turntable, with a siding track to allow ashes to be loaded on cars without causing delay in movement of locomotives to main-line trains. Like a service pit in the roundhouse, the wide configuration of the cinder pit most likely facilitated engine hostlers working under the steam locomotive for oiling and making some light repairs (Berg, p. 52).

When originally constructed, according to construction documents, the floor of the pit was most likely paved with vitrified brick land on edge with sand and grouted with cementitious mortar. The cinder pit walls were most likely built of hard fire brick, from 18 inches to 24 inches thick, laid in cementitious mortar to prevent deterioration from the heat of the cinder ash. Visual evidence shows that the coping of the cinder pit side walls is made with timber stringers. A water line and water column were located nearby to assist with cooling of cinder clunkers and ash. The water column for the cinder pit is intact, as documented in the attached photographic research.

Current State of Condition – Unknown - The cinder pit was filled with aggregate materials when the railroad ceased maintenance and repair of steam locomotives at the complex in 1954. According to railroad blueprints published in 1954, the cinder pit was retired in 1955.

Resource 10: Wood Timber Shipping Dock with Ramp and Store House Foundation — Condition: Poor

- **Contributing**

The Sioux City-based Stores Department was originally housed in a 40’-0” by 55’-0” brick-framed warehouse structure with an adjoining 15’-0” wide by 55’-0” long wood/timber shipping dock with ramp. Original construction documents delineate a track for the spotting of railroad freight cars that would be unloaded and loaded with materials and supplies. The warehouse structure was abandoned in 1954, according to railroad documents, and was demolished in 1963 after a fire engulfed the structure that year. It is assumed the supply track was removed sometime between 1955 and 1963. The extant remnants of the stores warehouse system are the shipping dock with ramp, the foundations of the warehouse building, and the concrete pad that was used for outside storage of materials and supplies. The stores department was strategically located to serve the needs of several work areas: the roundhouse, the machine and blacksmith shop, the car shops, and the oil house. To support the easy movement of large quantities of materials and supplies through the use of hand trunks and forklifts, there was a network of work walkways that radiated from the stores house to the other areas. These concrete walk ways could be used all four seasons and were wide enough to allow motorized and non-motorized forklifts and hand trucks.

The surviving shipping dock is constructed of various thicknesses and lengths of large dimensional timbers and planks. The loading and unloading dock features a deck height of 4 ft. above track level to allow for the unloading and loading of railroad box cars. The shipping dock deck sits upon eight timber columns built upon concrete foundations. The dock runs in a north-south linear pattern with the ramp lowering to ground level on the south end.

- **Current State of Condition – deterioration – state of disrepair**

The visual, condition assessment of the timber loading dock is exhibiting signs of significant deterioration of the wearing surface of the wood plank deck, the supporting wood deck beams, and the timber supports. Major causes of deterioration are wood rot resulting from many years of weathering the freeze-thaw cycles, damaged sustained by the 1963 fire, and termite infestations. While deterioration is substantial, the shipping dock exhibits significant historical integrity and provides that last remaining evidence of the site’s functionality as far as divisional supply depot for smaller ancillary shop facilities throughout the railroad system.

Foundation Remnants of Ancillary Buildings and Structures — Condition: Poor to Good

Scattered throughout the historic district are concrete foundation remnants of buildings, structures and other infrastructure that resembles the land use by the railroad. The foundation remnants provide context for the design and functionality of the complex as a major engine servicing terminal and car repair shop. The foundation remnants will be preserved and retained to mark the site of the railroad buildings and structures that once occupied the footprints of the foundations. Key interpretive/graphic panels are planned to help illustrate the razed buildings and structures to help visitors understand the functionality of the infrastructure component and the importance of the location in terms of land use design.

Resource 11: Power House Foundation (Contributing)
According to railroad blueprints, the building originally measured 50'-0" by 80"-0" and was rendered in the monitor style; similar to the machine and blacksmith shop building. The surviving foundation remnants are approximately 24 inches wide and 3 feet deep.

Resource 12: Oil-Mixing House Foundation and Concrete Pad (Contributing)

The mixing-house was a one-story brick building originally measuring 20'- 0" by 60"- 0" with a concrete floor pad. The foundation remnant is approximately 24 inches wide. According to railroad site plans published in 1954, the railroad abandoned the operation of the oil-mixing house in 1955 and demolished the structure, leaving the foundation and concrete pad for outdoor storage uses. The surface of the concrete platform is about 3 feet above grade.

Resource 13: Coal Station/Tower Foundation

The introduction of the diesel-electric locomotive led to the demise and eventual demolition of the coal tower during the retirement of buildings and structures in 1954-1955. What remains of this massive structure is the foundations that illustrate the foot print of the coaling station. The concrete foundation measures 66'-6" by 35'-5" with a height of 48" above grade level. The foundation is in a state of "poor to fair" repair, showing age from weathering with evidence of concrete spalling and flaking.

Resource 14: 24-stall Roundhouse Foundation (Contributing)

The decade following World War I brought about a dramatic change to the landscape of the Milwaukee Railroad Shops in Sioux City. This timeframe is often regarded as the Transition Era in Railroading. It was a time when many railroads were operating both steam and diesel locomotives, and the motive power of choice was not the steam locomotive. At Sioux City, the railroad began the orderly destruction of obsolete buildings and structures that were decommissioned during this transition time. The 1954 blueprints prepared by the engineering department called for the destruction of 24 stalls of the roundhouse building. After the demolition work was carried out, the foundation remnant was allowed to remain. The foundation's donut-shaped footprint spans 48,492 sq. ft. The surviving foundation exhibits much of its original concrete building materials, although, the concrete is exhibiting stress from many years of weathering. Buckling and heaving are present from the freeze/thaw cycles of the Midwestern climate.

Resource 15: Wheel Shop - Casting Platform (Contributing)

The wheel shops' casting platform is constructed of concrete with rebar, measuring 50'-0" wide by 100'-0" long, with a depth of 6 inches. The platform is in a state of good to fair repair, showing age from weathering with some spalling and flaking.

Water Works System Remnants **Condition: Poor**

Resource 16, 17 and 18: Water Well Foundations (Contributing)

The general layout schematic for the complex identifies the location of three water wells. The well head apparatuses for these wells were supported by concrete foundations, each measuring 14’-6” by 14’-6” in a square pattern. Each well was dug approximately 30 feet deep with a 14-inch diameter wells. No physical alterations were made to the water well foundations; original integrity was protected. The foundations are in a state of fair to poor repair with spalling and crumbling concrete due to weather extremities and a general lack of maintenance.

Resource 19: 150,000 Gallon Soft Water Tank Column Foundations (Contributing)

The surviving foundation consists of six square column footings, each constructed of concrete, measuring 6 ft. by 6 ft. and protruding about 3 feet above grade. The footings are in a state of “fair” repair and exhibit some concrete crumbling and spalling. These footings have significant historical value to the complex to help illustrate the site’s historical functionality and to provide an aesthetic reminder of the site’s industrial complexity.

Resource 20: 60,000 Gallon Hard Water Tank Foundation Base (Contributing)

The surviving foundation is a circular concrete foundation with an outer footing that forms a rim around the base that protrudes about 2 feet above grade. The base has a diameter of 30 feet and the circumference of the outer “rim” footing 188.5 feet. The base occupies a total footprint of nearly 2,827.5 sq. ft. The concrete base and outer rim footing are in a state of “fair” repair with some crumbling and spalling in the concrete. The reservoir base and foundation footings have a significant historical value to the complex to provide evidence of the defunct waterworks system that existed at this site and to illustrate the industrial nature of the site.

Resource 21: Water Column Box Area (Contributing)

The water column box area is a remnant of the water works system that was utilized in railroad and locomotive operations at the Sioux City Roundhouse, Repair Shops and Engine Terminal facility. The water column box area is located towards the geographic center of the complex, directly east of the oil house foundation. The concrete box area contains a below ground shut-off valve with evidence of a water column for filling locomotive tenders once protruding above ground.

Resource 22: Toilet Building #1 North Foundation (Contributing)

Located southeast of the surviving six-stall roundhouse is the concrete foundation for former Toilet Building #1. The foundation is in a square shape measuring 18’1” x 14’6” with 12” wide by 4’ deep walls that are trenched in the ground.

Resource 23: Store Room Warehouse Building Foundation (Contributing)

Trenched in the ground are a rectangular foundation measuring 40'-0" x 55'-0"with 12” wide by 4’ deep walls that once supported a nearly two-story high brick building that served as a supply warehouse.

Resource 24: Car Shop Lumber Shed Slab Floor and Foundation (Contributing)

Covering a space of 40'-0" x 50'-0", is a poured concrete slab that once houses a metal building for the storage of lumber that would eventually be milled and planed by carpenters in the car shop building.

Resource 25: Sand Tower Foundation (Contributing)

Located directly adjacent to the sand drying house on the northeast corner are four poured concrete bases measuring approximately 12" by 12" and four feet deep. The bases were used to support the sand tower wooden columns that held up the wood sand tank.

Resource 26: Worker Walkways — Condition: Poor

- **Contributing**

Although approximately 13,052 linear feet of worker walkway segments currently exist throughout the complex, they have (for a variety of reasons) not been adequately managed or maintained over the years. The worker walkways are constructed of poured concrete at various widths and lengths with depths ranging from 4 inches to 6 inches. The dimensions for each of the surviving walkways are detailed in the inventory sheet.

As the attached photos document, the worker walkways are suffering distress and severe deterioration. All surviving worker walkway segments are in a state of "poor" repair. The worker walkways exhibit signs of "spalling", crumbling, and cracking. The cause of deterioration of the concrete in the worker walkways is related to ready ingress of water because of the exposure of the walkway system to drainage and ground water runoff. Once cracking occurred in the walkway structure, the integrity of the concrete was compromised; allowing pathways for the ingress of water. As this water saturated the weakened concrete and froze during winter and snow melt periods, further damage from ice formation may have caused pressure on the concrete structure and hastened the deterioration.

Resource 27: Yard Tracks — Condition: Poor

- **Contributing**

The surviving track elements contribute to the designation of this site as a "railroad yard historic district." This track network remains in the original road bed location from when the complex was built between 1917 and 1918. A field inspection found that a few pieces of steel rail date to their manufacture date of 1888, 1900, 1903 and 1907 as illustrated in the attached photo documentation.

A field inspection shows that all the tracks, including frogs and switches, is either in a state of "marginal" or "poor" condition. The decline of the Chicago, Milwaukee, St. Paul and Pacific and the embargo and eventual stoppage of all traffic along the rail line through Sioux City into the Dakotas resulted in significantly deteriorated conditions of the shops complex's rail yard. Much of the steel rail and track hardware are heavily rusted; and the original ties heavily degraded and suffering wood rot as documented with the attached photos. Ballast for the roadbed is non-existent, and in some places there is vegetation and over growth.

At the time of the writing of this nomination, the property owner has started preparatory work for the restoration of the rail, switch points, and the overall track networks. At various places, restoration has involved the reinstallation of selected tracks into the overall track structure to replace worn and unusable rail, with replacement ties integrated into the original location of the dilapidated, unusable ties. This restoration work is protecting the integrity of the original routing of tracks within the roadbed, as well as the functionality of the network of tracks.

- **Narrative Descriptions of Non-contributing Resources**

At the time of this nomination, the Milwaukee Railroad Shops Historic District is undergoing extensive historic preservation and rehabilitation work to redevelop and transform this historic transportation facility into a regional railroad industrial heritage museum. With this transformation comes the need for new structures to support this new functionality. The following non-contributing structures are directly related to the new functional reuse of the site.

- **Resource 28: C&NW Turntable Shanty (Non-Contributing)**

This structure should be considered noncontributing to the historic district because it is not directly associated with the built environment of the Milwaukee Railroad Shops Historic District. However, the C&NW Turntable Shack holds significance as a railroad artifact as a representative style of a turntable control shack used by another granger railroad in a locomotive servicing terminal that was built in Sioux City. The C&NW Turntable Shack was salvaged and relocated to its current location in 1997 after the Chicago and North Western Railroad demolished its turntable structure within its engine terminal that was housed at 18th Street and Floyd Boulevard in Sioux City.

The turntable is a wood-framed structure with a sloping single roof face; back wall measuring 8.6 feet tall by 5.9 feet wide; front wall measuring 7.0 feet tall by 5.9 feet wide; and side walls measuring 5.3 feet wide. The shanty is constructed of studs and horizontal boxing and car siding. One side fenestration has an observation window while the other side fenestration houses a 36-inch wood panel door for entrance. The front fenestration has an observation window. The interior is open with all electrical and operating controls removed. The current functional use for this turntable structure is a ticket booth for the railway ride operation.

- **Resource 29: Scale Pit (circa early 1970s) (non-contributing)**

This structure should be considered as noncontributing to the historic district's integrity because it is not original to the Milwaukee Railroad Shops facility and was not used for railroad-related operations.

The Scale Pit measures 16'-8" x 63'-0" x 12'-0" with the walls and base floor constructed of 12" reinforced concrete. During the 1970s, the city of Sioux City leased the Machine Shops building from the railroad for the purposes of housing and supplying snow removal trucks and plows with street salt to combat icy conditions in the Riverside and Westside neighborhoods of Sioux City during the winter inclement weather. A scale pit with an electronic commodity weighing scale was installed directly adjacent to the Machine Shop for the purposes of weighing the salt loads carried by the trucks and plows, which allowed the City to maintain compliance for weight restrictions on state and city roadways. When the City abandoned its use of the building upon the abandonment of the site by the railroad in 1980, the electronic commodity scale was removed and the pit was filled with dirt.

- **Resource 30: Maintenance Building (circa 2009) (non-contributing)**

This single-story metal structure should be considered as noncontributing to the historic district's site because it was constructed and installed in 2009, outside the period of significance. The building houses equipment, tools, and machinery used in the maintenance of grounds that comprise the Milwaukee Railroad Shops Historic District. The maintenance building is a custom-built, steel building constructed by Morton Industries. Allied Design Architectural & Engineering Group designed the structure to Morton Standard Building Plan #306. The building's rectangular dimensions are 48' x 80' built on a 12" x 4' deep foundation. The building has a 5" deep fiber mesh concrete floor with no rebar. The building envelope consists of a gable roof with the fenestration comprised of steel siding with a steel wainscot. The east and south elevations have no openings in the fenestration. The north fenestration has a large 12' wide by 12' high roll up door and one small entry door. The west elevation has four openings consisting of a metal entry door and 3 large 12' wide by 18' high roll up doors.

- **Resource 31: Model Railroad and Civil Engineering Exhibit Center (circa 2010) (non-contributing)**

This building should be considered as noncontributing to the historic district because it was constructed in 2010, outside the period of significance. The newly constructed Railroad and Civil Engineering Exhibit Center is a single-story building measuring 80'-0" x 50'-0" x 18'-0" with a gable roof slanting east and west built upon a 4" thick finished concrete slab on grade. The building is of wood-framed construction with wood trusses, common wood rafters, and rough framing. The windows are custom wood frame and wood sash. The building contains 16 gauge hollow metal doors and frames, non-asbestos fiber siding, and asphalt saturated felt and roofing shingles. The structure is painted gray with two coats of latex enamel and one coat galvanize primer. This building is used to house interpretative exhibits on railroad engineering and to display an 18' wide by 68' long HO-scale model railroad depicting an urban/rural Midwestern topography of cities, prairies, farmsteads, small towns, and the Black Hills. The model railroad illustrates the Union Pacific route from Omaha, Nebraska to the Black Hills.

- **Resource 32: Restroom Facility (2015) (non-contributing)**

This structure is considered as noncontributing to the historic district's historic vertical infrastructure because it is not an original structure of the Milwaukee Railroad Shops facility and was prefabricated by the Public Restroom Company at their manufacturing plant in Minden, Nevada. The building measures 22'-10" x 19'-6" with the side walls constructed of an engineered concrete block wall system. The building features a "gabled" plank and beam roof system supporting a 26 gauge metal roof. The restroom building features a family-oriented design of four secure, single-occupant compartment restrooms. Entry doors are constructed of 14 gauge reinforced galvanized steel. Commercial grade, wall mounted, vitreous china plumbing fixtures are installed in each bathroom compartment. The restroom facility is mounted to an 8" thick concrete slab that is oil and stain resistant. The entire structure sits upon an 18" wide by 42" deep foundation.

Summary Statement of Significance of Locomotive and Rolling Stock Collection - Contributing

The motive power and rolling stock collection housed at the Milwaukee Railroad Shops Historic District consists of locomotives, passenger cars, freight cars, cabooses, and maintenance-of-way equipment associated with several historic railroads and builders. The locomotives range from a tiny 44-ton center cab-style diesel locomotive switcher built in 1941 for military-industrial use to a Trackmobile mover built in 1974. The vast majority of the equipment is under 50 years of age, ranging in age from 28 years to 99 years. However, this consist of equipment is very illustrative of the complex's functionality during its later years of railroad land use; and the eventual demise of complexes like the Sioux City Car Repair Shops.

As the Milwaukee Road grew northwestward through the Dakotas into the Pacific Northwest, the Sioux City Engine Terminal and Car Repair Shops became an important terminal and repair shop for movable equipment such as freight cars, cabooses, and other rolling stock that traversed the Milwaukee Road system. Because the Sioux City-based shops were the railroad's largest and last heavy locomotive and car repair shops between Iowa and the Pacific Northwest, this complex was charged with repairing not only the railroad's "native" equipment but also equipment owned by foreign roads or corporate shippers/customers. It would not be uncommon for the Sioux City shops to service equipment belonging to railroads such as the Union Pacific; Chicago and North Western; Great Northern; Chicago, Burlington & Quincy; Illinois Central; or the Burlington Northern – particularly since Sioux City was a major terminal and interchange point for all these rail lines.

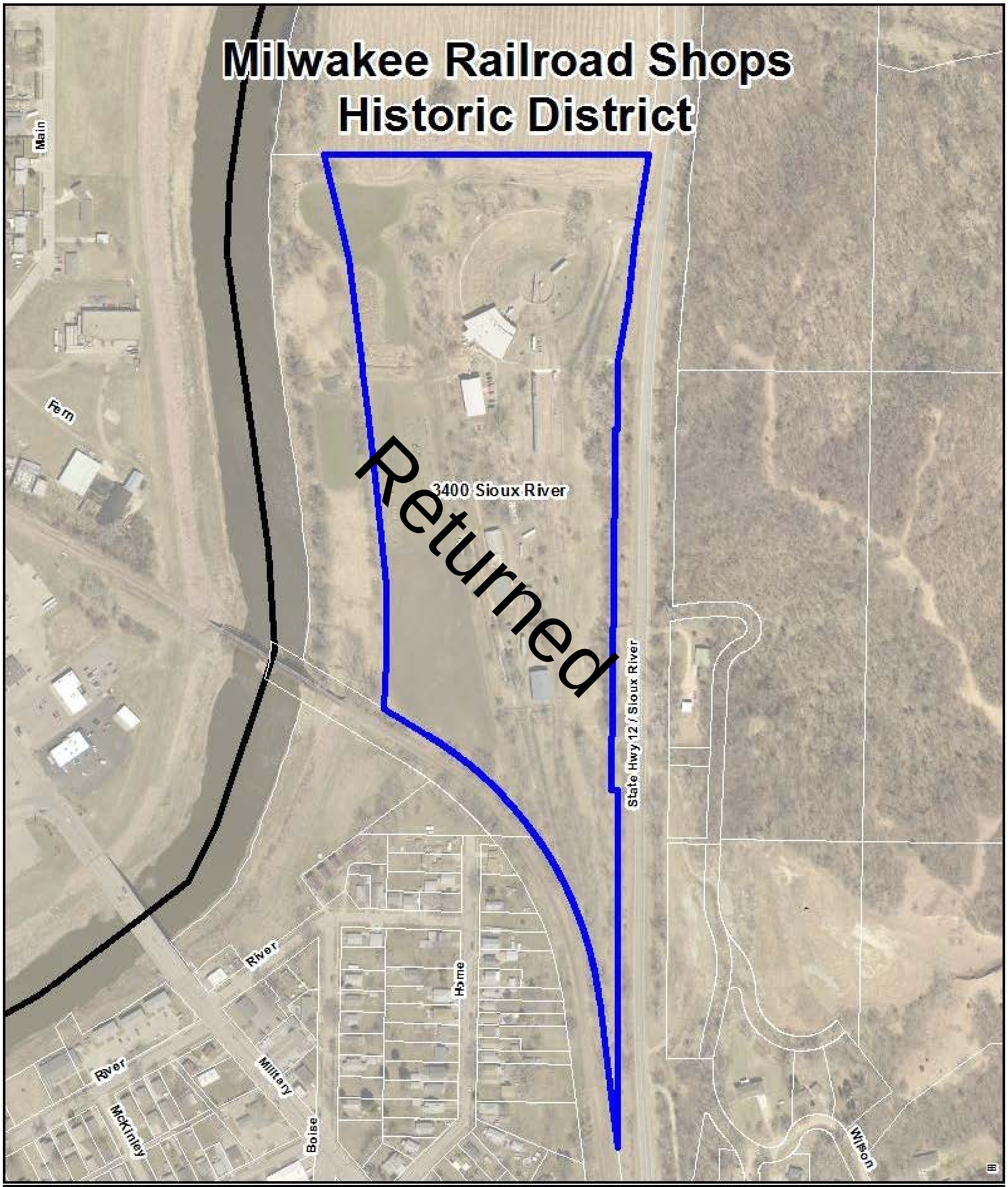
Field Inventory of Contributing and Noncontributing Resources

ID #	Resource	Construction Date	Major Alterations	Area (SF)	Original Functionality	National Register Status	Resource Type
1	Six-Stall Roundhouse Building	1917	1954	12,123	Locomotive Repair	Contributing	Buildings
2	Turntable and Pit	1917	N/A	6,370	Locomotive Service	Contributing	Structures
3	Machine and Blacksmith Shops	1917	1954	5,000	Parts Fabrication	Contributing	Buildings
4	Car Repair Deaprtment/Mill Building (a.k.a Car/Carpenter Shop)	1917	1954	2,620	Rolling Stock Repair	Contributing	Buildings
5	Toilet Building #2 (a.k.a. South Water Closet)	1917	1954	257	Restroom Facility	Contributing	Buildings
6	Sand Drying House	1917	1954	837	Locomotive Service	Contributing	Buildings
7	Wood Sand Tower	1917	N/A	416	Locomotive Service	Contributing	Structures
8	Engineer Tool Shed	1917	1954	238	Tool Storage	Contributing	Buildings
8	Wood Sand Tower	1917	N/A	416	Locomotive Service	Contributing	Structures
9	Cinder Pit	1917	1954	2,200	Locomotive Service	Contributing	Structures
10	Wood Timber Shipping Dock with Ramp and Store House Foundation	1917	N/A	825	Supply Distribution	Contributing	Structures
11	Boiler Power House Foundation	1917	1954	4,00[illegible]	Complex Utilities	Contributing	Sites
12	Oil-Mixing House Foundation and Concrete Pad	1917	1954	[illegible],20[illegible]	Locomotive and Car Service	Contributing	Sites
13	Coal Station/Tower Foundation	1917	1954	2,[illegible]45	Locomotive Service	Contributing	Sites
14	Roundhouse Foundation	1917	1954	47,[illegible]74	Locomotive Repair	Contributing	Sites
15	Wheel Shop - Casting Foundation	1917	1954	5,000	Rolling Stock Repair	Contributing	Sites
16	Water Well Foundation - Pump House # 1	1916	1954	210	Complex Water Works	Contributing	Sites
17	Water Well Foundation - Pump House # 2	1916	195[illegible]	210	Complex Water Works	Contributing	Sites
18	Water Well Foundation - Pump House # 3	1916	19[illegible]	210	Complex Water Works	Contributing	Sites
19	150,000 Gallon Soft Water Tank Foundation (6 col.)	1916	1954	216	Locomotive Service	Contributing	Sites
20	60,000 Gallon Hard Water Tank Foundation	1917	1954	707	Locomotive Service	Contributing	Sites
21	Water Column Box Area	1916	1954	128	Locomotive Service	Contributing	Sites
22	Toilet Building # 1 North Foundation	1917	1954	180	Restroom Facility	Contributing	Sites
23	Store Room Warehouse Foundation	1917	1965	2,200	Supply Distribution	Contributing	Sites
24	Car Shop Lumber Shed Slab Floor and Foundation	1917	1954	2,000	Rolling Stock Repair	Contributing	Sites
25	Sand Tower Foundation	1917	1954	64	Locomotive Service	Contributing	Sites
26	Worker-related Path System Components	1916	N/A	13,052	Worker Walking Paths	Contributing	Structures
	Worker Walkway 1 - Entrance to Roundhouse	1916	N/A	552	Worker Transportation		
	Worker Walkway 2 - Southside Roundhouse	1916	N/A	568	Worker Transportation		
	Worker Walkway 3 - Machine Shop Entrance	1916	N/A	1,016	Worker Transportation		
	Worker Walkway 4 - Pathway to Store House	1916	N/A	904	Worker Transportation		
	Worker Walkway 5 - Car Shop	1916	N/A	2,192	Worker Transportation		
	Worker Walkway 6 - Loading Dock to Oil House	1916	N/A	696	Worker Transportation		
	Worker Walkway 7 - West to River (near Car Shop)	1916	N/A	584	Worker Transportation		
	Worker Walkway 8 - Home Street to Car Shop Segment	1916	N/A	6,540	Worker Transportation		
	North Entrance Roadway 3400 Sioux River Road	1930s	N/A		Worker Transportation		

Field Inventory of Contributing and Noncontributing Resources, continued

ID #	Resource	Construction Date	Major Alterations	Area (SF)	Original Functionality	National Register Status	Resource Type
27	Rail yard Trackage System Components	1916-1917	N/A	42,906	Rail Yard Sorting System	Contributing	Sturctures
	Rail Yard Main Lead Segment (BNSF Switch Point)	1916-1917	N/A	1,143	Terminal Movement		
	Engine Lead Segment (Switch point)	1916-1917	N/A	4,396	Locomotive Movement		
	Engine Inbound Lead East Segment (Switch point)	1916-1917	N/A	4,727	Locomotive Movement		
	Engine Outbound Lead Segment (Switch point)	1916-1917	N/A	5,170	Locomotive Movement		
	Engine Storage Track Segment (Switch point)	1916-1917	N/A	1,927	Locomotive Movement		
	Car Shop Lead Segment (Switch point)	1916-1917	N/A	924	Rolling Stock Movement		
	Car RIP (Repair In Place) Track 1 Segment (Switch point)	1916-1917	N/A	5,563	Rolling Stock Movement		
	Car RIP (Repair In Place) Track 2 Segment (Switch point)	1916-1917	N/A	5,021	Rolling Stock Movement		
	Turntable Foundation Roadbed Segments (16)	1916-1917	N/A	12,170	Locomotive Work Sortment		
	Roundhouse Track 1 Segment	1916-1917	N/A	373	Locomotive Work Sortment		
	Roundhouse Track 2 Segment	1916-1917	N/A	373	Locomotive Work Sortment		
	Roundhouse Track 3 Segment	1916-1917	N/A	373	Locomotive Work Sortment		
	Roundhouse Track 4 Segment	1916-1917	N/A	373	Locomotive Work Sortment		
	Turntable Stub Track Segment	1916-1917	N/A	373	Locomotive Movement		
	Post 1981 Buildings and Structures						
28	C&NW Turntable Shanty	1916	1997	8	Turntable Controls	Non-Contributing	Buildings
29	Scale Pit	1970s	N/A	1,050	Commodity Weighing - Salt	Non-Contributing	Structures
30	Morton-built Steel Maintenance Building	2009	N/A	3,200	Complex Maintenance	Non-Contributing	Buildings
31	Railroad and Civil Engineering Exhibit Center	2010	N/A	4,000	Cultural Use - Public Exhibits	Non-Contributing	Buildings
32	Restroom Facility	2015	N/A	N/A	Visitor Services	Non-Contributing	Buildings
33	Security Fencing around the perimeter	1997	N/A	N/A	Complex Security	Non-Contributing	Structures
	Collection - Locomotives and Rolling Stock						
	Great Northern Railway Steam Locomotive No. 1355	1909	1927	N/A	Train Service	Contributing	Objects
	Great Northern Railway Tender No. 1451				Train Service	Contributing	Objects
	U.S. Marine Corps Center Cab Diesel Locomotive #206	1943	N/A	N/A	Train Service	Contributing	Objects
	Chicago & North Western "SHRA" Caboose #11168	1968	N/A	N/A	Train Service	Contributing	Objects
	Chicago & North Western Caboose #11009	1960	N/A	N/A	Train Service	Contributing	Objects
	Northern Pacific Caboose #1318	1913	N/A	N/A	Train Service	Contributing	Objects
	Chicago & North Western Box Car #160970	1969	N/A	N/A	Train Service	Contributing	Objects
	Chicago & North Western Box Car #162571	1973	N/A	N/A	Train Service	Contributing	Objects
	Burlington Northern Fruit Express Reefer #469	1957	N/A	N/A	Train Service	Contributing	Objects
	Northern Pacific Heavyweight Diner #111	1911	N/A	N/A	Train Service	Contributing	Objects
	Chicago Burlington & Quincy Commuter Coach #7202	1930	N/A	N/A	Train Service	Contributing	Objects
	U.S. Army 8-man Motor Car	1960	N/A	N/A	Maintenance of Way Service	Contributing	Objects
	Corliss Stationary Steam Engine	1918	N/A	N/A	Power Utility Generation	Contributing	Objects

Returned



SIOUX CITY

City of Sioux City Planning Division

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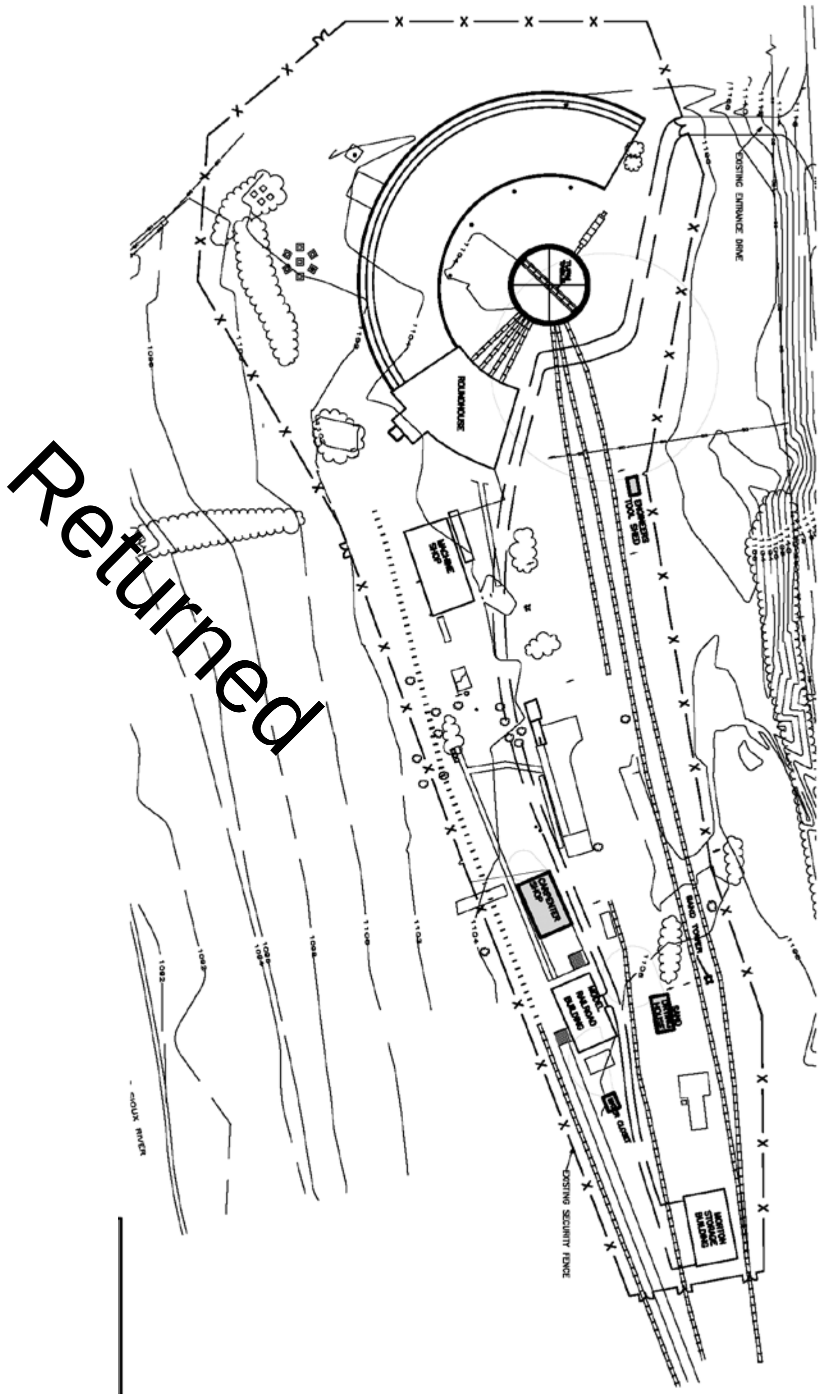
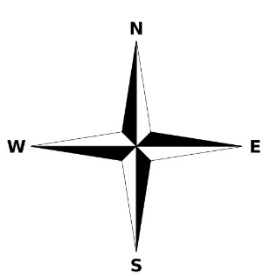
Milwaukee Railroad Shops Historic District
Name of Property
Woodbury County, Iowa
County and State
Name of multiple listing (if applicable)

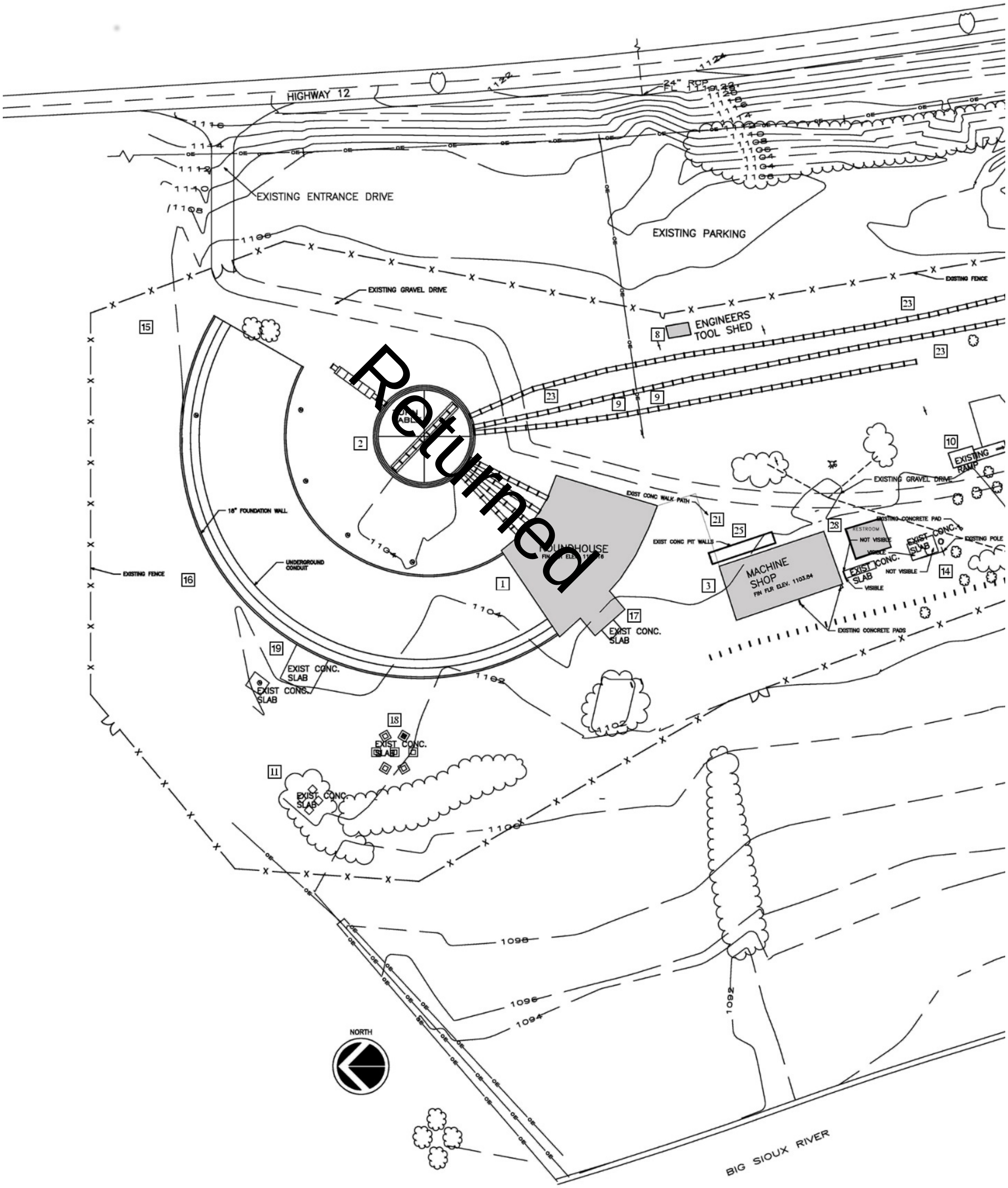
2015 - General Layout of Milwaukee Railroad Shops Historic District: Identification of Major Surviving Buildings (Complete Site View)

Source: RML Architects, Sioux City, Iowa
Date: December 12, 2016
Drawn by: Regina Smith, NCARB, Architect
Not to Scale



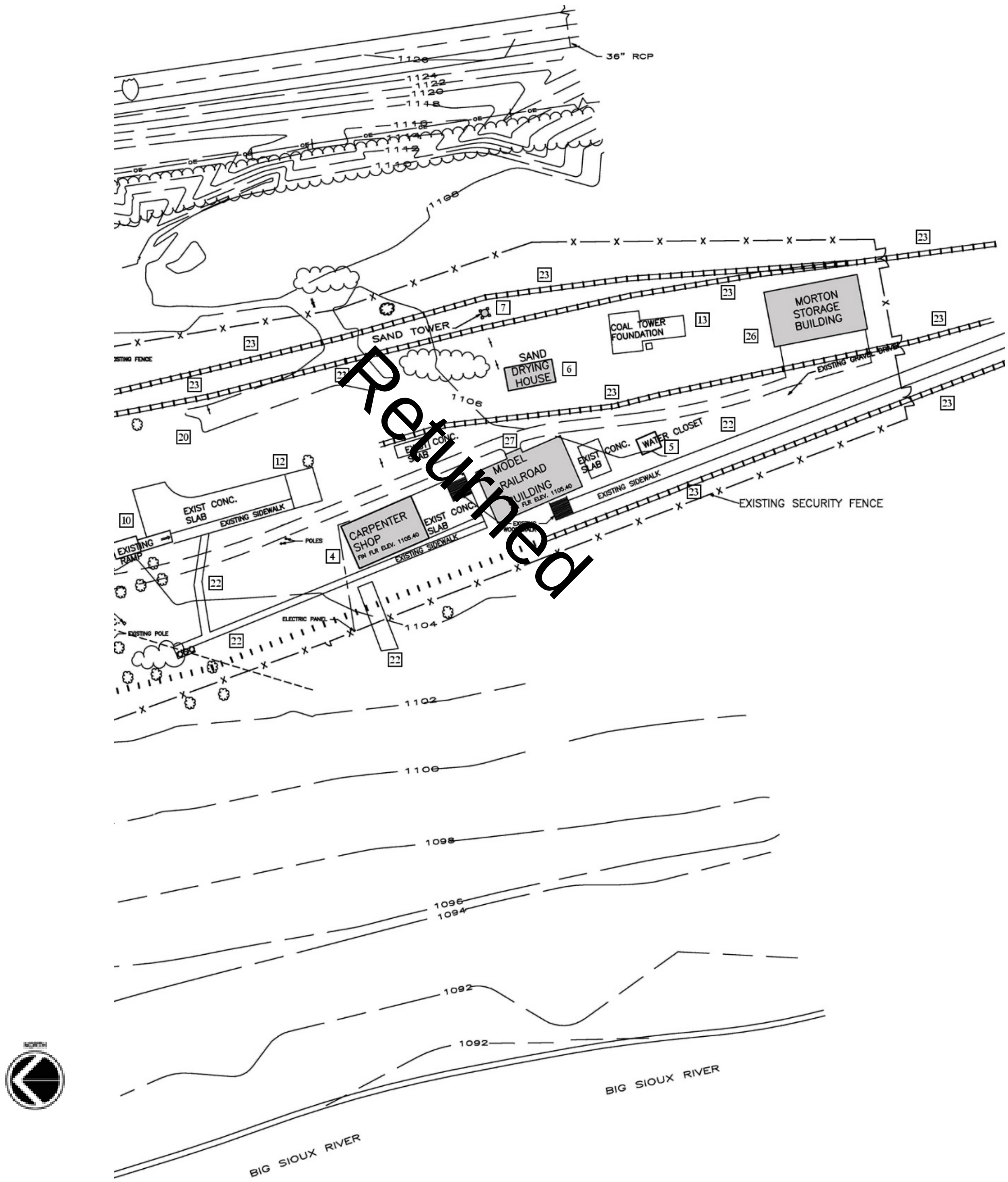


Map Identifying Major Buildings and Structures (North End Segment of Property)
Source: RML Architects | Date: December 12, 2016 | Drawn by Regina Smith, NCARB | Not to Scale



Map Identifying Major Buildings and Structures (South End Segment of Property)

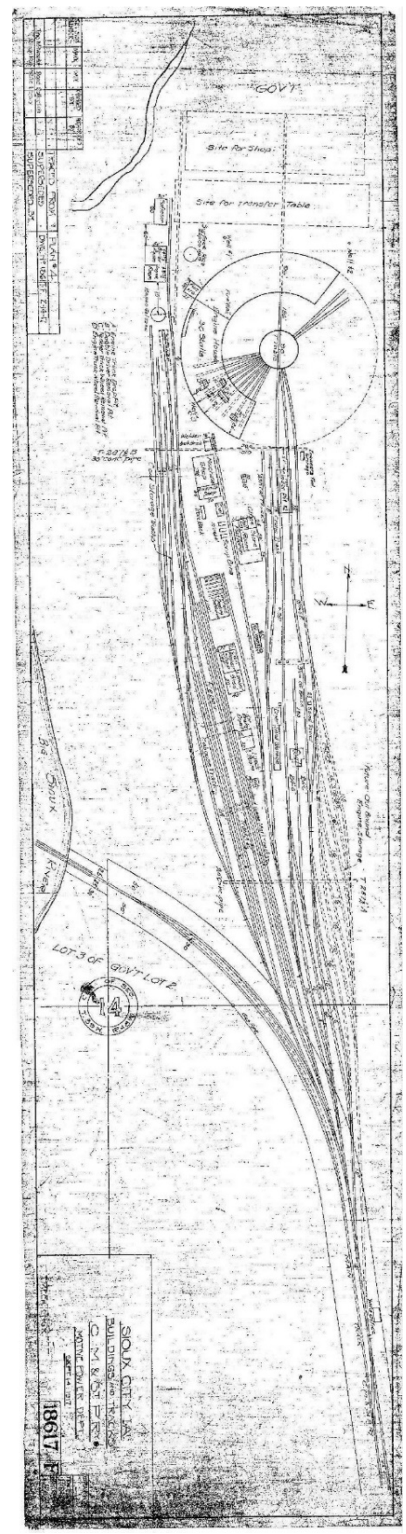
Source: RML Architects | Date: December 12, 2016 | Drawn by Regina Smith, NCARB | Not to Scale

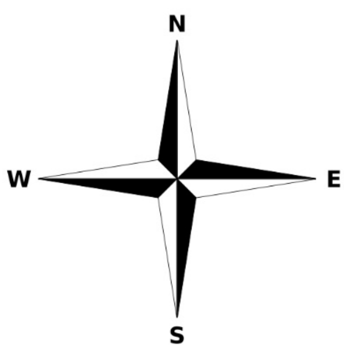


1916-1917 Complex Layout Plan

A ground plan of the Sioux City Roundhouse, Repair Shops and Engine Terminal prepared over the timeframe of 1916-1917 by the railroad's Engineering Department under the supervision of C. F. Loweth, Chief Engineer.

Source: Chicago, Milwaukee, St. Paul & Pacific Railroad Archives, Milwaukee Public Library System

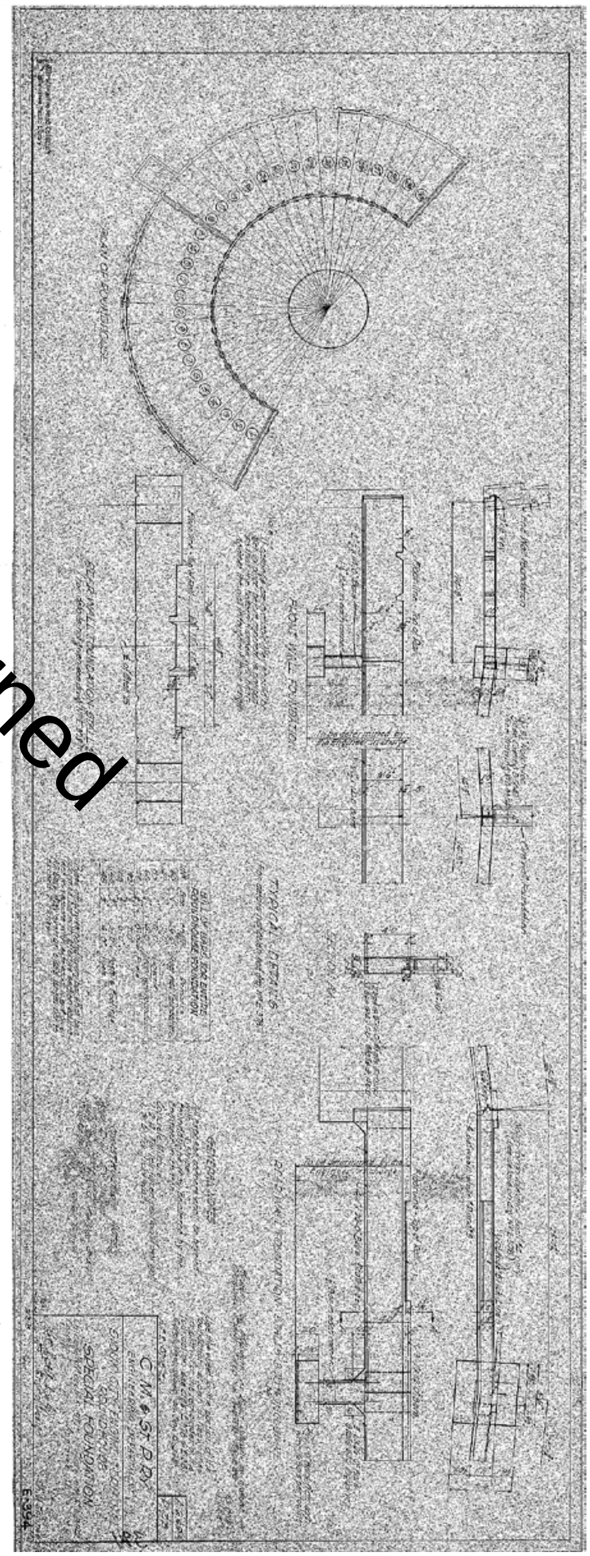


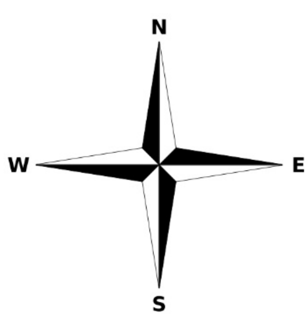


1917 General Layout of the roundhouse building

Document prepared by the railroad's Engineering Department outlining the construction details for the roundhouse foundation.

Source: Chicago, Milwaukee, St. Paul & Pacific Railroad Archives, Milwaukee Public Library System

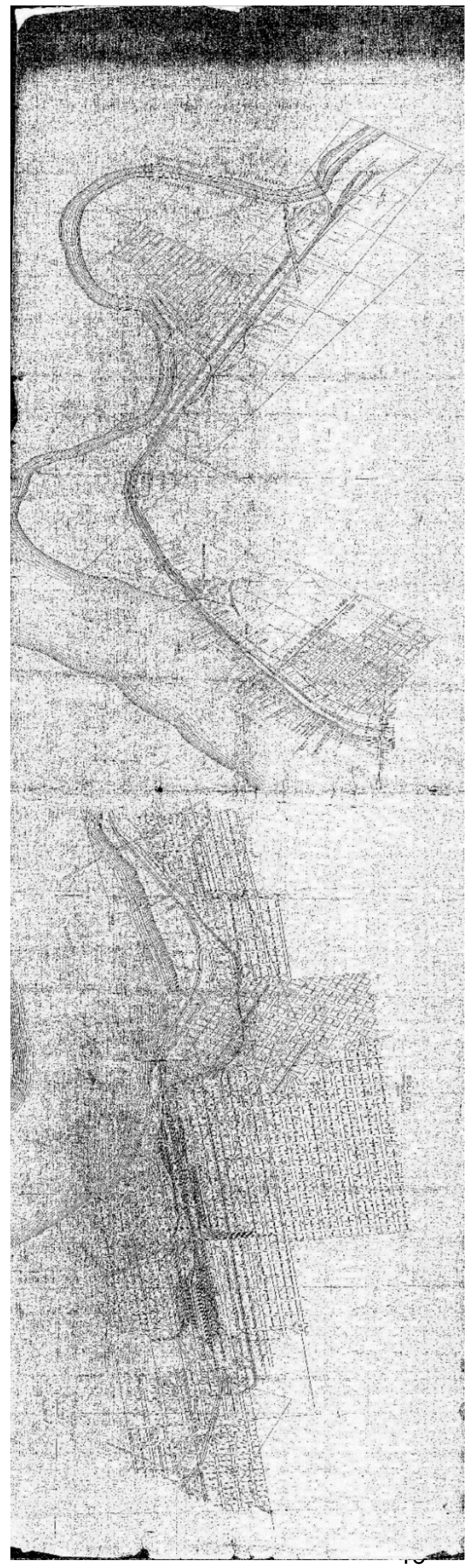


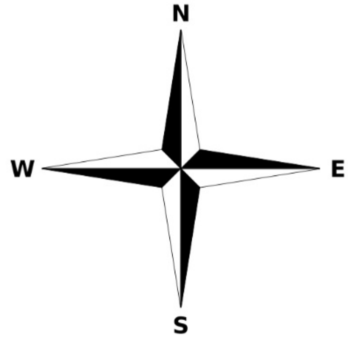


Location of Complex along Railroad Right-of-Way in Sioux City

This 1916 track diagram identifies the location of the Sioux City Roundhouse, Repair Shops & Engine Terminal along the railroad's right-of-way through Sioux City. This map illustrates the portion of track from downtown Sioux City (on the right) to the west (on the left) before crossing the Big Sioux River into South Dakota. The roundhouse terminal is located on the diagram on the far left.

Source: Chicago, Milwaukee, St. Paul & Pacific Railroad Archives, Milwaukee Public Library System

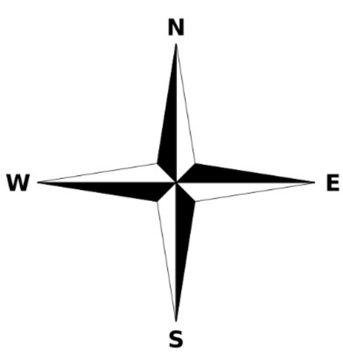




Milwaukee Railroad Shops Historic District
Name of Property
Woodbury County, Iowa
County and State
Name of multiple listing (if applicable)

Identification of major buildings, structures and rail yard in 1918

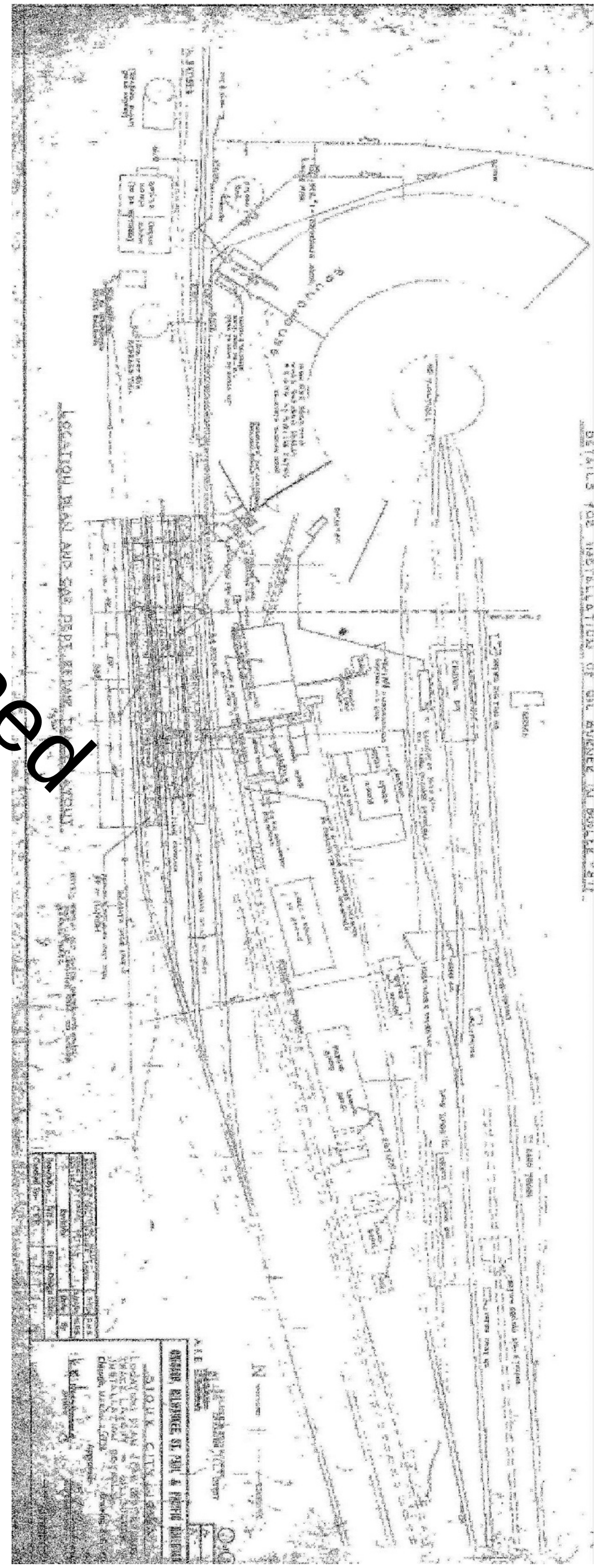
Source: Chicago, Milwaukee, St. Paul & Pacific Railway Archives, Milwaukee Public Library System
Labeling of Buildings by Ken Brown | Date: 2016

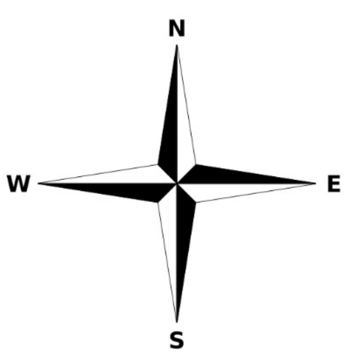


1954 Complex Layout - Alterations Plan

A ground plan prepared in 1954 by the railroad's Engineering Department for the transformation of the Sioux City Roundhouse, Repair Shops and Engine Terminal from a steam locomotive-oriented era to a diesel locomotive servicing and maintenance center. The plan outlines the retirement of buildings and structures and the recommendation for the demolition of some structures, including 24 stalls of the roundhouse.

Source: Chicago, Milwaukee, St. Paul & Pacific Railroad Archives, Milwaukee Public Library System





Summary Statements of Significance

The proposed Milwaukee Railroad Shops Historic District, often referred to as the Sioux City Roundhouse, Repair Shops and Engine Terminal, is being nominated for inclusion on the National Register for Historic Places for both statewide and local significance under Criterion A, C, and D; and Criterion Consideration G for its architectural significance and historical associations with the Chicago, Milwaukee, St. Paul and Pacific Railway, also known as "The Milwaukee Road" or "The St. Paul."

- The Milwaukee Railroad Shops Historic District – Sioux City Roundhouse, Repair Shops and Engine Terminal is historically significant under Criterion A for its associations with many important developments in railroad technology and the evolution of the "divisional terminal system" of railroad operations. The historic district derives additional significance under Criterion A for the role and functionality it played in the everyday work lives of railroad craft and trade workers (i.e. shopmen), as well as the trends in land use by the railroad to pursue their business strategies and economic interests in the agricultural farm-belt section of the United States.

- The Milwaukee Railroad Shops Historic District is significant under Criterion C and D as a good example of railroad design and construction. The Milwaukee Railroad Shops Historic District forms a rare example and remarkably well preserved type of landscape that houses railroad structures and archeological remnants tied to the servicing and repair of steam and diesel locomotives, passenger coaches, and freight rail cars that prevailed in the railroad industry during the "Golden Age of Railroading."

- The Milwaukee Railroad Shops Historic District meets National Register Criterion C in the areas of engineering and design craftsmanship because of its associations with visionary civil engineer Charles F. Loweth; who was widely recognized nationally as a major railroad builder and civil engineer. His craftsmanship influenced the practice of civil engineering within the railroad industry during the major expansion and building of railroad lines (1870 – 1930).

- The Milwaukee Railroad Shops Historic District also meets National Register Criterion C because the property represents the landscape designs and building methods and structural designs for a specific style of railroad structures known as steam railroad repair shops. The Milwaukee Railroad Shops Historic District forms a rare example and remarkably well-preserved landscape of a type housing railroad structures and archeological remnants tied to the servicing and repair of steam and diesel locomotives, passenger coaches, and freight rail cars that prevailed in the railroad industry during the "Golden Age of Railroading."

- The Milwaukee Railroad Shops Historic District is significant for listing under Criterion D for the information extant in the fabric of the surviving buildings and foundation remnants, as well as the surviving rail yard landscape. The above ground resources are likely to yield architectural and engineering data that can shed light on the construction, day-to-day operation, and the eventual demise of the site and the steam-era railroad repair shops business.

- The Milwaukee Railroad Shops Historic District is also significant under <u>**Criterion D**</u> for the information it is likely to yield about the poorly documented railroad repair shops system. The current existence of these historic resources is the primary source of information pertaining the once large-scale industrial breadth of the repair shop industry and this historic site in particular. The resources document the site's precarious journey through industrialism, economic disinvestments, and obsolescence.

- Under <u>**Criterion Consideration G**</u>, the Milwaukee Railroad Shops Historic District meets Criterion Consideration G because it continued to achieve significance within through a period of less than fifty years before this nomination. It continued major operations and represents the evolution of both transportation and industry. The Milwaukee Railroad Shops in Sioux City was a working railroad repair shops and engine terminal whose operations and functionality spanned 62 years. Its operational period between 1967 and 1980 is of particularly significance to the study of the modern-day period of railroad development and mergers.

  It is during this time span that the Era of Government Deregulation began in the railroad industry. This change in the regulatory environment resulted in the financial instability of the Chicago, Milwaukee, St. Paul and Pacific Railroad. This instability led to the railroad embargoing traffic on its western lines in 1980; its eventual bankruptcy in 1981; and the merger of its remaining eastern lines into the Soo Line Railroad in 1986. It was during this time span that the eventual shuttering of this railroad complex occurred and the embargo/divestiture of the associated railroad network through Sioux City and the Dakotas took place in 1981. This bankruptcy event is recognized by railroad historians as one of the 13 most outstandingly "bad examples, foul-ups and faux pas" of railroad management practices that would have long term effects in shaping what is today's railroad industry (Machalaba, p. 51).

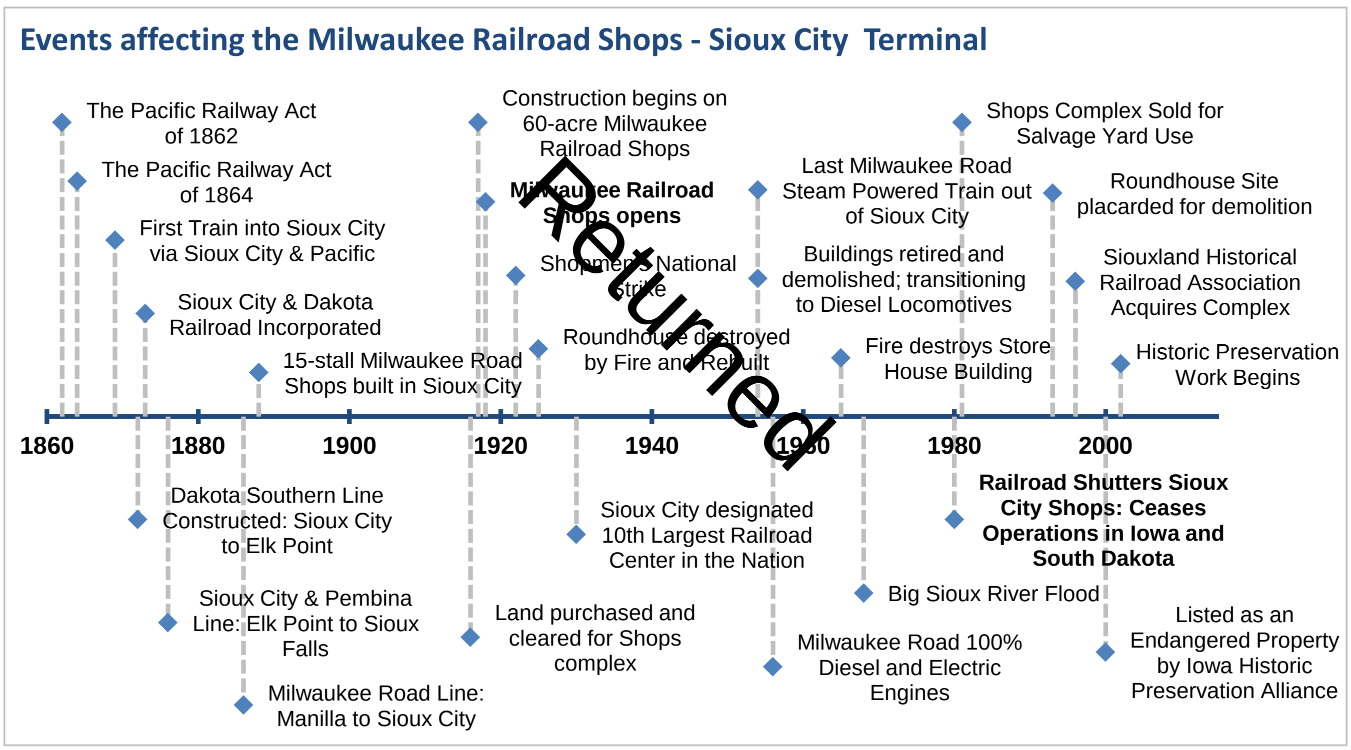
The historic contexts presented in this nomination link the Milwaukee Railroad Shops in Sioux City to important historic trends not just <u>**locally significant but also statewide, regionally (multi-state), and nationwide;**</u> and, in the case of the Chicago, Milwaukee, St. Paul and Pacific Railway; possibly even of national significance.

Now defunct, the Chicago, Milwaukee, St. Paul and Pacific Railway was the nation's last transcontinental railroad to be built. Unlike the other six original transcontinental railroads built in North America, there are no contemporary operations of the majority of the Milwaukee Road's western rail lines (Welsh, p. 3). For all practical operating purposes, the railroad is today defunct with its assets and real estate holdings having been abandoned and absorbed by adjacent land owners, sold off for new uses, or land banked for future rails-to-trails projects.

The Milwaukee Railroad Shops Historic District in Sioux City provides a visual study of railroad development in the region of the United States commonly known as "The Granger States" or the Midwest. When compared to similar surviving historic railroad properties, the Milwaukee Railroad Shops Historic District is a nationally important landscape that reflects both the regional differences in architecture and the company-preferred engineering and design standards of railroad roundhouses, repair shops, and engine terminals.

Period of Significance – Milwaukee Railroad Shops Historic District

The historic district's period of significance (1917-1980) encompasses the time span from the opening of the Sioux City Roundhouse, Repair Shops and Engine Terminal in 1918 through the dieselization of the railroad's motive power in 1954 to the eventual closing and abandonment of the complex in 1980. The following timeline presents events that affected the functional history of the Milwaukee Railroad Shops prior to and during the Period of Significance. The events are organized on an overall chronological basis; beginning with the birth of the railroad industry in Sioux City through the buildup of the Milwaukee Road railroad in Sioux City to the final shuttering of the roundhouse complex.



Summary Statement of Historical Perspective and Significance

The Milwaukee Railroad Shops Historic District – Sioux City Roundhouse, Repair Shops and Engine Terminal Repair Facility, including its rail yard, are significant in the area of TRANSPORTATION for its important functionality to the historical operations of the granger railroad network, and, in particular, to the operations of the Chicago, Milwaukee, St. Paul and Pacific Railway.

The Chicago Milwaukee St. Paul and Pacific Railway was a sub-continental, trunk line, granger railroad that evolved into the nation's last great transcontinental railroad. The Milwaukee Railroad Shops Historic District helps preserve and further the understanding of the historic district's legacy and also helps demonstrate to the general public how the railroad industry's widespread build up and operational network transformed our nation's expansion and development in the Northern Plains and Upper Midwest regions; basically the great swath of area extending from the Great Lakes (i.e. Chicago) westward to and through the Dakota territories and Rockies; and the area generally lying north of the 35th parallel between the 85° and 105° meridians of longitude.

The Milwaukee Railroad Shops Historic District's broad collection of buildings, structures, foundation remnants, and rail yard convey an engineering landscape seldom found in contemporary and modern railroad rights of way. The utilitarian style complex and surviving web of tracks that comprise the Milwaukee Railroad Shops Historic District were critical to the efficient multi-state operations of the railroad, which included the overall functionalities of construction, inspection, repair, maintenance, refueling, and storage of steam and diesel locomotives, passenger cars, freight rolling stock, cabooses and other railroad equipment.

The Sioux City-based Milwaukee Railroad Shops Historic District preserves and tells the story of an excellent example "of the changing (or changed) status that skilled craftsman in many fields were experiencing at the turn of the century under the onslaught of new technologies and growing corporate structures. The facility represents a new generation of division repair shops construction, one that in 1917 employed the latest technologies and reflected nascent worker-supervisor relationships" (Nash, p. 5).

Comparable Properties – Uniqueness of the Milwaukee Railroad Shops Landscape

Because of its integrated collection of historic resources, the Milwaukee Railroad Shops Historic District remains one of the more notable surviving examples in the nation of a steam-era railroad repair shop complex. The particular layout of this complex is unique to this site. The location provided easy access to water for the steam operations needed to power trains across Iowa and South Dakota into the great Northwest Territory. Thus, the Milwaukee Railroad Shops Historic District was part of an extensive steam locomotive and rail car maintenance and repair network developed for trains from hundreds of miles away.

Unlike many other railroad repair shops built to service the steam locomotive and rail cars, this complex has several buildings, structures and ruins that were not razed or bulldozed into the ground as rumble, with only one structure surviving – the roundhouse. Indeed, it remains one of the largest railroad repair shop sites in the United States to pay homage to the industrious nature of this type of railroad structure. Unlike the majority of its contemporaries, the Milwaukee Railroad Shops Historic District made it to the twenty-first century, a rarity when the only building to really survive was the roundhouse in an industry obsessed with razing obsolete buildings, structures and other vertical infrastructure.

While the nominated Milwaukee Railroad Shops Historic District has no peers, its signature building – the railroad roundhouse – may be evaluated for form and design against others across the United States. The Railway & Locomotive Historical Society maintains a comprehensive online database of defunct steam-era railroad repair shops, roundhouses, or remnants. This survey draws on a comprehensive data set gathered from the National Register of Historic Places, the common knowledge of railroad enthusiasts, and in-field surveys performed by historians and archaeologists. The survey does not evaluate the extant resources for historical significance or integrity; however, it was a nationwide comprehensive effort to identify and record historic roundhouses. Almost one-third of these buildings and structures inventoried are utilized today by the railroad industry for storage, minor repair work, or are vacant and derelict. Currently, this inventory of recorded roundhouses consists of 196 property listings of engine house buildings, repair shops structures, turntables, and/or surviving remnants of buildings and structures throughout the United States.

A second resource that can be used to identify surviving roundhouses or remnants of steam locomotive engine houses is the TRAINS magazine List of Roundhouses Still Standing in 2010. This online resource estimates there are currently 183 surviving railroad roundhouses or engine houses. Like the historic structures database maintained by the Railway & Locomotive Historical Society, the TRAINS magazine census does not determine the state of repair or physical condition of each site.

An analysis of the data in both lists shows the rarity of railroad roundhouse buildings surviving to the twenty-first century when compared to railroad stations and depots. The most comprehensive database that inventories surviving railroad stations and depots is DepotMaps.com. This online data bank has cataloged over 8,750 surviving depots and stations across the 48 contiguous states. Each station is plotted on a dynamic google map to identify their location.

The unique features and characteristics that define the Milwaukee Railroad Shops Historic District in Sioux City, as a whole, reflect the rarity of a railroad repair shop landscape. The limited number of roundhouses indexed by both TRAINS magazine and the Railway & Locomotive Historical Society proves this rarity.

Relationship to Railroad-Related National Historic Landmarks:

The Milwaukee Railroad Shops Historic District is a critical missing link to complete a network of railway-related properties designated as National Historic Landmarks and/or listed on the National Register of Historic Places. The location of the Milwaukee Railroad Shops Historic District in the country's mid-section provides a truly unique opportunity for it to operate on par with other well-known railroad-related National Historic Landmarks; which are mostly located in the eastern region of the United States.

National Historic Landmarks featuring Railroad Roundhouses and Repair Shops-Related Buildings and Structures

Historic Resource Name	Location	Build Date	Roundhouse	Orig. Function
Baltimore & Ohio Railroad Martinsburg Shops	Martinsburg, West Virginia	1866	Yes	Repair Shops
B & O Railroad Museum	Baltimore, Maryland	1883	Yes	Repair Shops
Central Georgia Railroad: Savannah Shops & Terminal Facilities	Savannah, Georgia	1853/1923	Yes	Repair Shops
Steamtown National Historic Site	Scranton, Pennsylvania	1932	Yes	Rail Yard
Cumbres and Toltec Scenic Railroad	Chama, New Mexico	1880-1881	Yes	Railroad Line
East Broad Top Railroad and Coal Company	Rockhill Furnace, Pennsylvania	1882	Yes	Railroad Line
Nevada Northern Railway Museum	Ely, Nevada	1905	Yes	Railroad Line
Allegheny Portage Railroad National Historic Site	Central Pennsylvania	1831-1834	Yes	Railroad Line
Total Number of Railroad-Related National Historic Landmarks	44			
Total Number of Historic Properties with Roundhouses	8			
Total Number of Historic Properties Originally Repair Shops	4			

Source: https://en.wikipedia.org/wiki/Category:Railroad-related_National_Historic_Landmarks

While railroads obviously have played a long and important role in our nation's development and history, railroad repair shops and roundhouse buildings are under-represented as preserved structural reminders of railroad heritage. Depots and stations by far are the most common buildings to be preserved and listed on the National Register of Historic Places. According to the database files of the National Register of Historic Places, there are approximately 966 stations and depots; 60 locomotives; and 8 roundhouses and repair shops listed. An analysis of National Historic Landmarks finds there is a total of 44 railroad-related properties designated. (Please see table above) Among those historic properties, 8 landmarks contain a roundhouse or engine house as part of their resource inventory. However, only 4 landmarks were originally functional railroad repair shops.

When compared to the four repair shops designated as National Historic Landmarks, the Milwaukee Railroad Shops Historic District has equivalent exceptional historical value for significance. What stands out in this comparison is the high percentage of surviving foundation remnants and buildings/structures at the Milwaukee Railroad Shops Historic District relative to the other sites. All sites have a surviving roundhouse or machine shop when an examination is made of their nomination forms. The distinguishing feature of the Milwaukee Railroad Shops Historic District is that it reflects the early 20th Century railroad land use, engineering design and construction methods while those sites designated National Landmarks were built late 19th Century and followed a different pattern during a time of railroad construction generally called First Generation.

Historical Images of Railroad Repair Shops and Roundhouses in Sioux City and Iowa

Image 1: Chicago and North Western Railroad Repair Shops and Roundhouse, Sioux City, Iowa

Photographer: Jack P. Fleckenstein, Woodworth Commercial Photos Circa: 1920

Digital Archive: Sioux City Railroad Museum, Siouxland Historical Railroad Association, Sioux City, Iowa

This is an aerial view looking northwest of the two railroad repair shop facilities located in the Floyd River Valley area of Sioux City. To the upper left is the repair shops and roundhouse for the Chicago and North Western Railroad and the Chicago, St. Paul, Minneapolis, and Omaha Railway. On the lower right, is the repair shops and roundhouse of the Illinois Central Railroad. Both roundhouse buildings were retired and razed in the mid-1950s when the railroad industry made its final motive power transitions to an all diesel locomotive fleet. To accommodate the repair and maintenance of diesel locomotives, the Illinois Central converted the boiler house to a one-stall engine house and the Chicago and North Western converted the former machine shop to a five-stall engine house. (Photo courtesy of the Fleckenstein Family, Sioux City, Iowa)

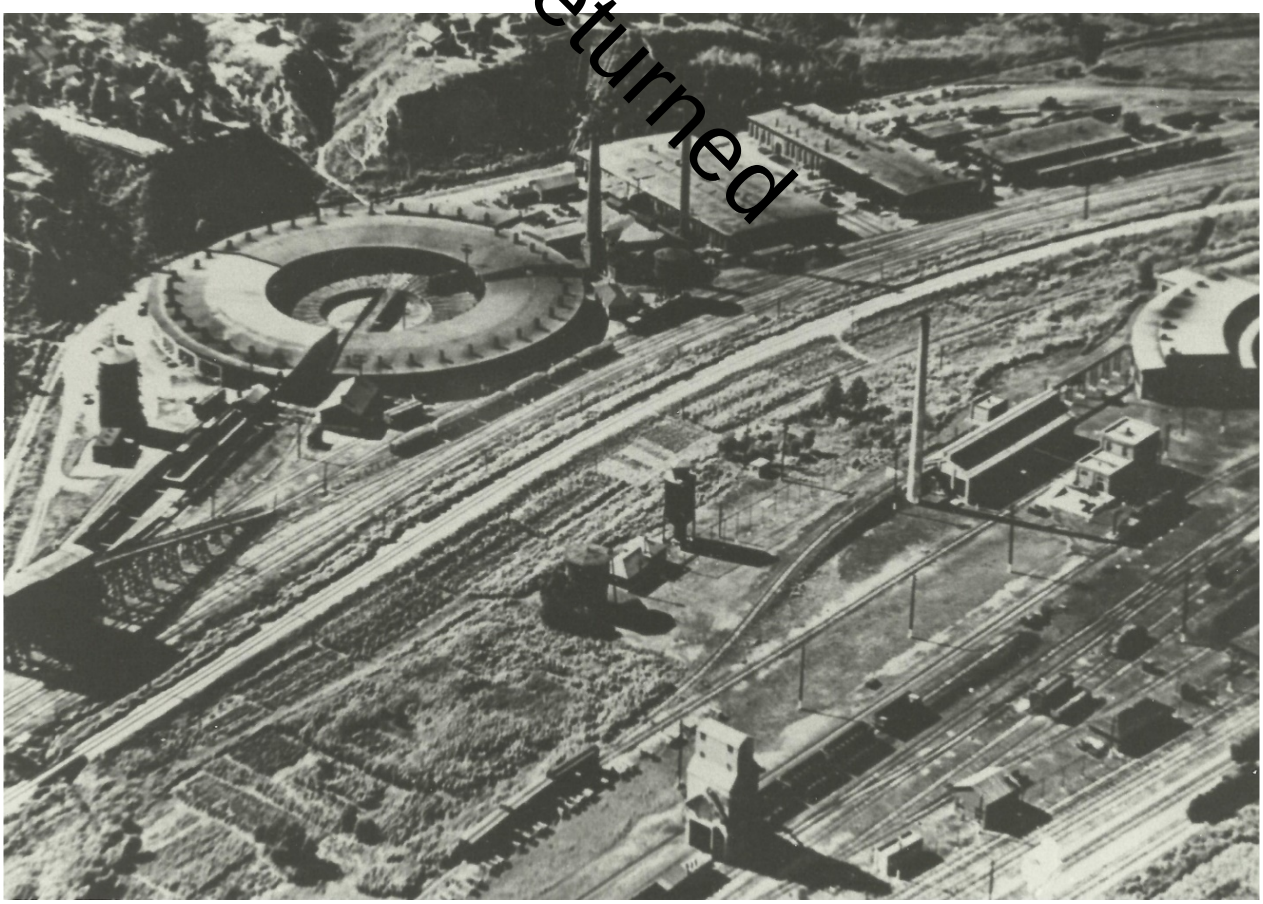


Image 2: Chicago and North Western Railroad Repair Shops and Roundhouse, Sioux City, Iowa

Photographer: Jack P. Fleckenstein, Woodworth Commercial Photos Circa: 1920

Digital Archive: Sioux City Railroad Museum, Siouxland Historical Railroad Association, Sioux City, Iowa

Looking north, this photo shows the full-service 36-stall, nearly full circle roundhouse and turntable of the Chicago and North Western Railroad and the Chicago, St. Paul, Minneapolis, and Omaha Railway. In the upper right is pictured a small portion of the 15-stall Illinois Central Railroad roundhouse. Both roundhouses were razed during the mid-1950s. The turntable continued to be operated by the railroad until 1995, when it was razed and scrapped. The control shanty is housed as an exhibit at the Milwaukee Railroad Shops Historic District. The joint railroad repair shops for the Chicago and North Western Railroad and the Chicago, St. Paul, Minneapolis, and Omaha Railway were built during the time period of 1910 to 1912; and were officially opened for operations in 1912. (Photo courtesy of the Fleckenstein Family, Sioux City, Iowa)

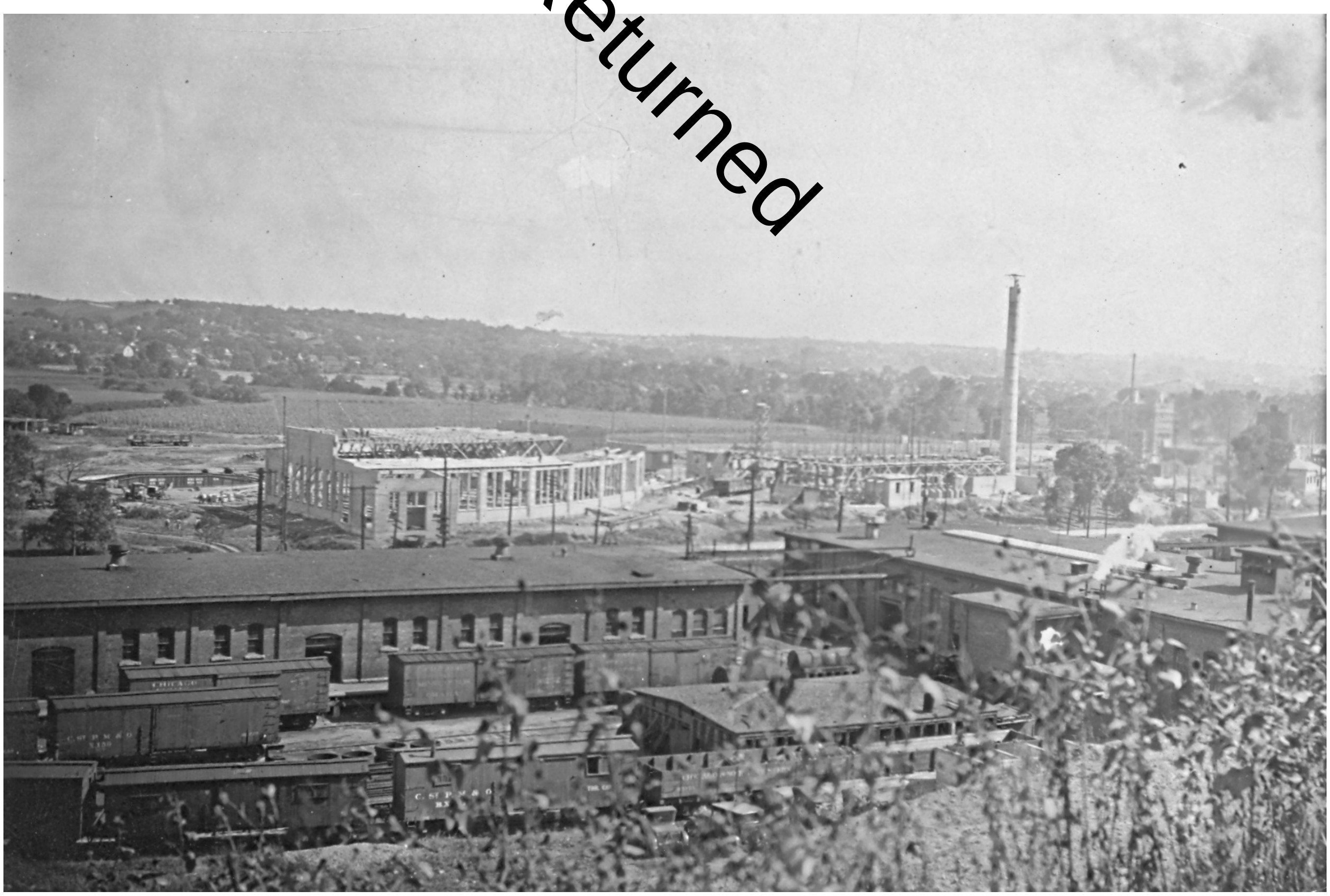
Image 3: Illinois Central Railroad Repair Shops and Roundhouse, Sioux City, Iowa

Photographer: Jack P. Fleckenstein, Woodworth Commercial Photos Circa: 1923

Digital Archive: Sioux City Railroad Museum, Siouxland Historical Railroad Association, Sioux City, Iowa

At the top, this photo shows the Illinois Central Railroad repair shops and roundhouse under construction in 1923. The complex became operational in 1925. The structures in the bottom portion of the photo are the car repair shops and back shop buildings of the joint repair shops belonging to the Chicago and Northwestern Railroad and the Chicago, St. Paul, Minneapolis, and Omaha Railway.

The images displayed on the next page show the repair shops and roundhouse operated in Sioux City by the Great Northern Railway Company. This complex was built between 1925 and 1929 and was located on the east bank of the Floyd River Valley area. Like the other repair shops in the river valley, the roundhouse, coal tower, and water tanks were razed in the mid-1950s with the end of the steam locomotive as the preferred choice of motive power. (Photos courtesy of the Sioux City Public Museum)



United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Milwaukee Railroad Shops Historic District
Name of Property
Woodbury County, Iowa
County and State

Name of multiple listing (if applicable)

Image 4: Great Northern Railway Repair Shops and Roundhouse Terminal, Sioux City, Iowa

Photographer: George Newman Collection, Sioux City Public Museum Circa: 1920

Digital Archive: Sioux City Railroad Museum, Siouxland Historical Railroad Association, Sioux City, Iowa

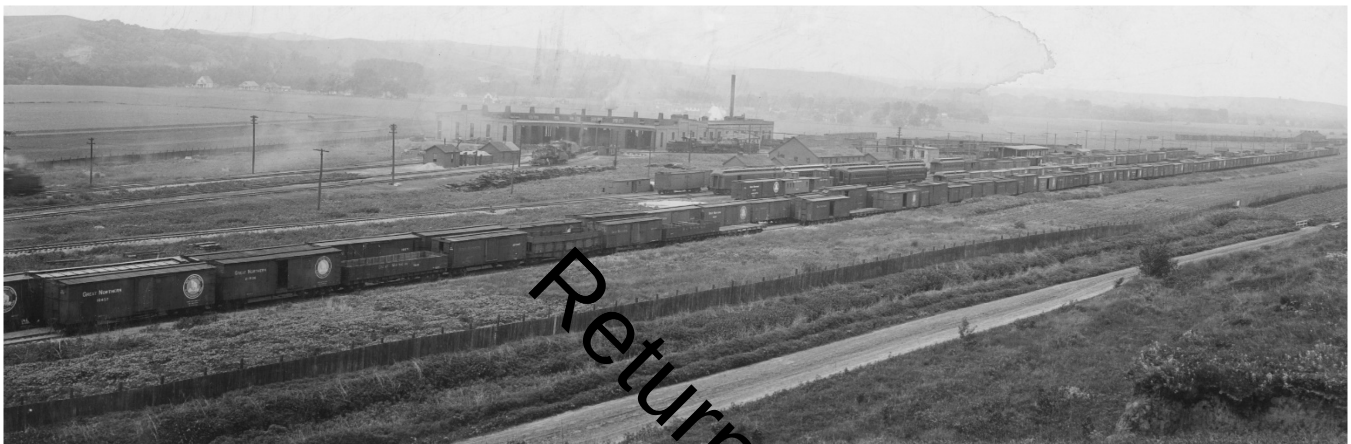


Image 5: Great Northern Railway Repair Shops and Roundhouse Terminal, Sioux City, Iowa

Photographer: George Newman Collection, Sioux City Public Museum Circa: 1920

Digital Archive: Sioux City Railroad Museum, Siouxland Historical Railroad Association, Sioux City, Iowa

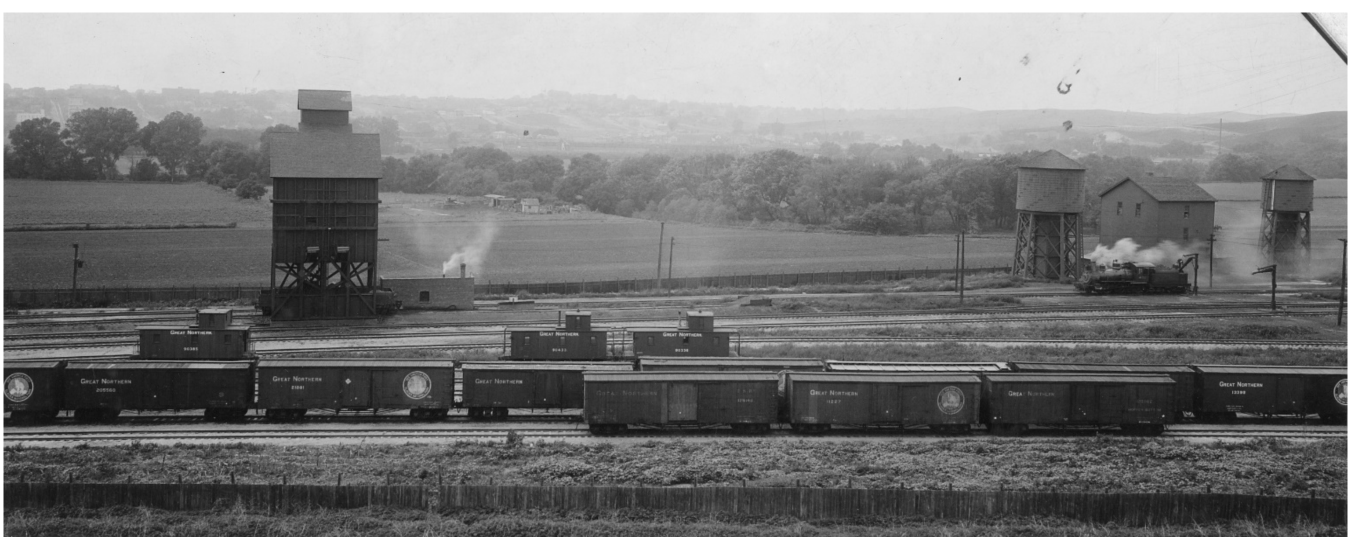


Image 6: Chicago, Milwaukee, St. Paul & Pacific Railway Repair Shops, Atkins, Iowa

Photographer: Unknown – Office Railroad Company Photo Circa: 1918

Digital Archive: Sioux City Railroad Museum, Siouxland Historical Railroad Association, Sioux City, Iowa

Build during the same time span as the Sioux City-based Milwaukee Road repair shops and roundhouse, 1916-1918, the railroad's engineering department utilized similar design plans when building the roundhouse, ash pit, turntable, engineer tool shed, and water tower for both complexes. You will notice the similarities in design between this photo of the Atkins facility and the photos of the Sioux City complex. You will also notice that the general layout of the repair shops and the location of buildings was tailored to local terrain and geography – thus the visual and physical characteristics of each complex gave each repair shop its own personality. The Atkins roundhouse consisted of 26 locomotive stalls while the Sioux City roundhouse was built to a size of 30 locomotive stalls. Like the Sioux City facility, much of the Atkins complex was retired, with 21 stalls demolished. The remaining 5 stalls were converted to maintaining and repairing diesel engines. The final 5 stalls were razed in the early 1960s. (Photo courtesy of Jim Koehn, Atkins, Iowa.)

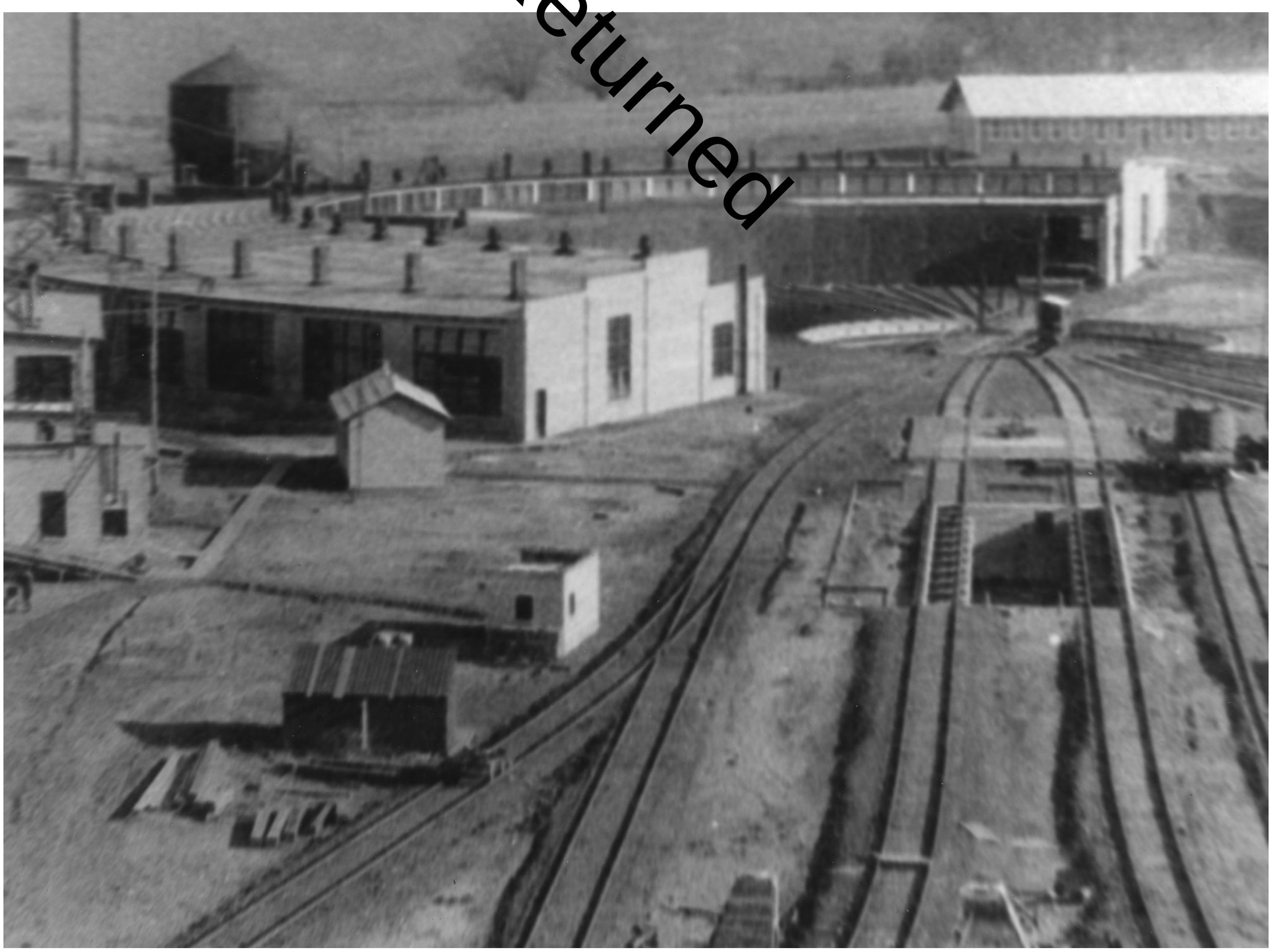


Image 7: Chicago, Milwaukee, St. Paul & Pacific Railway Repair Shops, North McGregor, Iowa

Photographer: Unknown – Office Railroad Company Photo Circa: 1918

Digital Archive: Milwaukee Public Library, Milwaukee Road Archives

While using a different style of roundhouse design, the North McGregor shops complex was built utilizing standard design plans for the smaller back shop buildings that support the locomotive roundhouse functions. This facility, while compact, followed many of the design patterns for locomotive repair shops. The complex was razed during the mid-1950s.

Criterion A & C: Chapter 1 – What is a Roundhouse, Steam Railroad Repair Shop, and Engine Terminal?

Infographic:

New York Central Ad Explains What a Roundhouse Is.

This 1945 display print ad by the New York Central Railroad offers a graphical look at the many functions the roundhouse played in the maintenance and repair of steam locomotives.

The emerging influence of the automobile in daily life is seen, as the railroad company explains the functional role of the roundhouse by comparing it to an automobile service station.

The cutaway view acts as an infographic to detail and simplify the complex separation of duties completed by the various craft and trade workers and roundhouse laborers as they tended to the steam locomotive.

The illustration shows the unique circular design, built around the turntable used to easily and quickly turn and spot the locomotives to the appropriate area of work that needed to be performed on the engine.

When evaluating the significance of the Milwaukee Railroad Shops Historic District under Criterion A, it is important to first identify and understand the historic contexts associated with the broader railroad engineering trade that had to focus on steam operations. Roundhouses and railroad repair shops did not stand in isolation physically or functionally. Their architecture and engineering design embodied a strong affiliation with meeting the operating needs of the steam locomotive.

Historic Context: The Steam Locomotive and Its Maintenance and Repair

The steam locomotive was the most popular mode of transportation power for a large part of the 19th and 20th Centuries; running well past World War II until they were eventually replaced by diesel-electric locomotives, airplanes and the more modern multimodal vehicles. In fact, in 1917, the point in time in which the Sioux City Roundhouse, Repair Shops and Engine Terminal were under construction; the Bureau of Railway News and Statistics reported the nation's railroads were operating 63,828 locomotives; 54,779 passenger cars; and 2,384,765 freight cars over a cumulative 252,029 miles of rail line (Thompson, p. 4). During this same time frame, the Chicago, Milwaukee, St. Paul and Pacific Railway operated a fleet of 1,982 locomotives; 1,577 passenger cars; and 67,191 freight cars over its 9,950 route miles in ten states (1917 Annual Report p. 8).

In the early part of the 20th Century, the standard steam locomotive used in freight service was capable of pulling forty-five of the industry standard size thirty-ton rail cars and about thirty-four of the standard size fifty-ton freight cars (Cease, p. 274). The average steam locomotive in freight service would run up to about 50 miles per hour; a coal drag would typically run at speeds not exceeding 35 miles per hour; and a steam locomotive in fast mail or merchandise service would typically run at 65 miles per hour. Steam locomotives in passenger service would generally travel in the range of 60 to 85 miles per hour.

A typical steam locomotive would make an average daily run of 133 miles or 4,000 miles a month. The distance a steam locomotive could travel was governed by three factors: (1) the carry capacity of water and fuel in its tender, (2) the rate of burning up its water and fuel reserves for creating steam pressure to power the engine, and (3) the consumption of lubricants for its running gear. With water being the most significant limitation, the operating range for the average size steam locomotive was about 100 miles between fillings of the tender.

Maintaining locomotives and rail cars in a state of good repair was a very capital-intensive business; requiring substantial investments of earned revenues. A 1907 study by L. B. Stillwell and H. C. Puttman, entitled *Substitution of the Electric Motor for the Steam Locomotive*, could not have been clearer about the annual relative costs associated with steam railroad operations and maintenance. Their study found railroads paid out between 30 to 40 percent of their annual operating expenses in fuel, locomotive repair costs, roundhouse expenses, and the wages for shopmen:

1. The expense for Roundhouse men amounts to 8.5 percent of the average annual operating expenses.

2. The repair and renewals of locomotives amounts to 7.509 percent of the average operating expenses.

3. Repair and renewals of engine houses and shops, also water tanks and coal-handling apparatus,

amounts to 2.36 percent of total annual operating revenues.

4. Repair and renewals of shop machinery and tools amounts to 0.562 percent of total annual operating revenues.

5. Wear and tear of wheels and brake equipment on rail cars amounts to 7.657 percent of total operating revenues

6. The cost of fuel for steam locomotives constituted 11.292 percent of total operating expenses.

Because the operating range of steam locomotives were restricted by water and fuel consumption, the railroads' standard operating practice was, all mainline steam locomotives pulling through trains (not making numerous stops) would be changed at division points such as Sioux City. The arriving steam locomotive was uncoupled from its train and dispatched to the roundhouse complex for inspection, fueling, and servicing; while a recently service locomotive was coupled to the train for the continuation of the run.

The mechanical complexity of steam locomotives, coupled with normal daily wear and tear on the locomotives and rolling stock, necessitated the railroad to setup repair shops or roundhouses along its rights-of-ways to reduce train delays caused by locomotive breakdowns and rail car defects. The roundhouse or railroad shops is where the railroad brought its locomotives and rail cars for routine and preventive maintenance work, standardized troubleshooting, and repair work. Highly skilled mechanics would overhaul the locomotives, clean out the boiler and fireboxes, and recondition the wheels on freight cars.

The mission of repair shops was to get a locomotive or rail car in and out as quickly as possible to reduce the amount of time the equipment was out of revenue service. A locomotive makes the railroad money when it's on the front of a train; not sitting in a roundhouse. The same holds true with a rail car: it makes the railroad money when hauling freight in a train; not sitting on a rip track for repairs. The average downtime for steam locomotives by class of repairs was:

- Heavy repairs occupy 90 days; equivalent to a wear of 100,000 working miles

- Medium repairs occupy 60 days; equivalent to a wear of 70,000 working miles

- Light and specific repairs occupy 30 days; equivalent to a wear of 30,000 working miles

- General average was 60 days (2 months) to a wear of 67,000 working miles

The average steam locomotive spent more than half of its lifecycle in the roundhouse receiving inspections, repairs, and regularly scheduled overhauls. A 1909 study on steam locomotive service hours conducted by American Master Mechanics' found that "engines averaged 20 per cent of their time in the roundhouse, 33 per cent of their time awaiting orders to go on the road, and 47 per cent of their time actually on the road. The more common assumption was that the time in the roundhouse exceeded 30 per cent. Consider the average run of a steam locomotive consumes 10 hours, and that a 5-hour lay-over is customary at the roundhouse, we see that one-third of the time is not available for earning dividends, and the motive power of the railroad is practically reduced by 33 per cent – exclusive of engines that are in the shop" (Kirker, p. 73).

Compared to the downtime of steam locomotives, the time a passenger or freight car spent in the shops was brief. Most of the work was performed by Carmen in the outdoor environment on repair-in-place (RIP) tracks; thus the need for shelter to house the cars was minimal. The outdoor track space provided ample area for body repairs, change of wheel sets, air brake work, and storage.

While the foregoing historic context is important for understanding the variety of operating conditions that ultimately lead to the obsolescence of steam locomotives as the primary motive power on the nation's railroad system; equally important is the story of the scale and scope of steam railroad shops as an industry in of itself.

Historic Context: Scale and Scope of Steam Railroad Repair Shops as an Industry Itself

The operations of all railroad repair shops and roundhouses were essentially similar-in-nature across the network; and mission-critical to the railroads. In practice, these shops ranged in size from small rectangular engine houses on branch lines to the large donut-shaped roundhouse with ancillary back shop buildings serving as division terminals. To service its fleet of locomotives and rolling stock, each railroad would build and own groups of roundhouses or repair shops across its entire system of tracks and rail lines. Depending upon the overall size of its mainline and branch line network, a 1000+ mile railroad system may have built 10 to 155 repair shops to service its fleet of steam locomotives and rail cars. These repair shops were generally spaced about 90 to 100 miles apart. The bulk of these repair shops or engine houses were small facilities; capable of making light running repairs until locomotives could be moved and scheduled for heavy repairs at the larger division repair shops like this Sioux City-based facility.

According to the U.S. Census Bureau's official industry classifications published in 1935, a railroad repair shop was defined as an establishment "maintained by the steam railroads for the purposes of making general and heavy or classified repairs to locomotives, cars, and other equipment. It did not cover the smaller roundhouses where only minor or running repairs were made, nor the car-repair-in-place tracks" (Biennial Census of Manufacturers, 1935, p. 915). The U.S. Census Bureau categorized railroad repair shops as a subsector of the manufacturing industry and would report on the state of the industry through its Census of Manufacturers.

The Census of Manufacturers provided detailed statistics that are important for understanding the scale and scope of the railroad repair shop sector. The Census Bureau conducted the Census of Manufacturers at two-year intervals beginning in 1919; however, railroad repair shops were out of the scope of counting beginning with the 1935 census. Prior to 1919, the Census of Manufacturers was conducted every five years.

The 1929 Census of Manufacturers counted 1851 railroad repair shop establishments employing 368,681 shopmen. By 1935, the same Census enumerated 416 railroad repair shop establishments across the country with 135,800 shopmen employed. These figures demonstrate the rapid contraction that took place in the railroad repair shop industry as roundhouse work was transitioning to tending more to the diesel locomotive. The following data table presents summary information on the growth and contraction of the railroad repair shops industry.

Steam Railroad Repair Shops and Shopmen Employed

Year	Shops (#)	Change (#)	Shopmen (#)	Change (#)
1914	1,362		361,925	
1919	1,744	382	484,437	122,512
1921	1,766	22	385,006	-99,431
1923	1,801	35	527,527	142,521
1925	1,842	41	425,234	-102,293
1927	1,794	-48	397,088	-28,146
1929	1,851	57	368,681	-28,407
1931	1,783	-68	282,405	-86,276
1933	1,586	-197	220,760	-61,645
1935	416	-1,170	135,800	-84,960

Source: U.S. Census Bureau, *Biennial Census of Manufacturers*: 1923, 1927 and 1935

The following data table reveals a once very high degree of concentration of railroad shops and roundhouses in the nine-state region often referred to as the Granger States.

Steam-Railroad Repair Shops Distribution by Grange States: Change in Establishments and Workforce

	1923		1927		1935	
State Name	**Shops (#)**	**Shopmen (#)**	**Shops (#)**	**Shopmen (#)**	**Shops (#)**	**Shopmen (#)**
Illinois	137	43,549	142	33,154	31	8,388
Iowa	66	15,204	61	11,804	8	2,257
Kansas	37	12,497	34	9,182	11	3,757
Minnesota	72	16,819	65	12,816	19	4,789
Missouri	62	13,302	59	10,996	14	3,689
Nebraska	25	7,508	25	4,766		
North Dakota	21	1,820	19	1,192		
South Dakota	18	1,251	14	842		
Wisconsin	61	12,810	50	9,709	9	2,507
Total Grange States	**499**	**124,760**	**469**	**94,461**	**92**	**25,387**
GEO Concentration %	**27.71%**	**23.65%**	**26.14%**	**23.79%**	**22.12%**	**18.69%**
Total United States	**1,801**	**527,527**	**1,794**	**397,027**	**416**	**135,800**

Source: U.S. Bureau of the Census, *Biennial Census of Manufacturers*: 1923, 1927 and 1935

As the data tables illustrate, relatively few additional new railroad shops, engine houses or roundhouse terminals were built after World War I. According to an article on railroad repair shop and engine house developments written by E. L. Woodward in a 1922 issue of *Railway Age*, no big shop construction program were being undertaken because of the general financial condition of the railroads. Financial capital was tightening, freight and passenger traffic was down, and depreciation in the state of repair of infrastructure was accelerating.

Thus, began the economic disinvestment in railroad shops and engine houses. Woodward stated in his article: “If a person was to visit a railroad repair shop or engine house one would find worn-out machinery and equipment which the railroads are compelled to use through the lack of funds…Owing to reduced traffic, there was not the usual incentive to provide greater terminal facilities and increase the efficiency of terminal operations” (Woodward, pp. 63-65).

At its peak level of employment in 1923, the railroad repair shops industry employed more than 527,000 shopmen in roundhouses across the country. But the industry lost nearly 392,000 of those shopmen over the next twelve years. This 74 percent reduction in employment was the result of 1,435 repair shops or roundhouses being shuttered by the railroad industry between 1920 and 1935.

These roundhouse closures were somewhat affected by the Great Depression and the revenue declines the railroads faced because of declining economic activity across all markets and industries. But also inferred from this data is the closings were also largely tied to rising maintenance costs relating to locomotives and rolling stock; new sophisticated technologies increasing the efficiencies of steam locomotives and rolling stock; and the beginning of the large-scale industry shift to first generation diesel electric locomotives. These factors necessitated the railroads to shift and centralize repair work at the larger divisional repair shops and roundhouse terminals.

Thus the bulk of the shuttered roundhouses and repair shops were left vacant or mothballed to be razed and leveled at a later date. Those shops and roundhouses that did survive operationally would later be either transitioned and downsized to accommodate the repair and maintenance of diesel locomotives, with many facing another cycle of closures, mothballing and demolition after the mid-1950s.

The need to demolish, level, and reclaim the land for other railroad use was necessitated by the fact that roundhouses are among the more complicated industrial properties to readapt or sell because they are special-use structures that are not easily converted to other uses. One property problem is their built location is generally in the right-of-way of railroad traffic. The second limiting factor is the contamination residue and property clean-up needed to be addressed before repurposing can begin. Thus, the vast majority of railroad repair shops and roundhouses fell to the wrecking ball and bulldozer.

Historic Context: The Milwaukee Railroad Shops as part of the Greater Milwaukee Road Repair Shops Network

In 1935 and 1936, the railroads were asked by the federal government to map out and report on the existing vertical infrastructure held by their respective companies and to file the information with the Reconstruction Finance Corporation (RFC); which was a government corporation that operated between 1932 and 1957, for the purpose of providing financial support to state and local governments and to made loans to banks, railroads, mortgage associations and other businesses. The Chicago, Milwaukee, St. Paul & Pacific Railway was one of the railway companies that was asked to file a report on their infrastructure and locations.

The railroad reported to the Reconstruction Finance Corporation that in 1936 it had a total of 121 roundhouses and repair shops in service. According to historical information gathered by the Milwaukee Road Historical Association, the railroad owned and operated at least 150 roundhouses and repair shops across its system during its history. In 1925, a total of 147 were in service. Between 1929 and 1937, the railroad retired thirty-one roundhouses, mostly small ones along branch lines.

Among those working 121 roundhouses listed in 1936, the following were equipped with machine shops and/or car shops for making heavy running repairs: Aberdeen (SD), Austin (MN), Bensenville (WI), La Crosse (WI), Miles City (MT), Milwaukee (WI), Minneapolis (MN), Ottumwa (IA), Perry (IA), St. Paul (MN), Savanna (IL), Sioux City (IA), and Chicago-Western Avenue (IL). The Sioux City Roundhouse and Repair Shops were one of eighteen roundhouse facilities operated in the state of Iowa by the Milwaukee Road. The table on the next page lists those roundhouses in operation during 1936.

- *Standardization of Buildings*

With the placement of 121 roundhouses and repair shops at multiple locations across its system, the Chicago, Milwaukee, St. Paul & Pacific Railway and many other railroad companies found it necessary to speed up the construction when building these massive complexes to keep up with demands for the repair and maintenance of locomotives and rolling stock. Railroad engineers responded to that challenge by adapting single building plans and construction documents to multiple locations.

Railroad repair shops generally consisted of a mix of two types of buildings. The first type was the permanent buildings and structures that functioned in heavy service over a long term period of years. This building class included structures like the roundhouse, machine shop, carpenter shop, power house, coal tower, water tower, etc. The second type of building found within the shops complex would be lighter, smaller buildings that were generally intended for short-term use, light work, or storage. This building class included structures like small office buildings, supply storage buildings, and garages. These buildings could easily be constructed and torn down based on the volume of business and growth within the repair shops facility.

With this mix of building types, railroad engineers began standardizing the design of buildings based on the structure's functionality and the personality of the railroad, itself. For example, roundhouses could be erected at multiple locations from a standardized design as to general dimensions and structural features. For instance, roundhouses were uniformly 105 ft. long to accommodate the largest steam locomotive. By standardizing design plans the railroad engineers were able to save on the costs of building materials by ordering bulk quantities of lumber and brick that are fabricated to the plans. Specialized building designs often require more time to build and higher priced materials.

With the standardized plans for buildings and structures, the railroad engineer could adapt a single roundhouse, machine shop, or sand drying house design to several locations. Unfortunately, while building plans could be standardized, the actual design layout and positioning of buildings and structures within that layout could not be standardized. The railroad engineer needed to design a specialize layout for each repair shop because of site conditions, landscape orientation issues, local building code requirements, and environmental considerations. So within the general site layout, while it is localized, its mix of buildings and structures are constructed using standardized designs.

The Sioux City-based Milwaukee Railroad Shops, exceeded in size by only those facilities located in Milwaukee, Wisconsin; contains buildings and structures that were similar in design, construction and scale to railroad facilities in the Iowa communities of North McGregor and Atkins. All three of these repair shops were built during the same time period of 1917-1918. However, while standardized plans were used in the vertical construction of infrastructure, the general layout of each complex was specialized in design.

Often, the railroad engineer would develop a portfolio of design plans for a particular functional type of building or structure. They would then pick the design plan that best fits in the general layout plan for the local area. This standardization also enabled the railroad's construction crews to have familiarity at all times with what they were building. While standardization of railroad repair shops as to general layout was virtually impossible, the railroad engineer would follow some standardized principles and practices. And railroad engineers would try to localize the standardized buildings with some minor architectural features.

Localization of Buildings and Standardization of Design for the Railroad Landscape

"Standards and standardization were vital to innovation and industry development in a major network industry of the late nineteenth and early twentieth century: the railroads" (Russell, p. 3). As previously cited, "building railways was expensive; money saved on depot [and roundhouses] construction could be put to good use elsewhere. To slash costs, and because it was more convenient, most railroads adopted standard plans" (Grant and Bohi, p. 23). "The railroad man's approach to the problems of city planning is somewhat different from that of the city planner, the municipal officer, or the public-spirited citizen interested in city planning, in that the railroad officer has a more direct responsibility for the justification of expenditures for improvements. It is not possible nowadays for railway managers to obtain funds for improvements which cannot, at least in a large measure, be justified by the certainty of an immediate and adequate return.…The railway manager is, therefore, rarely able to obtain the funds for improvements which cannot be justified on the score of necessity or of immediate return in operating economies" (Loweth, pp. 1-2).

Thus to achieve economy of scale and yet be financially responsible, "designs were made sufficiently flexible to allow variations to meet local needs, depots [and roundhouses] on some lines tended to look the same in town after town. Most railroads, however, employed various minor architectural features (brackets, vertical siding, and the like) to make stations [and roundhouses] built to the identical plan seem different to the casual observer, while allowing the company to benefit from the lower costs which standardization made possible" (Grant and Bohi, p. 23).

Chicago, Milwaukee, St. Paul & Pacific Railway Company

Census of Roundhouses and Repair Shops 1936

Location City	State	Stalls (#)	Turntable(FT.)
Aberdeen	SD	30	90' E
Andover	SD	2	-
Atkins	IA	6	90' E
Austin	MN	20	85' E
Avery	ID	14	107' E
Babcock	WI	3	60' H
Bedford	IN	10	60' A
Bellingham	WA	5	-
Beloit	WI	4	80' E
Bensenville	IL	30	90' E
Bristol	SD	3	-
Brodhead	WI	1	56' H
Calmar	IA	10	70' E
Canton	SD	2	-
Cedar Rapids	IA	3	58' E
Champion	MI	2	70' A
Channing	MI	5	-
Chicago - Western Ave	IL	35	90' E
Clinton	IA	2	-
Coburg	MO	15	85' E
Cologne	MN	1	-
Council Bluffs	IA	12	90'E
Davis Junction	IL	2	-
Deer Lodge	MT	15	105' E
Dekalb	IL	2	-
Dubuque	IA	24	75' E
Eau Claire	WI	1	-
Faith	SD	2	-
Faithorn	IL	10	80' E
Fargo	ND	3	60' A
Faribault	MN	1	65'
Fond Du Lac	WI	3	66' A
Freeport	IL	4	70' H

Chicago, Milwaukee, St. Paul & Pacific Railway Company

Census of Roundhouses and Repair Shops 1936

Location City	State	Stalls (#)	Turntable(FT.)
Galewood	IL	36	90' E
Great Falls	MT	8	90' E
Green Bay	WI	17	75' E
Harlowton	MT	17	107' E
Hastings	MN	3	60' H
Hilbert	WI	1	-
Horicon	WI	6	-
Iron River	MI	2	-
Jackson	MN	11	70' E
Janesville	WI	11	75' E
La Crosse	WI	27	90' E
La Farge	WI	1	-
Ladd	IL	2	-
Laredo	MO	3	85' A
Latta	IN	4	-
Lewistown	MT	12	85' E
Linton	ND	2	-
Madison	SD	8	70' E
Madison	WI	23	75' E
Manilla	IA	12	90' E
Maquoketa	IA	1	-
Marmarth	ND	6	90' A
Marquette	IA	22	90' E
Mason City	IA	23	85' E
McLaughlin	SD	2	-
Menominee	WI	2	60' H
Menomonie	WI	1	56' H
Milbank	SD	6	-
Miles City	MT	24	90' E
Milwaukee	WI	36 + 43	90' & 75" E
Mineral Point	WI	4	66' A
Minneapolis	MN	46	90' E
Minocqua	WI	4	70' A

Chicago, Milwaukee, St. Paul & Pacific Railway Company

Census of Roundhouses and Repair Shops 1936

Location City	State	Stalls (#)	Turntable(FT.)
Mitchell	SD	19	75' E
Mobridge	SD	18	90' E
Montevideo	MN	26	90' E
Monticello	IA	4	-
Nahant	IA	15	90' E
New England	ND	2	-
New Lisbon	WI	2	-
Ontonagon	MI	2	-
Ortonville	MN	3	-
Oshkosh	WI	3	70' A
Othello	WA	8	105' A
Ottumwa	IA	18	85' A
Perry	IA	27	90' A
Platte	SD	2	-
Platteville	WI	1	60' A
Portage	WI	18	85' E
Prairie du Sac	WI	2	60' H
Preston	MN	3	60' A
Racine	WI	13	70' A
Rapid City	SD	4	65' E
Raymond	WA	2	-
Red Wing	MN	2	56' H
Reno	MN	1	54' A
Richland Center	WI	1	58' A
Rockford	IL	4	70' A
Rockwell City	IA	2	-
Roscoe	SD	2	-
Roundup	MT	2	-
Sanborn	IA	4	75' E
Savanna	IL	28	90' E
Seattle	WA	3	86' E
Sioux City	IA	30	90' E
Sioux Falls	SD	5	85' E

Chicago, Milwaukee, St. Paul & Pacific Railway Company

Census of Roundhouses and Repair Shops 1936

Location City	State	Stalls (#)	Turntable(FT.)
Sparta	WI	2	-
Spirit Lake	ID	9	75' H
Spokane	WA	2	85' A
St. Maries	ID	5	-
St. Paul	MN	24	100' E
Stickney	SD	1	-
Tacoma	WA	17	107' E
Terre Haute	IN	15	72' E
Tomahawk	WI	2	-
Tripp	SD	1	-
W. Clinton	IN	16	80' E
Wabasha	MN	10	58' A
Watertown	WI	4	-
Waukesha	WI	2	-
Wausau	WI	6	75' E
Wauzeka	WI	4	60' H
Wells	MN	2	-
Wessington Springs	SD	2	-
West Union	IA	1	60' H
Winona	MN	1	-
Wisconsin Rapids	WI	2	-
Yankton	SD	2	70' A

Method of Turntable Power
A = Air
E = Electric
H = Hand/Manual

Source:
The Milwaukee Railroader, Fourth Quarter 2008

"While the buildings are free from expensive architectural embellishment, locomotive shops are splendid structures, representative of the latest and most careful design, embracing stability, strength, natural lighting, heating, ventilating and sanitary requirements, and compare well with the facilities of modern industrial concerns. The design of the locomotive shop building is made from an engineering viewpoint rather than an architectural one, and the details of placing machine tool equipment, erecting pits, and all auxiliary features are as carefully planned for the particular purpose of the shop as are the details of a machine for a given class of work" (Swingle, p. 26).

Along with standardization of design, came the standardization of construction materials to match design. Many railroads incorporated wood and timber-framed construction, along with brick masonry and concrete, to form the buildings and structures.

The Milwaukee Railroad Shops Historic District is a style of engineering standardization that the railroads adopted during the time period of the late 1800s through the 1920s. "Railroad companies were pioneers in the area of architectural standardization. The well-worn axiom that 'form follows function' may be debatable for many types of buildings, but it accurately describes railroad architecture" (Conard and Cunning, p. E-83).

In many ways the facilities provided for properly taking care of locomotives in service are the most important under the motive power department's jurisdiction and in fact at times are the most important features of the whole scheme of operation. The beginning of the movement for uniform high class locomotive terminals dates back to the late 1880s when the railroads formed their engineering committees to investigate, study and draft standard and basic design plans to help achieve economies of scale to build their stock of roundhouse terminals. From these originally adopted standardized plans, at least five or six roundhouse terminals of various sizes could be constructed. These standards were, of course, arranged to have sufficient flexibility to allow for the varying demands of different topographies of land. (American Engineer and Railroad Journal, pp. 461-470)

The design plans would start with a general layout view for the roundhouse terminal. The conceptual plan would provide locations for the roundhouse, ash pits, inspection pits, machine shop, blacksmith shop, carpenter shop/lumber mill, coaling tower, oil house, water treatment plant, water tower, power house, and the arrangement of lead tracks, storage tracks, repair-in-place tracks, and other ladder tracks. Each of the buildings and structures would then have standard architectural plans and construction documents governing their design, measurements and size, and construction materials. All buildings would derive their architectural design characteristics from their associations with the roundhouse building.

National Register Bulletin 18 provides guidance on evaluating the significance of a historic designated landscape. This bulletin advises that "the researcher should determine the original intent of the landscape design based on original plans, photographs, correspondences, etc. as well as any alterations to the original design and the dates such alterations occurred." The National Park Service also states that the landscape "retains integrity of location, design intent, setting, materials, workmanship, feeling and association. The essential physical features of a property must be visible to convey its historical significance" (pages 3 & 6).

The Milwaukee Railroad Shops Historic District meets this test. When built, the physical layout of the Sioux City Roundhouse, Repair Shops and Engine Terminal spanned almost 60 acres in land mass. While only 29.53 acres survive today, the present landscape remnants and existing buildings comprise the historic core of the original railroad terminal. The landscape of the nominated Milwaukee Railroad Shops Historic District can be defined as a "roundhouse terminal."

Like all railroads, the Chicago, Milwaukee, St. Paul and Pacific Railroad Company needed multiple locations of locomotive shops to carry out the regular servicing, routine inspections and all mechanical and structural repairs necessary to keep their locomotive and rolling stock fleet operational. Charles Loweth laid out the Sioux City Roundhouse, Repair Shops and Engine Terminal according to the longitudinal design practices generally accepted by the railroad industry at that time. Loweth also designed and laid out engine terminals and car shops across the railroad's fourteen-state system, including the other Iowa communities of Savannah, North McGregor and Atkins. Among these Iowa-based engine servicing terminals and maintenance facilities (all designed and built under Loweth's supervision), the only sole surviving complex is the nominated Sioux City-based historic site. And the Sioux City Roundhouse, Repair Shops and Engine Terminal contains the largest concentration of buildings, structures and rail yard that represent the Chicago, Milwaukee, St. Paul & Pacific Railway's existence.

When first built, as illustrated in the attached site schematic, the general layout of the Sioux City Roundhouse, Repair Shops and Engine Terminal embodied the standard characteristics of the "longitudinal-designed" repair shops facility, combined with the arrangement of a lateral ladder track system. The general layout was compact to minimize land use with the relative buildings and structures rationally arranged using functional zoning to organize work production and the "flow" of locomotives and rolling stock in and out of the complex. Entrance and exit off the Milwaukee Road's mainline into the facility was gained through a main track networked with 2 longitudinal lead tracks stretching to the turntable and branches of 5 lateral ladder tracks running longitudinally within the complex.

The arrangement of the Sioux City Roundhouse, Repair Shops and Engine Terminal presents an interesting example of standard layout principles adapted to the local geography in order to accomplish the functional purpose of the shops; which is to receive the locomotives and rail cars, house them during the various operations involved with servicing, inspecting, dismantling and repairing. While every railroad had its own design standards on the size and configuration of its repair shops and servicing terminals based on geography it served and the availability of land, the railroads generally followed the longitudinal ground layout.

The longitudinal design "groups separately the buildings and facilities belonging to each of the three principal classes of work, viz.: locomotives, passenger cars, and freight cars" along a set of longitudinal tracks for each class of work (Berg, p. 30). The longitudinal design achieves economy of scale and efficiency by "grouping the several departments or special branches of work belonging to each group in one large building or in a series of closely connected buildings (Berg, p. 21). The designers of the Sioux City Roundhouse, Repair Shops and Engine Terminal made use of the longitudinal design through the construction of a series of one-story utilitarian buildings and several large-scale structures to carry out the functions of inspecting, maintaining, servicing and repairing locomotives and rolling stock.

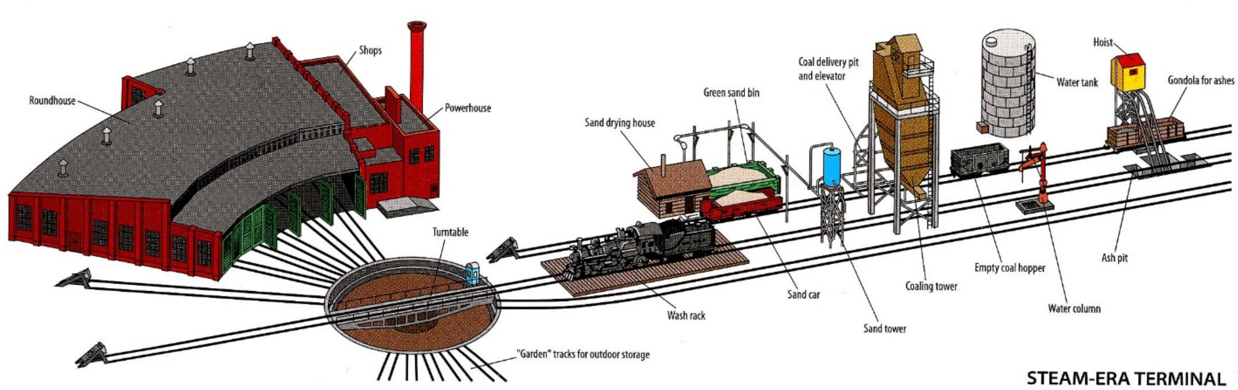
The longitudinal ground layout evolved into prominence during the 1890s when the railroads were merging the smaller start-up (i.e. regional) railroads into the larger subcontinental trunk lines and transcontinental railroads. Many of these smaller regional railroads had railroad shops consisting of one or more main buildings specialized for locomotive repair and another facility for the repair and servicing of rail cars – often times, may not be within close proximity to each other. As the railroads consolidated and started setting up their divisional system, they consolidated their smaller repair shops into larger main repair facilities that would serve a large territory by grouping several mechanical departments within a centralized tight landmass. A point to remember is the centralization of the repair shops was not based on the geographical center of the railroad or its operating divisions. The location of the centralized shops was based on the “center of traffic” – where the largest number of engines concentrate or where it is most convenient for empty cars en route to be stopped for repairs (Berg, pp. 11-12) based on where traffic is generated.

The grouping of mechanical departments into centralized facilities further allowed the railroads to concentrate and share certain classes of work common to more than one mechanical department, which in turn helped eliminate the duplication of labor while also reducing the unproductive movement of men and materials within the repair facility.

The mechanical departments generally consisted of locomotive repair, locomotive servicing, machining and blacksmithing, carpentry, rail car repair, water treatment, power generation, warehousing and storing of materials, locomotive and rail car storage, and passenger car cleaning and servicing. These work functions were carried out in buildings and structures such as the roundhouse or engine house; turning facilities such as a turntable; fueling structures (coal shuts/towers, fuel-oil tanks); cinder-handling facilities; water stations (water treatment plants, water towers, or water columns); sanding facilities; machine shops; blacksmith shops; wheel repair shops; oil and lubricant mixing; car repair-in-place tracks; and ready tracks for the storage of locomotives, rail cars, passenger cars, and cabooses.

The center piece of all work was the inspection, servicing and repair of the locomotives were carried out. The principal departments of the locomotive group are the erecting shop (i.e. roundhouse or engine house), the machine shop, the boiler shop, the smith shop, and the storehouse (Soule, p 161).

The following diagram shows these basic components of the typical steam locomotive terminal common to many railroad lines (McGuirk, p. 7). Please note, this general layout does not include the facilities required for the repair and servicing of passenger and freight cars, which were also an integral function of the Sioux City Roundhouse, Repair Shops and Engine Terminal.



Source: *The Model Railroader’s Guide to Locomotive Servicing Terminals* (Kalmbach Publishing Co.)

The above diagram illustrates the concept of longitudinal design based on locomotive repair and servicing being the centerpiece of work. The design often featured two longitudinal tracks coming in and going out of the terminal. One of the tracks was set aside for the inbound movement of locomotives through the inspection and servicing area; ending at the turntable and roundhouse building. Locomotives not needing repairs after inspection could be quickly refueled and turned around on the turntable for returning to service. Once turned the locomotive would leave the complex on the second track or outbound lead. Locomotives needing repairs were sorted by the turntable to the appropriate bay for repair work. Once repairs were completed, the locomotive was backed out of the roundhouse, onto the turntable, and sent out on the outbound lead for refueling and returning to service.

The third longitudinal track generally found in a large repair shop facility was the supply track. This track was important for the receiving of coal, sand, oils, iron, steel and other materials needed in the repairing of locomotives and rail cars. This track would also be used to ship out carloads of cinders from the ash pits, which were used as fill or ballast along the railroad.

A fourth longitudinal lead track, while not depicted in this diagram, was the inbound/outbound track leading to the car repair shops zone within the repair shops terminal. The principal departments of the car repair shops were the passenger car repair shop, the passenger car paint shop, the cabinet shop, the upholstery shop, the freight car repair zone of tracks, and the planing mill (carpenter shop). Whether to locate the car repair department contiguous to the locomotive repair department, such as the railroad did with its Sioux City Shops, was influenced by local traffic conditions, rail operations and mechanical department organization (Damon, p. 60).

The following were some of the fundamental design principles embodied by railroad engineers when laying out the railroad shops facility (Soule, p. 161; Damon, p. 61). While the engineers would work to satisfy these principles, there were always exceptions due to the individual conditions of the land's topography, development costs, and management policies.

1. Liberal space all owed for the extension of each department.

2. The storehouse with administrative offices should be central, convenient to all departments and ease of access on two tracks from the main line service track.

3. The forge shop should be convenient to both the locomotive and car repair departments.

4. The power house should be central and near the planing mill and repair tracks in order to burn refuse.

5. Yard cranes should be arranges to serve between the store house platforms and all departments.

6. The roundhouse should be very near the shop, or located enough away to justify a separate machine shop for light repairs.

7. Tracks, cranes, telphers and storage spaces should be arranged to insure the movement of materials with the greatest of time and labor.

8. Some consideration should be given to the appearance of stops and accessory storage facilities, lumber

yards, etc. from main line.

9. The advantages of a short tunnel of ample cross-section and use of the various steam, air and water piping systems

10. The possibilities of the adoption of longer and heavier engines should be considered, and some provision made for present spaces repair facilities for these larger engines.

11. A longitudinal array and grouping of buildings is parallel to the base line of tracks for the economy and functionalization of shared work.

12. Buildings should be so arranged that each may be extended by a large fraction of its original size. In the case of separate departments within the same building, permanent barriers between them should be avoided, so that the original arrangement of space to each may be modified to suit altered conditions.

13. The track system should be so arranged that tracks between principal buildings should simply be running tracks, and not standing tracks on which strings of cars may be left.

14. Outside tracks should not be so close to buildings that cars left standing on them will block off the light from any portion of the interior of a building.

15. The roundhouse should be accessible from machine shop and boiler shop; accessibility from the smith shop is not so important.

16. The oil house, when possible, should be between and easily accessible from the roundhouse and the store house.

17. If the shop group is in sight of the main passenger tracks, engines and cars awaiting repairs should be kept behind the buildings.

18. The original layout should include all yard accessories, such as scrap bins, lavatories, miscellaneous storage, lumber yard, etc.

19. The power plant should be central as regards to power distribution; but should be isolated as a precaution against fire.

Whatever general site layout plan was eventually used by the railroad, the railway's engineer was always cognizant to risk management and reducing the danger of fire. Fire destroyed many roundhouses across the railroad network. The nature of shop work introduced numerous fire hazards to the job site and increased the likelihood of fires starting, including:

- Smoking by workers
- Open burning of garbage and other refuse materials
- Motorized and steam-driven machinery and vehicles

- Materials subject to spontaneous ignition – lumber, coal, fuel oil, diesel fuel
- Welding and other hot work
- Temporary heating equipment
- Temporary electrical equipment
- Combustible formwork, scaffolding and other materials
- Storage of flammable and combustible oils and lubricants for locomotives and rail cars
- Storage of flammable gasses used for welding and metal cutting

Thus the railroad/civil engineers needed a design layout to minimize property damage in the event of a major catastrophic fire event and reduce the chances of fire spreading throughout the repair shops complex. Railroad repair shops were particularly susceptible to fire and at greater risk of the effects of fire because of their wood and timber-framed construction. Despite the fire risk, railways adopted the wood and timber-framed building methods because it allowed for quick erection times – particularly at a point in time when the railroads were in an infrastructure build-up cycle. Quick erection times meant the railroads benefited from reduced costs for site labor; it allowed the work of multiple trades working on site during construction. The quick construction also benefited the railroad by giving them the ability to standardize the prefabrication of building materials since they could use standardized construction documents and plans.

Because of the storing of large concentrations of lumber, paint, lubricants and oils that were kept on hand to for repairing locomotives and rolling stock, there was always the potential for fire and explosions. In the car shops, sawdust and wood shavings added to the fire hazard as combustible materials that were air-borne and susceptible to sparks. In the machine shops, forges and iron furnaces were potential sources of sparking a fire. In the roundhouse, shopmen were often using welding torches, lubricants, and other flammables in their work; which increased the likelihood of fires starting. And, in the outside environment, there were sparks, cinders, and soot exhausted from operating and idling steam locomotives (White, p. 145) along with the hot coal clinkers and ash cleaned from the locomotives' ash pans. Windy conditions could increase the rapidity of fire spreading from the air-borne sparks produced by the hot cinders being dropped during the cleaning of steam locomotives; thus the spacing between buildings became a fire mitigation technique in itself.

Subdividing the complex into many small buildings rather than just one or two large ones helped reduce the chance of losses to fire. That way, if the foundry (i.e. blacksmith shop) caught on fire it alone would be lost, assuming that there was sufficient space between it and the next building. Fire controls became part of the daily routine around the railroad shops. Firewalls were erected in roundhouses as well as subdividing and grouping types of work into sections of the roundhouse. The empty spaces between buildings were seen as necessary fire barriers, not wasted land. Since wood was essential to freight car repairs, dry lumber was housed in sheds kept some distance away from the buildings or with a fire wall barrier between lumber storage and planing mill (White, p. 145).

Even with these protective measures, accident statistics and newspaper reports during the early 20th Century tell a tale of many shopmen being killed or maimed over the years by roundhouse fires. And like many a roundhouse across the country, the Sioux City-based Milwaukee Railroad Shops were no less susceptible to fire.

A massive fire that broke out at the roundhouse terminal in 1925 received a lot of publicity and catapulted the shops into the regional spotlight. Midwestern newspapers from as far away as Davenport, Waterloo, Oelwein, and Omaha printed accounts of the fire. Many major daily newspapers across the nation, such as the *Oshkosh Daily Northwestern* and *Belvidere Daily Republican* picked up news feeds from wire services such as United Press, and printed short stories detailing what happened to start the fire.

In the early morning hours of August 4, 1925, fifteen stalls of the roundhouse building went up in flames, growing to an uncontrollable inferno that damaged ten steam locomotives that were in the shops for repairs. According to newspaper reports, the fire was so intense that it sent up sheets of flames that were highly visible for miles, and a heavy plume of smoke could be seen throughout the Riverside neighborhood. The fire caused an estimated $300,000 in losses (equal to $4,058,000 in modern 2015 dollars) to the complex. There was one roundhouse laborer critically injured in the fire.

Fire officials ruled the blaze an accident. The fire began when shop employee Charles Legget ignited a “fire-up” gun, a portable oil tank used to start fires under the boilers of steam locomotives in the shops for repairs. The “fire-up” gun consisted of a barrel of crude oil and a hose with a gun nozzle on the end through which the oil is pumped under 150 pounds of air pressure on the coal in the locomotive’s firebox to start the engine and build a fire. According to witness reports published in the various newspaper articles, the portable oil tank was located in the center of the roundhouse when it exploded around 3:15 a.m. after Legget ignited the “fire-up” gun. Legget sustained life-threatening burns to his face, hands and torso.

> A news story published by *The Oelwein Daily Register* reported that Legget said “he was operating the gun as usual when suddenly a sheet of flame blew in his face and seemed to set the entire place on fire at once. He jumped from the engine cab and a fellow workman caught him and beat the flames on his clothing.”

The Sioux City Daily Tribune reported shop employee Charles Leggett, age 47, worked in the roundhouse as a “fill-up man,” whose duty it was to fill the tender tanks with water and otherwise prepare them for service. In his newspaper interview following the fire, Leggett told the *Sioux City Daily Tribune* that at the time of the accident he was doing the job of another man who was off for the night. Officials of the railroad are quoted as countering the claim, stating that Leggett was not taking the place of another man and was performing is regular duties. The railroad identified Leggett’s job classification as engine wiper (August 5, 1925).

At the time of the fire, there were twenty (20) steam locomotives housed in the roundhouse for repairs. Shopmen responded quickly to the fire and were able to remove ten (10) steam locomotives from the roundhouse to safety. The remaining ten locomotives could not be salvaged because of the intense heat from the fire expanded the rails to the turntable, preventing movement of the locomotives.

Workmen began to fight the fire themselves to prevent the fire from spreading to the remaining segments of the roundhouse and the nearby machine shop and power house buildings. Four companies of Sioux City firefighters responded and fought the three-alarm blaze. By the time firefighters arrived, the southeast portion of the roundhouse was fully engulfed in flames. The fire spread rapidly along this segment of the roundhouse because of the timber frame roof structure. The heat from the blaze was so intense that the boilers of ten steam locomotives not rescued from the fire could be heard bursting apart.

Low water pressure and an overwhelmed water supply system forced firefighters to take a preventive stance, contain the fire to the south section of the roundhouse, and prevent it from spreading to the remaining fifteen stalls of the roundhouse building. Other factors affecting the fighting of the fire included different “thread sizes” between the couplings on the fire hydrants and the fire department’s hoses which limited the firefighting to three hoses. Because of the complex’s isolation from the city utility system the only available water supply for fighting the fire was the water stored in the terminal’s water tanks.

The fire caused extensive structural damage. The roof system was a complete loss, as well as the wood north elevation and the south brick elevation. The east brick side wall and the west brick firewall between engine stalls 15 and 16 suffered minor damage from the intense heat but did not crumbled. The wood turntable also suffered some minor fire damage. Photos published in the *Sioux City Journal* and *Sioux City Tribune* show these walls and turntable standing in the debris field after the fire.

Upon notification of the fire, the railroad dispatched C.F. Loweth, chief engineer, and a contingent of other railroad officials to Sioux City, to ascertain the property damage and authorize the reconstruction and repairing of the roundhouse section destroyed by the fire. Following the fire, rumors had spread that the railroad would cease operations and close the roundhouse terminal. The railroad officials reaffirmed the railroad’s intentions to keep the roundhouse terminal operational and rebuild the fire-damaged section. The complex was strategically important because of its location and its sophisticated technologies of the times. The railroad officials estimated it would take 90 days for the railroad’s construction crews to clear the fire debris and rebuild the roundhouse section. The railroad utilized the original building drawings and construction documents from 1916-1918 to govern the reconstruction project.

In the ensuring recovery and cleanup, a force of twenty-five (25) railroad construction workers and laborers was dispatched to the Sioux City site. Clearing away debris began the following day after the fire (August 5, 1925) and the task to clear away fire debris took one week. The portion of the brick sidewall left standing after the fire was torn down and the building’s foundation was cleared to prepare the site for rebuilding. The reconstruction of the roundhouse section was completed within 45 days by railroad crews.

Two Sioux City firms were awarded contracts for materials needed to rebuild the fire-damaged section of the roundhouse. Curtis Sash and Door Company was awarded the contract for manufacturing new window frames, doors and other special woodwork needed in the reconstruction. All these components needed to be specially made to conform to the original specifications and construction designs. A second contract was awarded to Sioux City Brick and Tile Company to furnish the brick needed for rebuilding of the roundhouse section.

The 1925 fire was not the only catastrophic disaster to change the landscape and built environment of the complex. Sioux City fire crews battled a subsequent three-alarm fire at the roundhouse terminal on Thursday afternoon, April 29, 1965; which destroyed the store house building and a box car docked on a siding track for unloading. The fire forced the evacuation of a diesel locomotive, wrecker and the wrecking train that was housed at the complex before the rapidly spreading fire reached that area.

According to news reports and photos published in the *Sioux City Journal* (April 30, 1965), three fire crews originally arrived at the scene sometime in the late afternoon and found the store house building and boxcar fully engulfed by flames. Additional fire fighters were called in to fight the dangerous fire. Firefighters responding to the scene heard explosions and found smoke billowing so high that residents living on the other side of the Loess

Hills Bluffs and in communities in South Dakota were able to see it.

Because the building was warehousing around 100 barrels of oil, asphalt roofing materials, and several acetylene gas cylinders, fire crews had to take a defensive posture to protect the surrounding buildings and rail equipment. The oil, acetylene gas and other flammable materials housed in the building fueled the fire and produced intense heat and caused numerous explosions. Fire crews spent four hours fighting the blaze.

There were no reported injuries from the fire. According to the *Sioux City Journal* report, the warehouse stockmen had ended their work about a half hour before the fire broke out; and were off the property at the time of the blaze. In addition, there was no shut down in work after the fire. Normal roundhouse terminal and railroad operations resumed after the fighting of the fire. The cause of the fire was undetermined. The damage was estimated at $10,000 (equivalent to $75,154 in 2014) and consumed the store house building, box car, and supplies. The store house's wood timber loading dock survived the fire. Conclusions can be drawn that despite the intense fire, the spacing between buildings and structures allowed fire crews to take a defensive posture and protect the rest of the complex, as well as the locomotives and rolling stock in for servicing and repairs.

Another characteristic of the longitudinal layout was the ability to minimize property damage from flooding threats. Across North America, there were a number of railroad repair shop terminals built in river areas and flood plains in order to access the rivers' aquifers. Because of the floodplain locations, these roundhouse terminals were often structurally prone to the threat of flooding. The flooding threats included such factors as high river levels resulting from excess run-off from rain storms and snow melts upstream, or the rise of the water table in the aquifer causing storm water ponding due to the inability of ground water to flow into the aquifer.

Railroad engineers would reduce vulnerability through land-use planning in these flood-prone areas. The distribution and spacing of numerous shop buildings throughout a terminal presented a methodology to prevent and mitigate long-term damage caused by flooding. The buildings were generally constructed at various elevations to raise the floor level above the designed flood level and minimize inundation of flood waters into the shop buildings. Engineers would use the spacing between buildings to create retention areas for the ponding of water away from the worksite. Should a major flood occur; buildings, structures and other property damaged by flood waters could often be dried out and restored easily; thus quickly reclaiming the use of the buildings and minimizing the time span a shop facility would be out-of-service.

The Milwaukee Railroad Shops Historic District provide an excellent landscape in which to study the impacts of weather on railroad operations. This terminal's siting along the Big Sioux River illustrates how the railroads adapted their standard building plans to the local environment to minimize weather impacts.

The Big Sioux River follows a course of 420 miles; rising in Roberts County, South Dakota and flowing south and southeasterly until it joins the Missouri River at Sioux City, Iowa. Between Sioux Falls and Sioux City the Big Sioux River serves as a natural boundary between South Dakota and Iowa. The Big Sioux River also forms a geographic boundary between the corn growing areas of Minnesota and Iowa to the east and the cattle-raising region of South Dakota to the west.

The headwaters of Big Sioux River are located in Summit, South Dakota. As the Big Sioux River follows it course, the river's watershed collects from the Rock River in Sioux County Iowa, the Indian River in Grant

County, South Dakota, and Broken Kettle Creek in Plymouth County, Iowa. All of these smaller streams collect runoff from surrounding farmland and towns located in the region.

The U.S. Geological Survey estimates the drainage area of the Big Sioux River at 8,900 square miles. With that large amount of drainage area to collect from, flooding along the Big Sioux River is not uncommon. In any given year, the Big Sioux River is likely to have areas along its course flooded by spring snowmelts or by intense rain storms. Occasionally, a major flood along the entire river will result from extremely heavy spring snow melts and ice blockages in its southern basin at Sioux City.

Generally, the Big Sioux River flows past the Milwaukee Railroad Shops Historic District at a river stage of fifteen feet. During heavy volume periods during snowmelts or after intense rain storms, the river stage will occasionally rise to a level between twenty and thirty feet in Sioux City with very little impact to the Milwaukee Railroad Shops Historic District. When river flows reach a stage of 32 feet, the river bank portion of the historic district begins to flood. At a river stage of 38 feet, the aquifer's water table is ground level and seepage in the ground begins. At this level, the locomotive pits in the roundhouse and the turntable pit become inundated with river water that has backed up through the storm water sewer system. At a river state of 41 feet, the entire railroad complex is submerged under three to four feet of water.

With its location in the southern basin of the Big Sioux River watershed, the Sioux City Roundhouse, Repair Shops, and Engine Terminal was always susceptible to the constant potential of spring flooding along the Big Sioux River resulting from the heavy snow melts and rain water runoffs in southern Minnesota, eastern South Dakota, and northern Iowa. Numerous times serious floods have stricken the complex facility over its working life.

The Big Sioux River flood of 1968 was the most severe to impact the historic district. A series of rainstorms dropped record-breaking rainfall across the entire Big Sioux River basin. The flooding of right-a-way along the Big Sioux River led the Railroad to order stoppage of all train traffic north out of Sioux City and the evacuation of its roundhouse terminal in Sioux City. The flood submerged the roundhouse terminal under four feet of water.

The physical damage to the railroad was minimal at the time, as the bulk of work centered on rail car maintenance and diesel locomotive servicing. Many of the buildings were vacant and seen as obsolete, with much of the equipment and machinery removed from the site. After the flood waters rescinded within a week, work returned to normal with very minimal cleanup needing to be carried out. This flood occurred after the 1968 flood control levee project carried out by the U.S. Army Corps of Engineers that minimizes the risk of the Big Sioux River flooding the community. However, the Milwaukee Railroad Shops Historic District is not protected by that levee system. The levee system met its expectations and protected the surrounding communities and neighborhoods; however it did force an inundation of floodwaters into the railroad roundhouse terminal area.

The second record flood to cease rail traffic into the Dakotas and cause the roundhouse terminal to close occurred when the snow melts and ice jams of March to April 1960 caused the Big Sioux River to swell in Sioux City and flood the entire area surrounding the Milwaukee Railroad Shops Historic District. This flood's widespread impact was the most severe for the entire area as the community of North Sioux City, South Dakota and the neighborhood of Riverside were both submerged under flood waters. An ice jam built up alongside the roundhouse terminal complex as debris and ice junks became entangled at the railroad bridge. To relieve the pressure of the ice jam and floodwaters, local emergency response people and the railroad's bridges and buildings department utilized dynamite and explosions to bust up the ice jam and to clear away debris. The complex was out of service for several months.

The following chart, which compiles the number of record crests of the Big Sioux River adjacent to the roundhouse terminal, demonstrates the value of spacing buildings as a flood recovery technique to bring back normal land conditions and restore railroad operations; thus leading to the conclusion of flood mitigation being a benefit inherently characteristic to the longitudinal landscape.

Year	Date	Crest (FT)*	Estimated River Stage (FT)
1969	Thursday, April 10, 1969	108.3	41.0
1960	Sunday, April 3, 1960	106.8	39.5
2014	Friday, June 20, 2014	105.6	38.0
1962	Sunday, April 1, 1962	104.8	37.0
1984	Monday, June 25, 1984	104.5	37.0
2011	Monday, June 27, 2011	102.2	35.0
1993	Wednesday, April 14, 1993	102.0	35.0
2010	Thursday, September 30, 2010	97.7	30.0
1997	Thursday, April 10, 1997	96.8	29.0
1979	Tuesday, March 27, 1979	95.6	28.0
1983	Friday, June 24, 1983	95.1	26.0
1978	Friday, March 24, 1978	94.5	25.0
1926	Wednesday, September 1, 1926	N/A - Flooding	N/A - Flooding
1929	Friday, March 15, 1929	N/A - Flooding	N/A - Flooding
1932	Tuesday, March 1, 1932	N/A - Flooding	N/A - Flooding
1933	Tuesday, September 5, 1933	N/A - Flooding	N/A - Flooding
1934	Friday, June 8, 1934	N/A - Flooding	N/A - Flooding

* Based on Datam Gage

Source: National Weather Service, Advanced Hydrologic Prediction Service

Historic Context: Original Functionalism of the Surviving Buildings and Structures

The previous sections that discussed the workmanship of railroad engineers and their utilization of standardized design plans in the construction and operations of railroad repair shops helps set the context for this discussion on the original functionalism.

Functionalism is a generally accepted standard that architects should design a building based on what the purpose of that building was to be. This principle is based on Chicago architect Louis Sullivan's phrase "form ever follows function" – his belief was that a building's size, massing, spatial grammar, and other characteristics are driven solely by the function of the building.

Milwaukee Railroad Shops Historic District
Name of Property
Woodbury County, Iowa
County and State
Name of multiple listing (if applicable)

The surviving historic resources of the Milwaukee Railroad Shops in Sioux City illustrate how the railroad's design of its buildings and structures were formed by the resource's purpose along with demands of climate. Each of them show how they supported the daily work routines of its shopmen labor force, and how railroad operations and the steam locomotive fashioned their design. The spacing and location of the buildings and structures provide insights in how engineers responded to climate and the work flow throughout the complex.

Six-Stall Roundhouse Building

The roundhouse building, also known as an engine house, is a large-scale, single story vernacular structure that is the primary character-defining building of the Sioux City Roundhouse, Repair Shops and Engine Terminal facility. This building was the core of the railroad's steam and diesel locomotive maintenance functions. The roundhouse building is larger than its neighbors in size and scale; but it is similar in building materials and functional style. The other buildings gain their significance in association with the roundhouse's and car shops' architectural appearances and functional histories.

> "The usual style of an engine-house, known in this country as a roundhouse, consists of a house built in a circular form around a turn-table, with track leading from the turn-table radially into the house. The building can either be built as a full circle, known as a closed or full-circle roundhouse, or it can be a segment of a circle, known as an open or segmental roundhouse. The walls of the building are not actually built circular, but in the shape of a polygon, the circle being divided up into stalls or panels, the walls in each panel being built on the chords connecting the panel points" (Berg, pr. 168).

Returned

The roundhouse is significant for its functionality as a "repair shops for the maintenance of locomotives in service" (Railway Shop Up To Date). "As such, its efficiency depends upon the facility, with which locomotives may be received, turned, repaired and dispatched with minimum detention" (Crandall, p. 212). The Sioux City Engine Terminal was originally built to care for steam locomotives used in passenger and freight service on the Chicago, Milwaukee, St. Paul and Pacific Railroad; but was converted in the 1950s to care for and maintain the railroad's fleet of diesel locomotives. Industrial railroad growth in the early 20th Century and in the upper Midwest required the construction of a major railroad terminal in Sioux City in 1917.

As a sheltered area, the roundhouse building was subdivided into several functional work areas. The type of work performed on the locomotives was the factor that classified those specific work areas: boiler work; running gear/wheel work; steam appliances; air and electrical system work; and tender repair.

Turntable and Pit

A turntable is a revolving structure, designed like a swing bridge, for turning locomotives and cars. The turntable is made long enough to balance a locomotive with an empty tender while turning. The turntable is essentially a single track swing span (i.e. bridge) on a central pivotal bearing surrounded by a roller or disc turning device, and on two end trucks, each having two flangeless tandem wheels on a circumferential mono-rail track in a circular bowl-shaped pit enclosed by means of a vertical masonry wall, the level coping supporting the rail ends of radial yard tracks with any of which the turntable track will connect when the span rails are brought into line. In this way there is no open or significant gap between the fixed rails and the turntable rails; and no significant tilting of the table, the rails being held rigidly at the same level (A.R.E.A.).

The center of the turntable is placed on a carefully prepared foundation usually constructed of reinforced concrete. Rail locks are usually provided at the ends of the turntable track to keep them in alignment with the rails of the approach track while locomotives and rolling stock are being transferred and to protect the ends of the rails at the temporary joint that is formed with the turntable is aligned with the radial tracks leading to the roundhouse. (A.R.E.A. pp. 283-284)

The turntable center and its turning device are placed in a circular pit depressed below the surface of the ground. This below ground structure, called a turntable pit, contains a wall and floor constructed of masonry, preferably concrete. The outer circle wall is built upon footing while an inside concrete step is built attached to the outer circular wall. This step carries the circle rail, sometimes laid on ties or chairs securely attached to the concrete step. The visible vertical face of the outer circle wall is equi-distant at all points from the center. (A.R.E.A. pp. 285-286)

A turntable is generally operated by a tractor running on the pit rail driven by an electric motor. This tractor is hitched to one end of the turntable; but at the end with the electric motor there is a counterweight so that when the table is empty (no locomotive or rolling stock on the table) the carrying wheels of the truck are always down on the pit rail and the table rails are aligned level with the fixed radial rails leading into the roundhouse or with them terminal's main tracks when the turntable is spotted. In other words, the empty turntable is always tilted with its motor end down. (A.R.E.A. pp. 283-286)

FACTOID: Railroad operating rules prescribed that the table must always be turned so that locomotives run upon the turntable at the motor (low) end; while engines could be run off at either end.

Machine and Blacksmith Shops

The Machine Shop and Blacksmith Shop/Foundry were side by side, with a common brick fire wall between them; and tributary to the car repair shops and the locomotive roundhouse. Located directly south of the roundhouse, the Machine and Blacksmith Shops is a large-scale, single story brick building, rectangular in shape. This structure is the second largest resource within the Milwaukee Railroad Shops complex. The building is subdivided as a sheltered work area into two parts: the north portion housed the machining area. The south portion of the building was constructed for housing the blacksmith shop and foundry. The building is significant for its original functionality for housing equipment needed in the fabrication and machining of new locomotive and rolling stock parts by skilled craftsmen and tradesmen.

The convenient proximity of the machine shop and blacksmith shop sited between the roundhouse and the car shops mill building allows the scope of work to support the functions of heavy and light repairs to both the locomotive fleet and rolling stock. The machine shop is approximately 68 feet by 50 feet and is in the north end of the building toward the roundhouse. The machine shop was originally fitted with machining tools and equipment to handle locomotive running and emergency repairs, together with wheel work, metal fabrication, and machining work required by the car repair shops. The arrangement and array of machine tools and equipment is shown by the accompanying line drawing exhibited in the supporting documents section. Power to operate the machinery was powered by steam piped from the power plant to this building through the roundhouse.

The blacksmith shop is situated in the south end of the building nearer the foundation remnants that supported the structures for the iron rack, coal shed, and wheel casting platform. The area for the blacksmith shop is 32 feet by 50 feet, and was used for housing hand forges, furnaces, swinging jib cranes, tool racks, benches, and ventilation equipment for removing smoke and gases from the forges. "From the standpoint of shop production, the blacksmith shop is looked upon as a feeder for the other shops. The blacksmith shop turns out the forgings entering into the construction of new cars, the bulk of the car forgings required in keeping up the repairs of both freight and passenger car equipment on the line, as well as the forgings for locomotive repairs, and on some systems a certain amount of switch and frog work, together with other repair work for the road department" (Haig 87-91).

Car Department Mill Building (a.k.a. Car/Carpenter Shop)

This structure is one of the eighteen buildings built during the rail terminal's initial construction between 1917 and 1918. Like many of the remaining structures in the proposed historic district, the Car Department Mill Building gains its significance from its original functionally for railroad use. Typical of the industrial, utilitarian style in which it is rendered, the building was designed as a sheltered workplace for the sawing, cutting, planing and assembly of the wood components used for repairing the car siding, doors, and interior walls of freight and passenger cars. Actual car repairs were performed outside in all kinds of weather on the parallel tracks that ran adjacent to the mill shop. This building's functionality was an essential part of the terminal's maintenance operations for the Milwaukee Road's Sioux City and Dakota Division.

The building features an open interior that was used to accommodate the usual equipment of wood-working machinery needed for piece-work to repair passenger and freight cars, as well as the interior of steam locomotive cabs. This equipment once housed in the building consisted of a heavy planer and continuously and intermittently operated machines such as saws, shapers, jointers, mortisers, tenoners, band saws and borers (Haig & Benedict, p. 117). The original erection drawings show an office area, located in the north end of the building for the car shops foreman that was partitioned off from the rest of the area by a wood stud wall. This wall was removed sometime during the building's lifecycle.

Toilet Building #2 (a.k.a. Water Closet)

The Toilet Building, also known as the water closet, was built during April 1918; and it is rendered in the railroad's standardized plans for restroom facilities at its major shop complexes. As the name implies, this building functioned as one of the two restroom facilities constructed in the complex for workforce. It is the sole-surviving toilet building. The toilet building functioned as a washroom with water closets, sinks, and lavatories to be used by more than one worker at a time. The 1918 blueprints show this building was originally subdivided by an east-west gypsum construction block partition into two equal sections for use by men and women. The north side subdivision was used for housing the women's restroom, while the south side subdivision was used to accommodate the men's restroom. The men's section featured a trough-style urinal. The toilet building made use of running water draining into a sewer system to flush human waste and waste water.

Sand Drying House

The sand drying house is one of the eighteen buildings built during the rail terminal's initial construction between 1917 and 1918. The sand house, with its accompanying wood sand tower, is located at the south end of the terminal, just north-west of the concrete foundation that once supported the coaling station. The terminal's south end was used for servicing locomotives with coal, water, fuel oil and sand. The sand house had three distinct functions: "the storage of wet sand, the drying of the same, and the storage of dry sand" (p. Berg, 71).

This particular building's original functionality was for the drying of sand that was used in locomotive operations for traction and cleaning flue tubes in the boiler. Sand was used on locomotives to increase the friction of the driving-wheels on the rails on heavy grades or when the rails were in a slippery condition. The sand had to be dry in order to run freely through the pipes leading from the sand-box of the engine to where the sand is spouted on the rails in front of the driving wheels. Sand was also used in the cleaning of the steam locomotive's boiler tubes. Sand, freshly dug, is always more or less moist and it absorbs moisture from the air very easily, even when properly stored under cover, so that artificial drying becomes a necessity (Berg, p. 71).

This building once housed a steam drier kiln and several roasting stoves for sand to be thoroughly dried and roasted. Sand originally arrived wet in gondola or hopper cars. It was unloaded into a big hopper adjacent to the sand house. The sand passed through holes in the hopper and was fed into the dryer and stove. After being dried in the stove and furnace that were sheltered in the sand house, the sand was placed in a screening hopper that sat above a sand drum. Air was applied to the sand drum from a compressor; forcing the sand to move through supply pipes from the sand drum to one of the two elevated sand towers. The sand drum was located below ground level with the sand screen above ground. A valve system was used to route the sand to the appropriate sand tower.

Wood Sand Tower

The wood sand tower is cylindrical structure located to the northeast of the sand drying house. Originally built as one of two sand towers within the locomotive servicing area, this tower was rebuilt during 2008. The sound tower had been heavily damaged by fire in 1963 and by subsequent wood rot and infestations by termites.

Located near by the sand house and adjacent to the ready track, the sand tower's function was to hold and distribute dry sand from an elevated reservoir or storage-bin to the locomotives. "From this elevated storage-bin the sand is drawn through spouts directly into the sandbox of the engine, similarly in the manner that water is drawn from a water-tank through a gooseneck or grain is spouted from a grain-elevator into barges/ boats or rail cars" (Berg, p. 77). From the sand tower tank, the sand was loaded by gravity to the locomotive's sand dome and sand box through a 4-inch pipe and controlling valve (Haig & Benedict, p. 199).

Engineers Tool House

This structure is one of the eighteen buildings built to a standard design during the rail terminal's initial construction between 1917 and 1918. This building gains its structural significance in association with the roundhouse building and its functional relationship with the work life of the railroad engineer and locomotive fireman. The building once housed supplies used by engineers and fireman in the field when operating their locomotives. Those supplies consisted of oil, lubricates, oil cans, etc. Often times, engineers and fireman would need to oil driving rods and fill mechanical lubricators while the steam locomotive was in operation, generally stopped for filling water and fuel. At those times when taking on water and fuel, the engineer and fireman would perform the routine operational tasks. The engineer's tool house is where locomotive engineers and fireman would pick up their supplies before taking their locomotive out on the road. The engineers and fireman would report to work at the Sioux City Engine Terminal.

The building is changed from original construction. Currently, the building is half the size it was at the time of original construction. According to 1954 site drawings, the south half of the building was retired and demolished. The south elevation wall now existing was originally a fire wall constructed during the building's erection in 1917. With the transitioning of motive power to diesel electric locomotives, the need for oil and lubricants was limited. The building was used for general supply storage after 1954.

Cinder Pit

Coal-fired (fueled) steam locomotives all produced waste in the form of ash or coal cinders. As coal burned in a steam locomotive, the burnt cinders fell into an ash pan at the base of the locomotive's fire box. To keep the steam locomotive in a state of good operating repair, this ash pan would need to be emptied periodically to remove the ash waste. The Sioux City Engine Terminal has a specialized area that was built for the specific purpose of quick and economical removal of the ashes from the locomotive and the pit itself. The steam locomotive would be driven over the open ash pit or bin where the hot coal embers or cinders would be dumped from the locomotive to cool. The cooled cinders were the removed by a steam shovel and loaded in to gondola rail cars for removal from the complex. Ash then could be used by the railroad as material for building roads in their complexes or in ballast for road bed. In some cases, the cinders were sold to contractors.

Wood Timber Shipping Dock with Ramp and Store House Foundation

One of the railroad operational functions originally housed at the Sioux City Roundhouse, Repair Shops and Engine Terminal was the Stores Department. The Stores Department is responsible for the purchasing and warehousing of materials and supplies needed for the complex to carry out its work. This department not only provided materials and supplies for the Sioux City-based operations, but for smaller engine houses and repair facilities throughout the broader railroad division. Generally the stores department would purchase and warehouse a standard supply of materials that would be consumed within a 30-day period – that is, a month's of supply is ordered at time. The general storekeeping rule was to prevent losses and shrink from an oversupply of materials, and to keep materials and supplies moving and not remain in stock longer than absolutely necessary (Stuart, pp. 700-701). The Stores Department acts as clearing house for loading and unloading of materials, and for distributing the materials to the appropriate areas of the complex or at an ancillary site.

Foundation Remnants of Ancillary Buildings and Structures

Scattered throughout the historic district are concrete foundation remnants of buildings, structures and other infrastructure that resembles the land use by the railroad. The foundation remnants provide context for the design and functionality of the complex as a major engine servicing terminal and car repair shop. The foundation remnants will be preserved and retained to mark the site of the railroad buildings and structures that once occupied the footprints of the foundations. Key interpretive/graphic panels are planned to help illustrate the razed buildings and structures to help visitors understand the functionality of the infrastructure component and the importance of the location in terms of land use design.

Power House Foundation

The power house was an isolated one-story brick building with timber roof structure positioned next to the roundhouse and the water treatment facilities. The power house featured a boiler room and an engine room housing a Corliss Stationary Steam Engine and generators for the creation of electricity needed throughout the entire facility.

Oil-Mixing House Foundation and Concrete Pad

The oil-mixing house was an isolated building near the car repair shops to the northeast, where it was conveniently situated for the delivery of oil, waste, etc. to engines and rail cars repaired and maintained at the Sioux City-based terminal. This facility housed tanks for oil to be dumped and mixed when barreled crude and mixed oils were purchased. However, the usual method employed by the railroad was to buy ready-mix oils from refineries and manufacturers. So this facility also housed an area for storage of barreled ready-mix oils.

Because the oil-mixing house was located just south of the stores building, it also provided for the storage and distribution of oils and waste for the smaller engine terminals situated throughout the division. Its location provided for delivery of supplies to the roundhouse, machine shop, and car shops where oil could be distributed.

Coal Station/Tower Foundation

One of the functions of the Sioux City Roundhouse, Repair Shops and Engine Terminal was to serve as a fueling station for the railroad's fleet of steam and diesel locomotives. The fuel servicing areas, located in the south east quadrant of the complex, provided for water, coal, petroleum, and diesel fuel. The Sioux City Engine Terminal housed a large coaling station to coal locomotives enroute, which necessitated facilities to rapidly distribute coal into the tender, or to coal locomotives for the start of their runs.

The Sioux City Engine Terminal made use of a standard coal-chute style tower system designed by the railroad as its method to coal locomotives. The design chosen by the railroad was an adaptation of the *coaling station with vertical bucket elevator with center covered supply track* (Berg, p. 156). Most likely, the railroad engineers chose this design because of the limited ground-space and compactness associated with the pocket area that defines the entire engine terminal and car repair shops.

The coaling station at Sioux City was a timber structure 66'-66" by 35'-5" by 110'-0" high with two upper storage bins holding a combined total capacity of 300 tons of coal. The storage bins sloped westward and eastward for delivery of coal to the locomotive's tenders. The coal-supply track was located in the middle of the structure. A hopper or gondola car full of coal would be spotted on this track for unloading. Under this center coal-supply track was a large below ground pit for the discharge and emptying of the coal from the hopper or gondola car. The pit was designed to allow for the flow of goal to the vertical buckets that made use of an elevator system to hoist the buckets to the top of the storage bins. The coal would then be dumped by the elevator buckets into the storage bins for eventual gravity loading into the locomotive tenders. The timber structure was crowned by two elevator cupolas/towers that clearly marked the hosting elevators.

Wheel Shop - Casting Platform

The Sioux City terminal featured a wheel shop located between the car shops area and the machine/blacksmith shop. Wheels are fundamentally critical to railroad rolling stock, passenger cars, and maintenance of way equipment. They are necessary to allow movement over the rails and must always be in a state of good repair to prevent derailments. The operational demands of wheels are enormous, making them the one component with the highest stress levels. Wheels are load bearing and support the weight of the car and its cargo; they steer the train and its car along the track; with their flange they keep the train and its cars on the tracks; and they must withstand the heat stresses caused by friction between the rail and wheel as well as the braking systems used to stop the train. Wheels need to be inspected daily and replaced often.

Water Works System Remnants

The maintenance, repair and servicing of a steam locomotive requires access to and usage of large quantities of water. Besides the functionality of filling the tenders (i.e. tanks) to supply locomotives with water for steam generation will in train service; water was needed for washing out a locomotive's boiler and firebox, for cooling ash and cinders removed from the locomotives firebox, and for cooling metal work and iron casts in the machine and blacksmith shop. As a result, the water supply system within the Sioux City Engine Terminal played an important role in the site's utility and functionality. In order to guarantee a continuous supply of water that was cost effective and not dependent upon municipal water services, the railroad constructed its own waterworks. Original construction documents show there were basically two waterworks systems at the Sioux City facility. One of the railway waterworks provided water for the steam locomotives and shop work. The second system supplied potable water for the employees to use for drinking or to access in the restrooms. The water system was also used for fire protection and firefighting within the complex. There are approximately three fire hydrants spread throughout the system.

The water was extracted from ground sources feed by the Big Sioux River and springs running from the adjacent Loess Hills Bluffs. Because the water needed for operating steam locomotives would have to be of high quality, the railroad had a filtering system to treat the water to the appropriate softness to meet the design standards of its locomotive fleet. The water was pumped into either the complex's soft water tower or hard water reservoir, depending upon the filtering and treatment the water received.

At one time, the complex possessed its own laboratory for monitoring the water processing and regularly testing the preparation of the feed water needed to supply the steam locomotives. The laboratory personnel would specify the salt content needed to treat the water, the pH value and the composition of feed water. Enginemen and hostlers would bring samples of the feed water to the laboratory for testing, as well as samples of oils and greases used as well in locomotive service. There is speculation the laboratory was a wood structure located near the roundhouse and machine shop buildings; and that it was demolished during the 1950s.

The waterworks was equipped with several systems for delivering water to various points throughout the complex: wells, pumps, pipes, storage tanks, softening plants, take-off points, and distribution columns. The Sioux City Roundhouse, Repair Shops and Engine Terminal were serviced by a water works consisting of 3 wells with pumping apparatus, 2 water storage tanks, 2 water columns, and a water treatment plant.

Water Well Foundations

The general layout schematic for the complex identifies the location of three water wells. The well head apparatuses for these wells were supported by concrete foundations, each measuring 14'-6" by 14'-6" in a square pattern. Each well was dug approximately 30 feet deep with a 14-inch diameter wells. While the railroad never officially abandoned the wells, the pumping mechanisms were removed in the 1950s when the complex was downsized. At that time, the complex was connected to the city's water system with a 4-inch line. However, when the railroad abandoned the complex in 1980, the complex was severed from the city's water system. The wells were officially abandoned in July 2009 and were capped with concrete in accordance with regulations enacted by the Iowa Department of Natural Resources. No physical alterations were made to the water well foundations; original integrity was protected.

150,000 Gallon Soft Water Tank Column Foundations

The soft water tank was utilized for the storage and distribution of water that was treated for use in steam locomotive operations. The circular water reservoir (tank) sat upon columns with several up and down direction supply pipes. The soft water tank was located adjacent to the roundhouse building near locomotive stalls 14 through 16, about at the halfway point of the donut-shaped roundhouse building. The surviving foundation consists of six square column footings, each constructed of concrete, measuring 6 ft. by 6 ft. and protruding about 3 feet above grade.

60,000 Gallon Hard Water Tank Foundation Base

The hard water tank was a ground storage reservoir used to store water extracted from the ground water table. This water was distributed to shop areas for use in metal work, locomotive cleaning, portable uses on the site, or for distribution to the water treatment plant. The surviving foundation is a circular concrete foundation with an outer footing that forms a rim around the base that protrudes about 2 feet above grade. The base has a diameter of 30 feet and the circumference of the outer "rim" footing 188.5 feet. The base occupies a total footprint of nearly 2,827.5 sq. ft.

Water Column Box Area

The water column box area is a remnant of the water works system that was utilized in railroad and locomotive operations at the Sioux City Roundhouse, Repair Shops and Engine Terminal facility. The water column box area is located towards the geographic center of the complex, directly east of the oil house foundation. The concrete box area contains a below ground shut-off valve with evidence of a water column for filling locomotive tenders once protruding above ground.

Worker Walkways

The complex contained an internal employee transportation system consisting of defined worker walkways and pathways for motorized and non-motorized travel. The worker walkways and pathways provided connectivity between buildings, as well as connections with the citywide sidewalk system and street car stop. The bulk of the traffic was foot traffic, however

The worker walkways also played an important function besides providing for worker foot traffic. The walkways were used for the distribution of materials:

> "The prime motive of the shop is to make repairs with maximum expediency and to return equipment to service in minimum time. Each building stand much in the same relation to the entire shop plan as the several component parts of a machine bear to the completed mechanism. This signifies the requirement of effective inter-communication among buildings. Distribution of material rapidly, economically and with least unproductive movement, then, is the keynote in the general arrangement of buildings, facilities and equipment" (Haig, p12).

The worker walkways were constructed at a width that allowed for the usage of hand trucks and forklifts to help move fabricated parts between buildings and work areas. These walkways enabled buildings, such as the machine shop/blacksmith shop buildings to perform dual work – supplying new fabricated components and repaired parts for locomotive and rolling stock repairs.

Yard Tracks

The original track system that supported the functionality of the Sioux City Roundhouse, Repair Shops and Engine Terminal formed a rail yard consisting of a set of 15 tracks, with some of the track leads stretching a mile and a half in length, for a cumulative total trackage of ten miles within the complex. All tracks within the complex were built to the standard gauge of 8'- 4.5" in section lengths of 40 feet. Today, the rail yard consists of a set of 5 tracks totaling 1.65 miles of total trackage – these five surviving tracks served the core functional areas of the complex: locomotive repair, locomotive fuel servicing, and rolling stock repair. A majority of the tracks were retired and removed during the late 1950s when the railroad transitioned from steam operations to diesel operated trains and the need for storage of equipment was in decline.

Rail yards are "collections of side tracks and necessary buildings at terminal, division, or junction points. Their purposes are to provide housing for idle locomotives, repair shops for cars and locomotives, storehouses of various kinds, storage tracks for temporarily idle cars, and to facilitate the receiving and dispatching of freight" (Raymond, p. 92).

Most of the rip tracks that were used for rolling stock repair and locomotive storage were removed by the railroad as part of a strategy to reclaim and scrap to local steel companies excess track materials (rail, fasteners, and spikes) to help offset the times of financial stress. The lead tracks to the car shops, roundhouse, turntable, and fuel servicing areas of the complex. The photo on the next page, captured during the late 1940s by railroad employee Guy Thatcher, shows the rail cars under repair on the rip tracks located just west of the car shops building. Photo courtesy of the Sioux City Railroad Museum.

United States Department of the Interior
National Park Service

Milwaukee Railroad Shops Historic District
Name of Property
Woodbury County, Iowa
County and State
Name of multiple listing (if applicable)

National Register of Historic Places Continuation Sheet

Section number 8 Page 87

Historical Image: Box Car under repair on RIP (Repair-in-Place) Track

Photographer: Guy Thatcher Circa: 1940

Location: Sioux City Car Repair Shops, Chicago, Milwaukee, St. Paul & Pacific Railway Company

Digital Archive: Sioux City Railroad Museum: Guy Thatcher Collection

Criterion C: Chapter 2.1 – The Civil Engineer who designed the Milwaukee Railroad Shops and its Layout

The Milwaukee Railroad Shops Historic District is a significant historic property under Criterion A for its associations with the work life and workmanship of a civil engineer who played a critical role in our nation's railroad past. The historic site provides an important perspective on the specialized field of railroad engineering as a discipline of the broader civil engineering profession. The next few paragraphs will discuss the field of railroad engineering followed by a brief biography on Charles F. Loweth, one of the preeminent civil engineers turned railroad engineers during the Golden Age of Steam Railroading who gained international recognition for his work.

Historic Context: The Work of the Railroad (Civil) Engineer

The broad collection of buildings, structures, foundation remnants, and rail yard are illustrative of the influence the civil engineering trade had on transforming surface transportation. "The railroad nurtured the new profession of civil engineering in the nineteenth century. Often schooled at West Point, in the technical schools of Europe, or new technical institutes in America, and sometimes self-taught; early civil engineers soon acquired the skills and experience needed for the location and construction of railroads that could be rapidly and economically built" (Middleton, p. vii).

When railroad construction got underway in earnest during the mid to late 1800s through the first two decades of 1900s, there became a great need for a specialized trade of civil engineers who were capable of understanding the unique challenges associated with designing, constructing and maintaining a railroad right of way through different landscapes and environments. In response to the need for the rapid buildup of rail lines and railroad companies, civil engineers were challenged not only to design and build tracks, but also to build and operate/maintain structures such as bridges, depots, stations, repair shops, locomotives and rolling stock.

This demand resulted in two specialized areas of railroad engineering practice to emerge: mechanical engineering and maintenance of way/structural engineering. In the case of mechanical engineering, the focus is on designing, constructing and maintaining equipment such as locomotives and rolling stock; while the focus of maintenance of way engineering is on designing, building and maintaining roadway (i.e. trackage) and structures such as bridges, buildings, depots and stations (Armstrong, p. 241).

Along with the two specialized fields of railroad engineering emerging, a set of functional hierarchical organizational structures were needed to manage the infrastructure buildup and the expansion of a fast-growing railroad industry. Professional engineering managers became necessary to coordinate the work of architects, civil engineers, draftsmen, surveyors, rodmen, and tens of thousands of workers and track laborers.

At the time of building of the Milwaukee Railroad Shops complex in Sioux City, the railroad's maintenance of way division was overseen by the Chief Engineer. The hierarchical flow of the Maintenance of Way Engineering Office generally followed this line: a chief engineer (overseeing the entire railroad), an assistant engineer (overseeing a region or a contiguous cluster of operating divisions), a division engineer (overseeing work within a specific divisional jurisdiction or district of the railroad), and a resident engineer (generally a local area of 30 miles or less).

The Chicago, Milwaukee, St. Paul and Pacific Railroad Company's Office of Chief Engineer was based in Chicago, Illinois. Within the Chief Engineer's office there was a planning and design staff consisting of an architect, an Engineer of Design, and several draftsmen. Out in the field were the Assistant Chief Engineer and Division Engineers, who had immediate personal supervision under the chief engineer of all the engineering force, construction crews and work projects.

The Chief Engineer was the general designing and executive officer of construction. His office furnished division engineers with copies of all general plans for ordinary structures, forms of excavations and embankments, specifications for all classes of work on their divisions, and special plans for unusual work or structures when they occur.

The Division Engineer, from surveys and information furnished by the resident engineers, and following the general plans furnished by the Chief Engineer, made all detail plans for the various small structures on his division, and wrote bills of material needed for the construction work, designating each by its station on the map or profile. Copies of these final plans and material bills were resubmitted back to the Chief Engineer's office. The Division Engineer would also make special designs for special structures that needed to be built to fit with local conditions and operating practices, and submit those structural plans back to the office of Chief Engineer for approval. The Division Engineer managed the labor forces of the railroad during major construction projects.

The Resident Engineer made all surveys and measurements required in staking out earthwork and structures for construction, and is in immediate charge of the work on his residency. He was also tasked with setting the track centers for track laying. (Raymond, p. 304).

Criterion C: Chapter 2.2 – Significance of Charles F. Loweth, Railroad Civil Engineer

Historic Context: Charles F. Loweth, A Preeminent Railroad Engineer

The Sioux City-based Milwaukee Railroad Shops complex design process flowed through this organizational structure. Charles F. Loweth, chief engineer of the railroad, was the master designer of the site's general layout and many of the signature buildings and structures. Assisting him in planning and design work was H. C. Lothholz, engineer of design. The person responsible for turning those designs and plans into an operating facility was the railroad's assistant engineer DeWitt C. Fenstermaker, who was responsible for overseeing the hundreds of railroad employees who constructed the complex.

All three of these railroad engineers would climb through the ranks of the civil engineering field; earning outstanding reputations for their design work and project management skills. Shortly after the completion of the Milwaukee Railroad Shops in Sioux City, Lothholz accepted engineering work with the American Bridge Company where he would go on to specialize in the designing of railroad bridges and turntables. Fenstermaker would move on and accept a commission to help build railroads in Panama and Cuba. He would later return to the United States to help local municipalities in the state of Illinois with planning and zoning activities and building codes. But, it was C. F. Loweth who would continue to build a portfolio of construction projects and become internationally recognized as one of the nation's finest railroad builders. His career is representative of the master civil engineers of those times who learned their trade mostly on-the-job with very limited post-high school education and training.

Charles Frederick Loweth was born on March 3, 1857 in Cleveland, Ohio; the eldest son of Daniel and Mary Ann Pennington (Brown) Loweth. His formal education included attendance at Bellevue High School in Cleveland and one year of studies (1876-1877) at Oberlin College located in Oberlin, Ohio. While in college, his studies focused on subjects in the natural sciences and mathematics.

Just prior to starting college, in 1875, Loweth began his work in the civil engineering field by taking an entry-level job as a chainman working on a railroad survey crew. In 1877, after the appeal of working on survey projects for the railroad, he left Oberlin College to take on work as a rodman for the Cleveland, Tuscarawas Valley and Wheeling Railway. Over the next three years he would learn civil engineering principles through self-studies and practice the trade on-the-job by holding the position of draftsman for the railroad and the American Bridge Company. Following a short stint with American Bridge Company in 1879, the Wabash Railroad hired Loweth to make surveys and design the entrance route of the railroad into Chicago.

His design work and engineering reputation quickly flourished in the industry. By the age of 24, which was in 1881, he had joined the St. Louis, Des Moines and Northern Railway Company holding the title of Principal Assistant Engineer. In this position, he oversaw the construction of the High Bridge that was built by the Chicago and North Western Railroad over the Des Moines River near Boone, Iowa – a structure that was 2,020 ft. long and 101 ft. above water. This accomplishment further propelled his reputation in the railroad industry as a master project manager.

After this project, Loweth enjoyed a thriving private practice in St. Paul as a consulting engineer for several railroad companies with lines extending from Michigan to the Pacific Northwest. Loweth served as a consulting chief engineer for the Northern Pacific Railway; the Minneapolis, St. Paul and Sault Ste. Marie Railway Company; and the South St. Paul Belt Railway Company. It was during this time of private practice that his engineering firm diversified into designing and supervising the construction of bridges, water-works and sewage systems for over one hundred municipalities across the country.

During his tenure in private practice, Charles Loweth was a principal engineer in the firm of Loweth and Wolff based in Minneapolis, Minnesota. One of the projects they worked on was the design and construction management for an elevated railroad in Sioux City. The elevated railroad project was conceived and promoted in 1887 by a group of nine Sioux City business leaders. They held aspirations to make Sioux City the "Chicago" or "New York" west of the Mississippi River. Sioux City was experiencing rapid growth at the time; during the ten year period preceding 1887, Sioux City grew from 10,000 residents to 30,000 people. The town started an eastern migration from the Missouri River into a neighborhood area known as Morningside. Unfortunately, traversing the community from downtown to the east was made difficult by the stockyards, railroad lines, and the often flooding of the Floyd River.

To overcome those land barriers, the nine investors conceived the idea of constructing an elevated "EL" street railroad. Each of the nine business leaders invested $1,000 each and contracted with King Iron & Bridge Company in the early 1890s to build a two-mile elevated railroad from the western limits of the Morningside neighborhood to a connection with the street car system in downtown Sioux City. The King Iron & Bridge Company subcontracted with Charles Loweth for the design of the elevated railroad.

Loweth left private practice in early 1910 to begin his career with the Chicago, Milwaukee, St. Paul and Pacific Railway Company in the position of Engineer and Superintendent of Bridges and Buildings. He would not hold this position for long. Later in 1910, he advanced to the position of Chief Engineer of the railroad; a position he would hold until 1935 when he passed away.

During his tenure with the Chicago, Milwaukee, St. Paul and Pacific Railway Company, Loweth was called upon to design construction plans for the Pacific Coast Extension from Mobridge, South Dakota to the Pacific Coast – making the railroad a transcontinental route. This link of rail line required him to develop plans for bridges and trestles across the Missouri, Yellowstone and Columbia Rivers. He and his team of civil engineers also had to design the route and track elevations for the rail line to cross the Rocky Mountains. This new route construction also called for design plans to build the support infrastructure that would be needed for railroad operations: stations, depots, freight houses, maintenance-of-way buildings, locomotive and car repair shops, terminals, and switching rail yards.

In addition to his work on the Pacific Coast Extension, Loweth was charged with improving and upgrading facilities and infrastructure on the railroad's older core lines in the Midwest. He was assigned the task of replacing aging wood timber bridges and trestles in the older parts of the railroad's system. This work lead him to become a master engineer at using reinforced concrete in bridge and trestle construction over major water and road ways, and reinforced concrete culverts for railroad lines traversing creeks and streams.

As part of this renewal of infrastructure, Loweth drafted new design plans and facility layouts for the replacement of several aging, obsolete and outdated locomotive and car repair shops along the mainlines in Iowa. His work included designing and constructing new repair shops in Sioux City, Atkins and North McGregor. To help minimize costs and to speed up construction, Loweth and his design teams developed a set of standardized building plans that could be configured and altered for the local environmental conditions.

In addition to his extensive work in the railroad industry, Charles Loweth was an accomplished civil engineering scholar. He published major works on railroad and civil engineering and gave workshops and speeches at trade association conventions. One of his most valuable essays and speeches was entitled "The Place of the Railroad in City Planning" presented at the Eighteenth National Conference on City Planning (1926). Other scholarly works by Loweth included his paper "Some Economical Considerations Involved in the Construction and Use of Inland Waterways of the United States."

Charles Loweth's distinguished career as one of the industry's leading railroad engineers ended in late April 1935, when retired due to declining health. He would pass away a short two weeks later. Because of the exceptional importance of Loweth's engineering work, the *New York Times* published his obituary on May 16, 1935, with the headline: *"Charles F. Loweth, Railroad Man Dies • Chief Engineer of the Chicago, Milwaukee, St. Paul & Pacific for 25 Years • Retired Two Weeks Ago • Designed Waterworks and Light Systems in More Than 100 Cities in Northwest".* The American Society of Civil Engineers also paid tribute to him by publishing a memoir on his life and working career.

National Register of Historic Places Continuation Sheet

Criterion A: Chapter 3 – Building a Railroad System in Mid-America to the Pacific Northwest

Historic Context: History of the Railroad Industry and C.M.St.P.&P. Railway Company

In view of the magnitude of the surviving components of this installation and its exceptionally long life of functionality to the railroad, the Milwaukee Railroad Shops Historic District is a representative example of a type of infrastructure and type of land use once needed by the railroad to pursue its business strategies and economic interests to better serve farmers, industrialists, farm towns, market cities, and urban centers of the Upper Midwest and Pacific Northwest regions.

- **Nomenclature of the tradename: Chicago, Milwaukee, St. Paul & Pacific Railway**

The Chicago, Milwaukee, St. Paul & Pacific Railway had a long, robust history, which began as a short line railroad in 1847 under the name of the Milwaukee & Waukesha Rail Road. When the railroad was formerly organized in 1849, it took on the name of the Milwaukee & Mississippi Rail Road Company. After the railroad defaulted on bond interest and went into receivership during the Financial Panic of 1857, the railroad was joined with several other short line roads in Wisconsin under one corporate ownership structure. Over the next two decades, the railroad continued its expansion into Chicago and to the Mississippi River. To be more representative of this growth and its scale, as well as to have a corporate name that was competitive with other major railroad companies at that time, the name of the railroad company was changed to the Chicago, Milwaukee & St. Paul Railroad in February, 1874. The railroad company would again experience financial difficulties in 1925, after its costly extension to the Pacific Coast was completed. The company went into receivership and in 1927 emerged as a new company that was organized under the corporate name of the Chicago, Milwaukee, St. Paul & Pacific Railway. The new railroad corporation inherited the property and assets of the former railroad. The company operated under this corporate name until 1986, when it was dissolved and absorbed into the Soo Line Railroad after declaring its final bankruptcy filing in 1977,

In conjunction with its new corporate name in 1927, the railroad rebranded the company's iconic nameplate to the brand name of *The Milwaukee Road*; using a tipped red rectangle for its visual identity. In later years, the railroad introduced the positioning statement "America's Resourceful Railroad" to reflect its character as a reliable, dependable, and strong transportation company serving geographic territories rich in natural resources, raw materials and agricultural crops. The following World War II ad illustrates the vast natural resources and agricultural products transported to commodity markets by the railroad. The Milwaukee Road brand name replaced the previously-used brand identity of *The St. Paul*, which was popular from the 1870s until 1900.

Source: Chicago, Milwaukee, St. Paul and Pacific Railway Company 1943 Advertisement

- **Associations with events that made significant contributions to the broad patterns of railroad history at local, state, regional, and national levels**

The nominated Milwaukee Railroad Shops Historic District represents the type of railroad physical plant that sprouted along the nation's railroad systems between the late 1800s through the second decade of the 1900s. This timeframe of railroad development, roughly 1880 to 1930, spans several eras of history, including the "The Golden Age of Steam Railroading".

The "Golden Age of Steam Railroading" is one of about five themed eras of railroad heritage that have been identified by historians and rail industry experts and enthusiasts. Those commonly-accepted themed eras and associated time periods are: The Birth of the Railways (1830–1860); The First Railway Age or the Western Expansion of the Railroad Network (1862–1900); The Golden Age of Steam Railroading or The Second Railway Age (1900–1950); The Age of Competition and Consolidation (1950–1995); and Contemporary or Modern Day Railroading (1995 to present).

Each of these eras is characterized by (a) the shifted styles of how the railroad industry works and operates; (b) the changes in the working conditions of the industry's labor force; and (c) the deployment of technological changes and innovations in motive power, engineering, and communications.

The Golden Age of Steam Railroading refers to an era commonly identified in railroad history as the time period spanning the first half of the 20th Century - from 1900 to 1950. During this time period, the railroad was the predominant form of transportation used to move people, freight, the mails, and the military. It was a time when the railroads were powered primarily by the steam locomotive. It's also a time when railroads found ways to be innovative by developing and deploying new technologies such as the diesel locomotive. It also became an era characterized by cutthroat competition between the railroad companies for traffic, the financial crash in 1929 and ensuring years of depression, and the emerging rivalry from the evolving modes of other alternative transportation (barges, automobiles and airlines) that lead to many railroad companies becoming tarnished by financial struggles, bankruptcies, consolidations and mergers.

These factors lead the railroad industry to propose a radical consolidation plan in1934, known as the Prince Plan, that would consolidate some 250 smaller railroad systems down into seven larger systems (Escanaba Press, p. 13). While the Prince Plan was never formerly adopted and enacted, it did focus attention on the economic challenges the railroad industry was facing during the twilight years of *The Golden Age of Steam Railroading*. This lead to many railroad companies to participate in a self-promoted, gradual consolidation of firms by acquiring smaller, neighboring railroads one by one; only later to be itself acquired by a larger wealthier railroad. This type of consolidation movement became known as "pyramiding."

The progression of the railroad industry during *The Golden Era* was also driven by innovations in organizational structures that included purchasing controlling stock in smaller railroads that shifted its orientation from the individual railroad firms built during the *early stage* to a higher corporate level of a hub-and-spoke network architecture that would eventually systemize the industry by forming business alliances among like-minded railroads across the country. Some of the smaller railroads became feeder systems for the larger stock controlling railroad; or two larger railroads would bridge together to offer cross-county transportation systems without the railroads actually merging into one large corporation. This time of collaboration and connectedness was able to take place because of the adoption of standard gauge operations after the Civil War.

- **Standardization and Expansion of the Nation's Railroad System**

Prior to the buildup of the nation's standardized railroad system, moving people and goods by water via steamboats, riverboats and barges on rivers and canals satisfied most of the country's transportation needs. However, this mode was not a four-season transportation system. Winter weather would often freeze the water and spring flooding resulting from snowmelt runoff frequently made riverboat navigation treacherous. The birth of the steam-era railroad in the 1830's addressed the need for a year-round, long distance travel, on-time shipping service most Americans were anxious for. While the early railroads demonstrated they were a viable transportation alternative that could compress time and space, their value was still limited by industry infancy, connectivity, and interchange problems caused by variations in track gauges.

The birth of the railroads brought about the need to transport people and goods rapidly across great distances without unnecessary breaks in movement. During the early adoption phase of railroading, which lasted until 1860, there were more than twenty track width gauges in use by the various railroad companies. This made moving goods over great distances cumbersome and difficult as freight loads would have to be broken down and restacked in rail cars with different wheel set gauges. During the Civil War, the railroads decided to work towards a standardized track gauge with the goal of a shared-services infrastructure based on interchanging locomotives and rail cars. To help transform the railroad network to a more uniform, dominant gauge of 4 feet 8½ inches (known as the standard gauge), Abraham Lincoln compelled the Pacific Railways to adopt the standard gauge when he sign the *Pacific Railroad Act of 1862* that authorized the construction of the First Transcontinental Railroad.

It is not without significance that the deployment of the standard gauge was a springboard for additional transcontinental railroads to emerge. Having the standard gauge was invaluable to encouraging connectivity between the western transcontinental lines with the different railroad companies operating east of the Missouri and Mississippi Rivers. Eastern railroads developed alliances and linkages with the western transcontinental lines into a set of nationwide coast-to-coast rail connections. The standard gauge also brought about infilling the agricultural heartland with rail lines and railroad companies built by local stakeholders desiring to reach out and connect their communities with the larger railroads. The standardization of the track gauge and the connectivity it brought helped to fuel the rapid growth of railroads.

Just prior to the Civil War in 1860, the nation's railroad system consisted of 30,626 miles of rail line mainly crisscrossing the country east of the Mississippi River. Shortly after the Civil War through the second decade of the 20th Century, there was a great deal of railroad construction. By 1900 the country's total rail mileage had increased from 163,597 miles in 1890 to over 193,000 miles, and no portion of the Pacific Coast lacked a rail connection to the east coast. *By 1916 there were at least 85,000 railroad station stops and depots across the United States. No point in Iowa was more than eight miles from a railroad line.* In 1918 when the Sioux City Roundhouse, Repair Shops and Engine Terminal complex began operations, the nation's rail system exceeded 254,000 miles of rail.

- **Background of the Chicago, Milwaukee, St. Paul & Pacific Railway Company**

One of the railroads that experienced birth and substantial growth during "The Golden Age of Steam Railroading" was the Chicago, Milwaukee, St. Paul and Pacific Railroad. Founded in 1847 in the state of Wisconsin by a group of businessmen; the Chicago, Milwaukee, St. Paul & Pacific Railway was charted to build a rail line from Milwaukee to Madison under the original trade name of the Milwaukee & Waukesha Rail Road Company. Through the years, a series of mergers and acquisitions helped the Chicago, Milwaukee, St. Paul & Pacific Railway to expand to a system of more than 16,065 miles of rail crisscrossing 14 states in the Midwest, Upper Great Plains and Pacific Northwest territories.

The Chicago, Milwaukee, St. Paul and Pacific Railway Company traces its ancestral roots to the original purpose of providing efficient transportation services in Wisconsin. With heavy financing in 1863 from Wall Street investors, including William Rockefeller and the Standard Oil Company, the railroad began its growth strategy of *Empire Building to the West.* Rather than constructing and building its own railroad lines, the transcontinental rail system that would eventually emerge as the Chicago, Milwaukee, St. Paul and Pacific Railway Company was formed through the consolidation of smaller regional railroads that were being built to connect with Chicago, the Great Lakes, California, and the Pacific Northwest markets.

These smaller regional rail lines were merged into a larger system, as described by Frank Spearman in his 1913 book, *The Strategy of Great Railroads*: "The St. Paul controls no subordinate lines; it absorbs them, makes them a part of itself, and their identity becomes merged absolutely into the strength of the whole system" (Spearman, p. 178). "What was to become another great rail system, a transcontinental, entered or left Chicago – either is correct – when the Chicago, Milwaukee & St. Paul Railway Company was incorporated in 1872. Into this system went probably more predecessor lines than has been the case in any other railroad" (Holbrook, p. 132). Many of the railroad's most important major routes were built between the 1850s and 1870s (High and Wides, p. 3). During the 1880s, the railroad expanded into Illinois, the Dakotas, and Missouri through the acquisition of smaller, regional railroads that were undercapitalized or financially stressed. By acquiring land grants as well as smaller lines, the railroad also extended its trunk line reach into Iowa and Minnesota.

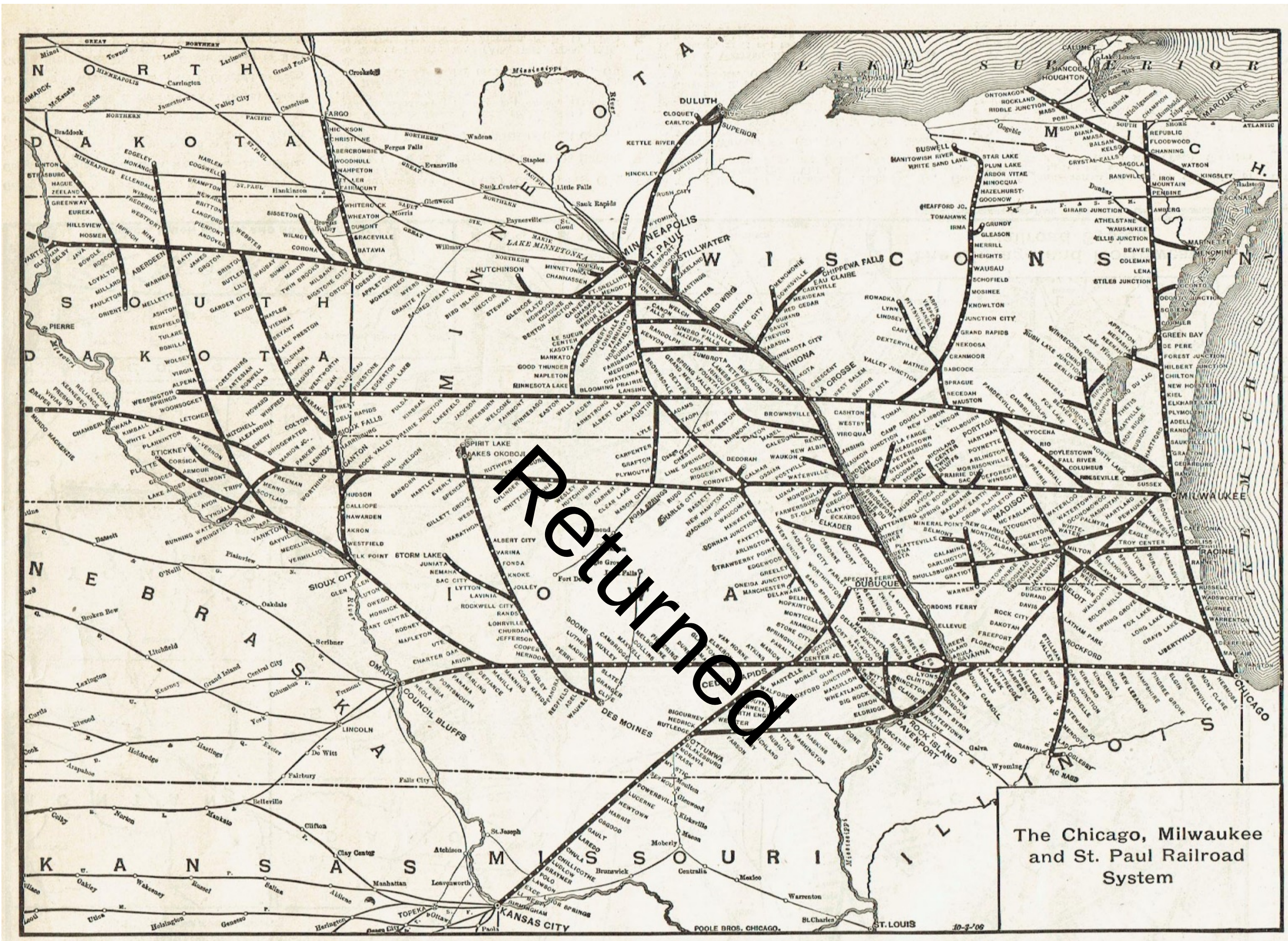
Between 1878 and 1945, the railroad amassed a sprawling network of main line routes and feeder branch lines throughout the Midwest. The rail lines reached from Chicago to Kansas City, Omaha, Des Moines, Sioux City; to Milwaukee; to Minneapolis and the upper Michigan Peninsula; to Minneapolis and St. Paul and Duluth; westward to the Black Hills; and to Butte, Spokane, Seattle, Tacoma, the Olympic Peninsula, and the Pacific. The *1945 Annual Report of the Chicago, Milwaukee, St. Paul & Pacific Railway Company* provides a statistical snapshot for the principal states the railroad operated in:

Total Track Mileage of the Chicago, Milwaukee, St. Paul & Pacific Railway Company (1945)

	Total Mileage	Total Employees
Idaho	233	361
Illinois	752	8,715
Indiana	197	1,169
Iowa	1,802	4,528
Kansas	7	N/A
Michigan	180	236
Minnesota	1,379	4,667
Missouri	154	642
Montana	1,251	2,689
Nebraska	6	N/A
North Dakota	367	271
South Dakota	1,735	2,678
Washington	1,082	2,946
Wisconsin	1,588	9,533
Other States/Additional Main Tracks, Yard Tracks	5,332	154
Total	**16,065**	**38,589**

Source: 1945 Annual Report of the Chicago, Milwaukee, St. Paul & Pacific Railway Company

The following map published in the *1917 Gazetteer of American Railroads* illustrates the railroad's market reach across Illinois, Wisconsin, Iowa, Minnesota and the Dakota.

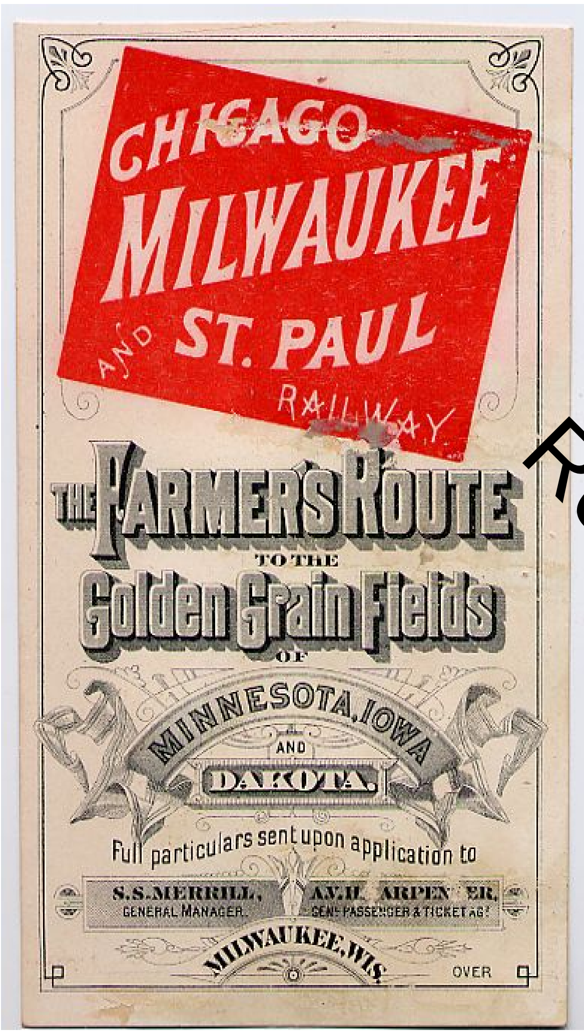


Source: *1917 Gazetteer of American Railroads*

As the map illustrates, the Chicago, Milwaukee, St. Paul & Pacific Railway Company operated two east-west trunk main lines across Iowa consisting of northern and southern routes. The northern mainline stretched across Iowa from the Mississippi River near Marquette to the Big Sioux River close to nearby Canton, South Dakota. This rail route traversed the northern Iowa counties of Clayton, Winneshiek, Chickasaw, Floyd, Cerro Cordo, Hancock, Kossuth, Palo Alto, Clay, O'Brien, and Sioux before crossing the Big Sioux River into South Dakota. This particular route offered direct connections to the east with Milwaukee and Chicago.

The company's southern mainline across Iowa, stretching from the Mississippi River to the Big Sioux River, was completed at Sioux City in 1887. Rail construction crews began laying the first rails in Eastern Iowa during the 1870-1871 time period. This main line split at Manilla, Iowa with the southwest line terminating at Omaha, Nebraska; and the northwest line routing to Sioux City across the Big Sioux River into South Dakota. This line mostly traversed the mid-section of Iowa across the counties of Jackson, Clinton, Jones, Linn, Benton, Tama, Marshall, Story, Boone, Dallas, Guthrie, Carroll, Crawford, Monona, and Woodbury. This mainline route offered direct connections to the east with Chicago, Illinois.

- **The Big Four anchor the building of the Agrarian Railroad Network**



Source: Milwaukee Road Public Relations Department

Deeply-rooted in the nation's bread basket region, the Chicago, Milwaukee, St. Paul & Pacific Railway developed into one of the four major sub-continental, trunk line railroads to be characterized as "a granger railroad" or "a farmers' railroad." The railroad company earned this moniker because its primary business strategy was to serve as a transportation utility to bring farm produce, livestock, meat, pork, dairy products, butter, and other commodities to market. The four railroads generally perceived as the Big Four Granger Railroads were the:

– Chicago, Burlington and Quincy Railroad (The Burlington)
– Chicago, Milwaukee and St. Paul Railroad (The St. Paul or Milwaukee Road)
– Chicago, Rock Island and Pacific Railroad (The Rock Island)
– Chicago and North Western Railway (The Northwestern Lines)

These Big Four granger railroads were also classified as "interior sub-continental" railroads because they operated extensive trunk and branch line networks that formed the anchor rail network in the nine "grange" states of Illinois, Iowa, Missouri, Minnesota, Kansas, Nebraska, North Dakota, South Dakota, and Wisconsin. All of these granger railroads were drawn to build trunk-line routes to the major trade and commodity markets of Chicago, with some of the railroads also extending their lines to reach the other major trade and commodity markets in St. Louis, Minneapolis, Omaha, Kansas City and Sioux City. All of these market cities offered the railroads access to grain elevators, milling operations, dairies, stock yards, and meat packing plants for processing the wheat, corn, beef and pork carried by their lines. Among the four grange railroads, all but the Rock Island operated rail lines and yard terminals in Sioux City.

The Big Four granger railroads were a subset of a larger pool of sub-continental railroads built during the late 1800s and early 1900s that were built to capture the lucrative agricultural trade generated by farmers, meatpacking plants, and other industries in the twenty-four state, Trans-Mississippi Region of North America (i.e. the Heartland). A complete list of railroads operating in this region was published in an 1897 issue of *The Omaha Daily Bee* newspaper. Data gathered from the Official Railway Guide of the United States by the newspaper's editorial staff detailed there were over 185 railroad companies operating a network of trunk and branch lines in the country's mid-section. Among those lines enumerated in the newspaper's census were the Big Four Granger Railroads and the following larger, wealthier trunk line railroads that had similar business strategies as the Chicago, Milwaukee, St. Paul & Pacific Railway:

- Chicago Great Western Railway
- Chicago, St. Paul, Minneapolis & Omaha Railway
- Great Northern Railway (a transcontinental railroad)
- Illinois Central Railroad (the only Chicago to Gulf, north-south transcontinental railroad)
- Minneapolis and St. Louis Railroad
- Northern Pacific Railroad (a transcontinental railroad)
- Union Pacific Railroad (a transcontinental railroad)

All of these granger railroads developed into subcontinental railway systems for four reasons (Overton, p. 45):

1) to provide fast overland routes between markets hitherto connected by circuitous or slow routes;
2) to extend central markets by networks radiating from important trade centers;
3) to tap the vast potential trade of the Mississippi River Basin; and
4) to open for settlement and commerce inland regions formerly inaccessible.

The westward building of the nation's granger railroad system allowed the farm produce of the plains states to flow to the eastern markets for sale, while the products produced by eastern factories could be carried on a return journey back to the plains in ever-growing volumes to supply farmers and the residents of farm towns – further stimulating the development of agricultural-based Midwest and granger states. The buildup of the granger railroads with their trunk line networks stimulated not only the development of the farm states but also the Dakotas and the Pacific Northwest regions. Pioneer settlers could easily travel by rail to gain access to ownership of farmsteads through the land grants offered by the federal government and the railroads; and the railroad network enabled the pioneer farmers to send their crops, livestock, and produce to the trade markets in the more populous eastern cities. However, the relationship between these pioneering farmers and the railroad companies became less harmonious as the railroads began to pool together and monopolize freight-hauling rates.

Source: Milwaukee Road Public Relations Depart.

- **Farmers Tackle the Railroad Problem; Railroads Encounter Grangerism**

The primary way of earning a living by settlers in the Dakota and Iowa territories was growing crops and raising animals. At first, farmers focused their efforts on selling crops and animals to feed themselves and settlers to the locals. They grew and raised what they needed for that market; there generally was no surplus. With the advent of the Midwest railroad network, farmers soon found their grain, corn, and wheat were cash crops. The late 1800s population growth in the Eastern states and in the developing urban centers of the Midwest, created a large demand for wheat by the mills. Shipping grain by rail as a cash crop to market was very labor intense and time consuming as farmers had to load rail cars with sacks of grain; or loading and unloading grain from box cars by scooping and shoveling by hand. The railroads gave rise to a new ancillary business known as the terminal grain collection elevator. These elevators were located every eight to ten miles. They were spotted along rail lines and a cluster of farmers around that elevator could haul their harvested grain to the elevators in a horse drawn wagon. These grain elevators then gave rise to a web of farm towns across the Midwest that then feed the railroad system with shipments of grant.

The farm towns and market cities (like Sioux City) with their grain elevators, livestock and meat packing businesses, and wholesale jobbers became a major economic influence in the nation's heartland as the agrarian railroad network expanded across the nation's heartland. This agrarian railroad network that developed between the farm fields and the market cities had such an extensive reach into the agricultural that no place in Iowa was more than 12 miles from a rail line. In Illinois the network was so extensive by 1874 that three-fourths of all land in the state was with five miles of a rail line. This growing dependence on the railways spurred intense competition between the railroad companies even though only one railroad typically served most farm towns.

By the last decade of the nineteenth century, railways became a major utility for farmers. The trains could speedily transport their crops to market without the fear of their produce spoiling and rotting on the train. In turn, farmers could buy industrial products and consumer goods from distant markets and have the trains bring them back to them. Unfortunately, the utility of the railroad also made the farmer dependent upon the freight rates the railroads would charge them.

This growing dependency on the railroads during the late 1870s and the entire 1880s occurred during a time when large scale railway management was still in its early stages of maturity. The large network of rail lines across the farmlands of the Midwest, also meant that some rail lines, known as branch lines, were not operated at full capacity despite being feeder lines to the railroads' main lines. Because railroad companies typically had to construct and maintain their own lines and rail terminals at their own expense, they needed to use freight rates to subsidize the operating costs for those rail lines. Each railroad company would need to adjust rates to meet the financial requirements of the local rail line; so, locate freight agents were authorized to alter rates at will to help ensure profitability of the local branch line. This revenue generation policy created a pricing discrimination between railroad companies, branch lines, and farmers based upon their geographic area and location within the entire railroad network.

Because rate regulation was mainly under the regulatory powers of each state, the variations in railroad rates tended to benefit the larger, richer, higher volume shipper at the expense of the more smaller volume, poorer shipper such as an individual farmer. Farmers had expected the growing number of railroad companies and their rail lines would keep freight rates low. The railroads only kept competitive rates at terminal cities, like Sioux City, were multiple railroad companies had a physical presence. In the terminal cities, because there were multiple, competing railroad companies, the railroad companies would sometimes cut their rates to capture the business from a competing railway. Shipping out of the terminal cities was more for the long haul to an eastern market. The railroads would earn more revenue per car because of the greater mileage in shipping.

In the more rural areas, there was generally only one railroad company operating the rail line. The more rural market was generally a short haul consisting of the farmer shipping his crops, produce and livestock to a terminal market city. The revenue generated per mile shipped was considerably smaller than the larger shipments out of the terminal cities. So, to make up those operating losses resulting from the rate cutting in the terminal cities, local freight agents would charge more to the farmer for their short-haul shipments to communities or markets served generally by one railroad company.

Because of this pricing policy practiced by the railroads, sometimes it cost more to send goods a few miles (a short-haul) than it did to send the same goods from a terminal market city like Chicago to another terminal market city like New York (a long haul).
Farmers protested to their state governments about the discriminatory rate practices between short-hauls and long-haul used by the railroads. Unfortunately, it was very difficult for state legislatures and governors to do anything about the railroad problem. They generally lacked the muscle to enforce a regulatory policy. Farmers soon realized they needed to execute a "co-operative action" that crossed state borders. This interstate action took on the name "Grangerism."

During the 1880s, "the farmers of the Northwest set vigorously about reforming the railroads. Over Wisconsin, Minnesota, and Iowa ran an epidemic of railroad legislation as lively as a prairie fire, and the movement took on a political activity that surprised the country. The organization through which the farmers worked was a fraternal association known as the Grange, and the movement became famous as the Granger movement. The Grange has gone the way of all orders political; its legislation lies forgotten on the statute books. But the movement left those railroads lying within the reach of the Granger laws a name that survives; Wall Street dubbed the Northwest roads The Granger Lines, and prominent in the group,….the Chicago, Milwaukee and St. Paul Railway." (Spearman, p. 177).

The Grangerism movement promoted farmers working together by forming co-operative organizations that would (1) allow a group of farmers to sell their crops and produce directly to the big city markets and (2) purchasing farm machinery, clothing, and household goods in large quantities to take advantage of wholesale prices. To build this economy of scale even bigger, the co-operative business practice included setting up a retail store for co-operative members only and also the construction and operation of co-operative grain elevators for storage of crops; creameries and dairies to sell milk and butter direct to the wholesale market; and even factories to manufacture their own farm machinery and equipment. The Grangerism movement allowed farmers to collectively work together and bypass the middlemen and jobbers. Through the co-operatives, farmers were on par with the larger shippers.

Grangerism also created political capital and clout for the farmer. Through their co-operative they could unify in political voice, and lobby and influence state legislatures to investigate the unfair economic practices by the railroads. Many states like Iowa and Illinois created state railroad commissions to fix maximum freight rates. The state legislatures made it illegal for the railroad to practice "differential freight rates" among shippers; and the legislatures set sanctions that could be imposed by the state railroad commissions. The railroads protested these Grangerism reforms to the federal government; asking the Supreme Court to declare the regulatory work of state railroad commissions as unconstitutional. In a series of decisions issued between 1876 and 1877, of which the most far-reaching case being *Munn v. Illinois*, the United States Supreme Court ruled state legislatures did have the right to regulate businesses that affected the public, including the railroads.

Despite the decision by the Supreme Court, often, the railroad companies would also find a way of evading the law. Besides ignoring the laws, railroad executives and their companies used political pressure on state legislators to repeal laws regulating the railroads. In addition to pressuring the state legislators, the railroads continued to pursue their policy agenda in the federal court system. In 1886, the railroads again argued their case before the United States Supreme Court. Ruling in the case of the *Wabash, St. Louis and Pacific Railway Company v. Illinois,* the Court qualified its decision in the previous Granger cases by ruling that state legislatures had no power to regulate traffic that moved across state boundaries as interstate traffic.

The Grangerism movement did not give up. They lobbied members of Congress to create a regulatory body that could regulate interstate traffic over the nation's railroad system. Farmers also raised objections to the railroad companies business practice of "pooling" where several railroad companies operating in the same area and across state boundaries carrying interstate freight would get together and form a pool to price fix by charging agreed-upon freight rates for shipping. Pooling also involved the railroads coming together would not compete against each other in specific geographical areas.

One of the most important implications to grow out of Grangerism is the parity this movement achieved for farmers with larger shippers and the railroads through the legislative process. As grain became the cash crop for small family farms, the pricing structure for shipping the grain to market did not favor the farmer who was a small shipper. They were not large enough to negotiate a rate structure that was on par with the larger shippers and grain buyers, nor were they able to combat individually the callous business practices of the railroad barons of the times. Like labor brotherhoods and unions, farmers worked together as a collective body to bring national and statewide attention to their railroad problem. Through regulations that became known as Granger Laws that were adopted by state legislatures, which eventually led to the federal regulation of the railroads as a public utility through the Interstate Commerce Commission, farmers were able to tip the scales towards their favor.

The development of Grangerism had another profound effect on the railroad industry. Grangerism brought about the cooperative style of business ownership and the new icon of the farm landscape – the grain elevator. Through this ownership practice, a pool of local farmers (known as a coop) owns the grain elevator. They collectively sell their grain to gain favorable shipping rates because of the larger volume shipped and to garnish higher earnings on their crops. Once the grain has been delivered to the elevator by the farmer, it was then shipped by rail to the final customer – a mill, food processor, or a larger terminal or export elevator. The ultimate development of the coop elevator storage and shipping industry became very lucrative to the Trunk Line Railroad network.

- **The Trunk Line Railroads Create a Grain, Livestock, and Meatpacking Economy in the Heartland**

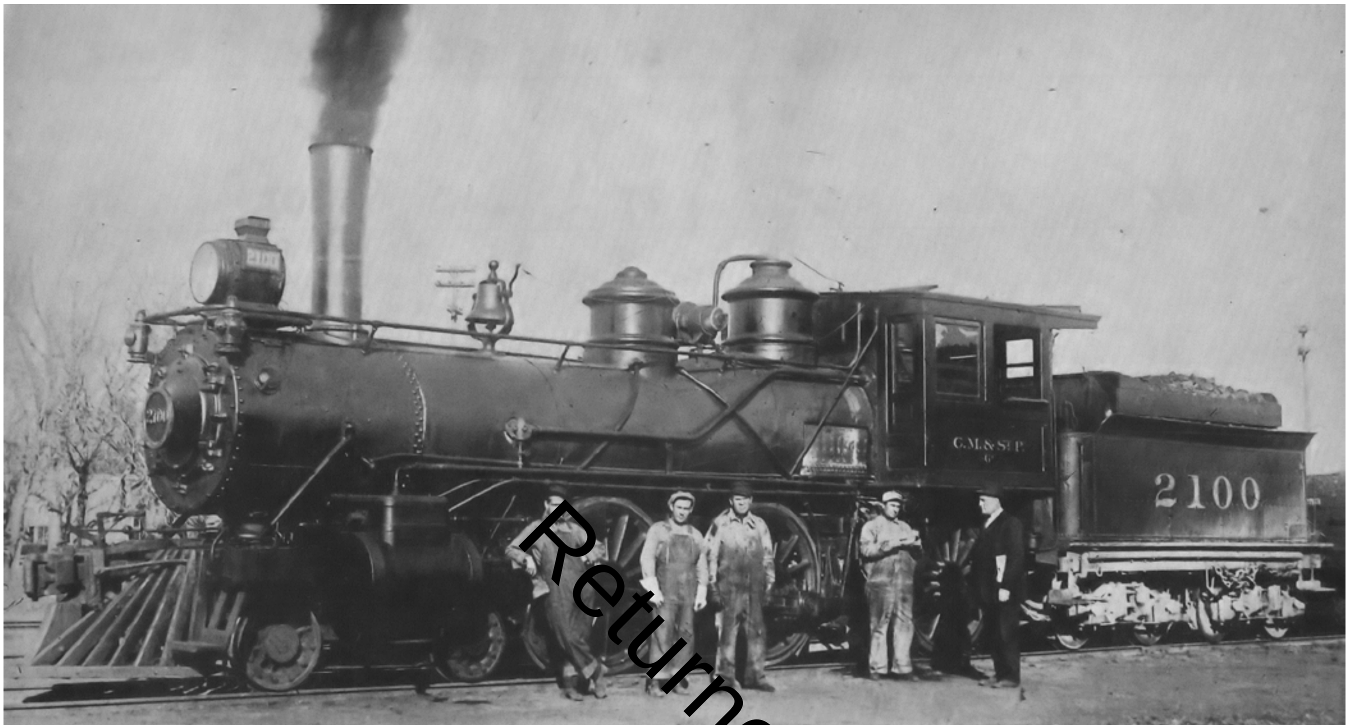
The early railroads were generally built by competing local companies desiring to reach major market cities such as Chicago, Minneapolis, St. Paul and Duluth in the upper Midwest. At the beginning of the Civil War, there were at least eleven eastern railroads with rail lines extending to Chicago. When the Civil War broke out, four railroad companies had started construction westward towards the Mississippi River and the state of Iowa. After the Civil War, railroad construction expanded dramatically across Iowa and the Trans-Mississippi region; stimulated by land grants awarded to railroad companies by the federal government. The expansion of the railroads and their ability to deliver more reliable transportation spurred the development and growth of agricultural-based manufacturing and food processing industries and market cities.

The improved transportation of goods and people began the growing of small farming communities across the plains; with many of these smaller villages growing into larger regional cities and market cities. According to Sheldon Stomquist, the difference between a regional city and market city was size. Generally, a market city was a community with a population base ranging from 10,000 to 50,000 residents and a regional city generally boosted a population ranging from 50,000 to 200,000 people. Among Iowa's several hundred farming communities, by about 1895 only a dozen grew into market cities while only Des Moines attained the status as a regional city. The vast majority of the market cities were "all pre-railroad river entrepots on the Mississippi or Missouri Rivers" (Stomquist, p. 161).

With the advent of the railroads, came a great opportunity for the smaller Iowa farming communities to grow in population and to take on trade as railroad towns. As railroads developed their reach further into the agricultural heartland, they needed labor, infrastructure, and hubs to gather, sort, maintain, and interchange freight cars and trains from the branch lines to the mainlines and other railroads. This required a network of hub rail yards and maintenance repair facilities. To set up their networks, the railroads linked a series of railroad towns along a line to serve as logistical centers of operations or terminals for gathering and switching rail cars to make up trains.

"The state of Iowa offers a remarkable setting in which to examine the effects of railroad development on urban growth and the social structure of agricultural communities. Iowa's extensive and parallel railroad development created a network of division towns that serviced railroad operation. A division headquarters required the residence of both operation and shop employees. The size of the required labor force varied a good deal, from towns having only a small roundhouse and light branch line traffic to those having major shops and heavy mainline traffic. Generally, a town with 100 or more railroad men…reflected a significant level of industrial concentration. Twenty-four town (in Iowa) meet that criterion, with numbers of railroad workers ranging from 100 to 685" (Stromquist, pp. 158-160). By 1890, when the bulk of railroad development had occurred in Iowa, "there were approximately 34 railroad companies reporting they had lines operating in the state of Iowa. The total number of railroad employees were estimated at 30,236 workers earning a total payroll exceeding $15-million (Robinson, pp.26-27).

At first, these railroad towns and market cities served mainly as centers of trade between western farms and eastern factories. But as the railroads continued their expansions westward to the Pacific Ocean during the late 1800s and early 1900s, the granger railroads and their sister pool of trunk line railroads bridged the eastern factories and Midwestern farms with the urban population centers along the Pacific Coasts and the emerging trade markets of the Far East. The growth of the Chicago, Milwaukee and St. Paul Railway (The Milwaukee Road) is illustrative of that bridging impact.



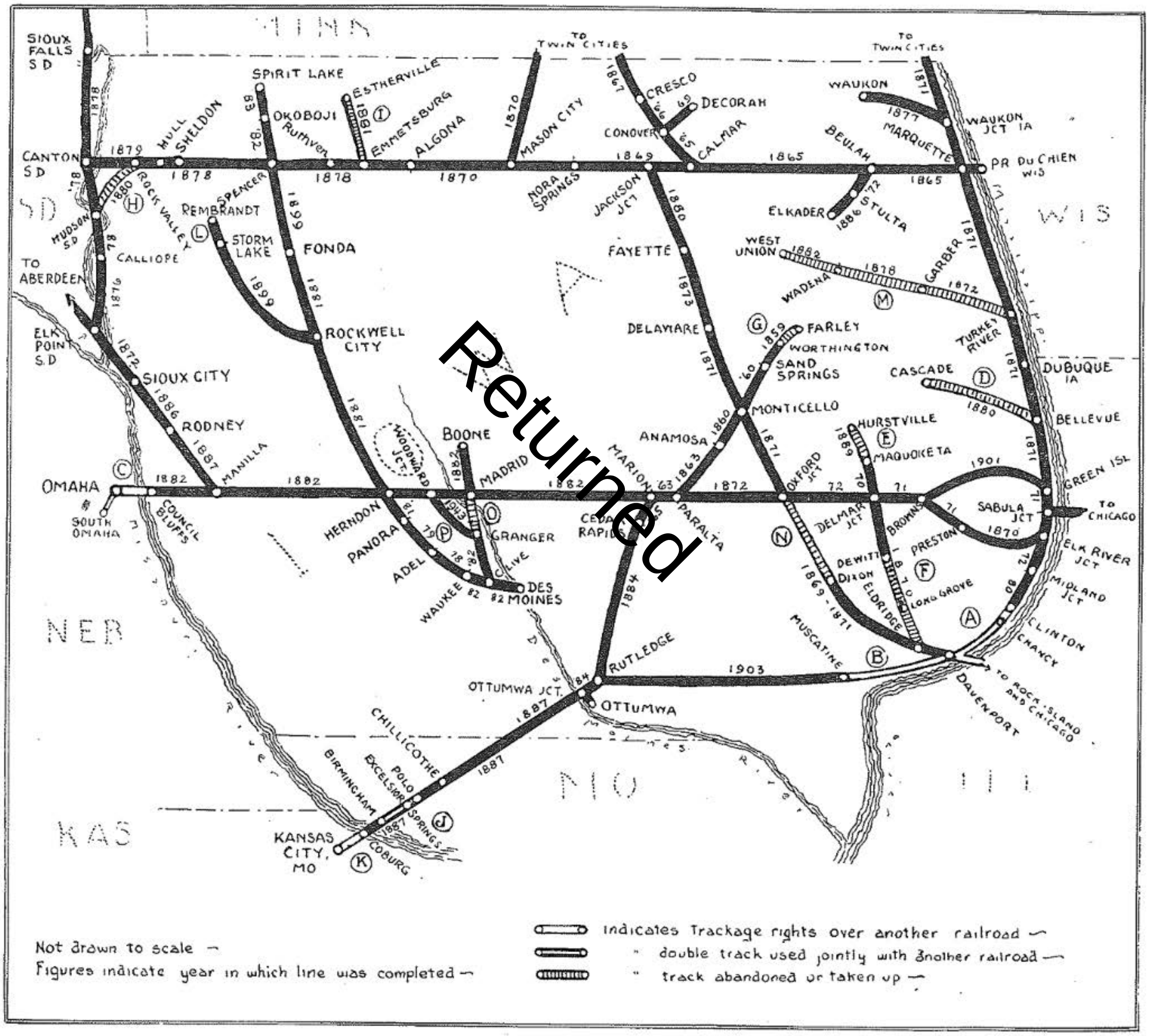
Chicago, Milwaukee & St. Paul Railway Company engine crew standing beside their steam locomotive talking to the Sioux City trainmaster.

Photographer: Unknown Date: 1910 Source: Archives, Siouxland Historical Railroad Association

Historic Context: The C.M.St.P.&P Ry. Enters Sioux City and the Dakotas

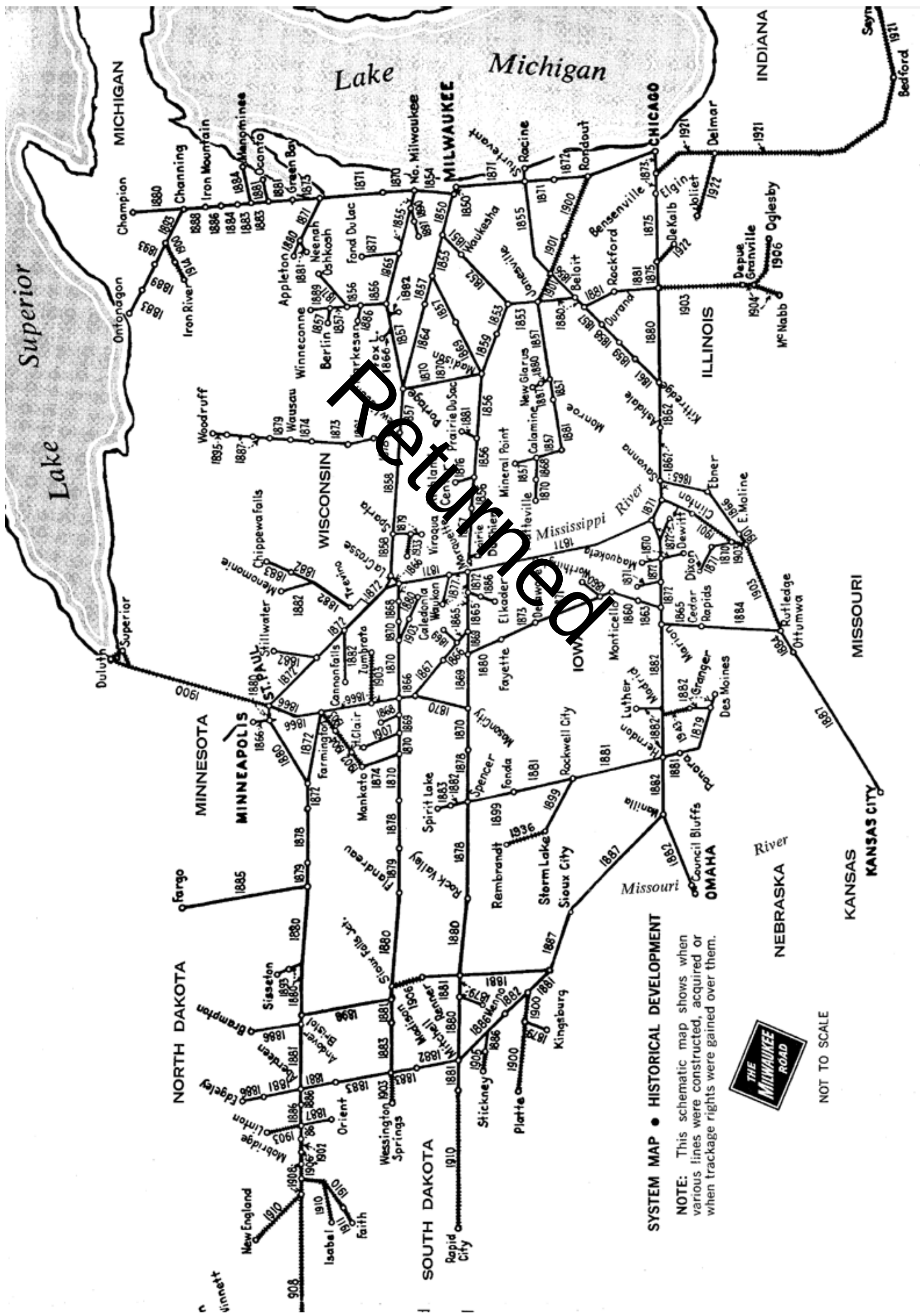
One of the Milwaukee Road's major expansions that were undertaken during the years between 1870 and 1900 was the buildup of its rail lines through Iowa. Over the course of its operational history, the Chicago, Milwaukee, St. Paul & Pacific Railway operated two trunk lines in Iowa that were supported by a network of branch lines and feeders. The operations of the Milwaukee Road included a main line running from Chicago, IL to Sioux City, IA to Aberdeen, SD; which later would be the junction point for the railroad's transcontinental route that would be finished by 1910. The buildup of this mainline route was carried out in incremental stages through acquisition of smaller railroads and the construction of new track by the Milwaukee Road itself. The expansion maps displayed on the next three page provides a comprehensive timetable for when rail lines were either built or absorbed into the system of The Milwaukee Road.

Date Map illustrating the Extension of Milwaukee Road Rail Lines Across Iowa
Source: Chicago, Milwaukee, St. Paul & Pacific Railway Company, Public Relations Department | 1947



Milwaukee Railroad Shops Historic District	Name of Property
Woodbury County, Iowa	County and State
	Name of multiple listing (if applicable)

Date Map illustrating the development of the Milwaukee Road Across the Upper Midwest
Source: Chicago, Milwaukee, St. Paul & Pacific Railway Company, Public Relations Department | 1947



Date Map illustrating the development of the Milwaukee Road Across the Pacific Northwest
Source: Chicago, Milwaukee, St. Paul & Pacific Railway Company, Public Relations Department | 1947

During the last quarter of the 19th Century through the 1920s, the Chicago, Milwaukee & St. Paul Railway was setting into motion its ambitious aspirations to become a transcontinental railroad to compete the rival transcontinental companies the Northern Pacific and the Great Northern Railway. In addition, the railroad company was looking for offensive moves to build and sustain its competitive advantage in the agricultural states. The business approach taken was known as the method of *strategic competitive expansion.*

A strategic business decision was made by the Chicago, Milwaukee & St. Paul to purchase the Sioux City and Dakota railroad and establish Sioux City as a division terminal. The notification of the purchase and intent was published in the *American Railroad Journal* on Friday, March 19, 1980:

- “The Chicago, Milwaukee and St. Paul Railway Company have taken a lease of the entire property of the Sioux City and Dakota Railroad Company. The leased property embraces the recently consolidated Dakota Southern and Sioux City and Pembina Railroads, and will be operated as the Sioux City and Dakota division of the Chicago, Milwaukee and St. Paul Railway.”

The Chicago, Milwaukee & St. Paul Railway entered into Sioux City from the Dakotas through its acquisitions of the Sioux City & Dakota, Sioux City & Pembina Railroad, and the Dakota Southern Railroad. These three railroads had incrementally laid lines from Yankton and Sioux Falls, SD to Sioux City; with a junction point at Elk Point, SD with two branches: one heading farther northwest into the Dakotas through Yankton and the second traversing in and out of Iowa and South Dakota heading north towards Canada. To connect its Sioux City- Dakota lines to its east-west Chicago Line through the southern areas of Iowa, the railroad laid its own tracks from Sioux City to Manilla between 1886 and 1887.

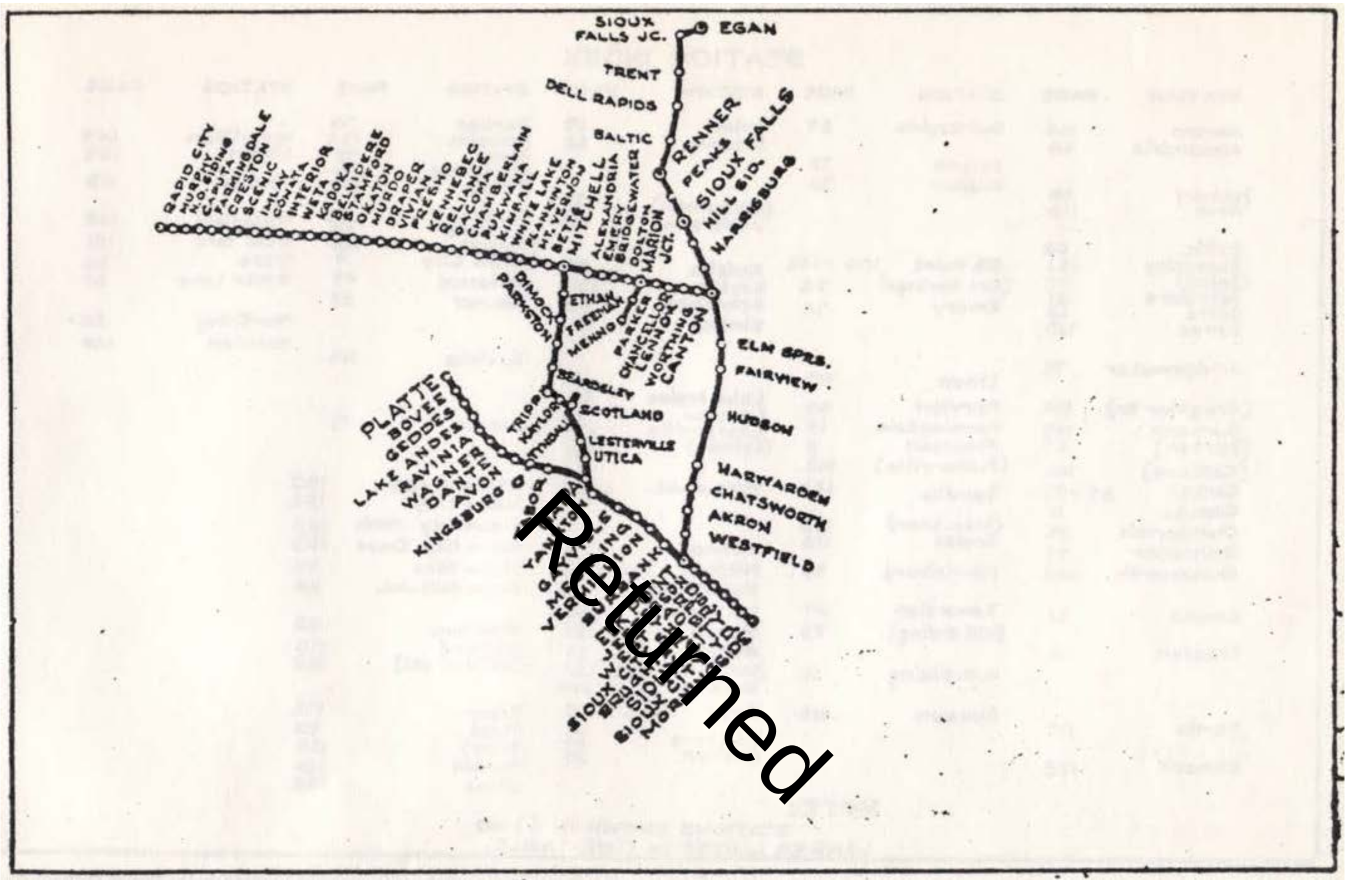
Through its strategy of empire building by acquiring and absorbing smaller railroads and by using land grants to finance new construction when needed to make connections between the acquired railroads, the Milwaukee Road developed into a giant network of main, trunk, and branch lines; which needed to be managed and coordinated to support its growing operations. Like all major railways, the Chicago, Milwaukee, St. Paul and Pacific Railroad system was divided into operating regions and then further subdivided into operating divisions and districts, anchored by a division point.

The division point was where the locomotives were serviced and fueled – sometimes repaired; where rolling stock was repairs; where freight cars were switched and made up into trains or switched out of trains for local delivery; and where train crews came on and off duty. The Milwaukee Road placed division points approximately every 100 to 150 miles apart. The railroad's division towns in Iowa were Cedar Rapids, Mason City, and Sioux City.

The divisional system was designed to bring managerial efficiencies for better movement of trains across the entire railroad system. "The divisional system came into being early in the history of railroading, or about the time any line grew to much more than 100 miles in length. Understandably, as a railroad grew physically, so did the problem of managing it properly, especially at the operational level." (White, pp. 53-54).

Each division would have a central headquarters for divisional management staff for each department: train operations, mechanical, motive power, car repair, maintenance of way, bridges and buildings, signals and telecommunications, dispatching, and sales. The divisional management structure was usually overseen by a divisional superintendent followed by a chain of middle managers consisting of a general manager, a couple of trainmasters, a roadmaster, a chief dispatcher, several yardmasters, a roundhouse foreman, and a car repair shop supervisors (White, p. 53). The railroad often established a central divisional repair shop for locomotives and rail cars, along with a hub rail yard; which were further supported by a series of smaller engine houses and switching yards located along branch lines.

At its peak in 1927, there were 31 major divisions that comprised the Chicago, Milwaukee, St. Paul and Pacific Railway system. One of the major divisions was the Sioux City & Dakota Division, which was anchored by Sioux City. This division would eventually lose this identity during the 1950s and merged with other contiguous divisions to form the Iowa, Minnesota and Dakota Division, and finally bear the name of Dakota Division in 1976. The operating territory was also known as Twenty-Second Subdivision on timetables. The map below shows the rail lines and towns served that comprised the division in 1976.



Map Identifying Towns and Stations Served by the Dakota Division
C.M.ST.P.&P.R.R. Condensed Profile: Dakota Division | Drawn by Office of Vice President – Chief Engineer | Date 1976

The Sioux City & Dakota Division came about as a result of the Chicago, Milwaukee & St. Paul Railway's purchase of the fledging Sioux City & Dakota Railroad in 1881. At that time, the Sioux City & Pacific Railroad was sufficiently developed for operations with 114 total miles of track, a few locomotives, about six passenger cars, and a few freight cars. The line ran from Sioux City, IA through Elk Point, SD to Yankton, SD with a branch line extending from Elk Point to Calliope, IA (i.e. Hawarden).

The Sioux City & Dakota Railroad actually began in 1871 as the Dakota Southern Railway Company for the purposes of connecting Yankton with the Sioux City & Pacific Railroad in Sioux City – thus connecting the Yankton trade territory with the emerging rail networks in Iowa. At that time, Yankton was the capital city of the Dakota Territory. The Dakota Southern Railway became the first railroad to operate in the South Dakota Territory. During the next several years, financial constraints from limited growth would cause the Dakota Southern Railway to reorganize under the new company, the Sioux City & Dakota Railroad. Much of the Dakota Territory was unoccupied by settlers. The new railroad company brought about stability by starting to aggressively build passenger and freight traffic into the Dakota Territory by promoting settlement in the state.

During the 1870s, other railroads such as the Chicago & North Western saw economic opportunities in the Dakotas and launched expansion plans for their rail lines to reach into the Dakotas. As soon as the Chicago & North Western announced its Dakota Territory expansion plans, the Chicago, Milwaukee & St. Paul Railway launched its own growth plans into South Dakota. Part of its growth strategy was to build an alliance with the Sioux City & Dakota Railroad and merge it into the larger system.

Because the Sioux City & Dakota Railroad was geographically isolated from a nearby connection to the Chicago, Milwaukee & St. Paul Railway's mainline in Iowa, a trunk line would have to be built to connect Sioux City to the mainline at Manilla, Iowa. This construction was completed in 1886.

When the smaller Sioux City & Dakota Railroad was merged into the larger Chicago, Milwaukee & St. Paul Railway system, its identity was changed to an operating division under the banner Sioux City & Dakota Division. By 1917, when the Milwaukee Railroad Shops were under construction in Sioux City, the Sioux City & Dakota Division consisted of 548 track miles with its mainline extending from Manilla, IA to Mitchell, SD; Elk Point, SD to Sioux Falls and Egan, SD; Sioux Falls, SD to Madison, SD; Yankton, SD to Platte, SD; and Tripp, SD to Stickney, SD. The divisional headquarters were set at Sioux City.

Sioux City and Dakota Division (1927)

Main and Branch Lines	Track Miles
Manilla to Sioux City, IA	91
Sioux City, IA to Mitchell, SD	137
Tripp to Stickney, SD	41
Napa to Platte, SD	82
Elk Point, SD to Souix Falls Jct., SD	103
Renner to Madison, SD	33
Marion Junction to Running Water, SD	61
Total Trackage in Division	**548**

Source: 1927 Milwaukee Road Divisions, http://nwlink.com/~kruegerp/milw/1927_division.htm

The investment into the Sioux City & Dakota Railroad proved to be financially lucrative to the Chicago, Milwaukee & St. Paul Railway Company. The steady development of livestock and grain markets in Iowa and the Dakotas helped feed the railroad's freight business, along with the growth of the stockyards, meat packing industry and food processing firms in Sioux City. Livestock became the largest commodity to be hauled by the railroad. While some cattle were destined for slaughter in Sioux City, a large percentage were placed on trains bound for the Chicago packing houses. All livestock not slaughtered at Sioux City, needed to be unloaded, fed, and watered at the stockyards. To accommodate this task, the railroad needed to build loading/unloading rail yard adjacent to the stockyards. The following statistics illustrate the livestock traffic generated by the division.

Receipts of Livestock Carloads from the C.M.&St.P.

Years	Total	Per Year	Per cent of total Receipts of all roads
1896-1900	28,116	5,625	36
1901-1905	58,732	11,746	40
1906-1910	65,114	13,022	38
1911-1915	70,476	14,093	34
1916		20,170	37

A very large percentage of these receipts comes from the territory lying west of the market, more coming to Sioux City from South Dakota than from any other state, although a considerable amount comes from northeastern Iowa.

Historic Context: Economic Conditions Influencing Railroad Development in Sioux City

The Chicago, Milwaukee, St. Paul and Pacific Railway's construction of its Sioux City Roundhouse, Repair Shops and Engine Terminal Repair Facility represents the culminations of significant business strategies made by this railroad company from the late 19th Century through the early-to-mid 20th Century. Once nearly 60 acres in landmass, this railroad facility was built in Sioux City to address the railroad's strategic need for a steam locomotive servicing terminal and rail car repair facility along its high traffic trunk line from Aberdeen to Chicago. The shops facility was set up to house the sophisticated technologies and machinery of the times to ensure the railroad had access to the running equipment of locomotives and rolling stock to keep it highly competitive and viable with other railroads serving the vast agricultural lands of the Iowa-Dakota territories.

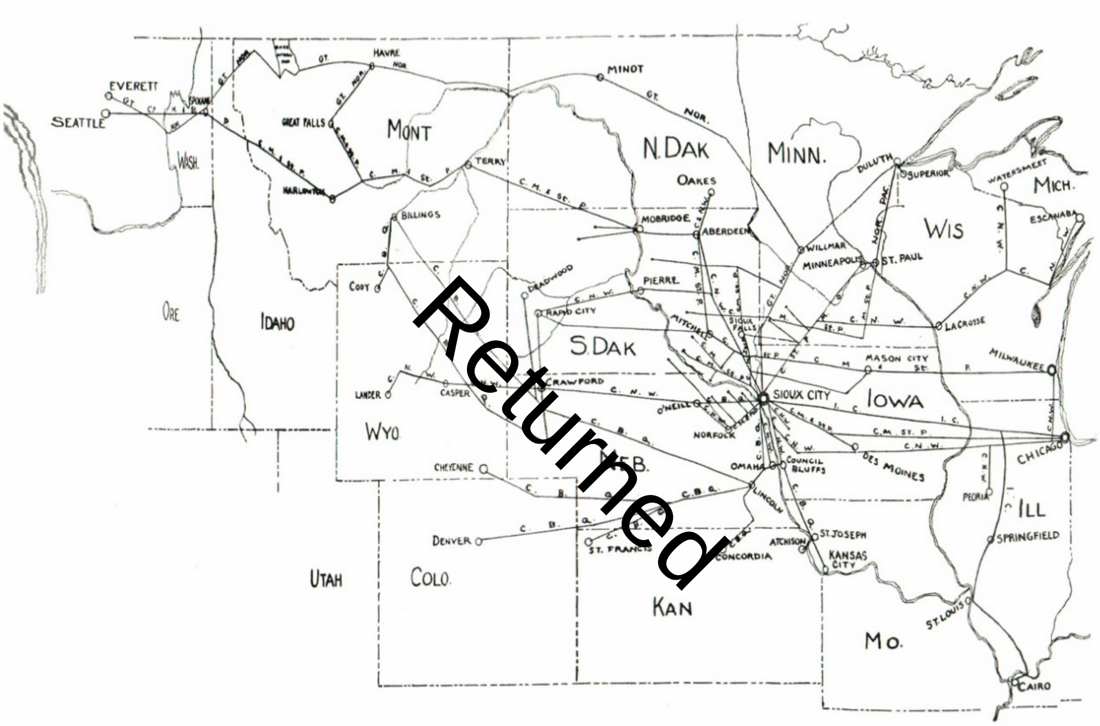
The proposed Milwaukee Railroad Shops Historic District is representative of the city of Sioux City's preeminence in the railroad industry throughout the early twentieth century. During that time period, the community was served by six trunk line railroads and ranked as the nation's tenth largest railroad center during the 1920s and 1930s. Over 20 rail lines radiated in and out of Sioux City to surrounding states. All of the six trunk line "railroads had locomotive and car repair shops located in Sioux City to assure adequate equipment and the best of service to shippers" (Chamber of Commerce, p. 15). Of those six engine terminals and car repairs shop facilities, the Milwaukee Railroad Shops Historic District is the sole surviving railroad support facility in the community.

After its platting in 1854 as a river town by surveyor Dr. John K. Cook, the community of Sioux City thrived as meat packers, agricultural producers, and warehouses/jobbers boomed in the late 1800s and early 1900s during the buildup of the nation's railroad network. Local and regional ambitions for building Sioux City into a major railroad center escalated significantly after the first train of the Sioux City and Pacific Railroad arrived in the city on March 9, 1868. That interest in building railroad lines into and through the city continued to run high through the 1920s and 1930s when Sioux City achieved status as the nation's tenth largest railroad center.

Sioux City's railroad interests trace back to the *Pacific Railway Act of 1862*; which authorized the building of the First Transcontinental Railroad. Among many provisions, the Act called for the building of a network of branch mainlines that would have beginning terminals along the Missouri River and join the main route of the Union Pacific Railroad in or near Nebraska. One of the stipulated mainlines to be built by the Union Pacific was a branch from Sioux City to a connection point in Nebraska. In 1864, Congress amended the Pacific Railway Act; releasing the Union Pacific from its obligation of building the rail line from Sioux City to a connection point in Nebraska.

This amendment allowed any railroad arriving north from Minnesota or east across Iowa, or any newly incorporated railroad, to construct this branch line and receive the associated land grants to help finance the building of the rail line. In 1864, Railroad financier John Blair organized the Sioux City and Pacific Railroad for the purpose of accessing the land grants to finance the construction of the rail line. In 1867, the railroad began construction of the line north; heading west from Missouri Valley, IA to California Junction (the connecting point with the Union Pacific mainline), and then north to Sioux City. This branch line was completed in February 1868, with the first train arriving in Sioux City on March 9, 1868.

The rapid interest in building railroads westward after the building of the First Transcontinental Railroad is arguably the single most important factor that contributed to Sioux City emerging as rail market. Other railroad companies began building routes to Sioux City to make connections with the Sioux City & Pacific Railroad. Those line came into Sioux City from all directions. This made Sioux City a central hub and spoke terminal city. The hub-and-spoke reference relates to a system of rail lines arranged like spokes in a wagon or chariot wheel and then connect to the hub of rail yards in the center or market city. The map below illustrates how Sioux City developed into a major hub-and-spoke rail center (Adams, p. 68)



Map illustrating Rail Lines In and Out of Sioux City during the 1920s
Map Maker: Unkown | Date: 1923 | Source: *Three Quarters of a Century of Progress: A Brief Pictorial and Commercial History of Sioux City, Iowa*

This hub-and-spoke system allows for railroads to develop alliances as part of an economy of scale. Several railroads might execute trackage right agreements and share a rail line (spoke) to gain access to the hub terminal (Sioux City) for interchanging traffic with other railroad companies. The hub-and-spoke system arranges an architectural web for smaller regional railroads to become affiliated with the trunk lines in creating a seamless distribution network. Often times, this leads to the acquisition and consolidation of the smaller rail lines into the bigger trunk line company.

In 1882, the *American Newspaper Directory* (published by Geo. P. Rowell & Co., Publishers) reported there were eight railroad companies serving Sioux City: the Chicago, Milwaukee & St. Paul; St. Paul & Sioux City; Chicago & North Western; Illinois Central; the Sioux City & Pembina; Dakota Southern; Covington, Columbus & Black Hills; and Omaha & Northern. The Sioux City & Pembina and Dakota Southern would eventually merge into the Chicago, Milwaukee & St. Paul; the St. Paul & Sioux City into the Chicago & North Western; the Covington, Columbus & Black Hills into the Chicago, Burlington & Quincy; and the Omaha & Northern into the Chicago, St. Paul, Minneapolis & Omaha.

During the late 19th Century through much of the 20th Century, the rail network in and out of Sioux City was eventually dominated by the competitive rivalry of six trunk line railroads; all of which evolved from the merging of the smaller predecessor companies identified earlier. The following six trunk line railroad established Sioux City as a division terminal within their larger railroad network. As a division terminal, the city saw each of the major railroads constructing major repair shops, depots, freight houses, sales offices, and switching yards for making up and breaking apart trains.

- The **Chicago and North Western Railway Company (C&NW)** served nine states in the Midwest. These states were Iowa, Nebraska, Illinois, Minnesota, Wisconsin, South Dakota, Wyoming, Michigan, and North Dakota. This railroad known as *The Northwestern* had a total mileage of 8,298 traversing these states and provided Sioux City with the west and east; giving access to markets in Omaha, Chicago, and the Twin Cities (Minneapolis and St. Paul). The Chicago and North Western Railway Company's main line through Sioux City extended south to Omaha and north to the Twin Cities.

- The **Chicago, St. Paul, Minneapolis and Omaha Railway** was a small regional railroad known as the *Omaha Road* that operated independently until 1957 when it was leased by the Chicago and North Western until the *Omaha Road* was finally merged as part of the larger railroad in 1972. The Omaha Road operated approximately 1,700 miles of trunk, main and branch lines through the granger states of Nebraska, Iowa, Minnesota, Wisconsin, and South Dakota. Main commodities hauled by this railroad were lumber, fish, dairy products, grain, and sugar beets. The Omaha Road entered Sioux City from Northeast Nebraska via crossing the Missouri River. This railroad built the Missouri River railroad bridge between Sioux City, Iowa and South Sioux City, Nebraska; granting trackage rights to the other railroads to allow those roads access and connections to either Sioux City or Northeast Nebraska (the Milwaukee Road did not participate in the trackage rights).

- The **Chicago, Burlington & Quincy Railroad** (one of the four Granger Lines known as the "Burlington" or CB&Q) was a system known as *The Burlington* that operated over 8,670 miles of rail line through the states of Illinois, Iowa, Missouri, Nebraska, Wyoming, and Colorado. The *"Burlington"* entered Sioux City from the southwest through South Sioux City (i.e. Ferry), Nebraska by crossing the Missouri River using a bridge controlled by the Chicago, Minneapolis, St. Paul & Omaha Railroad.

- The **Chicago, Milwaukee, St. Paul & Pacific Railway**, affectionately referred to as *The Milwaukee Road*, operated 10,600 miles of railroad lines in fourteen states with a transcontinental mainline extending from Chicago to the Pacific Northwest. This railroad had an extensive system of main and branch lines in the agricultural states of Wisconsin, Iowa, Minnesota, South Dakota, and Montana. In terms of miles of track operated by the railroad, the largest state served by the railroad was Iowa. The main line through Sioux City extended east to Chicago and northwest to Mobridge, South Dakota and north to Sioux Falls, South Dakota.

- The **Great Northern Railway** (GN) provided Sioux City with main line connections to its transcontinental main line from the Twin Cities to the Pacific Northwest, as well as markets in Canada. The Great Northern operated 8,288 miles of track; traversing the states of Wisconsin, Minnesota, North Dakota, Montana, South Dakota, Northwest Iowa, Idaho, Washington, Oregon, and California. The railroad also operated main and branch lines in the Canadian provinces of Manitoba and British Columbia. Sioux City was the southern-most terminal east of the Rocky Mountains. The railroad's main line ran north out of Sioux City to the Twin Cities.

- The **Illinois Central Railroad** (IC) operated 6,500 miles of railroad across fourteen Midwestern and Southwestern states; and is sometimes considered the nation's only north-south transcontinental railroad. Its system of rail lines earned it the moniker as "*The Main Line of Mid-America.*" This railroad's principal main lines were a north-south route from Chicago to the Gulfport, Mississippi and New Orleans; and an east-west route from Chicago to Fort Dodge, where the lines split into three routes - to the west to Sioux City, northwest to Sioux Falls, and southwest to Council Bluffs.

In addition to these six trunk line railroads, there was the homegrown Sioux City Terminal Railway Company that operated within Sioux City as an industrial switching road. This railroad operated 10.6 miles of yard tracks and 2.5 miles of main tracks in the city's stockyards and meatpacking district. The railroad was owned by the Sioux City Stock Yards Company to perform switching services between the Union Stock Yards, meatpacking houses, and the six connecting railroads.

➥ It is interesting to note, that five of the first steam locomotives operated by the Sioux City Terminal Railway were switching engines previously owned by the Milwaukee Road. The last steam locomotive to operate on a regularly scheduled basis was Locomotive No. 15. The 70-ton switch engine operated in the switch yards of the Milwaukee Road from 1911 to 1948; when it was sold to the Sioux City Terminal Railway for switching cattle cars and refrigerated box cars in the stockyards and meatpacking district. The locomotive was last operated during the week of October 19-24, 1958; at which time it was retired and sold for scrap to Sioux City Compressed Steel Company.

As evidenced by their original names, "The first railroads in the United States were built, as were most of the early turnpikes and canals, to serve nearby and local needs. During and following the Civil War, the railroads came to be regarded less as agencies to serve the exclusive needs of a particular city or its immediate back country and more as a coordinated network whose primary function was to facilitate transportation. Through parochial interests lingered on and have, indeed, persisted to the present time, they came to be over-shadowed by larger, national considerations" (Taylor and Neu, p.7).

"There were indeed many facets to the evolution of an integrated system of railroad transportation in the United States and Canada. A full-length history of development would cover at the very least: (1) the changes in the physical plant and equipment of the railroads, including both the adoption of uniform gauge and the improvement and standardization of techniques and equipment; (2) the evolution of institutional arrangements such as through bills of lading, agreements for interline exchange of rolling stock, the adoption of standard time, consolidations, rate and traffic agreements, and the appearance of fast freight lines; and (3) the rapid growth of the whole economy of the West, the revolutionary changes in marketing, and the scale of industrial production" (Taylor and Neu, p.7)

Beginning in the late nineteenth century and extending through the 1920s, Sioux City and its surrounding regional trade area characterized the competitive business strategies and extended rivalry among the six trunk line railroads who all were seeking a competitive advantage in gaining a larger share of the region's agricultural trade. Because Sioux City was strategically located in the "center of an agricultural region and was the supply point for a very extensive and growing country" (*American Newspaper Directory*, p. 120), the rapid growth of the regional economy influenced the development of Sioux City as both a major market and railroad terminal city. This nomination will examine in the following few pages the economic characteristics of Sioux City that formed the roots for the competitive interactions among the railroads in building up their footprint in the tri-state region of Iowa, Nebraska and the Dakotas.

Through the attributes of railroad transportation, area business leaders and eastern financers worked to make Sioux City *"the home market of the great northwest".* The City of Sioux City and the surrounding tri-state area of northwest Iowa, southeast South Dakota, and northeast Nebraska became a key trading center early on with the growth of farming, meat packing, and food processing. Prior to the railroads, Sioux City was a small river trading town surrounded by farmsteads and an emerging economic base dependent upon livestock and crop production.

Unfortunately, two of the major challenges faced by the community were the town's geographic distance and isolation from the major agrarian trading and food processing markets in the larger cities as well as a reliable transportation for the movement of people and goods. The main way to transport people, livestock and other freight was by steamboat, horseback, wagon, or stagecoach. Roads and pathways to the major cities were of relatively poor quality and the Missouri River was difficult to navigate. The development of rail links with connections to the major market cities served to break this geographic isolation and position Sioux City as a competitive major market center itself.

One of the community's major industries during the early 20th Century to benefit from the railroad connections was the wholesale distribution (i.e. warehousing and jobbing) trade. This Sioux City-based wholesale industry supplied the countless number of small independent grocery, hardware, clothing and general stores, as well as other Mom and Pop businesses and trading posts scattered throughout the country side in Iowa, Nebraska, and South Dakota. Sioux City-based jobbers were even able to supply business operations in North Dakota and parts of western Minnesota. Many of the products were distributed to these small enterprises after arriving in Sioux City via train for unloading in the many warehouses.

According to a 1923 article published by in the Chamber of Commerce's newsletter *Sioux City Spirit of Progress*, there were over 300 jobbing warehouses operating in Sioux City. Many of these jobbers also had their own factories and imported products into the community from other market cities or foreign countries. Chief among the products sold by the jobbers was foodstuffs, hardware, plumbing supplies, and merchandise lines such as cigars, tobacco, drugs, paper, paints, dry goods, leather, electrical supplies, and clothing. Automobile and auto supplies were, at this time, emerging as major product lines hauled by the railroads.

A second leading industry to emerge locally and regionally as a result of the connections offered by the developing national railroad network was the livestock and meatpacking industry, including the stockyards. The meatpacking industry started in Sioux City around 1871 when James E. Booge opened a small plant to slaughter hogs. A steamboat full of wheat had sunk in the Missouri River. James Booge bought the water-soaked wheat and found it had no value other than being used for 300 feeding hogs. Thus, after feeding the hogs, he slaughtered them for meat and then retailed the meat. The slaughtering processes required Booge to build a small plant and import butchers from St. Louis. This accidental start in 1871 launched Sioux City's bustling livestock and meatpacking industry as the community's economic anchor industry.

The industry had grown to such proportions that in 1920 there were eight major meatpacking facilities in Sioux City slaughtering over 2,000,000 million animals (cattle, hogs, and sheep) annually. In 1923, over 27,000 rail cars of livestock were shipped out of Sioux City to be slaughtered and processed in other markets. This production ranked Sioux City as the sixth largest livestock and meat packing center during the 1920s. Over 4,000 people were employed by the packers and stockyards; and the industry was producing over $107-million worth of meat products annually (Sioux City-the home market of the great northwest, 203-204).

In her history of the Stock Yards and meatpacking industry, *A Second Century Begins: A History of the Sioux City Stock Yards,* local historian and author Jolene Stevens credits the railroads with the growth of the industry: "A good hare of the credit for growth of the Sioux City Stock Yards in its beginning must be credited to the availability of railroads….An abundance of rail lines assured western ranchers of a means of transporting their stockers and feeders to feedlots in the area…..The Yard's territory at this time, at its inception and for a number of years to come, was vast indeed, extending to the northeast and east and southeast within a radius of 100 miles or more and to the west to include North and South Dakota, Nebraska, Colorado, Montana and Wyoming, and northeastward to include Wisconsin…..The railroad was the Yards' link to these areas."

Among the railroads serving Sioux City, the Chicago, Milwaukee, St. Paul & Pacific played a significant role in the transporting of livestock and meat products in and out of Sioux City. With its lines extending to Chicago, the Dakotas, and the Pacific Coast; the Milwaukee Road provided the Sioux City-based stock yards and meat packing companying with access to live stock all the way into Montana and to the commodity trade market cities in the east.

"The Milwaukee's business with the stockyards and meatpacking industry grew phenomenally. For the four years 1896 to 1900, the road handled an average of 7,029 cars and enjoyed 36 percent of the business. In the 1911-15 period, the average cars climbed to 17,619 carloads and 34 percent of the total business. Also at this time, the Milwaukee's less-than-carload lot (LCL) merchandise business was running about 50 cars per day at the freight house. In 1922, there were over 100,000 cars of freight shopped out of the city" (Clark Part 2, p 8).

Besides access to the livestock markets and meatpackers, area farmers gained access to the terminal grain elevators and processing mills housed in Sioux City through the railroads. With its strategic location on the western border of Iowa and contiguous to northeast Nebraska and southeast South Dakota, and just a short distance from southern Minnesota; Sioux City emerged as one of the nation's fastest growing grain markets during the first three decades of the 20th Century.

The community was "located in the heart of America's richest grain producing territory. The countryside surrounding Sioux City enabled farmers to raise a variety of grain crops such as wheat, corn, and oats. Of these four states, over 40% of the area is within Sioux City's trade territory. The establishing of terminal elevators here has done away with the clogging of small town elevators due to rail car shortage. The shorter haul has done away with the clogging of small town elevators due to car shortage. The shorter haul has released more cars that can be returned to country towns, thereby enabling country elevators to handle grain more rapidly. Formerly all grain had to be shipped to the larger city for storage, nowhere else was there sufficient room for storage" (Sioux City, The Fastest Growing Grain Market in America, p. 150).

The strategic location of Sioux City in the heart of the grain country, along with the main lines operated by six trunk line railroads, placed the community on a price parity with other larger grain markets in the Midwest. In 1917, the Interstate Commerce Commission granted proportional grain shipping rates by rail which recognized Sioux City as a grain market. This designation spurred the construction of several large grain terminals like Terminal Grain Corporation, Western Terminal Elevator, The Flanley Grain Company, and Farmers Terminal Elevator Corporation.

Along with the buildup of elevators for storing grain came the construction of milling operations to process the gain. Companies like Akron Mills, American Pop Corn Company, and Martens & Ketels Milling Company erected milling operations in Sioux City. Many of the elevators and mills built industrial railroad sidings into their complexes for the receiving and shipping of grain and process grain by rail. The *1927 Census of Manufacturers* showed Sioux City had 14 milling operations employing an annual average of 352 workers; generating $593,755 in payroll and over $5,753,027 in processed products.

The rail traffic generated by the grain elevators and milling operations was substantial. Sioux City Chamber of Commerce statistics published for 1920 showed there were 721 railroad cars of wheat, 3,278 cars of corn and 1,536 cars of oats shipped via rail to the elevators. Those numbers equated to a total of 5,535 car loads carrying over 8,000,000 bushels of grain being received at the elevators. During the first half of 1921, grain traveling to the terminals in Sioux City increased substantially. Statistics published by the Chamber of Commerce showed the elevators had already received 3,800 rail cars of grain, carrying 4,752,500 bushels by mid-year 1921 (Sioux City, The Fastest Growing Grain Market in America, p. 150).

Grain hauling was the major ancestral business strategy of the Chicago, Milwaukee, St. Paul and Pacific Railway. For much of its history, grain was the traffic king of the railroad – which led to the railroad earning the moniker as a "Granger Line." An analysis of the railroad's annual reports between 1880 and 1977 show that grain hauling accounted for approximately 17% of all traffic over the railroad and 15% of all revenue earned by the railroad (Milwaukee Road, Annual Reports).

The economic expansion of Sioux City's agricultural-based industries that took place during the first three decades of the 20th Century aligned well with the business strategies of the railroads. The steady diversification of the region's economy over those decades produced a broad-based economy built on the industrial sectors of trade, warehousing and jobbing, food processing, and grain marketing. This economic boost substantially increased the volume of trains in and out of Sioux City, positioning the community as a market city and major rail terminal. With that industrial growth, also came some societal challenges that needed to be considered.

Historic Context: Urban Design Policy Influences Location of Milwaukee Railroad Shops

- **Smoke Abatement, Transportation Planning and Urban Design**

The Milwaukee Railroad Shops Historic District – Sioux City Roundhouse, Repair Shops and Engine Terminal complex may be a representative example of the emerging practices of transportation planning at the turn of the 20th Century. This facility potentially offers insights in how the development of railroad infrastructure influenced local urban development during and after the heyday of the steam railway. This research speculation is based on literature reviews and generally known public opinion held at the time regarding issues such as railroad land use, air quality, and the nuisance of smoke produced by steam-operated railroads.

The Sioux City Roundhouse, Repair Shops and Engine Terminal complex was built during a time when modern city planning, urban design and zoning regulation began emerging as recognized professional practices of local government. The industrial complexity of railroads during the late 1800s and early 1900s posed a number of significant challenges for city planners who were starting to implement processes for designing and shaping cities due to the population growth resulting from industrialization and better mobility.

The operations of steam railway repair shops and the passing steam trains through communities on their way to other market cities and rail yards impacted the health, quality of life, and air quality of towns such as Sioux City. It was a time when city planning professionals across the country began to step up their scrutiny of safety issues relating to the location of railroad terminals, the movement of trains, and the emissions of smoke from the steam locomotives.

While the community interests in having the facility built in Sioux City were well known, city planners may have also been sensitive to the potential conflicts of additional rail congestion in the Sioux City downtown business corridor and the effects of smoke on air quality. The downtown business district housed three railroad stations, six railroad freight houses, and numerous jobber warehouses. In the near-downtown core, there were six railroad shop complexes and the same number of railroad switching yards. On any given day, according to local published train schedules, between 70 and 100 passenger and freight trains were entering and exiting the downtown core and near downtown business district. This equated to several hundred steam locomotives belching black smoke and soot every day in Sioux City.

The proposed new railway repair shops would mean a much larger footprint for the roundhouse, support buildings and accompanying rail yard; requiring a large tract of land that was not readily available in the near-downtown business district/stockyards area where the railroad's current shops facility was located. Thus local planners and developers searched out land owners in the Riverside neighborhood who might work with the railroad to provide the appropriate tracts of land for a terminal facility. By offering the railroad land in an outlying area of Sioux City away from the core business districts of downtown and the stockyards area, city developers and planners were possibly addressing industrial nuisances such as smoke and settling soot.

Steam engines use coal, wood or oil to heat water in a boiler to create the steam for the propulsive energy needed to power the locomotive. The excess smoke emitted by the locomotive often leads to the formation of a dark black smoke or smog – a mixture of smoke, dust particles, and small drops of fog. Many railroad terminal cities, where hundreds of steam locomotives operated daily, had their sky filled with the smoke and soot that lingered long after the steam engines departed the railroad yard or station, and belched their way through town.

The increasing numbers of steam trains passing through communities, each carrying hundreds of passengers or tens of thousands of tons of freight, raised concerns around the country about the increased emissions of smoke belching from operating steam locomotives and the smokestacks of the engine terminals. Even at a time when railroads were seen as critical infrastructure to the social and economic welfare of a community, many communities around the country began adopting ordinances enacting acceptable levels of smoke produced by the railroads.

Steam locomotives and their smokestacks were identified as major culprits to air pollution, as well as a nuisance of the settling soot. According to an article published by Scientific American in 1909, "150,000,000 tons of coal is used annually by the railways of the United States, out of which but 7,500,000 tons are used in drawing trains, while 142,500,000 tons go up the smoke stack. And English writer, John W. Graham, declared that a locomotive uses 3½ tons of coal per day on an average, and scatters the smoke of 36 pounds of coal over every mile on fast trains" (Woodruff, p. 1).

Many communities across the country created local commissions or municipal boards to help with drafting and monitoring smoke abatement policies. For example, in Indianapolis, its municipal committee drafted a uniform set of rules for how locomotive fireman should light their fires for the locomotive boiler to minimize the emission of smoke. The rules consisted of the following four directives (The Indianapolis Star, December 8, 1911):

1. Always avoid putting large amounts of coal on at one time.

2. Use the blower and fire door and whatever device for the prevention of smoke is on the engine intelligently.

3. Do not wait until the fire is burned so low that a large amount of coal is necessary to keep it from going out.

4. Endeavor to get the fire in such shape before leaving the roundhouse that it will not be necessary to build it up on the way to the train.

5. See that the boiler is nearly full of water, leaving a little room to prevent the engine blowing off by the use of the injector rather than by shutting off the blower.

In addition to these published rules, the Indianapolis committee issued the following four additional directives: (1) the steam locomotives fire should be built up gradually; (2) engineers are in charge of the engine, and are responsible to aid firemen in every way with monitoring and fueling the fire; (3) should always fire light, two or three shovelfuls of coal to prevent deadening of the fire, which causes smoke; and (4) the fireman should have his fire in condition and the steam pressure high enough that more coal will not have to be supplied (The Indianapolis Star, December 8, 1911).

The question of smoke abatement in Indianapolis received considerable attention nationwide from the leadership of the railroads. The railroads convened an investigation in Indianapolis in 1912 in an effort to help the industry respond better to growing competing interests involving railroad development, community betterment, and public health. The study gathered information on yard locomotives and freight and passenger trains operating in and out of Indianapolis. Investigations examined the use of brick arches and stack blowers in locomotives, as well as downdraft furnaces, steam jets, and upper-feed stokers in other industries. All the major railroads sent officials to a series of meetings that were held in Indianapolis and reported out of the findings at major conventions of railroad trade associations to help with research for the investigation (The Indianapolis Star, January 1, 1912).

The debate over smoke affecting public health and community welfare was fueled by numerous research studies in the first two decades of the 1900s. Major daily newspapers across the country and in Europe often published opinion editorials and news stories relating to the studies. One leading study featured in an Iowa newspaper (The Cedar Rapids Evening Gazette, December 21, 1912) discussed the smoke nuisance study conducted by the University of Pittsburgh. This landmark study argued against the continuation of communities allowing unnecessary smoke generation, which leads to increased air pollution. This university study became the impetus for the railroads and communities like Chicago, Cincinnati and Rochester to begin to work together to find common ground on which to combat the nuisance of smoke and soot.

Another leading study to have influence on local policies and regulations dealing with smoke abatement and soot nuisances was commissioned by the Chicago Association of Commerce and Industry and published in 1915. The entire 1,177 page report, titled Report of the Committee of Investigation on Smoke Abatement and Electrification of Railway Terminals, took four years to prepare. While the report found little evidence that railroad steam locomotives were a major culprit to air pollution, it did raise awareness for enacting local smoke abatement policies in regards to firing and operating steam locomotives in urban areas.

Many of the railroad companies operating in and out of Chicago, including The Milwaukee Road, provided expert staff to help investigate the air quality issues associated with smoke. Because of the releasing of the study prior to the building of the new Sioux City Roundhouse, Repair Shops and Engine Terminal facility, railroad officials would have gained insights in the emerging national environmental agenda to abate smoke and enact soot nuisance ordinances at the local government level. By the time construction plans were prepared for the Sioux City site in 1916, few of the railroads' civil engineers would have been strangers to local planning processes and this may have led them to select a site in an underdeveloped neighborhood within Sioux City. This assumption may be supported by the railroad's subsequent coverage of smoke abatement policies in later years through its employee newsletters.

The Chicago, Milwaukee, St. Paul and Pacific Railway officially addressed the issue of local government smoke abatement and soot nuisance ordinances with its employees by publishing best practices for the proper firing of steam locomotives in its three-page, March 1928, employee newsletter article by J.E. Bjorkman, assistant superintendent of motive power:

> "One of the most important problems, in fact, a serious problem confronting the bituminous coal burning industry is the problem of smoke abatement.…the greatest difficulty in avoiding offensive smoke is usually on switch and transfer engines, due to the very nature of their work, and on road engines starting out of the initial terminal, particularly if a hard pull has to be contended with before the fireman has had an opportunity to get the fire well started…if, when within the terminal limits where smoke ordinances usually govern, the firemen will fire carefully and the engineer co-operate in operating the engine in a manner consistent with conditions."

As railroad terminals like the Sioux City-based Milwaukee Railroad Shops complex were designed and developed over time, site by site and project by project; each was developed to be a self-sufficient, self-contained industrial plant. The proposed location of the Milwaukee Railroad Shops complex in the far northwest quadrant of Sioux City offered both railroad civil engineers and local planning officials the opportunity to create a pocket railroad corridor in a relatively sparsely settled, underdeveloped area on the out skirts of the community. Because the railroad facility would feed the sanitary sewer system, yet be self-sufficient with its own waterworks and electrical plant, the new railroad plant was envisioned as a model for urban and suburban development.

The railroad conceived their development with a complimentary, complete mixed-use neighborhood of residential housing, a business district, and recreational (i.e. quality-of-life) amenities. Diagrams published in the local *Sioux City Tribune* newspaper show (1) how a neighborhood with its proposed gridiron street design was to be designed around the new steam railway repair shops facility, and (2) how such a transportation pocket-style corridor encompassed a set of urban development “principles rooted in a conception of the community” (Hoch, p. 329). Although the original conceptual plans were downsized for economic reasons, the Milwaukee Railroad Shops Historic District continues to yield context and scale to how railroads did shape the city form.

After its construction, the Sioux City Roundhouse, Repair Shops and Engine Terminal of the Chicago, Milwaukee, St. Paul and Pacific Railway attracted a large class of railroad workers and their families to live in the new housing development. Post turn-of-the-20th century city directories, held in collection at the Sioux City Public Library, document the names, addresses and occupations of many of the railroad workers who resided in very close proximity to the complex and main cluster of businesses. This was most likely because they were within walking distance of the retail stores, street car stops, and the Milwaukee Railroad Shops complex and rail yard.

In addition to spurring the development of the new residential and business subdivision in the Riverside neighborhood, the Chicago, Milwaukee, St. Paul and Pacific Railway substantially increased its volume of freight and passenger trains through the entire community – thus influencing economic expansion elsewhere in the city. As one of six railroads serving the economic region anchored by Sioux City, this railroad’s influence on the urban design of Sioux City is a representative example of the national mark railroads left across the nation in the shaping of local land use policies.

“Early American cities evolved along rivers, canals, and post roads; and factories and suburbs grew up beside railroad rights-of-way” (Hoch, p. 326). As cities developed over time, the mixed use of warehouse districts, factories and industrial parks, and downtown commercial districts infilled adjacent to the rail lines as much as possible to ensure access to a viable transportation system. The breadth and depth of steam-era railroad operations required large tracts of land for the railroad’s physical plant, rail yards, and rail lines. When steam-era railroad repair shops, rail yards, and stations were erected, many towns and cities; the railroads had little competition for land. In the midst of development, communities started spreading out; growing business site by business site with a grid of streets and railroad grade crossings to accommodate the economic development.
A community’ increasing manufacturing output and warehouse jobbing drove up the demands for freight trains; causing automobile and pedestrian congestion at the grade crossings.

As more trains were needed to transport people and goods in and out of major market cities; the railroads started demanding more land to increase their physical infrastructure to house, service, maintain, repair, and sort locomotives and rolling stock. This growth created polarizing interests between local professional planners and railroad officials. By the 1920s, the introduction of corridor development practices associated with the management of railroad growth became a more structured character in urban design. In both everyday actions and the formal planning processes, interactions between the city planning profession and the railroads were often tenuous particularly involving the location of classification yards and locomotive terminals in cities.

C. F. Loweth, chief engineer for the Chicago, Milwaukee & St. Paul Railway and designer of the Sioux City-based shop complex, offered his views on the sometimes adversarial relationship between urban planning and railroad land use in his presentation titled *"The Place of the Railroad in the City Plan"*; which he delivered during the eighteenth National Conference on City Planning held on March 29, 1926 in St. Petersburg, Florida. "The railroad man's approach to the problems of city planning is somewhat different from that of the city planner, the municipal officer or the public-spirited citizen interested in city planning, in that the railroad officer has a more direct responsibility for the justification of expenditures for improvements…Zoning is a matter of great interest to railroads. Their prosperity is, in a large degree, tied up with the industrial development of the districts through which they run. Industrial developments, for the most part, must be in proximity, if not adjacent, to the railroads. There appears to be too frequently a tendency to restrict the commercial and industrial development along railroads through cities.…there are many other problems entirely aside from any connection with city planning which are of equal or greater importance than terminal operations in cities" (Wm. F. Fell Co., pp. 131-140).

Loweth's views were offered as a counterpoint to a presentation by Harland Bartholomew, then city plan engineer for St. Louis, Missouri. Bartholomew made a case in his presentation "*The Place of the Railroad in the City Plan*", that "the greatest problems confronting railroads today are those of terminal operations in cities. As cities grow in size and land increases in value it becomes more and more difficult to secure additional railroad rights of way and yard room. The city plan should anticipate provision of adequate space for such purposes conveniently located and unhampered by too numerous street crossings. The zoning ordinance and major street plan should particularly provide for the expansion of railroad facilities. A comprehensive railroad plan involving among other things ultimate industrial expansion, location of local classification yards, and interchange facilities should be devised preferably by a joint committee, representative of the several railroads and the city" (Wm. F. Fell Co., p. 120).

The location and design of the Sioux City-based Engine Terminal and Car Repair Shops complex suggests its site selection may have been influenced by C. F. Loweth's engineering experience associated with being a municipal planning engineer, civil engineer, and as a railroad engineering officer. With his background, Loweth may have interacted with local developers and city planners to lay out the complex in a remote area of Sioux City as a way to avoid the traditional adversarial planning issues generally found in other cities, including his home base of Chicago and its suburbs.

Criterion A: Chapter 4 – Building the Roundhouse and Repair Shops in Sioux City, Iowa

Historic Context: Construction of the Milwaukee Railroad Shops in Sioux City

Around 1912, the Chicago, Milwaukee, St. Paul & Pacific Railway earnestly began looking at replacing its aging 15-stall roundhouse, car shops and engine terminal in Sioux City; which was located along the Floyd River in the near downtown area, north of the Sioux City Stockyards. The 15-stall roundhouse and car shops were originally built in the early 1880s and had become obsolete due to the production of heavier, bigger, and longer steam locomotives featuring new steam technologies. Additionally, the current site was prone to the unpredictability of flooding along the Floyd River such as the great floods of 1881 and 1892. The railroad also found itself landlocked with limited options for expanding its shops and rail yard, and furnishing and equipping the roundhouse with the larger machinery needed to maintain and repair the emerging, sophisticated technologies being incorporated into steam locomotive and rolling stock design and operations.

Between 1910 and 1912, the railroad began the site selection process for the new shops complex; narrowing down their search between Sioux City and the nearby South Dakota community of Elk Point to house the new engine terminal. Elk Point, a railway junction town located approximately 15 miles northwest of Sioux City, at first, provided an advantage over Sioux City because of its natural breaking point for traffic traversing the railroad based on the existing time (hours of service) agreements with the trainmen and their trade unions. By relocating the shops in Elk Point, the railroad could save up to four hours of labor on every train run over the Sioux City and Dakota Division.

Sioux City eventually turned out to be the slightly better option for the railroad considering the aspects of logistics and the access to interchange connections with other railroads; access to a viable workforce; and the economic development incentives offered by the local government. Sioux City was selected after a spirited competition between the two communities.

According to the *Sioux City Journal* article published on September 6, 1916, a group of four local business leaders led by William Gordon, a local real estate developer, worked extensively for a long period of time (i.e. 1910 to 1912) to assist the Chicago, Milwaukee, St. Paul & Pacific Railway with identifying potential land, sufficient in size, to meet the railroad's requirements. According to the article, over 20 trips were made to the railroad's Chicago headquarters by the Sioux City leaders; and on three different times the proposition was thought to be lost, but each time Mr. Gordon obtained another hearing. On each visit to Chicago, William Gordon and the other leaders were accompanied by several local engineers and city planners to help work out location plans and economic development incentives to overcome the railroad's concerns. Finally, William Gordon and his delegation pieced together the parcels of land to meet railroad needs and a package of economic development incentives that included connections to the city's waterworks to compliment the railroad's own waterworks system and water plant; connections to the city's sanitary sewer system; and storm sewer protection for the property. There were also incentives offered by local businesses, including access to concrete and masonry brick at an extremely favorable pricing structure.

The *Sioux City Journal* article points out that local real estate developer William Gordon was instrumental in helping the railroad to secure and purchase the land options. An examination of the property's abstract and city plat maps found that the parcel of land that forms the Milwaukee Railroad Shops complex lays in part of Government Lot 1 and part of Government Lot 2 as platted in 1859. The land was originally conveyed by the United States to Paul Paquette and Fardina Grondron; however, the properties were later returned to the General Land Office by both land owners. In 1893, the property was platted by Woodbury County into lots that were subsequently real estate holdings Matthew L. Flinn, the Isaac Pendleton estate, and Sioux City Brick & Tile Company.

Matthew Lawrence Flinn was born in Martland, Illinois on June 15, 1849. He settled in Sioux City with his parents in 1868; finding employment as a brakeman with the Sioux City and Pacific Railroad. After several years, he went to work as a brakeman on the Chicago, St. Paul, Minneapolis and Omaha Railroad until he lost his left arm in 1873. After recuperating from his injuries, he then worked at the railroad's Sioux City Shops as an operator, time-keeper, and a clerk. Around 1880 he left the railroad and operated the Central Meat Market for a couple of years and then engaged in the real estate business. One of his land possessions to be acquired while he was active in the real estate business is a parcel of land that would eventually become part of the land where the Milwaukee Railroad Shops were built. After establishing his real estate business and acquiring lands in Woodbury and Plymouth Counties in northwest Iowa, Flinn started a contracting business for building sewers and water lines in the community.

In 1912, company officials confirmed they were in the process of buying land in the Riverside neighborhood of Sioux City and planned to start construction of the new roundhouse terminal and repair shops in the near future. *A Sioux City Journal* article published on August 22, 1912 under the banner headline *"Milwaukee Line to Build Here: Shops, Station and Roundhouse Contemplated"* reported that a contingency of railroad officials including the president of line, A. J. Earling, were in town to confirm the railroads intend to build major shops and a new switching yard in the Sioux City area. He also announced the railroad's intent to build its transcontinental line expansion to the Pacific Northwest. As part of his announcement to the news media, Earling reported the railroad had closed a deal with property owners in Riverside and North Sioux City for the purchase of land to build the shops complex, roundhouse terminal and railyard. Earling estimated the construction improvements would exceed a million dollars in Sioux City, making it one of the largest business expansions in the history of the railroad. Newspapers around the state of Iowa and across the Midwest made announcement of the railroad's planned capital improvement project by publishing articles produced by the Associated Press, which included *The Desert Evening News*, *Pella Chronicle*, and *Albert City Appeal.* Planning, engineering, preparation of construction documents, and local permitting for the Sioux City improvements would take nearly four years to complete because of the project's comprehensive scope of work.

The construction of the new Sioux City Roundhouse, Repair Shops and Engine Terminal facility was initiated in 1916 with the purchasing of final land options. The property's abstract shows the Chicago, Milwaukee & St. Paul Railway Company purchased 22.85 acres owned by M. L. Flinn for $18,280; a second 20-acre parcel owned by the Isacc Pendleton Estate for $15,382.50; and a third larger parcel of 29.3 acres owned by Sioux City Brick & Tile Company for $1.00 and other considerations. Anecdotal evidence collected from Sioux City Brick & Tile Company indicates that their company granted the land for building the shops complex in consideration for the railroad purchasing all their brick needs from the Riverside-based brick plant. At that time the Sioux City Brick & Tile Company owned two large brickyards just south of the proposed development site; both having industrial sidings connecting to the mainline of the railroad.

The planned construction of the new Sioux City-based Milwaukee Railroad Shops was of national significance to the railroad industry and civil engineering trades. Several industry trade publications (*Railway Age Gazette, The Bridgemen's Magazine,* and *Engineering News-Record)* announced in their 1916 journals the planning and construction of the Sioux City Roundhouse, Repair Shops and Engine Terminal:

"*Sioux City* – Chicago, Milwaukee & St. Paul Railway plans thirty-stall roundhouse, part of $1,000,000 terminal improvement. C. F. Loweth, Railway Exchange Bldg., Chicago, chief engineer" (The Bridgemen's Magazine, p. 261).

"Ia., Sioux City – Chicago, Milwaukee & St. Paul Ry. Plans 30 stall roundhouse, part of $1,000,000 terminal improvement. C. F. Loweth, Railway Exchange Bldg., Chicago, chief engineer" (Engineering News-Record, p. 15)

"Land is being secured for new engine terminals at Sioux City, Iowa, also at Atkins" (Railway Age Gazette, p. 571).

"Chicago, Milwaukee & St. Paul – New engine terminal and yard at McGregor, cost $575,000, 35 percent completed; new engine terminal at Atkins, cost $635,000, 10 percent completed; new engine terminal at Sioux City, cost $610,000, 10 percent completed" (Railway Age Gazette, p. 1189).

In addition to the announcements published by the trade publications, the following news feed was pick up by newspapers across the country like the *Salt Lake City Deseret Evening News* (September 6, 1916):

Sioux City, IA., Sept. 6 – A deal, which, it is said, will call for the expenditure of nearly $1,000,000 in Sioux City, was closed by the Chicago, Milwaukee & St. Paul road today when land was purchased for the erection of shops and roundhouse. Road officials say the new plant will be the second largest on the entire system. It was announced that the shops will bring nearly 5,000 workmen to Sioux City. Work on the shops is to begin at once."

As would be expected, the proposed construction carried immense importance to the local community. An article published in the Thursday, September 7, 1916, *Sioux City Journal* provided the first local announcement of the planned construction of the new Milwaukee Shops. The article carried the banner headline: "Milwaukee to Build Shops" with the following two sub-headlines: Road to Spend $750,000 at North Riverside – Start with 1,000 Employees. Accompanying the news article was a map illustrating the proposed site location with the land owners and property lot lines. Several local newspaper articles published by the *Sioux City Journal* and the *Sioux City Daily Tribune* boasted the railroad was expected to reach a peak employment of 5,000 workers when the shops are fully operational. In addition, the news was published

"A deal which is said will call for the expenditure of $1,000,000 in Sioux City was closed by the Chicago, Milwaukee & St. Paul railroad when land was purchased for the erection of shops and roundhouse. Officials said that the new plant would be the second largest on the system. It was announced that the shops will bring nearly 5,000 workers to the city. Work on the shops is to begin at once."

The *Sioux City Journal* article (September 7, 1916) stated the railroad was expected to employ 1,000 workers at the start and to increase the local workforce by 5,000 persons. A similar article published in the *Sioux City Daily Tribune* (May 26, 1917) under the banner headline, "Huge Terminals Spell Foundation for New City", detailed "the Milwaukee Railroad's shops and terminals at Sioux City will be, when completed, second in size to the company's shops at South Milwaukee, the largest on the system" and build employment to 5,000 when the improvements are completed. This article provided a detailed concept sketch of the new community to be built around the shops complex. The railroad planned on "laying 35 tracks, each more than a mile long, between the Big Sioux River and McCook (S.D.) station. These tracks will be used for freight cars employed in the great Middle West."

The published concept drawing showed on the Iowa side of the river, the shops and engine terminals, which when completed, would eventually be built up to accommodate 100 locomotives with a full donut shaped roundhouse and a large transfer table. While the Sioux City shops were the second largest facility built along the Milwaukee Road's right of way, the railroad never fully developed the site to the size depicted by the published concept drawing. The railroad's financial constraints, along with the overtaking of the railroad industry by the federal government during World War I, never allowed the full-scale construction as originally planned. Therefore, the railroad's engineering department, in collaboration with the motive department, needed to make modifications to the original development plans.

The design and shop drawings for the Sioux City Roundhouse, Repair Shops and Engine Terminal were collaboratively made in the offices of the motive and engineering departments of the Chicago, Milwaukee, St. Paul & Pacific Railway under the general direction of C. F. Loweth, chief engineer, and H. C. Lothholz, engineer of design. According to original construction documents and blueprints, the general layout of the entire complex was designed by C.F. Loweth; while some of the individual buildings were design by H. C. Lothholz. The turntable was designed by engineers with the American Bridge Company. Construction oversight was also the responsibility of C. F. Loweth. One of the major duties of C. F. Loweth was to oversee the Milwaukee Road's Bridge and Building Department.

The land upon which the Sioux City Shops were built originally consisted of riparian timberland along the east bank of the Big Sioux River. A narrow gauge railroad was laid into the timberland area to help with the clearing and grubbing of the site. A photo displayed in the documentation section shows a load of timber being hauled out of the complex.

According to the Field Engineer's Report filed with the Interstate Commerce Commission in 1918, the land clearing work required construction crews to clear trees and timber away from 9.7 acres of land. The construction company was able to cut and harvest trees, mostly cottonwoods and burr oaks, ranging in truck widths of 1-2 feet in diameter. The Field Engineer's Report stated the contractor cleared the land for the salvage of the timber for processing into lumber. Following the felling of the timber and the clearing of trees, the contractor grubbed and hauled away a cumulative total of 3 acres of tree stumps, debris, and shrubs from the land. Necessary fill material for cleaning, grading and shaping the roundhouse terminal landscape was obtained from the Loess Hills located alongside the railroad's right-of-way. Once the site preparation work was completed in late 1916, the railroad immediately began construction of the buildings, structures, and rail yard that would comprise the physical plant of roundhouse terminal. The entire building process was completed over two construction seasons with the complex becoming fully operational in July 1918.

An examination of the railroad trade journals *Railway Age Gazette, The Bridgemen's Magazine*, and *Engineering News-Record* published during the construction period of the complex does not find the name of a general contractor or construction firm. According to the usual practices of the Chicago, Milwaukee, St. Paul and Pacific

Railway, the construction work was carried out during the timeframe of 1917 to 1918 by company forces under the immediate direction of D. C. Fenstermaker, assistant engineer in charge of construction. Assisting Fenstermaker in the management of the construction forces were E. L. Sinclair, an assistant engineer based out of Marion, Iowa. According to construction documents maintained by the railroad, the local construction foreman was Louis Larsen.

- **The Golden Age of Agriculture Drives Construction of the Sioux City Complex**

Once the land was cleared for the new construction of the Sioux City Engine Terminal, Roundhouse, and Railroad Repair Shops complex, the railroad company began a flurry of building and rail yard construction in 1916 that would last until July 1918. As previously cited, the new construction of the Milwaukee Railroad Shops was designed to replace a much smaller 15-stall roundhouse and car repair shop complex located in the general stockyards area of Sioux City. The construction of a new industrial railroad complex would enable the railway to at least double its capacity to maintain the increasing number of locomotives and rolling stock that was being placed into the expanding Dakota Territory. The investment and eventual deployment of this new facility in Sioux City was happening at a financially opportune time for the railroad company.

The Sioux City Roundhouse, Repair Shops and Engine Terminal complex was built during a period of time that many agricultural economists have declared as the "Golden Age of Agriculture." This period is generally plotted from 1897 to 1918. During this time gross farm income nearly doubled and the value of farmland nearly tripled. The run on high commodity prices during this time period was fueled by the high demand for grain and meat in the domestic and overseas markets. The American urban population was expanding in the early years due to the availability of jobs in the industrial base; thus the need for basic farm products and produce increased in these urban manufacturing centers. Along with this domestic growth, war-torn Europe created a worldwide market for farm products grown in Iowa and other Midwestern states.

To cope with this demand, the agricultural-based railroads invested in new machinery, especially steam locomotives, and larger maintenance infrastructure to maintain their growing fleets of locomotives, rolling stock and passenger cars. The following data table distills information form the railroad company's annual reports showing the growth in new equipment and the attrition of old equipment out of the fleet. As you can see, the railroad invested in nearly 800 new locomotives and 17,356 freight cars over the six-year span of 1910 to 1916. In its notes to its stockholders, the railroad company eluded to the growth of agricultural commodities traffic as the reason why this equipment investment needed to be made.

Snapshot of the Number of Locomotives and Equipment in Service (1910 to 1930)

	1910	1916	1917	1918	1920	1930
Steam Locomotives	1,199	1,983	1,937	1,795	1,917	1,655
Electric Locomotives	N/A	N/A	N/A	45	62	63
Diesel Electric Locos	N/A	N/A	N/A	N/A	N/A	N/A
Freight Cars	44,868	62,224	62,019	60,506	61,183	66,730
Passenger Train Cars	1,103	1,599	1,577	1,565	1,604	N/A
Cabooses	607	1,091	1,067	1,046	1,006	945

Source: Annual Reports of the Chicago, Milwaukee & St. Paul Railway Company

- **World War I: Federal Government Takes Control of the Railroads**

When construction was at its peak in April 1917, the country entered World War I. For the previous two years, America's railroads were operating at nearly full capacity transporting agricultural products, munitions, and other goods for the British, French and Russians to supply their soldiers who were fighting the Germans. The "war over there" produced huge economic rewards for the businesses and industries converted their manufacturing plants and factories to the production of munitions, clothing and other products needed by the Allies. American industry was operating at full capacity.

When the United States joined the Allies and entered the War, the nation's railways were willing to volunteer their services to the military. Railroad leaders were very confident that their roads had the capacity to meet the logistical demands of the federal government's military buildup. At the time of entry into the war in April 1917, the 631 railroad companies in the United States carried 77% all freight traffic across the country and transported nearly 98% of all the intercity passenger business. Within a few months, the railroad industry felt intense stress from transporting American troops to military bases across the country for eventual deployment overseas. They were also challenged to keep up with transporting munitions and supplies to supply depots and naval ports across the country for equipping American troops overseas at the same time they were operating at near capacity hauling supplies and materials for the British, French and Russians. The railroads were not ready for the increased demand on their system.

The railways rapidly faced several other major challenges. There was a great demand placed on the existing fleet of available locomotives, boxcars, and maintenance and repair facilities. The high demand for the shipment of war materials and supplies caused a critical shortage of railroad boxcars and steam locomotives. In addition to the critical shortage of railcars, the railroads had to also respond to many of their railroad workers either being drafted or volunteering for military service. Overseas, there was a great labor need for men with railway experience. That gap was filled by the military's recruitment and selection of experienced railroad employees to take on numerous military roles to operate and maintain the railroads overseas.

It also became very evident that the railroads were still locked in their own competitive practices when it came to interchanging freight and passenger traffic between railroad companies. The challenges in coordinating train movements drove long waits, traffic delays, and the rerouting of long-distance military trains to bypass shorter routes across the country. The congestion that developed would result into a railroad problem like what occurred in the late 1900s; and the nation's railways would come up against intense governmental pressure.

To unify and efficiently manage a continental railroad system for the war effort, President Woodrow Wilson announced the nationalization and the federal government's takeover of the country's railroads on December 26, 1917. The United States Railroad Administration was charged with running the nationalized railway system under the oversight of William McAdoo, Secretary of the Treasury and Director General of Railroads, until the agency was dissolved on March 1, 1920. During the period of nationalization, the nation's entire railroad system was subdivided into three operating divisions [East, West, and South] for better coordination of train movements; and duplicate passenger services were eliminated. The urgent need for new equipment resulted in the expenditure of $380 million to produce 1,930 steam locomotives and 100,000 rail cars. Standard designs were used to speed up mass production and deployment of the new equipment.

The Chicago, Milwaukee & St. Paul Railway Company benefited greatly from the wartime economy. With the war taking place on European farmlands and in the major cities of the affected European countries, there was a great amount of destruction of farmland and disruption in the food processing. American farmers were called upon to produce more crops and livestock for the European markets. As an agrarian-based railroad operation, the Chicago, Milwaukee & St. Paul Railway Company was able to grow its revenue streams as more freight trains were needed to transport grain crops and livestock to American markets for eventual transportation to European markets and the military frontlines.

- **War Years of Prosperity End in a Crash for the Chicago, Milwaukee & St. Paul Railway Company**

The Sioux City Roundhouse, Repair Shops and Engine Terminal complex was built during a period of time that many agricultural economists have declared as the "Golden Age of Agriculture." This period is generally plotted from 1910 to 1918. During this time gross farm income nearly doubled and the value of farmland nearly tripled. The run on high commodity prices during this time period was fueled by the high demand for grain and meat in the domestic and overseas markets.

Like many railroad companies, the Chicago, Milwaukee & St. Paul Railway Company earned huge revenues from transporting crops, food stuff, and war materials and supplies for the Allies. When the war ended, the railroad found itself needing to compete for the limited passenger and freight traffic that was far below the capacity and scale of a wartime economy. With the postwar market swing, the railroad company made huge investments in upgrading and modernizing its passenger train services to fend off the emerging automobile and trucking industries; as well as the starting up off the airline industry. Along with the investments in passenger train improvements, it also had to make substantial capital improvements to their passenger stations to draw a new audience of travelers.

Consequently, the postwar economy and the 1920s rebuilding of the agrarian economy in Europe, caused the Chicago, Milwaukee & St. Paul Railway Company to enact a major financial readjustment in 1927. During the 1920s, the railroad company did not have sufficient revenues to offset the payments on debt it had acquired prior to World War I. The railroad acquired a lot of debt in its quest to become a transcontinental railroad through its purchases of smaller railroad companies and merging them into their corporate system, as well as the capital expenditures to electrify its lines and construction of new lines in the Pacific Northwest.

In 1927, the railroad's operating expenses and taxes paid to all levels of government amounted to about 82% of the company's gross revenues. Thus there was not enough discretionary income left to pay on its debt. Thus the railroad entered into insolvency in early 1927 and went into receivership. Despite the financial struggles the railroad was facing, Wall Street recognized that there needed to be a speedy reorganization of the railroad and create a new general mortgage to help finance the railroad. With the financing pledged, the railroad company was reorganized as the Chicago, Milwaukee, St. Paul & Pacific Railroad Company to help better define its emergence as a transcontinental railroad. The new railroad was branded as The Milwaukee Road.

- **1927 Marketing Campaign Launches New Brand Identity: The Milwaukee Road**

During the Great Era of Railroad Advertising, roughly 1920 to 1955, there were basically five distinct types of railroad advertising (Anderson, p. 82):

1. The first one was to sell transportation for the business journey.
2. The second type was to sell rail transportation for the leisure travel and vacation trip.
3. The third type was to attract favorable passenger traffic to the luxury of the brand named trains.
4. The fourth type was to sell rail transportation to businesses for the movement of freight.
5. Finally, the fifth branding type was the institutional advertising designed to attract favorable public attention to the railroad company.

In 1927, the Chicago, Milwaukee and St. Paul Railway Company was faced with a dwindling market for railroad transportation. “This is a day of intense competition – competition not only between the companies in each industry but between industries themselves. Furthermore, competition has been intensified to an even greater degree by the prolonged business depression” (Anderson, p. 81). As result, the Chicago, Milwaukee and St. Paul Railway Company was forced to undertake a new aggressive marketing campaign built upon the institutional advertising model due to market conditions.

In 1925, the Chicago, Milwaukee & St. Paul Railway Company entered into receivership because of its financial insolvency resulting from the excessive fixed expenses it had with operating a transcontinental railroad. The railroad’s debt was too large for its revenue base. As a result, the railroad recapitalized and reorganized; giving birth to a new railroad company in 1927 named the Chicago, Milwaukee, St. Paul & Pacific Railway.

The Advertising and Publicity Department of the railroad was charged with rolling out the “new” identity for the railway company in 1927 to distinguish the rail line from its competitors. It developed the moniker “The Milwaukee Road.” To launch the new moniker, a massive advertising campaign was implemented to build top of the mind awareness for The Milwaukee Road. The Advertising and Publicity Department placed a series of ads in national magazines focusing on the territory served by The Milwaukee Road.

The railroad developed a double-page print ad for each state served. These ads highlighted the important attributes of each state to the railroad’s network of rail lines. By highlighting the railroad’s importance to the economic well-being and quality of life for each of the states it served, the advertising campaign was focused on the railroad’s market value. The Milwaukee Road’s 1927 marketing strategy was aligned with the following generally accepted school of thought. “A railroad is primarily a public utility. The peculiar duty of a public utility is to be there when wanted – and not until then. It is the peculiar duty of a railroad to insure its continued existence, to furnish the best service that it knows to provide, and to see that the service is sold to everyone who should use it” (Anderson, p.81). The following two ads highlighting Iowa and the Dakotas are part of a series of 16 ads that ran nationally by The Milwaukee Road to demonstrate its public value (downloaded from MilwaukeeRoadArchives.com).

IOWA–

The golden corn state

BETWEEN the tranquil middle reaches of the blue Mississippi and the champagne-colored flood of the Missouri stretches a flowing prairieland that breaks frequently into high rolling hills crowned with groves of fruit and nut trees and drained by swift streams. Sparkling lakes dot its northern boundaries. In summer the air is scented with honey-locust and the fragrance of wild flowers. In winter the bright landscapes have the charm of rare old colored prints. Tilted warmly to the south, the extraordinarily deep, fertile, porous soil makes it one of the most wonderful agricultural regions in the world.

This is golden Iowa. An unequaled wealth-producing area where an almost perfect balance is maintained between industry and agriculture. A great region *where virtually the entire land surface is rich tillable soil.*

POPULATION: With a population of 2,500,000, there is only one city of over 100,000 inhabitants. There are 18 with over 10,000! Population is distributed with great evenness. The city here reaches its highest point of development—a compact industrial unit supported by the wealth of a rich soil. Typical are Des Moines, Dubuque, Cedar Rapids, Sioux City, Davenport, Council Bluffs, Ottumwa, Mason City, Boone, Clinton.

AGRICULTURE: The total annual value of farm crops is close to $1,000,000,000! Iowa leads the Nation in the production of corn. More than doubles the hog production of any other state. Stands second in the number of beef cattle. Third in dairy cattle. First in value of poultry and eggs. Of Iowa's 210,000 farms, more than 123,000 are operated directly by owners or managers; their average full value is estimated at more than $35,000!

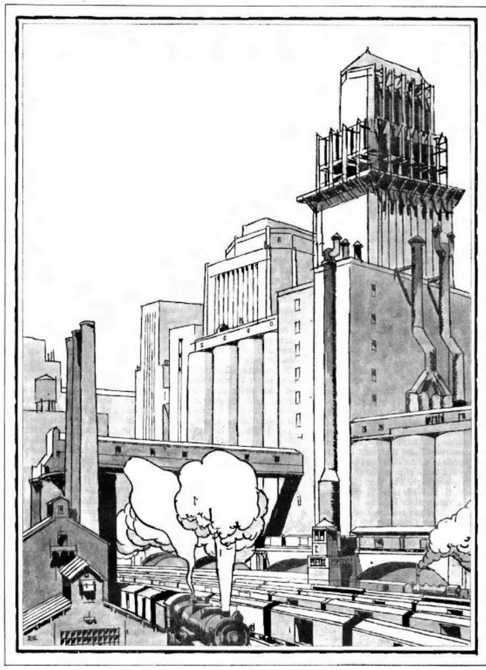
INDUSTRY: Industrial development has gained with significant suddenness in the last ten years. This has taken the form of a great variety of manufactories, employing local materials. According to the 1920 census, Iowa's factory output was already $745,000,000 annually; *it has increased considerably since then.*

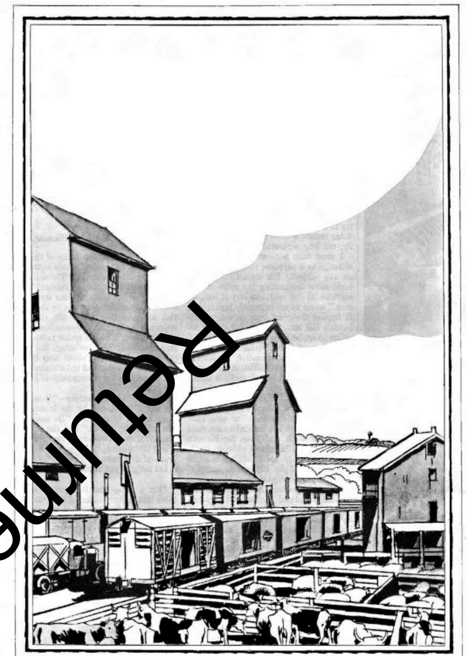
POWER: Great hydroelectric resources are available in the tremendous flow of the rivers that bound Iowa. Keokuk Dam, the largest river water-power project in America, is typical of what may be done. In addition, coal fields extend through 23 counties, already producing 9,000,000 tons annually.

TRANSPORTATION: No other state is so well served by railways. It is claimed there is a railroad within ten miles of every farm in the state. Three trunk lines of The Milwaukee Road serve Iowa, giving it outlets north, east, south and west.

The height of civilization

Located in the strategic center of a prosperous and peaceful nation, Iowa has attained close to the ideal of civilization as a commonwealth. With industry and agriculture about balanced, its population evenly distributed, and small, live metropolises as regional centers, it is in addition distinguished for the number and excellence of its educational institutions, its high standards of living, and the health, stamina and beauty of its rising generation.

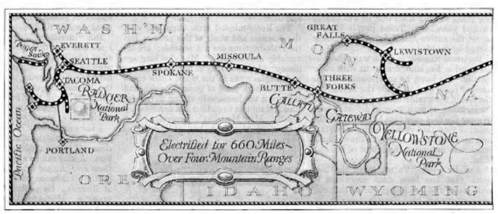


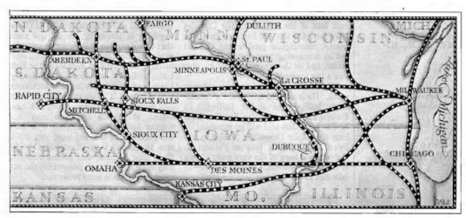


Returned

SHORTEST AND MOST MODERN ROUTE TO THE PACIFIC AND THE ORIENT

The MILWAUKEE ROAD





The recognized route between Chicago, Milwaukee and Twin Cities, Kansas City, Omaha, Des Moines, Sioux City, Butte, Spokane, Seattle, Tacoma

A farmers' railroad

TO CO-OPERATION between farmer and railroad must go credit for the marvelous development of Iowa. Neither could exist long without the assistance of the other. Most typical symbol of Iowa's growth is the small country grain elevator standing high beside the tracks at a wayside station. The overwhelming bulk of this region's produce flows to market over the rails; and the tools of production and the necessities and luxuries of life come flowing back.

The Chicago, Milwaukee & St. Paul Railway serves Iowa with three trunk lines and a network of branch lines and feeders. It extends the same character of service over all the great northwestern block of the United States from the middle reaches of the Mississippi westward to the Pacific.

The Milwaukee Road is 11,000 miles long, employing 60,000 men. It reaches from Chicago to Kansas City, Omaha, Des Moines, Sioux City; to Milwaukee and the upper Michigan Peninsula; to Minneapolis and St. Paul and Duluth; westward to the Black Hills; and to Butte, Spokane, Seattle, Tacoma, the Olympic Peninsula and the Pacific.

A master stroke of railroad engineering was achieved with the extension of the line to the Coast in 1909. For 660 miles over four great mountain ranges—Belt, Bitter Root, Rocky, Cascade, to shipside—*it is electrified.* The hydroelectric power is generated chiefly in Montana. The latest development in this most modern railroad is the *adoption of roller bearings on passenger cars.*

To the Coast

The scientifically surveyed Milwaukee Road is the short line to the Coast. It darts through mountain gorges hitherto impassable to mankind. Savage scenery of extraordinary grandeur alternates with the calm beauty of richly cultivated plains and valleys. The world-famous *Olympian* and the *Columbian* will take you in restful luxury by a route where you can study first-hand the march of industrial and commercial development in this region of extraordinary richness.

TO PUGET SOUND
THE CHICAGO MILWAUKEE AND ST. PAUL RAILWAY
ELECTRIFIED

Chicago, Milwaukee & St. Paul Railway
Room 884, Union Station, Chicago, Ill.

Make a check before the region that interests you. We have the closest co-operation with Chambers of Commerce and other business organizations who will supply you with detailed information.

- ☐ Puget Sound
- ☐ Inland Empire
- ☐ Industrial Montana
- ☐ Kansas City
- ☐ Agricultural Montana
- ☐ Upper Missouri R. Valley
- ☐ Eastern Dakotas
- ☐ Omaha—The Western Gate
- ☐ Minneapolis-St. Paul
- ☐ Wisconsin
- ☐ Iowa

Name ______

Street ______

City ______ 1-H

Milwaukee Railroad Shops Historic District
Name of Property
Woodbury County, Iowa
County and State
Name of multiple listing (if applicable)

The rising flood of Dakota corn flows out upon the plains

THE earliest pioneers halted at the far fringes of the forest, startled at the vastness of the rolling prairieland that swept away to the sunset. Startled and awed by this mysterious meadowland, carpeted with wild flowers, streaked with sparkling rivulets and the broad channels of great rivers! Amazed at the birds that sang and nested there, and the endless herds of bison grazing in grass that grew waist-high over thousands of miles of treeless plains!

Here was the dazzling land of the Dakotas. Today the dark brown soil, rich in all necessary elements, is being submerged under alfalfa and corn—corn, the golden gauge of civilization. For where there is corn there is agricultural stability—silos, milch cows, pure-bred cattle, hogs, poultry, a complete diversification that raises the standards of living and insures against the depression that often follows one-crop failures.

CHARACTERISTICS: The eastern Dakotas constitute a geographical entity that is a continuation of the rich plains of Iowa and Minnesota. It is simply newer country rapidly taking on the characteristics of the old. Southeastern South Dakota is one of the richest corn areas in the world. From this point the flood of corn moves northwestward, giving place by degrees to wheat and flax and the open range. Farms dot the prairie even in the remotest parts; and thriving towns are springing up rapidly. Abundant deposits of good coal!

INDUSTRY: The industry of the region is based almost entirely on its agriculture. About 80% of the population of the eastern Dakotas is agricultural. The industries centering in cities like Sioux Falls, Mitchell, Fargo, Aberdeen, are chiefly packing livestock products, distributing agricultural implements, shipping grain and distribution and maintenance of transportation.

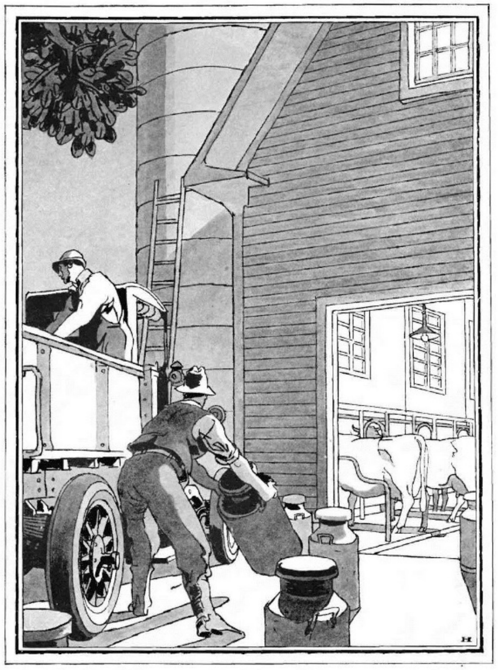
AGRICULTURE: South Dakota, as a state, though 36th in population, ranks 8th in corn production, 4th in spring wheat, 5th in barley, 3rd in flaxseed, 5th in oats, 4th in rye and 1st in wild hay. These are the leading growing crops, though the yield of a variety of other crops, principally alfalfa and clover, is very high. Cattle are raised at high profits because of the cheapness of forage.

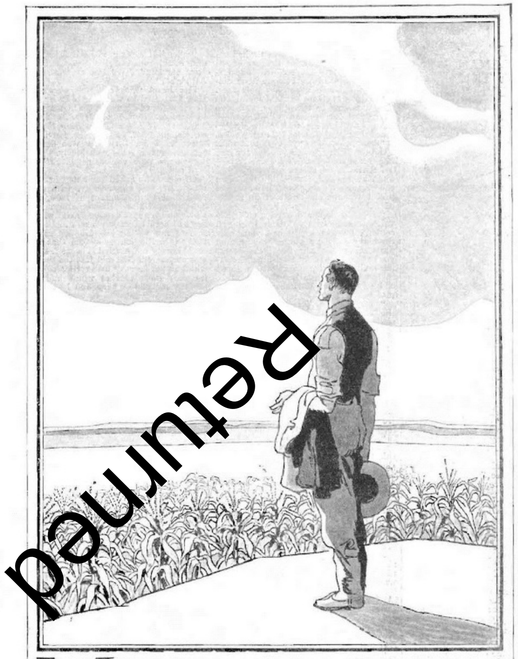
CULTURE: The Dakotas have existed as states for only 36 years. Modern ideas, therefore, govern their aspirations. Community life is very strong, and the interest paid to education is striking. Education is provided for everyone in the state, with special provisions for the transportation of children living at a distance from schools and advanced education for those who have no high schools in their vicinity. The state colleges, normal schools and technical institutions have a high reputation. All leading religious denominations are represented in the larger communities throughout the region.

The Corn Palace

Nothing is more expressive of the character and spirit of this region than the Corn Palace at Mitchell. This remarkable institution developed spontaneously as a community expression of joy at the completion of the harvest. Architecturally the building is unique, its outer walls being covered with elaborate mosaics laid in natural colors in harvest corn and grain. A festival is held here for a full week, and visitors come from many parts of the United States. This prairie town raises a fund of about $40,000 to entertain guests and visitors, and the best talent procurable is brought thousands of miles.

The Dakotas are young—virile—boiling with energy and ambition and new ideas. As rapidly as tractor plows can turn the virgin sod new wealth is being created. The present generation is bound to see tremendous expansion in industries and agricultural wealth.





Returned

Railroad pioneering

WITH the coming of the railroad the fertile Dakotas passed rapidly from the pioneer stage. Cultivation of the rich prairie soil and the development of modern towns followed the construction of railroads that replaced the tedious and costly wagon trains. They provided swift, economical outlets to great markets, and brought back tools of production, necessities and luxuries of life, and settlers in an endless stream. Chief of the great pioneering roads was the Chicago, Milwaukee & St. Paul.

The Milwaukee Road is closely identified with the story of progress and development throughout all the vast block that forms the northwestern quarter of the United States. Commencing in 1851 with a pioneer line from Milwaukee westward, it has grown into a system 11,000 miles long, employing 60,000 men.

The Milwaukee Road not only serves all the great agricultural areas, it also extends its splendid service into all the industrial and commercial centers of this enormous territory. It reaches from Chicago to Kansas City, Omaha, Des Moines, Sioux City; to Milwaukee and the upper Michigan Peninsula; to Minneapolis, St. Paul, Duluth; westward to the Black Hills; and to Butte, Spokane, Seattle, Tacoma, the Olympic Peninsula and the Pacific!

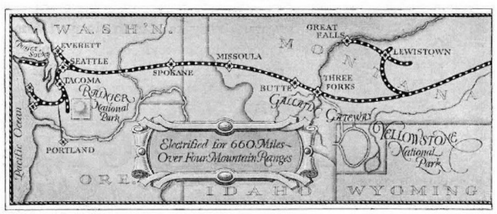
It is a long way from the little wood-burners of 1851 to the electric giants that go humming for 660 miles over four mountain ranges, from Montana to Puget Sound! A pioneer in opening new territory, the Milwaukee Road has always been a pioneer also in railroad engineering and equipment. The newest revolutionizing improvement is the equipment of *passenger cars with roller bearings!*

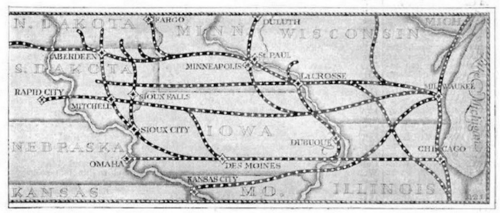
For beauty and for profit

Whether you are planning a business trip or a vacation, the opportunities along the Milwaukee Road are unsurpassed. From the ten thousand lakes of Minnesota, across the golden splendor of the plains, through the Belt, Bitter Root, Rocky and Cascade Mountains, to the glories of the Olympics and Puget Sound, there is a diversity and richness of beauty that has no parallel. It is all new country, virile, progressive. The trend of commerce towards Pacific outlets makes this region one of most vital interest to business leaders.

SHORTEST AND MOST MODERN ROUTE TO THE PACIFIC AND FAR EAST

The MILWAUKEE ROAD





The recognized route between Chicago, Milwaukee and Twin Cities, Kansas City, Omaha, Des Moines, Sioux City, Butte, Spokane, Seattle, Tacoma

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- ☐ Omaha—The Western Gate
- ☐ Minneapolis-St. Paul
- ☐ Wisconsin
- ☐ Iowa

Name ______
Street ______
City ______ 4-J

Historic Context: Social History - Built by Immigrant Labor

There are numerous anecdotal stories that have been shared by former railroad employees and local Riverside neighborhood residents visiting the Milwaukee Railroad Shops Historic District, who have alluded to the railroad hiring Italians and other European foreign workers to clear the land and construct the facility and the use of African Americans for the track gangs; all housed in labor camps near the present-day intersection of Military Road and Riverside Boulevard. Those accounts of the railroad labor camps have been shared as intergenerational stories passed down over the decades. Because no local photographic evidence or local newspaper accounts exist to substantiate this claim of the railroad's use of specific ethnic groups to build the Milwaukee Railroad Shops, this project's principal investigator researched the question on a broader context. The findings of this broader context research found the use of ethnic-based labor groups may very well be plausible.

Literature reviews of early 20th-Century railroad employment practices found the Chicago, Milwaukee, St. Paul & Pacific Railway, like many of the transcontinental railroads, actively recruited foreigners and members of specific ethnic groups for obtaining their construction and maintenance of way work force. One of the many challenges faced by railroad officials during the buildup of their rail lines was the problem of finding track and general construction laborers willing to take on the back-breaking and often dangerous work. The late 1800s and the early 20th Century saw regular upsurges in the railroads recruiting and hiring foreign-born workers to augment their labor forces and provide the muscle for track laying and building terminal structures. The Chicago, Milwaukee, St. Paul & Pacific Railway was no different than any other railroad – acquiring land was fairly easy, but hiring sufficient numbers of laborers to lay the track and build their terminals was much harder.

In his book, *The Milwaukee Road's Western Extension – The Building of a Transcontinental Railroad,* Stan Johnson's research found "Recruiting and keeping a viable labor force was a major concern. First, a considerable amount of railroad construction was underway elsewhere in the country, and competition for workers was severe. To be successful, recruiting had to be active and outreaching. The Milwaukee advertised in person, by use of posters, newspaper, and magazine ads and recruited in many different U.S. localities as well as overseas, particularly in Europe. There was precedent for recruiting abroad. Immigrant labor had been used extensively and successfully in other railroad construction in this country." The contributions of immigrants to the American railroad workforce trace back to the building of the First Transcontinental Railroad when the Union Pacific employed Irish workers and the Central Pacific utilized Chinese worker.

The railroads held definite perceptions and stereotypes about the quality of work produced by the various nationalities and ethnic groups. Each railroad company generally targeted specific ethnic groups for the specific construction tasks and geographic terrains where they had a need for workers. In 1916 and 1917, there were two landmark studies on railway labor that were published by the railroad industry trade journals: *Track Maintenance – Handling Laborers of Different Nationalities* by Kenneth Van Auken and *The Report on Economics of Railway Labor* edited by W. D Pence and E. H. Fritch. The first study provided insights into the railroad's perceptions of desired characteristics of each laborer group while the second study provided a survey of immigrant and ethnic groups employed by each of the major railroad companies in the United States.

The Pence and Fritch survey found the Chicago, Milwaukee & St. Paul Railway generally preferred to target the foreign ethnic groups of Italians, Greek, Bulgarian, Romanian, and Armenian origin along with African-Americans (Pence and Fritch, pp. 170-171). Italians were the largest ethnic group recruited and employed on the construction teams of the Chicago, Milwaukee & St. Paul Railway (Johnson, p. 159). According to Van Auken's study, one of the characteristics that may have made Italian laborers very attractive to the railroad was many of them were well versed in the use of the shovel and similar tools used in track laying because many of the tools were used in their homeland to earn their living with. He pointed out in his article "Some of the best spikers, in fact some of the best track gangs, to be found are Italians" (Van Auken, p. 270). His study found the African Americans' abilities to work well in unison in the track gang environment were desirable by railroad foremen (Van Auken, p. 272).

- ✓ *Please note, that by today's standards, Van Auken's study would not be generally accepted by the railroad industry because of the negative overtones and references he made on the subject of the characteristics of foreign-born laborers. However, his work does provide a representative example of the perceptions and stereotypes commonly held by railroad officials at the beginning of the 20th Century. His work offers societal insights into the railroad industry's recruiting, hiring, and employment practices of the times.*

The linear buildup of the railroad network required the railroads to move track and construction "gangs from place at frequent intervals, making necessary the provision of portable camps of one kind or another" (Pence and Fritch, p. 154). This continual movement of work crews from work site to work site required the railroads to provide housing accommodations for the laborers and their families. Thus, the housing accommodations needed to be portable but semi-permanent and sturdy enough to travel with the workers and their families. "The Chicago, Milwaukee & St. Paul has designed sectional buildings about the size of a car body, which is built of new lumber by company carpenter forces and which can be taken down and loaded on a flat car for movement from place to place" (Pence and Fritch, p. 155). Some of the men also lived in tent-style structures. Often, several men, generally up to 8 individuals, would be crowded into the camp cars or tent structures.

Once the housing accommodations were transported to the new work site, they would be clustered together to form camps. When these camps were set up in communities like Sioux City, the railroad camps needed to conform to local municipal standards for construction and sanitation (Pence and Fritch, p. 154). In the undeveloped areas, the railroad would generally provide water cars for drinking water storage and rudimentary sanitation such as portable toilet structures such as outhouses. However, the railroad did have standards and policies in place scheduling the fumigation of the bunk cars, changing of bed linens, and sterilization of portable water tanks. The railroad often provided medical services as well (Johnson, pp. 233-237).

Criterion A: Chapter 6 – The Roundhouse in the Heartland

Historic Context: Operational History and Role of the Milwaukee Railroad Shops

The typical work once carried out by the Milwaukee Railroad Shops was once part of a standard practice by the railroads to locate several main shops at points along their systems where freight traffic was the heaviest and the greatest number of steam locomotives and trains would need servicing. These points were not necessarily the geographic centers on the railroad, but rather the business centers of each system (Ball, p. 119). Almost anything requiring repairs can happen to a working locomotive or a rail car, but the things that usually happen are the result of the natural wear and tear of regular service. All railroad locomotive and car repair shops have to be prepared to perform operations such as re-turning or retiring wheels; refitting boxes, side rods, pistons, and so on; replacing, say, boiler tubes or firebox sheets; and repairing a multitude of minor parts—everything on short notice!" (Ball, p. 121)

The Milwaukee Railroad Shops complex in Sioux City was built to serve the Sioux City & Dakota division (later renamed the Iowa-Dakota Division) of the Chicago, Milwaukee, St. Paul and Pacific Railroad Company. This service area consisted of 550 miles of main and branch line trackage in the states of Iowa and South Dakota. This trackage included a mainline route between Chicago and the Pacific Northwest. All trains, locomotives and cars assigned to or passing through this division were cared for in the Sioux City railway repair shops and terminal. On any given day, an average of 35 steam locomotives were being repaired or rebuilt. Each month the Milwaukee Shops dispatched over 850 locomotives after routine maintenance, with two locomotives being completely overhauled per month. This was in addition to the daily inspection and repair of locomotives.

While the working life of the Sioux City Roundhouse, Repair Shops and Engine Terminal spanned some 65 years, the heyday of the Milwaukee Railroad Shops Complex stretched from 1918 when it opened to 1954 when the complex was downsized and disinvestments in infrastructure were made. The year 1948 marked a peak year in activity for the Sioux City-based Milwaukee Railroad Shops complex, as highlighted by a year-end production report published in a Sioux City Journal article:

- 6,317 freight cars repaired
- 8,316 steam locomotives serviced and repaired
- 561 people employed with an annual salary of over $2.1 million
- 6,541 freight trains for an average of 18 per day
- 4,380 passenger trains for an average of 12 per day

The Sioux City-based Milwaukee Railroad Shops were designed on the factory-style, production line model for the rebuilding, repair, maintenance and servicing of steam locomotives, freight rolling stock and passenger cars. The typical work accomplished at these shops is highlighted by a 1923 article published in the Sioux City Chamber of Commerce publication, *Sioux City Spirit of Progress*, which is presented below in its entirety:

> The average man with a secondhand automobile as his hands full keeping it in running order and probably doesn't envy the Milwaukee mechanics who run a garage for the 84 powerful locomotives running out of Sioux City on the Chicago, Milwaukee and St. Paul railroad. The shops are located at North Riverside on the Sioux River and consist of the mechanical department, which cares for the engines, and the car department, which cares for the cars. The entire layout covers approximately 50 acres with 30 acres additional being held by the railroad company for expansion. The yards are approximately a mile and a half long and have fifteen switching tracks, with several additional storage tracks, making ten miles of track.
>
> These railroad shops form one of Sioux City's largest industries and gives employment to from 300 to 500 men. Practically every known craft is employed – mechanics, brass workers, carpenters, car builders, electricians, blacksmiths, machinists, and others. These are all skilled workmen, many of whom have been with the shops for years, advancing from one department to another.

The Sioux City-Dakota division, which is managed from here, consists of 550 miles and is divided into seven sub-divisions as follows: Sioux City-Manilla, Sioux City-Madison, Sioux City-Egan, Sioux City-Mitchell, Sioux City-Platte, Running Water-Marion Junction, and Armour-Stickney. All engines and cars on this division are cared for in these shops. Supplies for the division are sent from the storehouse here valued at approximately $75,000 per month. The capital invested in the stationary equipment is in excess of $650,000, not to mention the value of rolling stock.

The most interesting part of the shops is the roundhouse, with 30 engine stalls. This was established in 1918 to replace the old house at 2nd and Division streets, which was built in 1887 and had 15 stalls. At that time the largest engine known to the shop was one of 16 inch cylinders; now the largest is 25 inch cylinders. In the roundhouse can be seen giant freight and passenger locomotives in every stage of assemblage. An average of 35 engines are in at all times which means that the house is full and some on the outside. Over 850 engines are dispatched from here every month. Averages of two engines are completely overcalled every month from headlight to the tender. This is in addition to the daily inspection and repair of every one that comes in.

When a locomotive comes in from a run, it is taken to the cinder pit, which is a pit 100 by 50 feet, and 14 feet deep under the tracks. Ashes and cinders are dropped into this pit filled with water to extinguish the fire. The engine is then towed into the roundhouse where it cools off and remains until two hours before it is ready to run. In the meantime, it has cooled off and the workmen are able to give it a careful inspection. The old days of the engine wiper, which gave the heroes of our fiction a beginning into the railroad game, is gone. In his stead, we have modern machinery which is characteristic of the entire plant. A mixture of hot water and oil is sprayed on the engine under heavy pressure which accomplishes the same work in much less time as the wiper with a piece of oily waste.

The inspection of the engine is carried on by several different departments. The airbrake mechanic carefully tests the brakes and mechanism that controls the brakes. A brake testing room is equipped with pressure gauges and other apparatus to test the safety of this vital part of the train equipment. The headlight testing mechanic tests the light itself as well as the generator that supplies it. In a like manner the injectors, the bell ringer and the cylinders are inspected with the same care by skilled workmen. The safety of thousands of daily passengers is due to the skill of these men in keeping a complex system of machinery in good working order.

After the engine has undergone its inspection and declared ready for a run it is left to await its call. One hour is required to get up steam to run a cold engine. When wood was the kindling used, it took a longer time than this. To start a fire now in the big powerful machine, a layer of coal six inches deep is placed on the grates. Into this is forced burning oil which quickly starts a hot fire and the engine is soon ready to start on its journey across the Iowa plains or the South Dakota hills.

Repairs are divided into two classes, running repair and heavy repair. The running repairs are made in the roundhouse and all small repairs due to the regular wear of the engines. The heavy repairs are usually due to some accident or defect in materials as when a cylinder is cracked, a piston breaks or something of this kind happens. These repairs require new parts or at least extensive machine work. For this purpose a large machine shop is maintained with a corps of machinists and mechanics. The most modern machinery is used here daily. The large 40-inch swing lathe is perhaps the largest of its kind in the city. Many smaller machines, a complete flue welding outfit, a blacksmith shop and an 80 ton steam hammer comprises the machinery required in this shop. Many new devices and attachments are developed and placed on engines coming in for repairs. This keeps the locomotives always equipped with the latest improvement.

For watering the dispatched engines, three deep wells with automatic electric control have been drilled near the roundhouse. All water used is first treated in the treating plant. This is to remove minerals from the water and thus protect the boilers. Over 7,000,000 gallons goes into boilers every month. The boilers on the Dakota divisions must be cleaned thoroughly every day, due to the water that is used along the way in local water towers. It is of course impossible for an engine to carry enough water from Sioux City for a complete trip.

The car shops were a separate institution under different supervision than the locomotive department but all a part of the Milwaukee shops. This department receives all damaged and worn out cars from throughout this division. In case they are not too badly damaged, they are rebuilt and put back into service. Some are dismantled and the parts used in repairing others much as in a garage. The car shop has its own planing mill, carpenter shop, blacksmith shop and air brake testing laboratory. New devices and attachments are added to the cars when they are in for repair. Repairs and rebuilding of cars takes place outdoors on RIP (Repair-in-Place) tracks.

Other interesting parts of the shops are the power plant, coal shed, sand house and supply department. The power house furnishes compressed air at 100 pounds pressure for use in riveting machines, power tools, and other uses. Steam is also furnished here for the pressure pumps, driving power tools, and heating buildings. The entire plant is electrically operated with power that is purchased from a local company. This comes to the power house at 13,000 volts and is stepped down to 220 at which it is used. There is a total of 170 horse power used in the various departments in operating machines.

The coal shed (i.e. tower) has a capacity of 300 tons. The coal is received in cars and hoisted to the tower for storage. This permits an engine to be loaded with coal by gravity from the tower. Sand for sanding slippery tracks is supplied from the sand house. The sand is first dried in a large roasting oven and then put into the sand box on the locomotive.

Shower baths and locker rooms are provided for the workmen, as well as a lunch room. Every effort is made to care for the safety and welfare of these mechanics and laborers who look after the welfare of the train equipment. Safety is taught every man from the day he reaches the shops. Large placards are posted at every turn warning the men to be careful in their work for their own safety. Officers of the company are strong supporters of "Safety First".

The Milwaukee had its beginning in this part of the country in the seventies. The Dakota Southern Railroad, a local enterprise was the beginning. This road started in 1873 and extended from Sioux City to Yankton. In 1879 it was absorbed by the Chicago, Milwaukee and St. Paul and extended to Sioux Falls. The years following this absorption were hard ones for railroads, according to veteran railroaders. The year 1881 was one long to be remembered. For weeks during that winter the tracks were covered with snow and ice. Most of the clearing work had to be done by hand labor and there was little in the way of modern machinery for clearing snow. Hardly had this situation been cleared when the famous floods appeared from the melted snow and ice and the Milwaukee tracks were under water for days. Since those days this railroad has grown steadily, putting on more trains, increasing their terminal facilities and in other ways improving service to the people.

The Sioux City yards and shops are one of the busiest terminals on the system. The personnel include some long familiar faces. C.N. Curtis, division freight and passenger agent, is a veteran of the line. His service dates back to 1880 when he was a section hand at Vermillion. He was one of the shovel brigade during the blizzards of 1881 and one of the rescue crew during the floods following. He has been continuously in the service of the company and has been in Sioux City since 1884, and is widely known in railroad and business circles. At the shops, A.M. Martinson is master mechanic. H.J. Palmer is master electrician. Mr. Palmer's father has been with the shops since their establishment in Sioux City.

- *Role of the Shops in Train Service*

The Milwaukee Railroad Shops – Sioux City Roundhouse, Repair Shops and Engine Terminal played an integral role in servicing, maintaining, and repairing the locomotives and rolling stock used in the consists of the railroad's signature brand named passenger trains, main trains, scheduled time freights, express trains, and extras.

The Sioux City Car Shops played a vital role in inspecting, maintaining and repairing the railroad's fleet of locomotives, passenger cars, freight cars and cabooses. The Sioux City Car Shops were one of the larger facilities that were strategically located along the Milwaukee Road system for the functions of complete passenger and freight rail car service needs including cleaning, wheel set assembly and refurbishment, axel finishing, and heavy repair services ranging from preventive maintenance and routine repair to total car refurbishment and wreck repair. Because the Sioux City Car Shops specialized in both light and heavy repairs, the facility provided on-site and mobile inspection, repair and maintenance services to passenger and freight trains at the Sioux City Depot or in the switching yards to minimize train service downtime and reduce the shopping of locomotives, passenger cars and other rail cars.

Prior to the mid-1950s, at the peak of rail travel, The Milwaukee Road operated three brand named passenger trains each way daily on the Chicago-Sioux City-Sioux Falls main line. The passenger traffic included *the Midwest Hiawatha*, *the Arrow*, and *the Columbian*. These named passenger trains were instrumental in earning The Milwaukee Road its reputation as a "premier railroad with high quality and dependable passenger operations." The Milwaukee Road maintained this reputation right up until May 1, 1971; when long-distance and intercity rail travel was reorganized into the AMTRAK system.

- The *Midwest Hiawatha* was part of the family of regional passenger trains operated under the "Hiawatha" brand name. There were three regional brand name passenger trains operated under the "Hiawatha" trademark. Among them were the *North Woods Hiawatha, Midwest Hiawatha,* and *Chippewa Hiawatha. The Hiawatha* passenger service was on the nation's first regularly scheduled streamlined trains that became known as the "Fastest Trains in America" because it wasn't uncommon for the trains to be clocked at speeds exceeding 100 miles per hour on their daily runs. The *Midwest Hiawatha* was assigned to the mainline running from Chicago to Omaha, with a section splitting off at Manilla, Iowa to link Sioux City and Sioux Falls, South Dakota with the Hiawatha passenger service network. The *Midwest Hiawatha* passenger train service began in 1939 and was phased out in April 1956.

Over its years of operation, the *Midwest Hiawatha* passenger trains utilized steam locomotives (Class A 4-4-2s; F5 Pacific 4-6-2) that were wrapped in a streamlined-style shroud. In 1948, the steam locomotives were replaced with the F7 diesel locomotive. In addition to the streamlined locomotives, The Hiawatha passenger service featured a distinctive class of rolling stock that included "Super Dome" observation cars and popular "Tip-Top-Tavern" and distinctive "Beaver Tail" lounge observation cars on the rear of the passenger train. It would not be uncommon for the train's equipment to need running repairs and daily preventive maintenance work. And, due to prolonged wear and tear the equipment would require heavy repairs. The Sioux City Roundhouse Terminal became responsible for maintaining the locomotives, passenger cars, coaches, and complete train-set in a "state of good" operational repair.

- *The Arrow* was introduced by the Milwaukee Road in August 1926 as a regional inter-city brand name for its premier passenger service between Chicago and both Omaha and Sioux City (the train was split at Manilla with one section of the train operating to Omaha and the other section running to Sioux City). *The Arrow* brand was launched to replace two earlier named trains known as the *Omaha-Chicago Limited* (trains #7 and #8) and the *Sioux City Limited* (trains #6 and #11) under one umbrella trademark. This effort was part of the railroad's competitive marketing strategies to (1) differentiate its long haul and regional train services from that of its competitors, (2) build brand credibility for its premium inter-city passenger service, and (3) grow its share of passenger traffic in targeted specific geographic markets. In 1934, the railroad extended the Sioux City portion of the *Arrow* over the Big Sioux River to service the Sioux Falls market and compete against the Great Northern Railway; Chicago and North Western System, Illinois Central Railroad and the Chicago, Rock Island and Pacific Railroad in Iowa and South Dakota. Like the rest of the rail industry's passenger traffic during the decade of the 1950s, *The Arrow* began to experience a downturn in ridership as the passenger train competed against a growing airline industry and the expanding automobile market. After years of heavy revenue losses and dwindling passenger traffic, the Milwaukee Road eventually discontinued *The Arrow* passenger service in October 1965.

  One of the Milwaukee Road's deepest commitments to its *Arrow* premium passenger service was to have operational equipment in a continuous "state of good repair" to ensure smooth operations. The Sioux City Roundhouse Terminal, Repair Shops and Engine Terminal facility played a critical role in the upkeep and maintenance of *The Arrow's* motive power and rolling stock to minimize downtime and ensure train schedules were kept. *The Arrow* was originally pulled by Class A Atlantic-style, Class F7 Hudson-style, or Class S3-style 4-8-4 steam locomotives that were replaced by Alco diesel locomotives in the 1940s. The rest of the passenger train consist included a couple of coaches, a sleeping car, dining car, parlor car and lounge service. All of this equipment was serviced and maintained by the Sioux City Roundhouse Terminal and its shopmen.

- When the Milwaukee Road completed its Pacific Northwest Extension in 1909 and joined the pool of transcontinental railroads, it inaugurated its "Coast Line" passenger service with two named trains, *the Olympian* and *the Columbian*, both of which operated over the Chicago-

Milwaukee-La Crosse-Minneapolis-Aberdeen-Seattle route. Both trains operated throughout the 1910s and 1920s. The railroad discontinued operating *the Columbian* in 1930 as a result of the downturn in ridership caused by the Great Depression.

In 1931 the Milwaukee Road reactivated *the Columbian* as a new daily intercity passenger train service between Chicago and the Seattle/Tacoma area via a more southern route. The rebranded train service followed the existing Iowa-South Dakota route of Chicago-Savannah-Perry-Manilla-Sioux City-Sioux Falls-Aberdeen-Butte-Seattle/Tacoma. The Columbian made its initial run over the new route through Sioux City on 23 February 1931.

One of the reasons why railroad executives selected this southern route was to establish a long haul corridor service in this territory to fill a gap left by the discontinuation of several local and regional passenger train services. With low trending ridership during the late 1920s, various local passenger trains had previously been discontinued by executives in early 1931 as a cost-cutting measure to eliminate poor performing routes in its Midwest operating divisions of Illinois, Iowa, and the Sioux City & Dakota. Milwaukee Road executives launched the new *Columbian* train service as part of the railroad's bigger business strategy to return train service to profitability by consolidating passenger train services and delivering reliable, frequent and interconnected long-haul and regional train services to more destinations.

The launch of the new *Columbian* route through Iowa provided the opportunity for the Milwaukee Road to have long-distance train connections to St. Louis and other major cities in Missouri via links with the Wabash Railroad routes into Des Moines. The *Columbian* had a station stop for passengers to disembark or board at Perry, Iowa. A short-distance train service ferried passenger traffic from Perry to Des Moines, where connections were made with the Wabash trains to St. Louis or Kansas City. These new destinations coupled with the new *Columbian* route provided access to transcontinental train service from St. Louis to Seattle/Tacoma. Prior to this time, St. Louis was virtually isolated from transcontinental train service into the Pacific Northwest because of limited access to long-haul routes.

The new branded long-haul corridor train service also enabled the railroad to provide an upgraded fleet of locomotives, rolling stock and other amenities. The Sioux City Roundhouse Terminal was responsible for locomotive, coach, and train-set maintenance and fueling services for the *Columbian* runs.

In addition to passenger train service, the Milwaukee served Sioux City during the *Golden Age of Steam Railroading* with five daily scheduled, round-trip freight trains going west-east to the Chicago markets. These trains also stopped at Sioux City for switching to makeup or breakup the train with freight loads originating in or being delivered to Sioux City. To ensure all its freight hauling equipment was maintained in a "state of good repair" to meet federal and industry standards, the Sioux City was tasked with rolling stock and train-set inspection and maintenance services for tens of thousands of scheduled and express freight trains that rolled in and out of Sioux City along the Milwaukee Road mainline. Among those many trains, were the following notable freight trains.

- The 1960s was a period of time when the railroad aggressively entered into a competitive battle with the over-the-road trucking industry through its Flexi-Vans service. Milwaukee Road executives decided to expand their investment in the growth of its intermodal, door-to-door, rail-highway traffic by expanding its intermodal service between Chicago-Milwaukee-Twin Cities and extending it to both its Omaha and Kansas City terminals.

  The Flexi-Van service made use of specially designed flatcars, lightweight semi-trailer units, and specially-designed highway wheel and axle assemblies known as “bogies”. The special trailer units were designed to slide from their highway wheels onto the flatcars via hydraulic lift tables installed on the flatcars (which were powered by the semi-tractor battery). When a van or semi-trailer was backed onto a specially-constructed railroad flatcar from the side, it was pulled and slid off the bogies with the assistance of the flatcar’s lift tables. The van was then swung around so that it would sit lengthwise on the flatcar. The loading or unloading process could be accomplished within 5 minutes. Each flatcar was capable of securing hauling two vans or semi-trailers.

  This design did not require the railroad to make substantial investment in specially designed intermodal terminal facilities or loading/unloading equipment. The design did provide opportunities to load and unload the Flexi-Vans in a variety of locations. It gave the railroad a competitive advantage with shippers who lacked physical locations adjacent to railroad sidings.

  In September 1960 the Milwaukee Road inaugurated their new Flexi-Van Service in Sioux City by shipping two refrigerated semi-trailers loaded with dressed hog carcasses processed by local meatpacker Sioux City Dressed Pork. This first Flexi-Van load was shipped to Boston and began a weekly shipment of two vanloads a week of process hog carcasses for distribution in Boston. The Flexi-Van Service was expanded to other shippers in the greater Sioux City area.

- In 1964 the railroad introduced the *XL Special* (Train No. 261 westbound) and the *Thunderhawk* (Train No. 262 eastbound) as two high-priority long haul freight trains that ran a transcontinental route between Chicago and Tacoma. These two freight trains operated daily at speeds often times surpassing passenger train service to ensure a 55½ hour delivery schedule.

  XL Special Train No. 261 ran a westbound route that left Chicago at 2:30 p.m. daily with its Chicago cargo and would make pickups or set outs of freight cars in Milwaukee, the Twin Cities, Aberdeen, Spokane and Seattle. The eastbound *Thunderhawk Train No. 262* would leave Seattle-Tacoma at 2:00 a.m. daily with its Washington cargo and would make pickups and set outs in the same cities as the *XL Special*.

  While the *XL Special Train No. 261* and the *Thunderhawk Train No. 262* did not operate through Sioux City, this expedited freight service did influence train operations in the area. The railroad operated three scheduled time freight trains (Train No. 8, Train No.23, and Train No. 73) out of Sioux City to dispatch freight cars for connection and pickups with the *XL Special* and *Thunderhawk* at Aberdeen. The Sioux City Roundhouse, Repair Shops and Engine Terminal played a pivotal role in ensuring all locomotives and freight cars were road worthy and in a state of good operating repair to minimize over-the-road breakdowns and to meet schedule demands.

It was not uncommon for the railroad companies to operate special trains for promotional events to highlight the importance of the railroad industry, to showcase new technologies, or to cash in on significant event. Just like any other train, the Sioux City roundhouse terminal became responsible for preparing and equipping the trainset as well as servicing, inspecting and making running repairs to the locomotives and trainset. There are several occasions connected to this type of work:

- In 1920, the Chicago, Milwaukee, St. Paul & Pacific Railway celebrated its electrification of its lines between Harlowton, Montana and Avery, Idaho and another separate electrified district between Othello and Tacoma, Washington with system tour and public exhibition of its "King of the Rails" locomotive. This electric locomotive was dispatched around the Milwaukee Road's system, including a special stop in Sioux City for exhibition at the 1920 Interstate Fair. This locomotive weighed 265 tons and operated with fourteen axels, twelve of which were driving axles and two were pilot or guiding axles. The locomotive was designed to handle twelve-passenger cars, against a 2.2 per cent grade. Electricity was distributed to the locomotive via overhead wires very similar in scale to trolley lines. With its appearance in Sioux City, the roundhouse terminal and its work crews became responsible for building a rail line into the Interstate Fairgrounds to exhibit the locomotive, as well as keeping the locomotive shined and polished for the people to enjoy.

- Between July 20, 1927 and October 23, 1927, Charles Lindbergh toured the United States for the purposes of promoting aviation. Flying the "Spirit of St. Louis," he touched down in 48 states, visited 92 cities, gave 147 speeches, and rode 1,290 miles in parades. One of his fly-ins was in Sioux City on August 27, which was billed as "Lindy" Day. For the event, the railroads operating in and out of Sioux City ran special excursion trains to bring people in from the rural areas of northwest Iowa, southeast South Dakota, and northeast Nebraska. The Chicago, Milwaukee, St. Paul & Pacific Railway ran the special excursion trains from the points of Mitchell, Armour and Platte, South Dakota. For the event, the Milwaukee Road also ran shuttle trains from the depots and stations in downtown Sioux City to the celebration grounds at the North Sioux City air field. The Sioux City roundhouse played a critical role in preparing, servicing, and fueling the locomotives and coaches that were used for the shuttling of people, as well as tending to the locomotives and coaches needed for the special excursion trains that moved people between Sioux City and the various points in South Dakota.

- Another special exhibition train the Sioux City roundhouse terminal tended to was the 1976 *American Freedom Train*, which celebrated the United States Bicentennial with its trainset painted in a red, white and blue paint scheme pulled by former Southern Pacific 4449, a large 4-8-4 steam locomotive. The train consisted of ten display cars converted from baggage cars that once traversed the New York Central and Penn Central railroads. Within these cars over 500 artifacts representative of American History were available for public to view. The trainset was set up for display on a Milwaukee Road siding in downtown Sioux City.

  The *American Freedom Train* was on public exhibition in Sioux City for four days beginning

September 12, 1976 with its departure on September 16, 1976, when it traveled to Des Moines. Because the steam locomotive was live and operational, it was periodically detached from its trainset during the four-day exhibition and sent to the roundhouse terminal for fueling, servicing and inspection by the rail crews.

When the first train arrived in Sioux City on March 8, 1868, it set in motion a new method to handle the transportation and sorting of mail in and out of city. The Post Office Department began using the railroads as a mode to transport mail in November 1832 when the department authorized its stagecoach contractors to haul mail by rail on a route from Philadelphia to Lancaster Pennsylvania. By early December 1832, transporting mail by rail had been expanded to West Chester, Pennsylvania. Over the next several decades, the Post Office Department continued to award contracts for hauling mail by rail as the railroad network continued to be built up across the eastern United States.

During the Civil War, the assistant postmaster of Chicago (George B. Armstrong) experimented with the concept of equipping a rail car for the purposes of sorting and distributing mail between Chicago and Clinton, Iowa, using the mainline of the Chicago & North Western Railroad. This service differed from the normal hauling of mail in that mail was sorted to and received from each post office along the railroad's mainline route. Mail was also sorted and prepared for distribution for major post offices beyond the end-points of the railroad's mainline. Postal workers were placed in the special rail car to perform the sorting while the train was moving. This experiment was so successful that similar mail sorting routes were tested and established between New York and Washington; Chicago and Rock Island, Illinois; and New York and Erie, Pennsylvania.

In 1869, the Post Office Department inaugurated the Railway Mail Service, a nationwide distribution network of rail cars specially equipped to handle the transportation and sorting of mail aboard passenger trains. By 1896, the Post Office Department reported that the mails were carried on 172,794 miles of railroad and that 6,779 postal clerks were employed in the Railway Mail Service.

Sioux City served as one of the busiest Terminal Railway Post Office as a sorting facility for the Railway Mail Service. In 1912, there were 36 mail trains operating in and out of Sioux City. By 1940, the volume of mail and grown to nearly 19-million cancellations and the terminal was dispatching mail to 41 trains for distribution along the railroad routes radiating out of Sioux City (Kirkpatrick, p.133).

Like all the trunk line railroads serving Sioux City, the Chicago, Milwaukee, St. Paul & Pacific Railway played a significant role in the haulage of mail, express freight, and newspapers out of the Sioux City post office terminal depot. The rail cars used for the sorting and hauling of mail consisted of one or more cars placed at the head end of passenger trains or they were operated as solid mail trains between major cities and postal terminals. These solid mail trains became known as the Fast Mails or Express Trains; and they would have precedence in running over all other scheduled passenger and freight trains on the line.

The Chicago, Milwaukee, St. Paul & Pacific Railway operated four Fast Mails and Express Trains in and out of Sioux City. They were the Aberdeen SD & Sioux City RPO; Des Moines & Sioux City RPO; Egan SD & Manilla RPO: and the Sioux Falls, Sioux City & Manilla RPO (Kirkpatrick, p.133). These trains were assigned specially constructed railway post office cars known as a Railway Post Office (RPO).

The Railway Post Office cars were owned by the railroad company but were built to design standards developed by the Post Office Department in 1912. The standards set three basic car lengths of 15-foot and 30-foot compartments shared with other baggage, and a full length 60-foot car. Standard features within the RPO car were letter cases, pouch and newspaper racks, and overhead boxes and bins. The pouch and paper racks were in five foot sections, with each section capable of being folded up against the side of the car when not in use. All 60-foot RPO cars constructed after 1912 were of all-steel construction. Standardization made the RPO cars interchangeable so they could be assigned on any multiple railroad runs.

Like any moving piece of railroad equipment, the Railway Post Office cars experienced downtime due to running inspections and the wear and tear on wheels, axels, and car bodies. In addition, it would not be uncommon for the RPO cars to be involved in derailments and accidents while in service. When repairs, refurbishing and inspections were needed, the RPO cars were dispatched to the car shops for servicing. The Sioux City Roundhouse, Repair Shops and Engine Terminal was responsible for the maintenance and repair of the RPOs that were operated over the lines of The Milwaukee Road in and near the Sioux City area.

Stewarding its favorable brand reputation as an innovator in passenger service and high speed, dependable freight service and mail distribution required The Milwaukee Road to create a regional network of railway repair shops staffed with a cadre of mechanics and laborers. Prior to the mid-1950s, the steam-era railway repair shops industry was one of the most labor intensive businesses in the nation. For every engineer and fireman needed to operate the locomotives, another four or five workers were working in the shops behind the scene to service, maintain, and repair the locomotives and rail cars. “Across the land, on every railroad, the story is the same: men and women working around the clock, keeping the locomotives’ time spent in the shops at a minimum” (Ball, p. 118). These workers were classified as Shopmen.

Criterion A: Chapter 7 – Shopmen Work in the Roundhouse and Repair Shops

Historic Context: Labor History and Workforce Role of the Shopmen

The nominated Milwaukee Railroad Shops Historic District is a lasting reminder of a type of work place put into service to perform a specific and specialized class of work once carried out by hundreds of thousands of people who were employed by the railroads across the country.

- *Occupational Analysis of the Shopmen Workforce*

The Shopmen workforce consisted of a variety of occupations spread across many crafts and trades, as skilled and unskilled laborers. Major occupational groups within the Shopmen workforce included machinists, mechanics, blacksmiths, boilermakers, tinsmiths, sheet metal-fabricators, carmen, electricians and carpenters (Stromquist, p. 106). For the purposes of highlighting the steam railway repair shop industry and its Shopmen workforce, we focus on the average national employment of 400,000 people in the Shopmen crafts and trades during the 1920s (Davis, p.15). Carmen made up the largest portion of the Shopmen’s workforce; a segment which at times was comprised of 180,000 to 220,000 workers. These workers dismantled, built and repaired freight cars of all types: box cars, fruit cars, hoppers, gondolas, stock cars and refrigerated cars. Carmen also serviced and repaired passenger cars and coaches, dining cars, and business cars. (Davis, p.15) Employment of shopmen locally peaked at some 2,400 workers in 1925 with employment contracting to 2,162 shopmen working at seven roundhouse terminals in Sioux City, as illustrated by the table below.

Steam Railroad Shops Employment as a share of Manufacturing Industry Workforce

	1925	**1928**	**1929**
Total Sector Employment	11,348	22,774	26,272
Total Railroad Shops Employment	2,431	2,253	2,162
Railroad Sector Share	**21.42%**	**9.89%**	**8.23%**
Total Sector Payroll Value	$8,413,261.47	$32,413,438.39	$37,804,073.79
Total Railroad Shops Payroll Value	$4,499,562.95	$4,043,129.00	$3,987,812.51
Railroad Sector Share	**53.48%**	**12.47%**	**10.55%**
Total Number of Sector Firms	248	1,271	1,411
Total Number of Railroad Shops Firms	7	7	6

Source: Sioux City Chamber of Commerce *Sioux City Spirit of Progress*, 1925, 1928 and 1929 editions.

Between 1920 and 1930, the City of Sioux City housed the nation's tenth largest railroad center based on the amount of freight and passenger traffic flowing in and out of the community. According to statistics published by the local Chamber of Commerce, during the 1920s, over 100,000 carloads of goods annually originated out of Sioux City for transport to markets. Freight movement by rail in and out of Sioux City consisted of three major destination markets: 1) local and regional distribution primarily in the upper Plains region, 2) domestic trade for national distribution, and 3) international trade connections in major market cities. In order to meet their locomotive and rolling stock fleet needs for moving people, freight, and livestock, all six trunk line railroads developed land for and invested in the construction of steam railway repair shops in Sioux City.

When the Milwaukee Railroad Shops facility was built in Sioux City during the second decade of the 20th Century, the railroad industry was, at the time, the nation's largest industry. In 1917, the nation's railroad network consisted of 360,000 miles of track with the industry grossing over four billion dollars in revenue earned through freight hauling and passenger services. As an industry of itself, steam railway repair shops were classified as an industry within the manufacturing sector. Statistics gathered by the U.S. Census Bureau between 1920 and 1930 showed the nation's railroad repair shops were the third largest manufacturing industry in the country. Local statistics collected by the Sioux City Chamber of Commerce showed between 1920 and 1930, steam railroad repair shops were the second largest manufacturing industry in the region; only exceeded by the meatpacking industry. As a percentage of total wages paid to manufacturing workers, the steam railroad repair shops payroll comprised over 50 percent of all salaries and wages paid out to the manufacturing workforce.

Within the roundhouse terminal's working environment, there was a hierarchy that was used to identify the worker's specialty of craft trade, as well as what functional areas the shopmen were assigned to, and the levels of authority if they were in management. The Sioux City roundhouse terminal utilized different colors of hard hats for the ease of quickly identifying who did what. Within the boundaries of the roundhouse terminal, the following color chart was used (Brown, p.2):

White Hard Hat – Management/Foreman
Yellow Hard Hat – Sheet Metal Workers and Steam Pipe Fitters
Orange Hard Hat – Boilermakers
Green Hard Hat – Machinists
Red Hard Hat – Electricians
Caucasian or Flesh Color Hard Hat – General Laborers and Engine Hostlers

Outside of the repair shops, a yellow hard hat was used to identify workers as gandy dancers (i.e. trackmen) or workers employed in the functional departments of Maintenance of Way and the Bridges and Buildings. Managers within these two departments wore white hard hats. Anecdotal stories have been told by local railroad workers that it was not unusual for some gandy dancers to paint their hard hats half white and half yellow so that they could deceive supervisors from a distance that a foreman was on the job site.

The work life of Shopmen involved a lot of long hours involving lifting and manual labor, as well as dirty, grimy and gritty work. Shopmen were often exposed to unsafe or risky conditions. Accidents routinely occurred in the machine and repair shops and the roundhouses. Exploding boilers, crude tools, unreliable machines, primitive forges, scattered pieces of metal, and the very bustle of activity in the shops took their toll. Shopmen received serious burns and bruises and were in constant danger of losing limbs (Licht, p. 185). The following collage of images, snipped from a series of 1932 railroad-oriented supplier ads published in *Railway Age* by Republic Steel Corporation for their Toncan iron products, help to illustrate the worklife of a railroad shopmen.

- *Shopmen Injuries and Fatalities in the Sioux City Shops*

Working in and around the roundhouse or car shops was grimy, dirty, and always dangerous. Shopmen always faced the likelihood of death or injury. Working on and around locomotives and rail cars of all types exposed the rail workers to hazards such as exploding boilers, scattered pieces of metal, unreliable belt-driven machines, primitive forges, and crude hand tools. Often times, shopmen would often receive serious burns and bruises and were in constant danger of losing limbs. It was not uncommon for the workers to sustain struck-by injuries or fall from the locomotives and rolling stock while climbing on and off of them. The vast majority of injuries or fatal accidents would involve only one or two workers in a single incident. Like all railroad repair shops across the country, the Sioux City-based shops of the Milwaukee Road experienced more than a few such dreadful incidents:

- One of the worst fatal accidents took place on Thursday, October 4, 1928. A newly hired railroad laborer, on his second day of work at the roundhouse, died when he climbed down from a steam locomotive and drowned in the cinder pit. Charles Crawford, age 35, was working as a “fire knocker” cleaning a steam locomotive of its ashes and fire as it was parked over the cinder pit. Crawford was climbing down from the locomotive cab when instead of stepping on solid ground, he stepped on a “coal scum” floating on the surface of the water that was in the pit to cool the ashes and coal clunkers. He drowned in eighteen feet of water and coal slurry. He was submerged in the water for about a half-hour before other workers realized he was not working and discovered that Crawford had fallen into the cinder pit. Grappling hooks had to be used to search the cinder pit and recover Crawford’s body (Sioux City Journal, October 5, 1928, p. 1).

- An experienced railroad worker, Frank Sheets, was critically injured on May 25, 1923, while he was engaged in breaking up coal for the steam locomotives. Sheets was assigned work at the coal tower that day. The coal had become compressed together and needed to be broken apart into smaller briquettes before moving the coal from the bunker through the chutes to the steam locomotives. Sheets and another railroad employee were working inside the coal bunker when Sheets became injured. The other employee was shoveling the coal to break it up. When he was throwing one of the large lumps of coal, he struck Sheets’ foot. The force from the lump of coal hitting Sheets’ foot caused several broken bones and toes, injuring the entire foot. Sheets lost the use of his foot and became permanently disabled after the injury. (Sioux City Journal, August 15, 1923, p. 7).

- A contracted employee with Superior Oil Company perished in an explosion on Monday, January 16, 1950, while transferring gasoline from railroad tank cars to over-the-road tanker trucks. Harry Borden, age 39, was engaged in operating a gasoline engine that powered the pump used in transferring gasoline from the tank car to a tanker truck when the explosion occurred. According to news reports, Borden was standing a short distance in back of the truck and became engulfed in flames after a blast. Witnesses stated to the news media that Borden was a human sheet of flame; and he ran about 150 feet towards the complex powerhouse when he stumbled, fell, and died from his injuries. The local newspaper reported the explosion may have started from a small amount of gasoline leaking from a hose in the gasoline-powered engine onto the hot metal of the pump; spreading to the transport truck. Or, the blast may have originated from static (The Cedar Rapids Gazette, January 17, 1950, p. 15).

These three incidents highlight the risks and hazards that were common across every steam railroad repair shop in the nation were touched by similar accidents or events leading to worker injuries or death.

- *Structural Changes in Railroad Shops Employment*

U.S. Census Bureau statistics published in 1920 show there were approximately 2,236,000 people working across the nation for the railroads in a variety of occupations and trades (1920 Census). Among all railroad workers across the county, approximately one in five – or roughly 400,000 people - worked as *shopmen* in railway repair shops; a broad occupational classification that included machinists, mechanics, boilermakers, sheet metal fabricators, carpenters, electricians, and other specialized trades. At the local level, a total of 2,431 people were employed in 1925 in the six steam railway repair shops operated in Sioux City, according to statistics published by the Sioux City Chamber of Commerce. Among those 2,400 shopmen, nearly one-quarter of the shopmen were employed at the Milwaukee Railroad Shops – Sioux City Roundhouse, Repair Shops and Engine Terminal facility in Riverside.

Although railroads were vital to interstate commerce, there are two significant periods of structural employment changes in the railroad industry. Railroad employment peaked in the mid-1920s and declined substantially with the Great Depression. Between 1920 and 1930, the nation lost 42 percent of its railroad jobs due to the intense competition among railroads resulting from the severe economic downturn of the late 1920s and the consolidation of railroad companies through mergers and acquisitions of less profitable companies. In 1928, the annual report of the Chicago, Milwaukee, St. Paul and Pacific Railroad reported an average daily workforce of 48,129 employees across its company. In 1930, the annual report reported an average daily employment of 42,326 workers system wide. This reduction of 5,803 workers in the railroad's labor force equated to 12 percent job loss rate.

Corporate reorganizations; the adoption of the diesel locomotive, track-laying machinery, and other innovations; and abandonment of non-profitable rail lines would lead to additional reductions in the nation's railroad labor force after 1950. Between 1920 and 1995, national railroad employment dropped by 89 percent. Employment across the fourteen-state system of the Chicago, Milwaukee, St. Paul and Pacific Railroad declined from 48,129 workers in 1928 to 16,470 workers in 1966; a job loss rate of 65.8 percent over that 38-year time frame.

The structural changes in railroad employment affected Shopmen locally. In Sioux City, railway shops employment underwent a moderate 11 percent decline during the 1920-1930 period compared to what was occurring at the national level. Despite the six local railway shops eliminating 269 jobs during the 1920-30 timeframe, the railway repair shops industry remained a critical class of work in the local economy until the late 1940s. In 1925, railway shops accounted for 21 percent of the local manufacturing sector employment. By 1930, its share of total manufacturing industrial employment had fallen to nearly 8 percent locally when Sioux City saw a major expansion of its manufacturing base. Between 1925 and 1928, over 1,000 manufacturing firms were established in Sioux City.

Nationwide employment in maintenance of equipment declined by more than 75 percent between 1958 to 1989 because the number of locomotives and rail cars declined with lower traffic levels, and because diesel locomotive and freight cars were constructed larger for pulling and hauling larger capacity (Duke, Litz and Usher, p.54). In

1948, the Sioux City Engine Terminal and Car Repair Shop facility boasted an average daily employment of 561 workers. When the facility closed in 1980, there were only two employees left on the payroll.

Historic Context: Women Work at the Milwaukee Railroad Shops

Prior to the turn of the twentieth century, women were typically found working in the home either as a homemaker or housekeeper; tending to the responsibilities of a household, family and children. As a homemaker, their work centered on the tasks of rearing children, cooking for the family, cleaning the house, sewing and mending clothes, and shopping for food.

In the two decades preceding World War I, some women began to venture out of the home to pursue employment and work in industry. A few women found opportunities in the railroad industry, many in clerical positions and as maids cleaning passenger cars and train stations. But the nation's entry into World War I created a critical need to move women into the railroad workforce with men being activated for military service in Europe.

By August 1918, the United States Army had an acute need for 5,000,000 troops for the war effort in Europe. With this great wartime need for recruits, the manufacturing industry and the railroads estimated they needed to entice more than 7,000,000 women into the workforce as laborers to fill unskilled and skilled jobs.

This call up for more troops affected the opening of the new Sioux City roundhouse, engine terminal and car shops in July 1918. As shopmen and other railroad workers were called up during the 1918 second draft and wave of enlistments took place, they left their railroad jobs in Sioux City to serve their country overseas. To replenish the labor pool the railroad was losing across its entire system, the Milwaukee Road actively recruited women to work as engine wipers, locomotive oilers, and general laborers and small machine operators in the roundhouse, machine shop and car shops.

To entice women to come to work for the railroad, corporate management enlisted the help of the news media by holding press conferences and issuing press releases to build awareness of the jobs available. Local and regional newspapers surrounding Sioux City and across Iowa published articles about this unusual employment situation that was occurring at the new railroad shops in Sioux City.

An examination of newspapers of the times, found articles were published in *The Sioux City Journal, The Sioux City Daily Tribune, The Pella Chronicle, The Postville Herald, The Waterloo Times-Tribune,* and *Omaha World Herald.* The recruitment campaign for women workers took place over a two week period spanning the last week of July and the first week of August.

Among the many articles published, the following three pieces with their eye-catching headlines are very illustrative of how white women were the target of the recruitment campaign. It is noteworthy to see the perceptions and stereotypes that were held at the time in regards to race, "men's work" and gender-based working abilities. For example, the articles talk about the working conditions and that women who were to be hired were expected to stay for the duration of employment. It more or less means the women will be on a "long-term interview" process to see if they would be retained during a post war railroad.

Call for Women Workers to Care for Engines Now

Women will be employed as engine wipers in the new Milwaukee Shops just as soon as they can be obtained through the air of the state federal employment bureau. An order for 10 women was place by the railway company today in the women's division of the bureau.

Cleaning up the round house will also be included in this work, said Mrs. Lillian Larrimore, superintendent of the women's division, who started today to recruit women labor. The work is not heavy, but will be found very dirty and greasy, and unless the applicants withstand it they will not be urged to even try it. Negro women have been employed in the round house by the railroad company, but efforts will be made to obtain white women under the order placed with the employment agency.

The women will wear overalls as those were employed to work on the warehouse platform of the railroad a week ago are wearing.

Many applications for men's work are being received by the women's division and many women are being places, Mrs. Larrimore says.

Source: *The Sioux City Daily Tribune*, Tuesday, July 30, 1918, p. 7

Grease and Grime Fascinate Girl Engine Wipers

Grimy waste instead of a powder puff. Grease streaked overalls instead of natty shopping clothes.

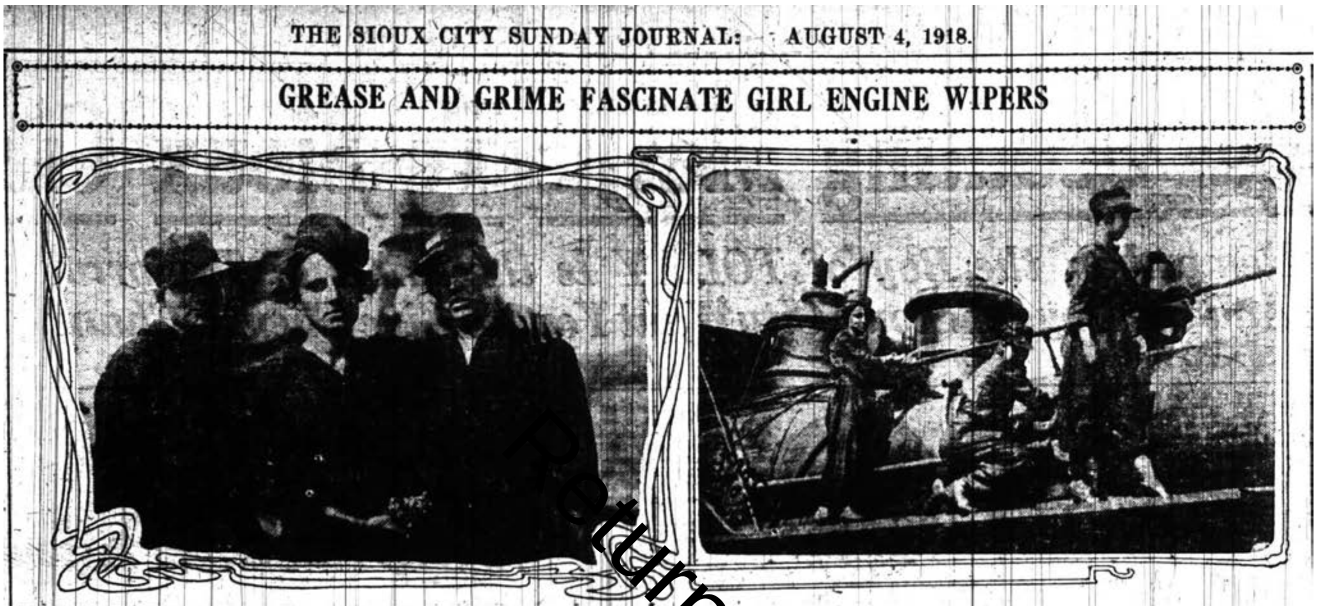
That is what a half-dozen Sioux City girls have chosen. They have taken up men's work of the most different sort at the Milwaukee railroad roundhouse. They are wiping engines.

Engine wiping is a tiring task even for a man. The worker has to climb a steep running board and clean the shiny surface of the locomotive with a bunch of waste.

Despite the grime and hard work, however, the girls enjoy it. It takes them outdoors and it beats sitting behind a store counter or scrubbing a floor, or toiling over a hot stove, they say.

Source: *The Sioux City Sunday Journal*, August 4, 1918, p. 15

Note: this article was accompanied by two large photos, displayed below, illustrating the women at work as engine wipers at the Sioux City roundhouse terminal.


THE SIOUX CITY SUNDAY JOURNAL: AUGUST 4, 1918.

GREASE AND GRIME FASCINATE GIRL ENGINE WIPERS

Source: *The Sioux City Sunday Journal*, August 4, 1918, p. 15

Railroad Makes Call for Feminine Engine Wipers to Replace Men

Sioux City, Aug. 3 – Another call has been sent out in Sioux City for women to take men's places at work. This time the Chicago, Milwaukee & St. Paul Railroad company is asking for women engine wipers at its new shops at Riverside, a suburb of Sioux City. Ten women are asked for in this first call.
A few Negro women have been employed in the shops for some time but white women are desired now. This work will be dirty and greasy. It is made plain, and only women who believe they can become accustomed to it and remain permanently are to be taken on. They will be supplied with overalls.

Mrs. Lillian Larimore, superintendent of the women's division at the government employment agency, states that is the last few days many applications have been received from women desiring work that has previously been done by men and that as a rule they appear competent and eager to assume the more burdensome duties that are being imposed by the war.

Source: *The Waterloo Times-Tribune*, Sunday, August 4, 1918, p. 11

One follow-up newspaper article published in late August 1918 estimated that approximately 40 women were hired by the Milwaukee Road to fill the labor gaps at the Sioux City Roundhouse, Engine Terminal and Car Shops complex. A few of these women working as general laborers in the car shops were able to hold onto their jobs post war as illustrated by the employee photo displayed in the narrative section containing historical illustrations.

A similar labor need would arise again in 1941 with the entry of the United States into World War II. The railroads would once again seek out women to fill the positions of engine wipers, general laborers, and inspection track walkers.

Over the functional life of the Milwaukee Railroad Shops Historic District – Sioux City Roundhouse, Repair Shops and Engine Terminal facility, there are three important periods or events that had profound impacts on the labor structure of craft and trades workers not only in Sioux City but across the entire railroad network of the nation. Those events include The Shopmen Strike of 1922; the shift in railroad motive power from steam to diesel; and the demise of the Chicago, Milwaukee, St. Paul and Pacific Railway.

Historic Context: The Shopmen Strike of 1922

During the World War I, a period of nationalization where the federal government took control of the nation's railroad industry, railroad workers received wage increases and the reaffirmation of an 8-hour work day across the industry that was granted in 1916. After the war and the end of nationalization, Congress passed the Esch-Cummins Act (Railroad Transportation Act) in February 1920, which set up the Interstate Commerce Commission and the nine-member Railroad Labor Board.

Because of the economic downturn in the railroad industry, the legislation was passed to ensure the sustainability of the nation's railroad network. The statute not only encouraged the consolidation of railroads but also gave the Interstate Commerce Commission powers to approve or disapprove corporate mergers, abandonment of rail lines, and rates for both passenger and freight traffic.

The Railroad Transportation Act also addressed labor issues. The Railroad Labor Board was established through the legislation to create an agency for settling wage disputes between the railroad companies and their employees and to oversee the working conditions of more than 2 million railway workers.

The decade after World War I became a point in time for the railroads that was marked by labor unrest stimulated by (1) the end of federal war-time controls of the railroad industry, labor relations, and worker compensation; (2) the profitability goals of railroad executives; and (3) an economic readjustment fueled by a post-war, consumer-driven market. Consequently the shopmen of the Sioux City Roundhouse, Engine Terminal and Car Repair Shops would find themselves thrust into the middle of a nasty nationwide strike in 1922 that mobilized more than 400,000 railroad workers across the country in one of the most important labor conflicts of the 20th Century. This labor conflict grew into a national crisis causing violence, destruction of property, and even death for several strikers. The Shopmen Strike of 1922 is a reminder of how events on the national scene can become the focal point for workplace fears at the local level.

The onset of the First World War in Europe brought unprecedented prosperity and strain to the nation's railroad network. There was great demand for things like food, clothing, guns, and ammunition – as well as raw materials such as coal, iron, and steel – all of which required hauling by the railroads. The War effort led to substantial increases in rail freight traffic to keep the manufacturing sector, military and Europe supplied with materials, supplies, and fuel. The railroads also saw increased passenger traffic as the armed forces moved recruits and soldiers by train to various military camps and bases. The demands of the war effort created bottlenecks in the nation's railroad system; hampering military logistics and forcing President Wilson to nationalize the country's railroad system through Executive Orders and Congressional action. After the War, the government gradually returned control of the rail system back to their former owners.

During the decade following World War I and the end of nationalization, the railroad industry was challenged for growth as the volume of passenger and freight traffic weakened with the shift from wartime, military sector consumption to a peacetime, consumer-driven economy. This was a time period characterized by increased ownership of cars, radios, and other new household appliances. These economic changes led the nation to invest in the construction and building of a network of cross-country, hard surfaced, all-weather roads to meet the public's demand for transporting people, goods, and mail by automobile, motor truck and buses. These economic improvements threatened the preeminence of the railroads in American life.

Faced with declining revenue from a lagging traffic market and the intensified competition with the automobile and motor truck industry, railroad executives developed industry-wide strategies to cut costs and increase operating efficiencies throughout their systems. Management started by looking at how to increase profitability and productivity in the repair shops through the implementation of a variety of workforce adjustments targeting the shopmen crafts and trades. Management came up with a plan to adjust their payroll spending by cutting wages and changing working conditions and hours of service of the shopmen.

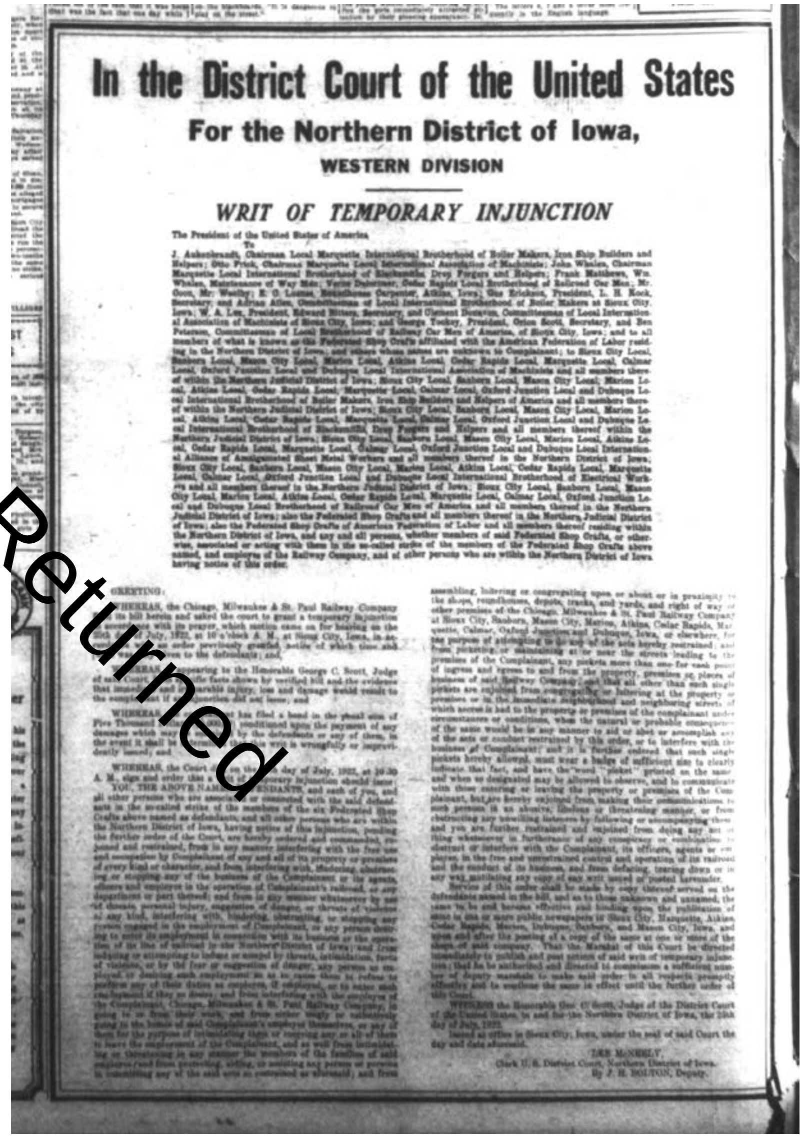
During the World War I period of nationalization, railroad workers received wage increases and the reaffirmation of an 8-hour work day across the industry that was granted in 1916. After the war and the end of nationalization, Congress passed the *Esch-Cummins Act* (*Railroad Transportation Act*) in February 1920, which set up the Interstate Commerce Commission and the nine-member Railroad Labor Board. Because of the economic downturn in the railroad industry, the legislation was passed to ensure the sustainability of the nation's railroad network. The statute not only encouraged the consolidation of railroads but also gave the Interstate Commerce Commission powers to approve or disapprove corporate mergers, abandonment of rail lines, and rates for both passenger and freight traffic. The Railroad Transportation Act also addressed labor issues. The Railroad Labor Board was established through the legislation to create an agency for settling wage disputes between the railroad companies and their employees and to oversee the working conditions of more than 2 million railway workers.

In 1921, railroad executives asked the Railroad Labor Board to authorize a slate of workforce changes. Their demands compelled the Railroad Labor Board to order nationwide wage cuts on June 6, 1922, of an average of 12 percent that affected over 400,000 craft and trade workers across the country that were employed in the repair shops. This was the second wage cut imposed on railway shopmen since the conclusion of World War I. Later in that same month, the Railroad Labor Board assessed similar wage cuts in the pay of railroad clerks, signal men, stationary firemen, and maintenance of way employees.

The 400,000 shopmen responded to the wage cuts and changes in working conditions by walking off the job on July 1, 1922, affecting the operations of more than 60 railroads. Across the state of Iowa, some 12,000 shopmen representing 62 shops participated in the strike. Locally, the walkout affected nearly 2,400 shopmen working across six roundhouse terminals in Sioux City. At the Milwaukee Road's roundhouse terminal in Sioux City, at least 300 workers walked off the job to participate in the nationwide strike. These workers would stay off the job for several months, returning to work on September 18, 1922. Railroad officials were determined to keep the shops operational and the trains rolling in and out of Sioux City. To accomplish that feat, the companies employed a large number of strikebreakers. Railroad executives placed recruitment ads in the local newspapers, like the one displayed to the right for the Milwaukee Road, to target retired shopmen, former workers, and local residents. The railroads also recruited outside of Sioux City with ads targeting African Americans and immigrants to fill positions in their Sioux City shops. For those workers brought in from out-of-town to cross the picket lines, railroad officials authorized the construction of camps near the shops to house and feed the strikebreakers. In addition to hiring temporary workers to fill worker slots created by the strike, the railroad company assigned management to tasks involved with servicing and maintaining locomotives, passenger cars and freight rolling stock. Clerical workers were also assigned to work short shifts in the shops.

In response to the newspaper ads purchased by the Milwaukee Road, three men who were formerly mechanics on the Sante Fe Railroad made application to work in the Sioux City shops, as reported in *The Sioux City Journal* (July 13, 1922). This same article reported that ten older, seniority shopmen had indicated to railroad officials that they would cross the Sioux City picket line and return to work at the Milwaukee Road shops. With the shopmen out on strike, women were also hired to fill the labor gap. A photo and caption published by The Sioux City Journal (July 27, 1922) under the banner headline *"Girls Take Strikers' Places"* shows two women greasing and oiling a steam locomotive while being serviced in the Milwaukee Road's shops in Sioux City.

With the hiring of strikebreakers, a bitter struggle ensued nationwide with violence against strike breakers and railroad property. There were several lynchings, bombings, and beatings – including the tarring and feathering of strikebreakers. In many places, Governors called in the state militia to keep the peace and control deadly situations. The federal government also responded by recruiting and deputizing new deputy U.S. Marshals and dispatching them to potential hot spots. While in Sioux City, things were relatively calm, many of the strikebreakers were threatened with harm when crossing the picket line. At the Milwaukee Road shops in Sioux City, strikebreakers and company property were protected by federal marshals. The railroad company stationed its force of special police officers at the Sioux City shops, passenger station and rail yards to protect company property and other railroad workers not participating in the strike.


In the District Court of the United States
For the Northern District of Iowa,
WESTERN DIVISION
WRIT OF TEMPORARY INJUNCTION

In addition to the use of federal law enforcement, the Chicago, Milwaukee, St. Paul & Pacific Railway sought the assistance of the court system and obtained an injunction against the striking shopmen. The railroad received a temporary restraining order prohibiting violence and limiting picketing activities to one picket at each entrance point to the repair shops complex in Sioux City. The injunction went into effect immediately and limited the strike activities of the six federated shop crafts involved by restraining strikers from interfering or harassing those employees crossing the picket lines to resume work or new employees hired by the railroad.

The decision, by Federal Judge George C. Scott, was based on a 1921 opinion by Supreme Court Justice Taft declaring that to place more than one picket at any one point necessarily acts as an intimidation of other employees trying to work. Furthermore, Judge Scott prohibited strikers from using abusive language aimed at new employees or older employees desiring to return to work. A copy of the injunction and restraining order, pictured below, was published in the Sioux City Journal. The injunction also restrained strike activities at the railroad's shops in the Iowa communities of Mason City, Sanborn, Cedar Rapids, Dubuque, Marquette, Atkins, and Marion, Iowa.

Local law enforcement also weighed in on the strike to ensure picketing was peaceful without any violence. The police department stationed special patrolmen on duty at each of the six railroad shops complexes. And the city attorney asserted (1) the prevention of strikers and strike sympathizers from carrying arms or assembling in numbers on or near railway company properties, and (2) the establishment of armed camps by railroad companies would be expected. He cautioned both sides that violations of local laws and ordnances would lead to prosecution by the City.

While there was increasing hostile relations between the railroad companies and the organized craft labor organizations during the strike period, both sides continued to hold talks. In an attempt to effect a settlement of the Shopmen's strike in Sioux City, between the railroad company and the four unions representing the shopmen, the president of the Chicago, Milwaukee, St. Paul & Pacific Railway visited Sioux City on Thursday, July 21, 1922, to outline a plan to end the walkout. Railroad president H. E. Byram praised the striking workers for their longevity and loyalty to the company. He further stated that if the men return to work they would do so at their previous position and seniority ranking; that the railroad company would not contract out shop work to other companies; and the railroad would remove all injunctions issued against the strikers. The company terms were not accepted by the striking shopmen in Sioux City.

The prolonged strike actions resulted in the disruption of rail services across the country. Train service in and out of Sioux City was caught up in the labor dispute. On a daily basis, *The Sioux City Journal* and the *Sioux City Daily Tribune* would provide scheduling updates on train schedules for passenger and freight service, as well as mail train traffic. According to a review of the newspaper coverage during the duration of the strike, the Milwaukee Road's scheduled passenger trains and time freights were not affected by the strike. However, on several occasions there were delays in mail and grain trains. One incident in particular occurred during the week of July 10th, when a grain train destined for Chicago was held up for a day on a passing track along the Milwaukee Road's main line in Sioux City.

The President of the United States, sought a negotiated end to the strike by supporting both organized labor and the railroad companies, trying to work out a compromise based on decisions made by the National Railroad Labor Board in July. When these efforts failed, U.S. Attorney General Harry M. Daugherty initiated an aggressive approach to end the strike by sending in federal marshals to contain strike activities and protect railroad property, and by trying to sway public opinion by comparing the activism by the shopmen to Socialism and Communism.

After nearly 75 days, the shopmen ended the strike and returned to work in the Sioux City shops when the prolonged labor conflict began to die out. On September 12th, shop craft union leaders voted to approve a labor agreement with one-fourth of all the railroad companies affected by the strike, including the Chicago, Milwaukee, St. Paul & Pacific Railway Company. Under the agreement all men returning to work would do so at the prevailing rate of pay which was fixed by the United States railroad labor board, effective on July 1, the day the strike order went into effect.

Criterion A: Chapter 8 – Transformational Changes Impact Milwaukee Railroad Shops

Historic Context: Technological Changes Affect the Milwaukee Railroad Shops

- *Conversion of Roundhouse Terminal to Diesel Locomotive Servicing and Maintenance Center*

The nature of work performed by Shopmen changed overtime, shifting to a larger percentage of more highly-skilled workers performing tasks relating to the maintenance and repair of diesel locomotives. One of the biggest transitions to occur at the Sioux City Roundhouse, Repair Shops and Engine Terminal involved the changing functional role from tending steam locomotives to servicing diesel locomotives. In 1954, the railroad's Motive Power and Engineering Department unveiled construction plans and documents for converting the roundhouse terminal into a diesel locomotive servicing and maintenance center.

The plans called for demolishing and razing 24 stalls of the roundhouse. These stalls housed men and equipment that were utilized for in boiler and fire box inspection, repair, and other related work on coal and oil fired steam locomotives. With the conversion to diesel locomotives, these functional areas would become obsolete and dead space. Conversion of the roundhouse eliminated the usage of several other structures. The construction plans called for the retirement of the sand drying house, stores warehouse building, a toilet building, and the machine and blacksmith shop building. These structures were not demolished, but were converted to storage use. However, several backshop buildings and structures were razed in 1954: power generation and steam plant, water treatment plant, a toilet building, several office areas, water tower, water reservoir, a sand tower, and the coaling tower. Also eliminated from service were the cinder/ash pit, which will filled in with ballast and dirt materials.

The six stalls of the roundhouse that survived were set up as the diesel servicing and maintenance center. These stalls were originally dedicated to wheel replacement and light running repairs for steam locomotives. With their inspection pits and hydraulic lifts for wheel replacement work on steam locomotives, these stalls were appropriate for conversion to diesel locomotives at very minimal cost to the railroad.

The conversation did require the railroad to make minor alterations and renovations to the roundhouse building. Stall number one, which was used for wheel repair, was enclosed and subdivided into two floors. The ground level floor area was converted to two small machining workrooms and an office for the roundhouse foreman and his clerk. The top level was converted to a locker room and washroom for the shopmen – the toilet building and locker room area located adjacent to the roundhouse building were razed during the conversion.

With the demolition of the power generation and steam plant building, the downsized roundhouse building needed a new source to heat the interior of the building. The railroad reduced the size of the inspection pit and the repair track in stall three and built an area to house a boiler for heat generation. The railroad, according to local building permits, brought in a boiler from the Mitchell, South Dakota roundhouse (recently razed) and set it up in the Sioux City roundhouse. At this time, the railroad site was plumbed to city utilities, which were later severed in 1980.

As part of the conversion process, the railroad also increased the size of its gasoline fueling station to also hold a large diesel fuel tanks to fuel diesel locomotives. In 1934, the railroad built a "divisional" gasoline fueling station and pump house on a berm along the eastern edge of the roundhouse terminal. This fueling station was used to fuel up maintenance-of-way motor cars, right-of-way weed trimming equipment, and various power tools.

The second half of the Twentieth Century saw the decline of the steam locomotive as the engine driving the railroad industry. After World War II, the railroad entered the twilight era of the steam locomotive and entered the time period that would eventually be considered by industry historians as "railroading's decade of greatest transition" – the 1950s – when diesel-electric locomotives became the mainstay of motive power.

The major driving forces behind the shift to diesel-electric locomotive power being efficiency and cost control. Steam locomotives were very labor and capital intensive. The general rule of thumb was that for every engineer and fireman operating the steam locomotive, the servicing, maintenance and heavy repairs demanded an additional four workers for a total of eight workers in the shops. The operation of steam locomotives required enormous facilities and infrastructure to house fuel, water, and repairs.

Steam locomotives, because they needed numerous daily and monthly inspections and repairs, were only available for service about 6,000 hours annually. The diesel powered locomotive, on the other hand, was available for more than 8,000 hours annually. The diesel could operate 330 days of 24-hour continuous service before needing repairs. And The diesel-electric was far more fuel efficient; it could operate up to 5 days of 24 hour work days on a tank of fuel oil or diesel fuel.

With the transition to operating more diesel-electric locomotives, there was less demand for shopmen. Parts needed in general repair of the diesel-electric were standardized and interchangeable components that did not need the special machining required by steam locomotives. The railroads found they didn't need to have as many roundhouses and repair shops; so they could consolidate their physical infrastructure.

The diesel locomotive offered the railroad companies the ability to pull more tonnage at faster rates of speeds. A series of diesel-electrics could be coupled together with one engineer controlling all of the locomotives to pull a long train compared to the need for an engineer and fireman for each steam locomotive hooked in a series. In addition, diesels did not need to be turned around, they could operate forward and backwards compared to the steam locomotive, which needed a turntable or "Y" track to turn the locomotive in the proper direction for operations.

From a non-cost efficiency perspective, the shift to diesel-electric locomotives was also showmanship. The diesel-electrics symbolized modernization of the railroad system. Their sleek and streamlined look allowed the railroads to present an upgraded appearance for the passenger train market. Many railroads, including the Milwaukee Road, would publicly exhibit the new diesel-electric technology in their major hub cities with many local newspapers would cover these events. And, the corporate advertising by the railroads reflected the pride in the shift to the new diesel-electric technology. "Official after official wanted to rid their properties of the artifacts of Age of Steam and to reveal to the world that railroads were not fossilized giants of the misty past" (Grant, p. 117).

Prior to 1960, there were generally six categories of running equipment used in freight and passenger train services: steam locomotives, electric locomotives, diesel-electric locomotives, freight cars, passenger cars and cabooses. To these are added the repair shops and other facilities necessary for inspection, fueling, servicing, and making running repairs. The following data, compiled from the Milwaukee Road's corporate annual reports to stockholders, shows the overall trend in the displacement of the steam locomotive by the diesel-electric from 1945 to 1958. As illustrated, by 1956 the steam locomotive had virtually vanished from the Milwaukee Road's inventory of motive power. The following data table was built from information gathered from the annual financial reports of the Chicago, Milwaukee, St. Paul & Pacific Railway Company.

Census of Locomotives and Rolling Stock of the Chicago, Milwaukee, St. Paul & Pacific Railway Company, 1910 to 1958

Fiscal Year	Steam Locomotives	Electric Locomotives	Diesel Electric Locomotives	Freight Cars	Passenger Train Cars	Cabooses
1910	1,199	N/A	N/A	44,868	1,103	607
1916	1,983	N/A	N/A	62,224	1,599	1,091
1917	1,937	N/A	N/A	62,019	1,577	1,067
1918	1,795	45	N/A	60,506	1,565	1,046
1920	1,917	62	N/A	61,183	1,604	1,006
1930	1,655	63	N/A	66,730	N/A	945
1940	1,085	58	43	54,152	939	770
1945	1,047	52	103	55,930	966	784
1946	1,034	50	117	53,759	949	813
1947	1,027	49	139	51,526	1,033	793
1948	1,001	49	148	55,352	1,114	729
1949	910	49	185	58,714	1,086	808
1950	838	60	232	58,787	1,119	786
1951	665	57	316	58,248	1,092	802
1952	600	54	349	57,023	971	757
1953	418	54	379	56,306	973	694
1954	104	52	493	56,229	937	635
1955	104	103	683	56,229	939	635
1956	8	100	763	54,616	932	583
1957	1	100	807	52,897	858	555
1958	0	98	807	53,188	765	524

Returned

Source: Annual Reports of the Chicago, Milwaukee, St. Paul & Pacific Railway Company (1910 to 1958)

Just after World War II, diesel locomotives started to infiltrate the two operating divisions serviced by the Sioux City roundhouse terminal and repair shops. By the end of 1954, the Milwaukee Road had operated its last steam locomotive in Sioux City. By February 1955, no steam locomotives were in regular service along the Milwaukee Road lines.

This gradual shift prompted the railroad to make major workforce adjustments over a period of time by laying off many shopmen as the job skills of the boilermakers and pipefitters became obsolete. And, as previously cited in this nomination, the railroad downsized the physical complex by shuttering many functional areas, razing some buildings and structures, and retrofitting the roundhouse to meet the function role for maintaining the diesel-electric locomotives.

While the shift to diesel-electric locomotives made much of the Sioux City-based Milwaukee Railroad Shops obsolete and greatly changed the industrious landscape, the eventual shuttering of the roundhouse terminal and car shops was part of the Milwaukee Road's efforts to reorganize under a Chapter 7 Bankruptcy plan.

1950s Railroad Advertising Documents the Great Transition in Motive Power

By the time of the following two 1955 display ads, the diesel locomotive had displaced the steam locomotive on all passenger and freight trains along the Milwaukee Road System, as well as in their switching yards and terminals.

The first ad appeared in the *Dubuque Telegraph Herald* on April 8, 1955 and the second ad was published in the *Mason City Globe Gazette* on February 18, 1955. Ads similar to these two were published by the railroad in local newspapers across their expansive system.

Source: *Dubuque Telegraph Herald*, April 8, 1955

Source: *Mason City Globe Gazette*, February 18, 1955

Railroad Initiates Technology Projects at the Sioux City Shops

Railroads are often perceived as "old technology" because the iconic symbolism associated with the industry is the steam locomotive. Even though this perception is widely held, nothing is more farther from the truth. The railroad industry is constantly investing in the research, development and deployment of new technologies to increase its efficiency and effectiveness as a transportation utility. The following two historical snippets are illustrative of how technological advancements impacted the work of the shopmen and physical makeup of the shops themselves.

In April 1922, the shopmen at the Sioux City roundhouse terminal were asked to participate in the development and deployment of radio technology for train service. Officials located in the railroad's Chicago headquarters initiated a project to retrofit and equip a railroad passenger coach with a radio telephone system to use for demonstration purposes along its system to train employees and to showcase to the public. The Milwaukee Road was investing in new radio-based systems for its named passenger train services to have the ability to communicate with train dispatchers almost instantaneously. In 1922, radio technology was just emerging as state-of-the-art technology of the time. The railroads were one of the first adopters of the technology in an industrial setting. The railroad's goal was to have at least one such radio car in each of its operating division.

The Sioux City shops was selected to retrofit a passenger coach as a porotype car. To accomplish this scope of work, the shopmen needed to remove the passenger seats from the coach, make alterations to the coach interior, and install the electrical system and radio equipment. One of the trains to pilot test this new technology car was The Pioneer Limited, a Milwaukee Road passenger train that ran between Chicago and the Twin Cities.

Prior to undertaking this special assignment, local railroad officials would often negotiate with other companies to perform special work. One such company was the Sioux City Street Railway Company, the operator of the electric streetcar system in Sioux City. Shortly after the Sioux City roundhouse terminal opened in July 1918, the shopmen were assigned the task to completely build a new streetcar. A photograph displayed in the historical illustration section shows the streetcar under construction in the first bay of the roundhouse building.

During the second and third decades of the twentieth century, the nation's electrical grid and energy generation industry greatly expanded, bringing new appliances and power tools to the market. This new, more accessible source energy enabled manufacturing and industry to convert from steam to electrically powered machinery and equipment. This shift reduced the costs of maintenance, fuel, and labor needed to operate machinery, tools, and lights.

During the 1930s, the railroads began the process of decommissioning many of its smaller roundhouses and repair shops to more centralized roundhouse terminals along its system. With this downsizing of the repair shop industry and consolidation of work to fewer shop facilities, the railroad industry made capital investments in modernizing the surviving shop complexes by retrofitting them to be powered by electricity instead of steam. The Sioux City shops was one of the ones along the Milwaukee Road system to receive such an investment. The following news story, published in *The Sioux City Journal* (July 16, 1930) announces the upgrade:

Milwaukee to Electrify Its Railway Shops Here

> "Power electrification of the shops and roundhouse of the Chicago, Milwaukee, St. Paul and Pacific railway here, at a cost of $80,000, has been started, Fred Paul, master mechanic has announced.

The improvements, which consist principally of the installation of electrical motors for steam power throughout the plant, will make the shops here one of the most modern rehabilitation and maintenance units of the Milwaukee System.

All steam pumps in the various units of the plant will be replaced with electrical pumps, Mr. Paul said. The steam drives, air compressors, now in use, will be replaced with electrically driven compressors.

A hot water washout plant will be installed in the shops, which will mean the elimination of the present stationary boiler used to heat the water for washing out and refilling the boilers of locomotives. Through the use of this plant the hot water and steam contained in the locomotives when they come in will be utilized to heat the fresh water used for washing out and refilling, instead of being turned into the sewer immediately.

Electric blowers, used in firing up engines, will replace the old steam blowers, Mr. Paul said. About 60 days will be required to complete the job of installing new equipment."

Criterion A: Chapter 9 – Milwaukee Railroad Shops Houses Other Maintenance Departments

Besides the function of fueling, servicing, maintaining and repairing locomotives, passenger cars, and freight rolling stock, the Sioux City Roundhouse, Engine Terminal and Car Repair Shops housed several other functional areas involved with railroad operations.

Wrecker Train Stationed on Ready Track at Sioux City Repair Shops
Photographer: Guy Thatcher Circa: 1940s

The site was the home base for the divisional wrecker train and crew that would be dispatched to clean up after a train derailment. This train was photographed on its ready track in the above photo taken by railroad employee Guy Thatcher in the late 1940s. This train consisted of a steam powered crane capable of lifting a steam locomotive or rail car, a couple of gondola cars for hauling wreckage, a bunk car for the crew, and a caboose. The wreck train was on call at all times, ready to be dispatched to a derailment or train wreck. Often times, the wreck train would return to the Sioux City roundhouse terminal with the damaged equipment for it to be repaired. The photo below, shot by Guy Thatcher, shows the wrecker and its train cleaning up a late 1940s passenger train derailment in South Dakota after it was dispatched from the Sioux City shops terminal.

Wrecker Train Responding to a Passenger Train Derailment along Mainline in Southeast South Dakota
Photographer: Guy Thatcher Circa: 1940s

The roundhouse terminal also served as a reclamation area where obsolete or wrecked locomotives and rail cars could be scrapped or parts salvaged for operating equipment. The roundhouse terminal housed a segregated area, called the boneyard, where the reclamation activities would take place.

Another area of the roundhouse terminal was segregated for the Bridges & Building and Maintenance of Way departments. The roundhouse terminal was a staging area for the work trains and crews involved with the building and maintenance of tracks, bridges and buildings along the right-of-way. As a staging yard, the terminal would maintain a supply of rail, ties, spikes, and lumber to be used in the construction and repair of the railroad's vertical infrastructure.

Criterion B: Comparative Analysis of Properties Best Representing Charles F. Loweth's Work

The Milwaukee Railroad Shops Historic District is significant through Criterion B because of its direct associations with the engineering principles and design practices of Charles F. Loweth, a railroad and civil engineer who gained prominence during the "Golden Age of Steam Railroading."

Charles F. Loweth's important historical role in the railroad industry and the civil engineering field was recognized earlier in this nomination package on pages 82 through 85. Given his associations with the buildup of the railroad network in the Heartland and into the Pacific Northwest, and his enduring passion for city planning and bridge building, it is not surprising that several comparable properties designed by Loweth are listed on the National Register of Historic Places.

This nomination's principal investigator utilized the database of the National Register of Historic Places to compile a list of four comparable NR properties that are determined significant for their relationship to the railroad industry and architectural design ties with Charles F. Loweth. Those historic properties are:

- Iron and Steel Bridges in Minnesota Multiple Property Listing;
- Chicago, Milwaukee and St. Paul Railroad Grade Separation, Minnesota;
- Bridge No. 12 – Bullard Creek Bridge, Minnesota; Edgerton Depot, Wisconsin; and
- the Milwaukee Depot, Montana.

Given their associations with Charles F. Loweth, all of the properties including the Milwaukee Railroad Shops Historic District share predictable engineering principles and the use of concrete in railroad building. None, however, is on the magnitude of the landscape that holds the broad range of historic resources that comprise the Milwaukee Railroad Shops Historic District. The historic property nominated in this application is the only known surviving steam-era locomotive and rail car repair shops designed by Charles F. Loweth to have survived the "great transition in railroad motive power." Thus, the Milwaukee Railroad Shops Historic District is unparalleled in its representation of the work of prominent railroad engineer Charles F. Loweth; who was an accomplished civil engineering author and internationally recognized by the Association of Civil Engineers and many rail industry trade publications.

Criterion D: Industrial History Archaeology – Data Potential of a Complex Railroad Property

The historic district is significant through National Register of Historic Places **Criterion D** because the extant historic, material resources of the Milwaukee Railroad Shops Historic District provide architectural and engineering data that can shed light on the construction, day-to-day operations, and the eventual demise of the site. The site also details the changes in the industrial landscape due to the greatest technology transfer in railroad operations involving modernization from the steam locomotive to diesel motive power, which made this type of railroad landscape obsolete. Finally, as we have demonstrated earlier in this nomination, the Milwaukee Railroad Shops Historic District is unique when compared to other significant railroad-related historic properties; and it can likely yield important information to a distinctive class of railroad landscape that is scarcely documented in the National Register of Historic Places.

The Milwaukee Railroad Shops Historic District is a distinctive landscape and a class of property belonging to the steam-era repair shops business, an industry within the railroad industry. The historic resources within this proposed historic district's boundaries reflect the systematic land use patterns relating to railroad industry practices regarding the maintenance and repair of motive power and rolling stock.

Renewed interest in operating the district for railroad museum activities led the Siouxland Historical Railroad Association, the City of Sioux City, the State Historical Society of Iowa (Historic Preservation Office), and the Iowa Department of Transportation to undertake an evaluation and inventory of the threatened cultural resources, especially the remnants and foundations of buildings, structures and the rail yard.

A team of historical archaeologists, historians, and railroad subject matter experts, developed a comprehensive design for an industrial history investigation addressing the district's potential significance in the areas of architecture, archaeology, and historical themes. The basis for the research design was the assumptions delineated in the district's original letter of eligibility for listing on the National Register of Historic Places:

> "there may be building ruins and buried deposits present that have a good potential to document the spatial arrangement, extent, and/or uses of individual buildings and structures of the steam-era railroad. The complex contains buildings, structures, trackage, and ruins that when collectively grouped together, exemplify the range of specific building types associated with railroad operations" (Christian 1992).

To develop their research design and the historic context, the team consulted the following resources:

- Oral history interviews and informal conversations among railroad workers, family members, etc.
- Historic maps and construction design plans
- Historic and modern aerial photographs
- General histories of the area, community and nation
- Corporate histories and annual reports of the railroad
- Previous historical and archaeological reports
- Geotechnical investigations of the study area
- Local government records – city council minutes, building permits, plat descriptions
- Historical newspapers, railroad industry trade journals, and collateral railroad marketing materials

Following the background research involving the above-mentioned primary and secondary resources, a historic context was developed drawing upon the themes of industrial railroad development during the operational phase of the Sioux City Roundhouse, Engine Terminal and Car Repair Shops facility. That historic context and its subthemes were used to evaluate the significance and integrity of the site's cultural resources that remain within the Milwaukee Railroad Shops Historic District and to identify the remaining industrial landscape features that give the site its historic character. In addition, the thematic analysis evaluated the patterns of change to the built environment and everyday work life of the shopmen and other railroad workers. All data and information gathered during the course of the historic context phase was analyzed, and it is presented in this nomination package.

This thematic analytical approach generated an important industrial archaeology research question for the evaluation of the surviving built environment and landscape of the Milwaukee Railroad Shops Historic District. The overall research question pertains to the changing market orientations of the steam-era railroad industry and the associated technological changes in the steam railroad repair shops business structure throughout the nation.

Archaeological resources in the Milwaukee Railroad Shops Historic District not only illustrate but also contain scientific information about the spatial layout of the original steam locomotive and rail car repair facility; and how changes in industry economic conditions and motive power technology affected the property over time. For example, a strong visual contrast of ground-based features can be captured through aerial photography and surveys. These photographs can then be compared and contrasted with satellite and historical aerial photographs to show the changes in the railroad landscape during the property's railroad operation years.

The archaeological resources of the Milwaukee Railroad Shops Historic District are associated with several key structural types linked to the historic context of steam locomotive-era railroad operations. They include foundation remnants, railroad grades, and buildings that can be connected to illustrate their associations with each other - while having separate functionalities of their own – to form a systematic operation in servicing, repairing, and maintaining railroad steam locomotives and rolling stock.

> "Industrial landscapes, then, can be defined as geographical regions that not only have been used historically for industry but also have been distinctively modified by the same activities. They reflect the cumulative history of industry-related land use practices, distinctive patterns of spatial organization, and cultural traditions. The key components of industrial landscapes include landforms, buildings and structures, objects, transportation networks, boundary markers, vegetation related to land use, and small-scale elements" (Hardesty and Little, p. 132).

In looking at the opportunities the Sioux City-based Milwaukee Railroad Shops Historic District can give to industrial archaeologists interested in steam locomotive-era railway landscapes, this site gives especial data and historical resources to assess the manner in which steam locomotive repair shops fell into obsolescence, disrepair, and eventual closure and razing. This site provides primary research from the perspectives of how the buildings were functional workspaces that were each part of a larger systematic land use. This landscape illustrates land use changes taking place during the Milwaukee Railroad Shops active railroading period between 1917 and 1981.

- *Prior Historical Surveys and Archaeological Investigations*

This nomination is the culmination of ten years of historical research led by the principal investigator, Larry Obermeyer, Jr. The archival information generated in this time period provide extensive documentation and data relating to both the property itself and the historical contexts presented in this nomination.

The historical research conducted on this property also includes limited fieldwork to support the historical research. Field activities included an intensive-level survey and evaluation of numerous buildings, structures and objects within the historic district performed in 1998 by Jan Olive Nash of Tallgrass Historican, L.C. This intensive fieldwork yielded three strong correlations between surface resources and several historical contexts:

- “The Sioux City Riverside shops and roundhouse complex may well be an excellent example of the changing (or changed) status that skilled craftsmen in many fields were experiencing at the turn of the century under the onslaught of new technologies and growing corporate structures” (Nash, p. 5)

- “The facility potentially represents a new generation of division repair shops construction, one that in 1917 employed the latest technologies and reflected nascent worker-supervisor relationships. Additional research to clarify the skills employed at the Riverside facility and the daily activities of its workers would complement the physical resources and aid in the interpretation of the site, and its buildings and structures” (Nash, p. 5).

- “Even with the missing resources and the ruins of others, the site remains overwhelmingly intact and exhibits a high degree of integrity. The large roundhouse with its working turntable, red-brick shop buildings, the yard arrangement of tracks and sidewalks, and the smaller buildings and sand tower give a real sense of the complexity and industrial nature of the property” (Nash, p. 7)

A Phase I investigation was conducted by Todd Kapler of Cultural Heritage Consultants with the aim of providing an impact statement on how planned historic preservation work and infrastructure improvements would affect the significance of the Milwaukee Railroad Shops Historic District. While this fieldwork very limited in scope, the investigation yielded a landscape map using GPS locational information to aid in mapping identified resources on the site.

- *Archaeological Assessment*

“The entire Milwaukee Railroad Shops Historic District was designated archaeological site 13WD206 by the Office of the State Archaeologist, which is recommended NRHP-eligible under Criterion D” (Peterson, p. 5). During summer 2014, the Siouxland Historical Railroad Association and the City of Sioux City engaged the Office of the State Archaeologist of the University of Iowa and Tallgrass Historians, L.C. to conduct a Phase IA Geoarchaeological Reconnaissance and Phase I Intensive Archaeological Investigation of how planned improvements may affect and impact the historic district. This study included archaeological sampling involving shovel testing of 142 spots, auger testing 56 spots, and the backhoe trench excavations of 9 spots. This sampling is the only controlled archaeological study in the historic district, other than the surface inventories. The Archaeological Assessment produced the following finding (Peterson, Artz, and Rogers, p 1):

- *“Thirty-four archaeological features were identified, with 15 archaeological resources recommended as contributing to the property’s significance. Contributing resources include remnants of an iron rack shed, blow off boxes, a sand tower, two wells, a water softening bin, a hard water reservoir, a soft water tank, the powerhouse and electrical substation, a coal tower, the office building, two water closets, and the non-extant portion of the roundhouse.”*

The aim of the 2014 archaeological assessment was not only to test the site for its historical significance under Criterion D, but to also expand the Siouxland Historical Railroad Association’s understanding of the Milwaukee Railroad Shops holdings for future research, interpretation and preservation activities. It is nearly impossible to walk the landscape of the Milwaukee Railroad Shops Historic District without encountering industrial railroad remains on the surfaces. Because of the surviving archaeological patterning, along with the photographic archives and original building plans that are curated, the Milwaukee Railroad Shops Historic District can easily be envisioned for its once active industrial railroad operations.

- *Comparable Districts under Criterion D*

Given the extensive railroad network that developed across the continental United States, it is not surprising that several comparable railroad repair shops or roundhouses listed on the National Register of Historic Places. As previously listed in the table on page 8, eight railroad landscapes are similar to the Milwaukee Railroad Shops Historic District. They all share design characteristics based on industry standards and design principles.

Among them, only three are comparable repair shops or roundhouses determined significant for listing under Criterion D: the Baltimore & Ohio Railroad Martinsburg Shops, Central Georgia Railroad: Savannah Shops & Terminal Facilities, and Steamtown National Historic Site: Delaware, Lackawanna and Western Railroad Yard. None of the remaining five is comparable to the industrial landscape of the Milwaukee Railroad Shops Historic District.

These historic sites reflect a range of specific associations with how the railroads adapted their industrial operations to the local geographic area and the landforms upon which they built. All three are illustrative of how the railroads land use patterns were designed around operations in the eastern region of the United States. What differentiates the Milwaukee Railroad Shops Historic District from the other three is the regionalism of how railroad repair shops and their land use patterns were applied elsewhere in the country. Railroad operational practices and land use patterns were regionalized because of how the railroad network developed as it expanded westward.

Each of these sites contain extant remains with the potential to yield data and information relating to the land patterns and operations of individual railroad companies and their engineering design work. However, none of them contains anything close to the number or variety of extant contributing archaeological resources that the Milwaukee Railroad Shops Historic District contains.

This district's assemblage of extant resources contains the nation's most comprehensive collection relating to the different components that formed the railroad repair shops vertical infrastructure. The Milwaukee Railroad Shops Historic District is unparalleled in its representation of its associations with the steam-era railroad repair shops industry in the Granger states and the type of surviving structures, buildings, and extant archaeological resources.

Criterion Consideration G:

- *Financial Struggles and Bankruptcy Forces the Closure of the Sioux City Roundhouse Terminal*

The third major change in the Sioux City-based Milwaukee Railroad Shops was the demise of the railroad during the late 1970s; which lead to the final embargoing of the rail line on March 1, 1980; and the Sioux City roundhouse terminal's closure and abandonment. Throughout much of its history, the Chicago, Milwaukee, St. Paul & Pacific Railway Company was weathering through financial struggles caused by adverse economic conditions, a top-heavy financial structure associated with operating a transcontinental railroad, and in the final years of operation with management inexperienced in the railroad industry. Periodically cash-strapped, the railroad company filed for bankruptcy three times under Chapter 7: 1925-1928, 1935-1945, and 1977-1984.

Because of its periodic financial struggles after the mid-1950s, the Milwaukee Road deferred maintenance along its main and branch lines causing the railroad to fall into a "state of poor repair." Railroad management issued slow orders due to the condition of the tracks; which tripled the transit times to move freight across its system. Freight cars needing repair were sidelined along passing tracks or in rail yards for lack of money to make them road worthy, and locomotives needing major service repairs were parked in engine terminals. And, of course, little money was available for the maintenance and upkeep of roundhouse and repair shop buildings, other railroad structures, and rail yards.

The final financial blow came when railroad management filed for federal bankruptcy protection in 1977. Unfortunately, a series of industry disruptions; including some managerial decisions by company executives that ended poorly, led the Milwaukee Road into deep financial difficulties in the 1970s that the railroad could not overcome.

The Milwaukee Road had been in financial difficulty sine the 1970 decision by the Interstate Commerce Commission allowing the competing Northern Pacific, Great Northern, and Chicago, Burlington and Quincy railroads to merge into the Burlington Northern system. When the Commission allowed this large scale merger to take place, it made provisions that could allow the Milwaukee Road system to merge into the Burlington Northern system should the Milwaukee Road be negatively impacted by the new larger railroad system. On two occasions the Milwaukee Road petitioned the Interstate Commerce Commission to allow it to merge into the Burlington Northern system because it was in an unfair competitive situation. On both occasions, the railroad's request was denied.

Compounding the stiff competition from the new Burlington Northern railroad system, was the passage of the Railroad Revitalization and Reform Acts in 1973 and 1976 by Congress that deregulated railroads. This legislation set the stage for the deregulation of freight rates to benefit shippers by allowing railroads the freedom to set freight rates for traffic where there was competition – so the larger railroad systems could undercut market prices in heavily competitive areas to be subsidized by higher freight rates that could be set by the railroads in their less competitive markets. Since the Milwaukee Road was a smaller railroad and often times in markets also served by the Burlington Northern system, it did not have the system scalability to establish multiple freight rates within its rail network to compete with the Burlington Northern pricing structure. The rate fixing ate into the Milwaukee Road's market share.

The Milwaukee Road soon found that it was no longer able to not able to compete not only with the Burlington Northern, but also the other larger systems of the Soo Line and Chicago and North Western. With dwindling traffic over its lines, combined with inexperienced management that was engaged with diverting some traffic to the Burlington Northern, meant the Milwaukee Road was simply cash strapped and not earning a profit to survive. The railroad accumulated sizable debts to sustain its operations. Finally, the Milwaukee Road was forced to enter into bankruptcy in 1977.

The combined bankruptcy and track conditions forced the railroad to embargo traffic in early 1980 over its rail lines in western Montana, Idaho and Washington, as well as few selected lines in Iowa, South Dakota and North

Dakota. The embargo, approved by the bankruptcy trustees and the Interstate Commerce Commission, meant that there was a cessation of operations and train movements without abandonment at that time. One of the routes selected for the embargo was the railroad's east-west mainline starting at Sabula, Iowa and passing through Cedar Rapids, Tama, Perry, Manilla, Sioux City into South Dakota.

On March 1, 1980, the Milwaukee Road shuttered its roundhouse terminal and ceased train operations in Sioux City, putting the final 2 shops workers and over 30 train service personnel out of a job. Later, in November 1980, the State of South Dakota purchased the Milwaukee Road rail line from downtown Sioux City to Elk Point and the two rail segments from Elk Point to Sioux Falls and Elk Point to Yankton. The remainder of rail line from Sioux City east to Manilla, Perry, Cedar Rapids and Sabula was abandoned and scrapped.

Charged with divesting the Milwaukee Road of surplus property, the Sioux City roundhouse terminal complex was sold to Michael Garvin in 1981, a local farm machinery and tractor salvage operator. He converted the complex to a junk yard and dump and would operate it for the next fourteen years.

Historic Photo: Complex after abandonment in 1980.
View: Looking northwest with the Machine/Blacksmith Shop Building and Roundhouse
Photographer: Unknown, Morris Peterson Collection, Sioux City Railroad Museum

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The collection of primary and secondary resources used in the preparation of this nomination package include books, historical photos, trade journal articles, newspaper clippings, Milwaukee Road-produced publications, and a large number of site-specific construction blueprints and drawings.

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Location of Digital Files: Siouxland Historical Railroad Association, Sioux City, Iowa

Returned

National Register of Historic Places Continuation Sheet

CITY	STATE	TYPE	DWG_NO	DATE	Description
Sioux City	IA	Engine Term Facil	19541A	1917	Pipe lines
Sioux City	IA	Engine Term Facil	7730D	1904	Water softener layout
Sioux City	IA	Engine Term Facil	E1072	1917	Machine & blacksmith shop plan & elevations
Sioux City	IA	Engine Term Facil	E166	1917	Car department mill building elevations
Sioux City	IA	Engine Term Facil	E1831	1917	Substation plan & sections
Sioux City	IA	Engine Term Facil	E1837	1917	Power house coal bins
Sioux City	IA	Engine Term Facil	E1919	1918	Toilet building plan & elevations
Sioux City, Atkins	IA	Engine Term Facil	E356	1917	Brake repair & lunch room elevations
Sioux City	IA	Engine Term Facil	E394	1917	Roundhouse special foundation
Sioux City	IA	Engine Terminal	E1841	1917	Engine terminal, Handrailing at ash pit
Sioux City	IA	Engine Terminal	E1850	1918	Engine terminal, Power House Coal door, reinforcing plate
Sioux City	IA	Foundation	E1092	1918	Macine and Blacksmith machine foundation shop
Sioux City	IA	III Engine Terminal	J1064	1946	Plat: 145 ton coaling plant
Sioux City	IA	Machine/Blacksmith	E1072	1917	Engine terminal, Machine and Blacksmith Shop, plan and elevation
Sioux City	IA	Power House	E1068	1917	Engine terminal power house, Coal Hoppers and Coal Slides
Sioux City	IA	Power House	E1837	1917	Engine Terminal Power House, Coal bins
Sioux City	IA	Power House	E1839	1917	Engine Terminal Power House, Handrailing at pump pit
Souix City	IA	Power House	E658	1917	Engine terminal Power House Plan and Elevations
Sioux City	IA	Power House	E659	1918	Sioux City and Atkins engine terminal power house (foundations)
Souix City	IA	Power House	E659	1917	Engine terminal Power House foundations
Sioux City	IA	Pump House	9705C	1907	Layout of pump & pipe lines.
Sioux City	IA	Roundhouse	19025B	1917	Double driver removal pit.
Sioux City	IA	Roundhouse	D9904	1917	96' Standard Roundhouse, Track door details, 1917
Sioux City	IA	Roundhouse	E376	1917	Sections,standard 96'roundhouse.
Sioux City	IA	Roundhouse	E378	1917	Foundation,standard 96' roundhouse.
Atkins	IA	Roundhouse	19025B	1917	Double driver removal pit.
Atkins	IA	Lunch House	B2031	1918	Standard Lunch house, Atkins terminal
Atkins	IA	Engine Term Facil	B2578	1918	Standard lunch house plans elevations & details
Atkins	IA	Engine Term Facil	B2578	1918	Standard lunch house plans elevations & details
Atkins	IA	Roundhouse	D9904	1917	96' Standard Roundhouse, Track door details, 1917
Atkins	IA	Power House	E1068	1917	Engine terminal power house, Coal Hoppers and Coal Slides
Atkins	IA	Cistern	E1083	1917	Concrete Cistern Water service for drinking water, Atkins Engine Terminal
Atkins	IA	Engine Term Facil	E1086	1917	Drainage system east extension
Atkins	IA	Engine Term Facil	E1457	1918	Pump house plan & elevations
Atkins	IA	Power House	E1839	1917	Engine Terminal Power House, Handrailing at pump pit
Atkins	IA	Engine Terminal	E1841	1917	Engine terminal, Handrailing at ash pit
Atkins	IA	Engine Term Facil	E1847	1918	Fire chart building locations
Atkins	IA	Engine Terminal	E1850	1918	Engine terminal, Power House Coal door, reinforcing plate
Atkins	IA	Engine Term Facil	E362	1917	Drainage system plan & details
Atkins	IA	Engine Term Facil	E374	1917	Toilet building plan & elevation
Atkins	IA	Roundhouse	E376	1917	Sections,standard 96'roundhouse.
Atkins	IA	Roundhouse	E378	1917	Foundation,standard 96' roundhouse.
Atkins	IA	Engine Term Facil	E383	1917	Roundhouse general plan
Atkins	IA	Engine Term Facil	E385	1917	Machine & blacksmith shop plan & elevation
Atkins	IA	Engine Term Facil	E660	1917	Car department mill building plan & elevations
Atkins	IA	Engine Term Facil	E667	1917	General layout distributing water pipe lines
	IA				
North McGregor	IA	Engine Term Facil	13130E	1910	Piping plan in roundhouse
North McGregor	IA	Engine Term Facil	13225D	1910	Roundhouse layout
North McGregor	IA	Power House	18845C	1916	Water pipe lines in pump pit.
North McGregor	IA	Engine Terminal	18990C	1917	Pipe line layout.
North McGregor	IA	Compressed Air	19007C	1917	Details,air tanks & cooling pipes.
North McGregor	IA	Roundhouse	19025B	1917	Double driver removal pit.
North McGregor	IA	Engine Term Facil	D9891	1916	Roundhouse general layout
North McGregor	IA	Engine Term Facil	D9892	1916	Roundhouse special details for pyrobar roof
North McGregor	IA	Engine Term Facil	D9893	1916	Roundhouse details of air & pipe ducts
North McGregor	IA	Engine Term Facil	D9895	1916	Roundhouse fan room
North McGregor	IA	Engine Term Facil	E154	1916	Roundhouse boiler washout pipe line
North McGregor	IA	Engine Term Facil	E166	1917	Car department mill building elevations
North McGregor	IA	Engine Term Facil	E174	1917	Machine & blacksmith shop elevations
North McGregor	IA	Engine Term Facil	E24	1916	Toilet building complete plans
North McGregor	IA	Engine Term Facil	E356	1917	Brake repair & lunch room elevations

Returned

Historical Illustrations

The following collection of illustrations is a visual history of the changes to the Sioux City Roundhouse, Repair Shops and Engine Terminal over its period of historical significance.

Historical Illustrations 1

This 1916 image shows a work train ready to haul timber out of the area that will eventually become the Sioux City Roundhouse, Repair Shops and Engine Terminal for the Chicago, Milwaukee, St. Paul & Pacific Railway. This timber is being harvested by a local contractor, Sioux City Brick & Tile, as part of the grubbing and clearing of the land. The work train is operating on a temporarily-laid narrow gauge rail line.

Photographer: Unknown

Archive Collection: Digital Collection, Sioux City Public Museum, City of Sioux City

Location of Digital File: Siouxland Historical Railroad Association, Sioux City, Iowa

Historical Illustration 2

Circa 1918 official company photo showing the construction of the roundhouse terminal complex is complete and now operational. With camera facing north, from atop the coal tower structure, this photo highlights the functionality and industrial nature of the Sioux City facility.

Photographer: Real Estate Department, Chicago, Milwaukee, St. Paul & Pacific Railway Company

Archive Collection: Digital Collection, Siouxland Historical Railroad Association

Location of Digital File: Siouxland Historical Railroad Association, Sioux City, Iowa


Returned

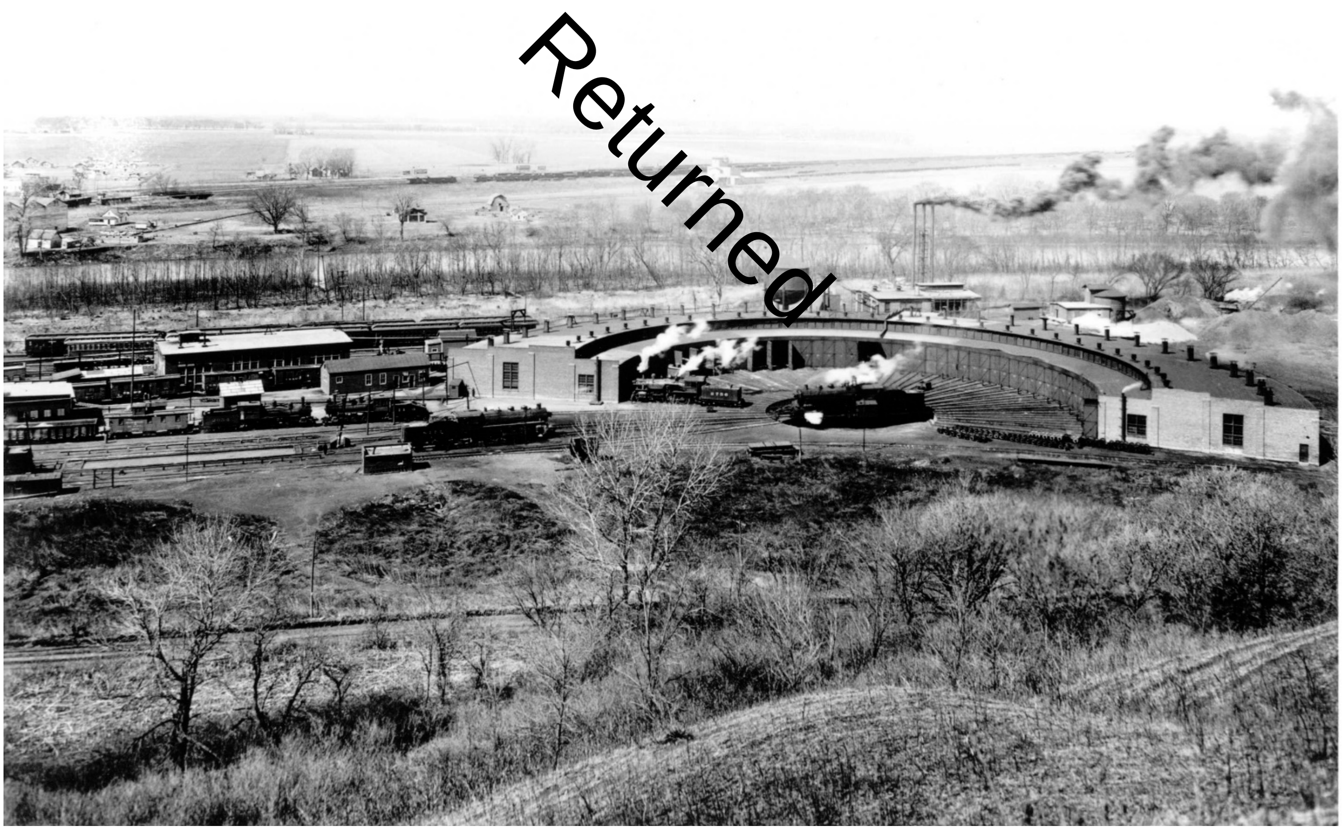
Historical Illustration 3

The north end of the Sioux City Roundhouse, Repair Shops and Engine Terminal in 1920. The water tower, power generation/steam plant, and water treatment facility are shown in the background behind the 30-stall roundhouse building. To the left of the half-donut shaped roundhouse building is the machine shop and blacksmith shop building and a small wood-framed storage building.

Photographer: Woodworth Commercial Photos

Archive Collection: Digital Collection, Siouxland Historical Railroad Association

Location of Digital File: Siouxland Historical Railroad Association, Sioux City, Iowa



Historical Illustration 4

An aerial photo captured around 1930 by an unknown photographer shows the roundhouse terminal complex at its time of peak activity.

Photographer: Unkown

File Name: SC04.TR.Airports.Graham Field.Runways.03.cropped

Archive Collection: Digital Collection, Sioux City Public Museum, City of Sioux City

Location of Digital File: Siouxland Historical Railroad Association, Sioux City, Iowa

Historical Illustration 5

A 1963 aerial view looking south/southwest shows the Sioux City Roundhouse, Repair Shops and Engine Terminal layout, with the mainline crossing the Big Sioux River into South Dakota (on the right). This photo illustrates the meat clever shape and its remoteness as a pocket-style facility laying in the valley at the foot of the First Bluffs of the Loess Hills Natural Landmark (on the left) and the Big Sioux River (on the right).

Photographer: Real Estate Department, Chicago, Milwaukee, St. Paul & Pacific Railway Company

Archive Collection: John W. Barriger III National Railroad Library, St. Louis, Missouri

File Name:
15587134823_66bc9985a1_o Sioux City Roundhouse Complex 908 Aug 14, 1963 Sioux City, IA 013

Location of Digital File: https://www.flickr.com/photos/milwaukeeroadproject/albums/

Returned

United States Department of the Interior
National Park Service

Milwaukee Railroad Shops Historic District
Name of Property
Woodbury County, Iowa
County and State

Name of multiple listing (if applicable)

National Register of Historic Places Continuation Sheet

Historical Illustration 6

A 1982 aerial view looking south/southeast shows the Sioux City Roundhouse, Repair Shops and Engine Terminal layout, with the mainline crossing the Big Sioux River into South Dakota (on the right). This photo depicts the roundhouse terminal post abandonment just prior to its sale to Michael Garvin, a farm machinery salvage yard operator.

Photographer: Real Estate Department, Chicago, Milwaukee, St. Paul & Pacific Railway Company

Archive: John W. Barriger III National Railroad Library, St. Louis, Missouri

File Name:
15813504219_7ec221ba79_o Sioux City Roundhouse 3883 Jul 8, 1982 207

Location of Digital File: https://www.flickr.com/photos/milwaukeeroadproject/albums/


Returned

Historical Illustration 7

This 1925 company photo shows one “trick” of day time workers assigned as shopmen and car men in the Car Repair Shops. The group of workers includes women employed in the shop trades, as depicted on the left.

Photographer: Public Relations Department, Chicago, Milwaukee, St. Paul & Pacific Railway Company

Digital Photo Restoration: Chad Watkins

Archive: Digital Archives, Siouxland Historical Railroad Association

Location of Digital File: Siouxland Historical Railroad Association, Sioux City, Iowa

Historical Illustration 8

This 1925 company photo shows shopmen gathered between the roundhouse and turntable pit for an official portrait of the workers employed at the Sioux City Roundhouse, Repair Shops and Engine Terminal facility.

Photographer: Public Relations Department, Chicago, Milwaukee, St. Paul & Pacific Railway Company

Digital Photo Restoration: Todd Schultz

Archive: Digital Archives, Ruth Blake Collection, Siouxland Historical Railroad Association

Location of Digital File: Siouxland Historical Railroad Association, Sioux City, Iowa

Historical Illustration 9

This 1932 company photo shows the shopmen assigned to working on steam locomotives in the roundhouse. This group of shopmen are assigned to “Trick 1” or the daylight/daytime shift.

Photographer: Public Relations Department, Chicago, Milwaukee, St. Paul & Pacific Railway Company

Archive: Digital Archives, Ruth Blake Collection, Siouxland Historical Railroad Association

Location of Digital File: Siouxland Historical Railroad Association, Sioux City, Iowa

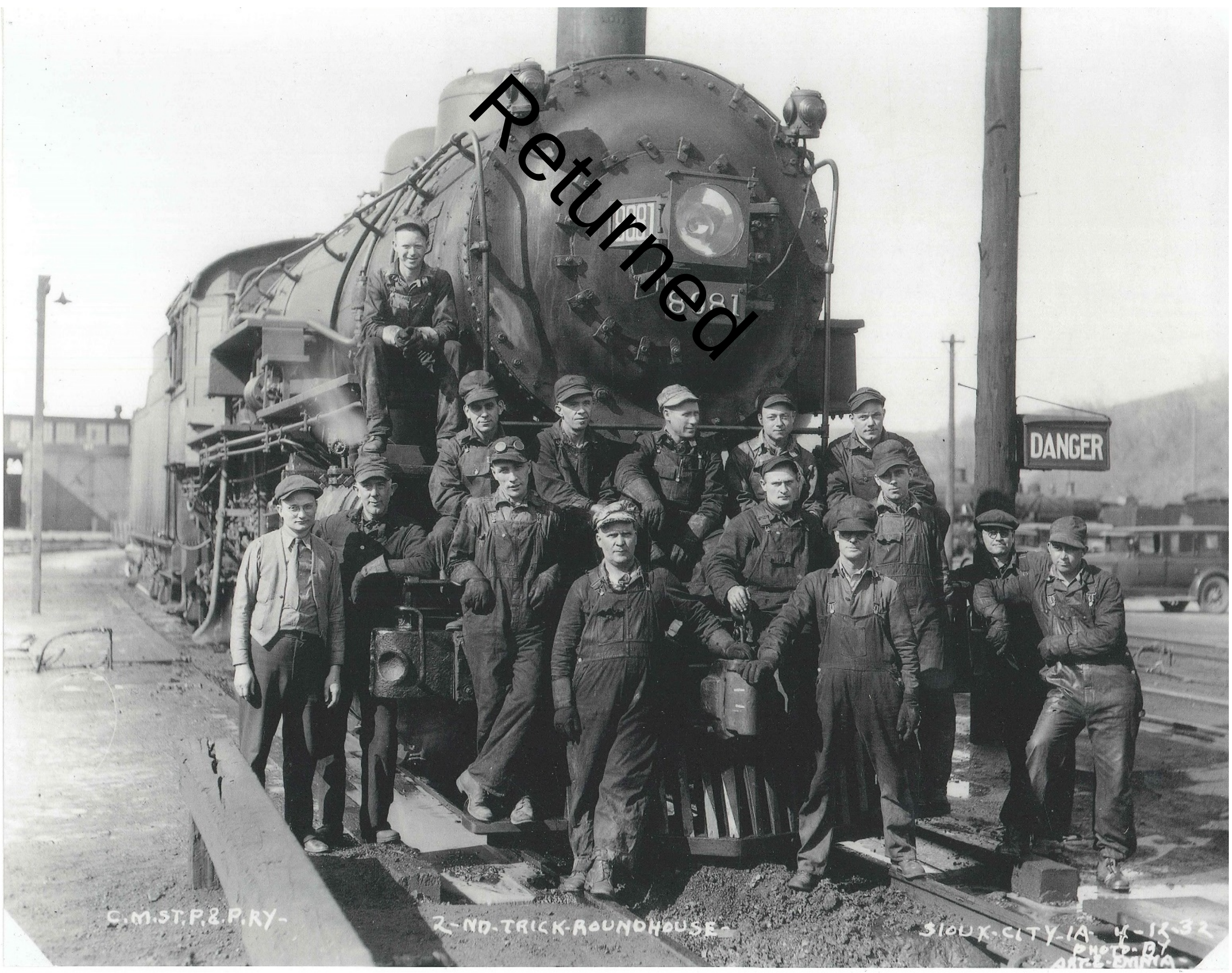
Historical Illustration 10

This 1932 company photo shows the shopmen assigned to working on steam locomotives in the roundhouse. This group of shopmen are assigned to "Trick 2" or the afternoon shift.

Photographer: Public Relations Department, Chicago, Milwaukee, St. Paul & Pacific Railway Company

Archive: Digital Archives, Ruth Blake Collection, Siouxland Historical Railroad Association

Location of Digital File: Siouxland Historical Railroad Association, Sioux City, Iowa



Historical Illustration 11

This 1932 company photo shows the shopmen assigned to working on steam locomotives in the roundhouse. This group of shopmen are assigned to "Trick 3" or the night/midnight shift.

Photographer: Public Relations Department, Chicago, Milwaukee, St. Paul & Pacific Railway Company

Archive: Digital Archives, Ruth Blake Collection, Siouxland Historical Railroad Association

Location of Digital File: Siouxland Historical Railroad Association, Sioux City, Iowa

Returned

Historical Illustration 12

This 1918 company photo shows the shopmen assigned to working on steam locomotives in the roundhouse. These shopmen are building and assembling a streetcar for the Sioux City Electric Railway. It was common for the railroad companies to perform contract work with other railroads and electric street railway companies.

Photographer: Public Relations Department, Chicago, Milwaukee, St. Paul & Pacific Railway Company

Archive: Digital Archives, Larsen Printing Company Collection, Siouxland Historical Railroad Association

Location of Digital File: Siouxland Historical Railroad Association, Sioux City, Iowa

Historical Illustration 13

This 1940s photo shows a shopman (hostler) assigned the duties fueling, supplying and servicing steam locomotives. In this photo, the worker is using a water column to fill the water supply of the steam locomotive. The roundhouse can be seen in the lower right in the background.

Photographer: George Berkstressor

Archive: Digital Archives, George Berkstressor Collection, Siouxland Historical Railroad Association

Location of Digital File: Siouxland Historical Railroad Association, Sioux City, Iowa.

Historical Illustration 14

This 1940s photo shows a shopman (hostler) assigned the duties fueling, supplying and servicing steam locomotives. In this photo, the hostler is tending a steam locomotive at the sand tower by getting ready to lower the supply pipe to fill one of the locomotive domes with sand.

Photographer: George Berkstressor

Archive: Digital Archives, George Berkstressor Collection, Siouxland Historical Railroad Association

Location of Digital File: Siouxland Historical Railroad Association, Sioux City, Iowa.

Historical Illustration 15

This 1932 company photo shows shopmen (boilermakers) working on the flue sheet located in the smokebox area of the steam locomotive.

Photographer: Public Relations Department, Chicago, Milwaukee, St. Paul & Pacific Railway Company

Archive: Digital Archives, Sioux City Public Museum, City of Sioux City

Location of Digital File: Siouxland Historical Railroad Association, Sioux City, Iowa.

Historical Illustration 16

This 1954 company photo shows the roundhouse building shortly after the razing of 24 stalls and downsizing the building to 6 stalls for transitioning its functionality to diesel locomotive servicing and maintenance. Two diesel locomotives, assigned to a passenger train, are on the servicing track along with its train set. The machine shop and blacksmith shop building is pictured on the right.

Photographer: Public Relations Department, Chicago, Milwaukee, St. Paul & Pacific Railway Company

Archive: Digital Archives, Sioux City Public Museum, City of Sioux City

Location of Digital File: Siouxland Historical Railroad Association, Sioux City, Iowa.

Historical Illustration 17

This company photo (circa 1940s view looking north) shows the functional areas of the locomotive serving terminal and car repair shops (repair-in-place) tracks. The large seven-story coal tower is located in the center of the picture. In the background is the twin sand towers and sand drying house. Part of the work train (crane, tender, and gondola car) for the Bridges & Building Department is pictured on the right, as well as its staging area for ties.

Photographer: Public Relations Department, Chicago, Milwaukee, St. Paul & Pacific Railway Company

Archive: Digital Archives, Sioux City Public Museum, City of Sioux City

Location of Digital File: Siouxland Historical Railroad Association, Sioux City, Iowa.

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Historical Illustration 18

This photo (circa late 1940s) provides a close-up view (looking north) of the coal tower structure, sand drying house and the twin sand towers. A gondola car of coal is being unloaded in the middle of the coal tower. On the right is another crane used by the Bridges & Building Department and its staging yard for track building equipment.

Photographer: George Berkstressor

Archive: Digital Archives, Berkstressor Collection, Siouxland Historical Railroad Association

Location of Digital File: Siouxland Historical Railroad Association, Sioux City, Iowa.

Returned

Historical Illustration 19

This early 1950s photo shows one of the few remaining steam locomotives in the roundhouse for inspection and servicing before going back into servicing along one of the railroad's branch lines.

Photographer: George Berkstressor

Archive: Digital Archives, George Berkstressor Collection, Siouxland Historical Railroad Association

Location of Digital File: Siouxland Historical Railroad Association, Sioux City, Iowa.

Historical Illustration 20

This 1920's photo shows a passenger train getting ready to cross the Big Sioux River into South Dakota. The train just passed the junction point with the railroad's Sioux City Roundhouse, Repair Shops and Engine Terminal Complex; which is pictured in the lower half of the photo. This photo shows cars on the repair-in-place tracks awaiting work by the car shops. The extreme lower portion of the photo shows the staging yard of materials and supplies for the Bridges & Building Department of the railroad.

Photographer: Unknowm

Archive: Digital Archives, Sioux City Public Museum

Location of Digital File: Siouxland Historical Railroad Association, Sioux City, Iowa.

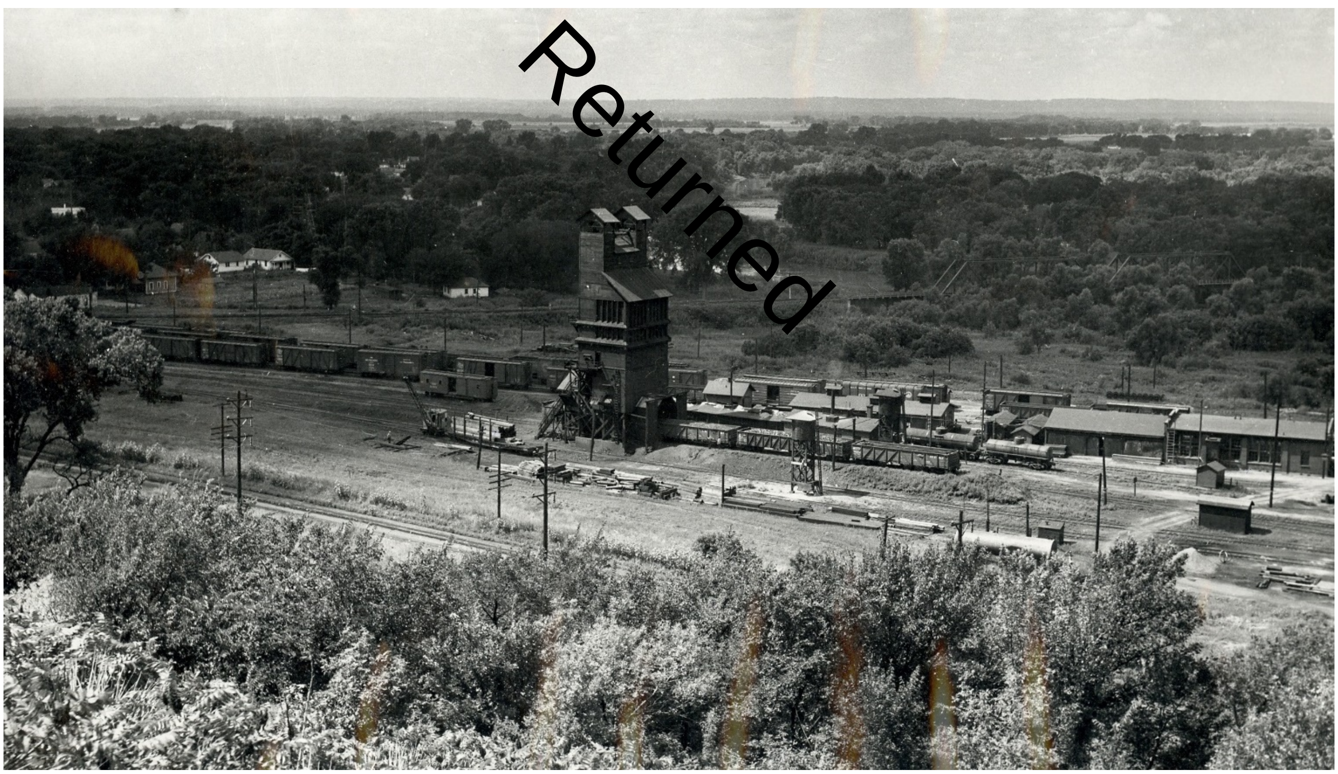
Historical Illustration 21

This early 1951 photo shows the south end of the roundhouse terminal complex. The grouping of buildings and structures include the coal tower, two sand towers, sand drying house, car shops (carpenter shop and planning mill building), dimensional lumber storage shed, employee lunch room building, and toilet building.

Photographer: George Berkstressor

Archive: Digital Archives, George Berkstressor Collection, Siouxland Historical Railroad Association

Location of Digital File: Siouxland Historical Railroad Association, Sioux City, Iowa.



Historical Illustration 22

This early 1951 photo shows the mid-section of the roundhouse terminal. This cluster of buildings include the wheel works, stores warehouse building and the machine shop and black sith shop building.

Photographer: George Berkstressor

Archive: Digital Archives, George Berkstressor Collection, Siouxland Historical Railroad Association

Location of Digital File: Siouxland Historical Railroad Association, Sioux City, Iowa.

Historical Illustration 23

This early 1946 photo shows the north section of the roundhouse terminal. This cluster of buildings include the 30-stall roundhouse, water tower, power generation and steam plant, and the water treatment plant.

Photographer: George Berkstressor

Archive: Digital Archives, George Berkstressor Collection, Siouxland Historical Railroad Association

Location of Digital File: Siouxland Historical Railroad Association, Sioux City, Iowa.

Historical Illustration Collage

On this page is a grouping of motive power to illustrate the different types of steam and diesel locomotives that were inspected, serviced, fueled, maintained and repaired by the Sioux City Roundhouse, Repair Shops and Engine Terminal.

Photographer: Unknown (top left); George Berkstressor (top right), Ken Brown (bottom left and right)

Archive: Digital Archives, Siouxland Historical Railroad Association

Location of Digital File: Siouxland Historical Railroad Association, Sioux City, Iowa.

Photographs of Existing Historic Resources

The following information is common to all the photographs

Property Name:	Milwaukee Railroad Shops Historic District
Address:	3400 Sioux River Road, City of Sioux City
County and State:	Woodbury County, Iowa
Photographer:	Lawrence (Larry) Obermeyer (except where noted)
Photograph Date:	Summer 2015
Location of Digital Files:	Siouxland Historical Railroad Association – Archives

Photo 1 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0001)
Aerial View: looking east
Camera Facing: East
Photographer: George Lindblade

Photo 2 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0002)
View: looking down at roundhouse building, turntable, and roundhouse archaeological remnants
Camera Facing: down
Photographer: City of Sioux City

Photo 3 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0003)
Aerial View: looking down at roundhouse building, turntable, roundhouse archaeological remnants, machine shop and blacksmith shop building, and part of the rail yard.
Camera Facing: down
Photographer: City of Sioux City

Photo 4 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0004)
View: The Northeast façade of the roundhouse building
Camera Facing: Southwest
Photographer: Larry Obermeyer

Photo 5 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0005)
View: The Southwest façade of the roundhouse building
Camera Facing: Northeast
Photographer: Larry Obermeyer

Photo 6 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0006)
View: The East and Southeast façades of the roundhouse building
Camera Facing: Northwest
Photographer: Larry Obermeyer

Photo 7 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0007)
View: The Northeast and East façades of the roundhouse building
Camera Facing: Southwest
Photographer: Larry Obermeyer

Photo 8 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0008)
View: The Southwest and West façades of the roundhouse building
Camera Facing: Northeast
Photographer: Larry Obermeyer

Photo 9 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0009)
View: The East and North façades of the machine shop and blacksmith shop building
Camera Facing: Southwest
Photographer: Larry Obermeyer

Photo 10 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0010)
View: The South and East façades of the machine shop and blacksmith shop building
Camera Facing: Northwest
Photographer: Larry Obermeyer

Photo 11 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0011)
View: The North and West façades of the machine shop and blacksmith shop building
Camera Facing: Southeast
Photographer: Larry Obermeyer

Photo 12 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0012)
View: The South and West façades of the machine shop and blacksmith shop building
Camera Facing: Northeast
Photographer: Larry Obermeyer

Photo 13 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0013)
View: The North and West façades of the car shops/planning mill building
Camera Facing: Southeast
Photographer: Larry Obermeyer

Photo 14 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0014)
View: The South and West façades of the car shops/planning mill building
Camera Facing: Northeast
Photographer: Larry Obermeyer

Photo 15 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0015)
View: The South and East façades of the car shops/planning mill building
Camera Facing: Northwest
Photographer: Larry Obermeyer

Photo 16 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0016)
View: The North and West façades of toilet building number 1.
Camera Facing: Southeast
Photographer: Larry Obermeyer

Photo 17 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0017)
View: The South and West façades of toilet building number 1.
Camera Facing: Northeast
Photographer: Larry Obermeyer

Photo 18 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0018)
View: The South and East façades of toilet building number 1.
Camera Facing: Northwest
Photographer: Larry Obermeyer

Photo 19 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0019)
View: The South and East façades of sand drying house.
Camera Facing: Northwest
Photographer: Larry Obermeyer

Photo 20 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0020)
View: The South and West façades of sand storage tower.
Camera Facing: Northeast
Photographer: Larry Obermeyer

Photo 21 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0021)
View: The South façade of sand storage tower and the two lead servicing tracks.
Camera Facing: North
Photographer: Larry Obermeyer

Photo 22 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0022)
View: The North façade of sand storage tower, the two lead servicing tracks and the sand drying house.
Camera Facing: Southeast
Photographer: Larry Obermeyer

Photo 23 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0023)
View: The North and West foundation remnants for the wood coal tower structure
Camera Facing: Southeast
Photographer: Larry Obermeyer

Photo 24 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0024)
View: The east foundation remnant for the wood coal tower structure
Camera Facing: Northwest
Photographer: Larry Obermeyer

Photo 25 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0024)
View: The foundation remnant for the wood coal tower structure
Camera Facing: South
Photographer: Larry Obermeyer

Photo 26 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0026)
View: The foundation remnant for the wood coal tower structure
Camera Facing: Northwest
Photographer: Larry Obermeyer

Returned

Photo 27 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0027)
View: The wood structure loading dock
Camera Facing: Southeast
Photographer: Larry Obermeyer

Photo 28 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0028)
View: The wood structure loading dock
Camera Facing: Northeast
Photographer: Larry Obermeyer

Photo 29 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0029)
View: Foundation remnant of west, south and east wall portions of warehouse stores building
Camera Facing: Northeast
Photographer: Larry Obermeyer

Photo 30 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0030)
View: Concrete pad for outside storage area adjacent to warehouse stores building
Camera Facing: Northwest
Photographer: Larry Obermeyer

National Register of Historic Places Continuation Sheet

Milwaukee Railroad Shops Historic District
Name of Property
Woodbury County, Iowa
County and State
Name of multiple listing (if applicable)

Photo 31 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0031)
View: North and east façade of the engineer's tool shed building
Camera Facing: Southwest
Photographer: Larry Obermeyer

Photo 32 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0032)
View: Foundation remnant of the corner of south and east walls for toilet building number 2
Camera Facing: Northwest
Photographer: Larry Obermeyer

Photo 33 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0033)
View: Foundation remnant for the former brake shop building next
Camera Facing: Southwest
Photographer: Larry Obermeyer

Photo 34 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0034)
View: Foundation remnant for the former brake shop building next
Camera Facing: Southeast
Photographer: Larry Obermeyer

Photo 35 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0035)
View: Foundation remnant for wellhead number 1
Camera Facing: Northwest
Photographer: Larry Obermeyer

Photo 36 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0036)
View: Foundation remnant for wellhead number 2
Camera Facing: Northeast
Photographer: Larry Obermeyer

Photo 37 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0037)
View: Foundation base for treated water storage tank
Camera Facing: Southeast
Photographer: Larry Obermeyer

Photo 38 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0038)
View: Foundation for water treatment plant
Camera Facing: Northeast
Photographer: Larry Obermeyer

Photo 39 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0039)
View: Foundation for the bin that stored chemicals for treating water for steam locomotives
Camera Facing: Northeast
Photographer: Larry Obermeyer

Photo 40 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0040)
View: Foundation for the building that housed the power generation and steam plant for the complex
Camera Facing: Southwest
Photographer: Larry Obermeyer

Photo 41 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0041)
View: Column support foundations for the complex's water tower
Camera Facing: Northeast
Photographer: Larry Obermeyer

Photo 42 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0042)
View: Foundation remnant for the water treatment plant
Camera Facing: Northwest
Photographer: Larry Obermeyer

Photo 43 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0043)
View: Looking south, southwest at the turntable and roundhouse
Camera Facing: Southwest
Photographer: Larry Obermeyer

Photo 44 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0044)
View: Looking south, southwest at the turntable and roundhouse
Camera Facing: Southwest
Photographer: Larry Obermeyer

Photo 45 (IA_Woodbury County_Milwaukee Railroad Shops Historic District_0045)
View: Looking at foundation sidewall of the turntable pit with the inspection pit
Camera Facing: East
Photographer: Larry Obermeyer

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

NATIONAL REGISTER OF HISTORIC PLACES
EVALUATION/RETURN SHEET

Requested Action: Nomination

Property Name: Milwaukee Railroad Shops Historic District

Multiple Name:

State & County: IOWA, Woodbury

Date Received:	Date of Pending List:	Date of 16th Day:	Date of 45th Day:	Date of Weekly List:
2/15/2018	3/9/2018	3/26/2018	4/2/2018	

Reference number: SG100002243

Nominator: State

Reason For Review:

__ Appeal	__ PDIL	__ Text/Data Issue
__ SHPO Request	__ Landscape	__ Photo
__ Waiver	__ National	__ Map/Boundary
__ Resubmission	__ Mobile Resource	__ Period
X Other	__ TCP	X Less than 50 years
	__ CLG	

_____ Accept X Return _____ Reject 3/30/2018 Date

Abstract/Summary Comments:

Recommendation/ Criteria: Nomination must be returned for technical and substantive problems. See attached National Register Return Sheet for detailed comment.

Reviewer Patrick Andrus Patrick Andrus Discipline Historian

Telephone (202)354-2218 Date 3/30/2018

DOCUMENTATION: see attached comments : No see attached SLR : No

If a nomination is returned to the nomination authority, the nomination is no longer under consideration by the National Park Service.

United States Department of the Interior

NATIONAL PARK SERVICE
1849 C Street, N.W.
Washington, DC 20240

IN REPLY REFER TO:

United States Department of the Interior
National Park Service

National Register of Historic Places
Evaluation/Return Sheet

Property Name: Milwaukee Railroad Shops Historic district
State and County: Woodbury County, IOWA
Reference Number: SG100002243

Reason for Return:

This nomination must be returned for technical and substantive problems.

The nomination tries to do too much. That is, it attempts to be an all-encompassing 10-year effort to produce an exhaustive monograph on the Milwaukee Railroad Shops Historic District, when all it really needs to be is a National Register nomination--that is, a targeted statement of the district's National Register significance and assessment of its eligibility. It would benefit from heavy editing--of both a typographical as well as excising sort. Specifically, there is a tremendous amount of overly flowery language (e.g., "the illustrative scars of those technological impacts," found on p. 5) that is rendered additionally problematic by its inclusion in run-on sentences (e.g., "This site has exceptional value because of the symbiotic relationship it portrays between structural design and the historical context of the functional role played by the steam-era railroad repair shops as industry within an industry," p. 3). And some of it just makes no sense, for instance: "The site is an excellent example of the railroad blending the natural setting with the industrialism and functionalism of the industry" (p. 5). In sum, the nomination needs to be heavily edited, dramatically shortened, and rewritten using short, declarative sentences.

The word "functional," "functionality," and "functionalism" are misused throughout the document. If the author could do a global find and replace and pretty nearly everywhere that the word "functional" or "functionalism" appears just replace it with "function," that might be a good start.

The word "landscape" can be deleted from many of the places where it appears in the nomination. The author is talking about a railyard, and when he invokes the word "landscape," he appears to have conflated it and the word district--with which it is not synonymous. Moreover, landscape is not one of the five property types recognized by the NR Criteria for Evaluation.

In Section 5 of the form (Number of Resources within Property) on p. 2, it states that there are 16 contributing sites. However, The first paragraph on p. 3 says in two places that the district is comprised of

United States Department of the Interior
National Park Service

National Register of Historic Places
Evaluation/Return Sheet

Property Name: Milwaukee Railroad Shops Historic district
State and County: Woodbury County, IOWA
Reference Number: SG100002243

15 sites, including the overall 29.5 acre district. I think the author may be confused between the words site and district as NR property types. It appears to me that he's got 15 properties, not 16. This error is repeated on p. 11.

In Section 5 (Number of Resources within Property) on p. 2, the author needs to insert a 0 (zero) in the Noncontributing site line.

The photos need to be pulled out of the text and placed on their own full pages. This will alleviate the fact that they are sometimes so small as to be nearly illegible and, equally important, it will alleviate the mistakes where the text says, for example, "As depicted in the map below . . ." when the embedded map is at left (p. 3).

The nomination needs to directly address why this property is of exceptional importance in order to justify National Register Criteria Consideration G. The period of significance for the district is defined as extending to 1980. Please provide an explanation of why the continued use of this property for twelve years past the 50 year point is considered to be exceptionally important.

Disinvestment is a collective noun, and requires no "s" to make it plural (1st paragraph, p. 6).

The possessive is "its" (no apostrophe) (1st paragraph, p. 6).

The nomination does not justify the inclusion of the collection of locomotives and rolling stock as contributing objects in this historic district. The only information about these objects is found in a list on page 33 which provides their dates of construction and major alterations. There is no description provided of these objects and the nomination does not evaluate their historic integrity. It is not even clear if any of these locomotive and rolling stock operated on American rail lines. On page 6, it states "all locomotives, passenger cars and freight rolling stock (rail cars) indexed in this nomination, while foreign..." In order to contribute, these objects (even if they were of foreign manufacture) must have been operated within the borders of the United States. If they were not used on an American rail line, they cannot be considered contributing. Please provide a description of each of the 13 locomotives and rolling stock, an evaluation of their historic integrity and a brief history of their use (when and where they operated).

The author should consult the National Register's 2009 White Paper titled "Integrity Requirements for Settings and Locations of Locomotives and Other Rolling Stock," because the nomination needs to make

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an explicit case for why this museum collection is NR-eligible. This document should appear in the Bibliography. The white paper can be found on the National Register's website, www.nps.gov/nr, under Publications, "Policy Clarifications-White Papers."

In the second paragraph on p. 13, the word is "topography" and not "typography."

The discussion toward the bottom of p. 13 suggests that the author is not fully conversant with National Register integrity, and the "Summary Statement of Integrity" would benefit from a closer consideration of National Register Bulletin 15: How to Apply the National Register Criteria for Evaluation (pp. 44-45) for definitions of each of the seven aspects of integrity.

Could the five "conservation zones based on original functionality" into which the district is divided just be called five zones or key areas?

The text under the heading "List of Contributing and Noncontributing Resources" on p. 15 references an inventory list displayed on p. 31, but there is no list on p. 31. Likewise, that same sentence should delete the words "sketch map" and replace them with "table."

In the table spanning pp. 32-33, the header "Original Functionality" should read "Historic Function" and the column labeled "Resource Type" should make all entries in the singular form (e.g., building, structure, site, etc.) whereas they are currently pluralized--which makes no sense when applied to a single resource.

In Section 8, p. 43, the phrase "archeological remnants" should be replaced with "archeological sites." Likewise, on that same page the phrase "rail yard landscape" should just read "rail yard."

The heading "Criterion D: Industrial Historical Archaeology--Data Potential of a Complex Railroad Property" could profitably be reduced to "Criterion D: Industrial Archaeology & Data Potential." The text that follows needs heavy editing as it just throws the words "landscape" and "property" around. Most significant, this section has got to present five or six research questions, in order to justify the district's eligibility under Criterion D.

United States Department of the Interior
National Park Service

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Evaluation/Return Sheet

Property Name: Milwaukee Railroad Shops Historic district
State and County: Woodbury County, IOWA
Reference Number: SG100002243

The discussion of the "letter of eligibility" on p. 166 is confusing. The Bibliography notes that the letter was written by Ralph Christian to Gretchen Schalge in 1992. It is not clear who Ralph Christian is or what was the purpose of this "letter of eligibility." Please explain.

At the bottom of p. 167, it appears that he means " . . . limited fieldwork to supplement [and not support] historical research."

The Archaeological Assessment (p. 168) needs some reworking--further explanation of methods, removal of redundant language.

The paragraph under the heading "Comparable Districts under Criterion D" (Section 8, p. 169) references a table on p. 8 of the nomination, however p. 8 is a map and there is no table. This obviously needs correction.

And finally, the spelling of archeology in the nomination is inconsistent (it is spelled both "archeology" and "archaeology"). The National Register preferred spelling is archeology, but whichever spelling is used needs to be internally consistent within the nomination. This warrants a global find-and-replace.

Julie H. Ernstein, Ph.D., RPA
Supervisory Archeologist, National Register & National Historic Landmarks

Patrick Andrus, Historian
National Register of Historic Places

3/30/2018

IOWA DEPARTMENT OF
CULTURAL AFFAIRS

KIM REYNOLDS, GOVERNOR
ADAM GREGG, LT. GOVERNOR

CHRIS KRAMER, ACTING DIRECTOR

August 30, 2018

Joy Beasley, Keeper of the National Register of Historic Places
National Park Service
National Register of Historic Places
1849 C Street, NW, Mail Stop 7228
Washington, DC 20240

RECEIVED 2280
SEP - 5 2018
NAT. REGISTER OF HISTORIC PLACES
NATIONAL PARK SERVICE

Dear Ms Beasley:

The following National Register nomination from Iowa is enclosed for your review and listing if acceptable. This nomination is a revision of a nomination (SG100002243) that was returned to Iowa SHPO by NPS for revision on March 30, 2018. A copy of the Evaluation/Return Sheet is also enclosed for your reference.

Milwaukee Railroad Shops Historic District

The Milwaukee Railroad Shops Historic District is eligible for its statewide and local significance under Criteria A, C and D. It derives its significance from its association with several important eras of railroad development across Iowa and in Sioux City. The period of significance begins in 1917 when the bridge and building department set up their materials yard and began operations at the repair shop facility; and ends when the Milwaukee Road embargoed operations in Sioux City and across much of Iowa, and when the facility was finally abandoned in late 1980. Its historic associations with one of the nation's most prominent railroads in the Midwest and Pacific Northwest regions, together with its character-defining features, such as utilitarian design, one-story brick and wood construction, and large open workspaces, help to convey the specific time and place of its construction and its unique use within the state's railroad network. The district meets Criterion Consideration G for exceptional significance as one of the most rarest surviving examples in the country that represents the largest corporate railroad collapse; which significantly altered the physical make-up of the nation's railroad network.

Please let me know if there are any questions. I can be reached via email at laura.sadowsky@iowa.gov or phone at 515-281-3989.

Sincerely,

Laura Sadowsky

Laura Sadowsky
State Historian
State Historical Society of Iowa

Enclosures.

STATE HISTORICAL BUILDING • 600 E. LOCUST ST. • DES MOINES, IA 50319 • 515.281.5111 • IOWACULTURE.GOV