

United States Department of the Interior
National Park Service

National Register of Historic Places
Continuation Sheet

Mill City Southern Pacific Railroad
Bridge

Name of Property
Linn County, OREGON
County and State

Name of multiple listing (if applicable)

Section number ____ Page 1

Supplementary Listing Record

NRIS Reference Number: SG100006686

Date Listed: 06/22/2021

Property Name: Mill City Southern Pacific Rail Road (SPRR) Bridge

County: Linn

State: OR

This Property is listed in the National Register of Historic Places in accordance with the attached nomination documentation subject to the following exceptions, exclusions, or amendments, notwithstanding the National Park Service certification included in the nomination documentation

Paul R. Lusignan
Signature of the Keeper

6/22/2021
Date of Action

=====
Amended Items in Nomination:

Significance

Transportation is deleted as an Area of Significance. [Transportation is related here more to function rather than significance. The nomination directly associates the significance of this bridge under Criterion C to the structure's engineering technology. When bridges are listed under Criterion C alone, the standard area of significance is Engineering. In cases where Criterion A is also noted in addition to Criterion C, transportation, community planning & development, or politics/government may be more relevant areas.]

Criteria Consideration B-Moved Resources does not need to be checked. [Criteria Consideration B need not be justified for a property that is moved prior to its period of significance. The Mill City Bridge is significant for the period beginning in 1919 when the structure was first placed in this location.]

The OREGON SHPO was notified of this amendment.

DISTRIBUTION:

National Register property file

Nominating Authority (without nomination attachment)

United States Department of the Interior
National Park Service

National Register of Historic Places Registration Form

National Register of Historic Places
Date Listed 6-22-2021
NRIS No. 56100000686
Oregon SHPO

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 Mill City Southern Pacific Rail Road (SPRR) Bridge

other names/site number North Santiam River Railroad Bridge

Name of Multiple Property Listing N/A

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

2. Location

street & number North Santiam River

☐ not for publication

city or town Mill City

☐ vicinity

state Oregon code OR county Linn code 043 zip code 97360

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 ☒ 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 local

Applicable National Register Criteria: A B X C D



05/13/21

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

Date

Oregon State Historic Preservation Office

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:

 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

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5. Classification

Ownership of Property

(Check as many boxes as apply.)

<input type="checkbox"/>	private
<input checked="" type="checkbox"/>	public - Local
<input type="checkbox"/>	public - State
<input type="checkbox"/>	public - Federal

Category of Property

(Check only **one** box.)

<input type="checkbox"/>	building(s)
<input type="checkbox"/>	district
<input type="checkbox"/>	site
<input checked="" type="checkbox"/>	structure
<input type="checkbox"/>	object

Number of Resources within Property

(Do not include previously listed resources in the count.)

Contributing	Noncontributing	
		buildings
		site
1		structure
		object
1	0	Total

Number of contributing resources previously listed in the National Register

N/A

6. Function or Use

Historic Functions

(Enter categories from instructions.)

Transportation: Rail-Related, Railroad Bridge

Current Functions

(Enter categories from instructions.)

Transportation: Pedestrian-Related

7. Description

Architectural Classification

(Enter categories from instructions.)

Other: Pratt Through Truss

Materials

(Enter categories from instructions.)

foundation: Concrete (Piers)

walls: N/A

roof: N/A

other: Wrought Iron (Superstructure)
(Phoenix Columns)

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Narrative Description

(Describe the historic and current physical appearance and condition of the property. Describe contributing and noncontributing resources if applicable. Begin with a **summary paragraph** that briefly describes the 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).

Summary Paragraph

The Mill City Southern Pacific Rail Road Bridge is a 120-foot-long single span pin-connected Pratt thru-truss bridge that spans the North Santiam River in Mill City, Oregon. A rare surviving example of wrought iron construction, one of only two such bridges in Oregon, the Mill City SPRR Bridge relies upon patented Phoenix Columns fabricated by the Phoenix Bridge Company circa 1885 as documented in company promotional materials and relocated and reassembled at this site with some modification for length in 1919. Used to carry rail traffic until 1971, the bridge was converted to pedestrian use by 1991, adding a wooden deck and new railings for safety. The character-defining Phoenix Column truss remains essentially unchanged with high integrity. The bridge can be accessed directly, on the east, from N. 1st Avenue or, on the east, via the pedestrian/bike path that extends east from SW 3rd Avenue.

Narrative Description

The Mill City SPRR Bridge is located over the North Santiam River in Mill City, straddling the boundary of Marion and Linn counties. The site is at the end of the original downtown core of Mill City. Hammond Park, located just north of the bridge, is a small city-owned and maintained public park that provides access to the river. Small residential uses line SW 3rd Street and SW Linn Place, to the west of the bridge site. The bridge connects the former railroad right-of-way, now a bike path/pedestrian trail running parallel to SW Linn Place, to Memorial Wayside Park. After crossing the North Santiam River, the bike trail heads east along NE Wall Street, passing Mill City Falls Park. On the north side of NE Wall street there is a block of small scale historic commercial buildings, many of which were formerly associated with the timber mill that gave the city its name. The area adjacent to the bridge site is gently sloped, dropping sharply to the river channel, with exposed bedrock areas at the abutments. A steep rise north of 1st Avenue leads to Oregon State Highway 22. The Mill City SPRR Bridge spans the North Santiam River, as shown on Marion County Assessors Plat 093E30DA and Linn County Assessors Plat 090330DD. The bridge is not located on a specific designated tax lot.

Mill City Southern Pacific Rail Road Bridge - Physical Description

The main span of the bridge is a 120-foot-long wrought-iron, pin-connected Pratt thru-truss. The columns are $\frac{3}{4}$ " thick Phoenix Columns, each comprised of four sections, riveted together with 1-1/2" x $\frac{3}{4}$ " with projecting flanges to create a mixture of 8-1/4" and 7-5/8" inside diameter columns. The upper chords and end diagonals are also made of riveted Phoenix sections, in this case 12" inside diameter. Overhead lateral connections are also Phoenix Column in section. The wrought iron span has six panels, L0-L1 through L5-L6. The outer columns, at L1U1 and L5U5, are not Phoenix Columns but are rather of built-up channel flanges (15" x 18-1/2") with 3/8" x 2-1/2" "latticework" type webbing. The channels are stamped "Illinois-USA." It is assumed that the built-up columns were fabricated and installed by the Southern Pacific Rail Road in 1919 as part of the reassembly of the bridge and its modification for use at the Mill City site.

A 2014 bridge evaluation reports "The truss was originally 180-foot long....In 1919 it was moved to Mill City but only 120-feet of the truss was used."¹ This modification, while certainly plausible, cannot otherwise be verified. The use of the built-up columns on the Mill City Bridge and the lack of the traditional Phoenix-bridge type portal detailing supports the assumption that the bridge was indeed altered and reduced in length as part its relocation to this site.² Such modifications are typical of Phoenix Column bridges, specifically designed for easy assembling, disassembly, and relocation at alternate sites as needed highlighting that the length of the bridge is not a character-defining feature.

¹ Ausland Group. *Condition Evaluation and Load Rating Report, City of Mill City, Historic Pedestrian Railroad Bridge*. Prepared for the City of Mill City, 2014:3.

² See Figure 14, "End View," for the *typical detailing found* at the end of a Phoenix Column span.

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The lower chords and most of the truss diagonals of the main span are of wrought-iron flat bars with a forged eye or loop at each end, allowing them to be attached to the columns with a heavy machined pin. These “eye bars” and the connecting machined pins are the key character-defining feature of a pin-connected truss. “The eye bars have forged circular openings at each end that were machined to fit the pins precisely.”³ The eye bars run diagonally between the tops and bottoms of the columns, as well as parallel to the deck, along the bottom. Wrought tension rods are set in opposition, diagonally, between the top chords and bottoms of most columns and are also used at the top panel points, horizontally (see current photos 5 and 6).

Two poured concrete piers are located at either end of the main span, each nicely detailed with form board markings and projecting caps. The western pier (Pier 1) is approximately 8 feet tall, rising from a rectangular concrete plinth, with the vertical element detailed with rounded outside edges tapering to a small cap and sill, to support the floor beams. The eastern pier (Pier 2) matches in design but is approximately 18 feet tall. The eastern pier has an incised date on the plinth cap stating “1919,” the date of the bridge construction. The western pier reads “1917,” for unknown reasons.

Thirteen timber bents, eight (8) on the west side and five (5) on the east, support the timber approach spans. These spans are of unknown date and, given the type of construction and material, have logically been rebuilt all or in part with replacement elements to address damage and decay. Built of standard timber trestle design of uncertain construction date, these features are not considered historic.

As documented in a 2014 bridge analysis, the wrought iron main span has been minimally modified and repaired over time, retaining substantial integrity to its original design and use of materials. Some individual members, such as the built-up columns, are of steel but they are likely original to the Mill City location, having been part of the modification for reconstruction on this site in 1919.

As designed and constructed, first in California and then at Lake Oswego and, finally, Mill City, the main span of the Mill City SPRR Bridge carried railroad traffic. At Mill City, the bridge was used to transport raw logs into the mill and to ship cut timber from various mill, a mainstay in the Mill City economy until 1935. Regular rail travel across the bridge, still largely related to the timber industry, ended in 1967. The last train reportedly went over the bridge in 1971.

Mill City Southern Pacific Rail Road Bridge - Post-1971-Use & Known Modifications

As originally built for rail use, the Mill City SPRR bridge had no solid decking nor any sort of bridge railing or safety features. With the end of railroad use in 1971 the steel rails from both the main and approach spans were removed. SPRR retained ownership until 1975 when the bridge and much of the former railroad right-of-way was acquired by the Oregon Department of Transportation. In February 1991 ODOT transferred the bridge and 8.25 acres of adjacent property to the City of Mill City, which retains ownership.⁴

ODOT, as well as the US Forest Service, provided the city with some funding to allow the conversion of the bridge for safe pedestrian use and the paving of the railroad right-of-way trail.⁵ “Ties on the bridge were covered with replaceable deck planks and a new wooden bridge rail was installed.”⁶ Pressure treated timbers, including embedded “bumpers” that ran the length of the bridge to imply the original tracks, with “ties” in-between,” visually interpreting the historic rail function. Unpainted wooden bridge railing, built of 4x4” posts and 2x6” horizontal railing with simple cap, was installed on the length of the bridge to protect the public. A wooden “bench” was built along the northern edge of the main span, to cover a water supply pipe and, to provide additional height, a stock metal railing was installed above that feature for the entire length of the main span. Other known changes to the main span include the installation of lighting, at the

³ Ibid.

⁴ ODOT, “Abandonment Resolution No. 645, as adopted by the Oregon Transportation Commission on February 19, 1991.

⁵ Lundquist, Roel. *Personal Communication*, 19-October-2020.

⁶ Op Cit. *Ausland Group*, 2014:1.

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built-up outer columns or portals (LI-U1 and L5-U5). No other significant changes impacting original character are known and the design of the Phoenix Column truss itself remains virtually intact as it existed after the 1919 relocation to this site, retaining high integrity.

Linn County, in association with Marion County and the City of Mill City's Save Our Bridge Committee, secured funding through the TIGER Discretionary Grant program to support the rehabilitation and restoration of the Mill City SPRR Bridge. The project will address existing deficiencies and damage so as to assure the bridge remains a functional element and continues to support bike and pedestrian use. Most of this work will focus on the replacement and upgrade of the existing, decaying, and non-historic timber approach spans. Trestle posts will be replicated in weathering steel to match the design and dimensions of the timbers. The non-historic deck of the main span will be replaced with new work designed in coordination with Oregon SHPO, Oregon Department of Transportation, and the Federal Highway Administration.

The historic Phoenix Column main span will be cleaned and repainted. The wooden bench that houses utilities will be removed, and a new water pipe will be visible outside the bridge railing. All new, compatibly designed, bridge railing will be installed in place of the existing railing.

SUMMARY

The Mill City SPRR Bridge is a 120-foot-long wrought-iron single span bridge over the North Santiam River, in Mill City, Oregon. A rare example of wrought iron bridge technology, and one of only two bridges in the state built with the patented Phoenix Column, a segmental riveted column technology built by the Phoenix Bridge Company, the span was originally constructed in northern California circa 1885 and relocated to the Mill City site in 1919. The Mill City Southern Pacific Bridge remains largely as constructed at that time, modified to fit the Mill City site and, after 1971, to allow conversion for use as a pedestrian bridge following the end of rail traffic. Phoenix Column bridges, by design, are built of repetitive assemblies that were connected to meet site needs, allowing expansion or contraction in length as needed when disassembled and relocated for reuse after their original installation. The bridge now located at Mill City was, accordingly, likely modified when first relocated to Oregon and then modified again, when installed over the North Santiam River. The bridge retains the essential characteristics of the significant Phoenix Column design.

The Mill City Southern Pacific Bridge retains high integrity in design, materials and workmanship and continues to reflect its original character as an exemplar of Phoenix Column technology.

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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.)

- ☐ 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.
- ☒ 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.

- ☐ 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:

- | | |
|-------------------------------------|------------------------------------------------------------------------------|
| <input type="checkbox"/> | A Owned by a religious institution or used for religious purposes. |
| <input checked="" type="checkbox"/> | B removed from its original location. |
| <input type="checkbox"/> | C a birthplace or grave. |
| <input type="checkbox"/> | D a cemetery. |
| <input type="checkbox"/> | E a reconstructed building, object, or structure. |
| <input type="checkbox"/> | F a commemorative property. |
| <input type="checkbox"/> | G less than 50 years old or achieving significance within the past 50 years. |

Areas of Significance

(Enter categories from instructions.)

Engineering

Transportation

Period of Significance

1919 (relocation to Mill City)

Significant Dates

Significant Person

(Complete only if Criterion B is marked above.)

N/A

Cultural Affiliation (if applicable)

N/A

Architect/Builder

Phoenix Bridge Company

Period of Significance (justification)

The Mill City SPRR Bridge was fabricated by the Phoenix Bridge Company and first erected c1885 in northern California. The Period of Significance is established as 1919, the year the bridge was relocated and modified for reassembly in Mill City by Southern Pacific Rail Road Company.

Criteria Considerations (explanation, if necessary)

Although the Mill City SPRR Bridge was originally located elsewhere and relocated with modest reconfiguration in length, this is considered an intrinsic and characteristic element of the type as they were designed to be moved. Phoenix Column railroad bridges were specifically engineered and even marketed based on their easy assembly, disassembly, and potential for relocation and reuse as railroad needs changed over time. The Mill City SPRR Bridge continues its original function as a bridge, spanning a waterway, as designed.

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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 Mill City Southern Pacific Rail Road Bridge is significant at the statewide level, under Criterion C, in the areas of Engineering and Transportation, as a rare example of wrought iron bridge using patented Phoenix Columns. The Mill City SPRR Bridge is a rare Oregon example of a Phoenix Column Pratt thru truss bridge, as designed and manufactured by the Phoenix Bridge Company, of Phoenixville, PA. The span was built for the Southern Pacific Rail Road for use in California c1885. Typical of Phoenix Column spans, the bridge was disassembled and relocated, first to Lake Oswego, OR, c1901 and then finally to Mill City in 1919. In Mill City, it replaced an earlier wood truss bridge at the same location, to carry the railroad across the North Santiam River, serving the timber and logging interests in the region. Railroad use continued until 1971, after which the bridge was converted and minimally modified for its current bike and pedestrian use.

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

MILL CITY, OREGON

Mill City spans the North Santiam River, which separates Marion and Linn counties. Both commercial and residential uses are located within the city limits, which includes land in each of the two counties. The traditional commercial strip lines Oregon State Highway 22 at the north, and additional commercial along SW Broadway and S 1st Street, across the river. Prior to incorporation, "Mill City," was located on both sides of river, in both counties, with the timber mill occupying most of the area to the north, in Marion County, and housing and commercial uses, for the most part, located to the south, in Linn. "The post office is in Marion County....The part of the community on the south side of the river is in Linn County."⁷ The area was largely undeveloped until the last quarter of the 19th century. Lack of easy access into the area from the more densely settled Willamette Valley to the west delayed most Euro-American settlement. In 1887, partially in anticipation of the construction of a railroad line, John A. Shaw and a group of Stayton businessmen founded a timber mill, the Santiam Lumbering Company, to take advantage of the huge forests in the region, the mill providing the impetus for the community's name. A small community developed around the timber mill. "Shaw managed the mill, a store, the post office and a hotel."⁸

The history of the Oregon Pacific Railroad line and its construction from the Willamette Valley, up the North Santiam through Mill City, tied to railroad developments beginning in Astoria, is beyond the scope of this document.⁹ The development of the rail line to Mill City, which would open up the heavily forested North Santiam region, was a long-time goal that reached fruition in the late 1880s.

Construction on the railroad reached to within a mile and half of Mill City by November 20, 1888, but the bridge across the river itself was not quite completed. "On the last day of November 1888, after a special noon ceremony...the first Oregon Pacific Railroad train crossed over the Santiam Bridge and into the town of Mill City."¹⁰ With improved access, Mill City quickly grew and by 1890 boasted "...two general stores, one drug store, one saloon, two hotels, one watchmaker, one barber shop, one blacksmith shop, one shoe shop, two millinery shops, the Santiam Lumbering Company mill and forty-two dwellings."¹¹ In 1899 Shaw's group sold the mill and other assets to the Curtiss Lumber Company, which in 1900 sold the operation to the Hammond Lumber Company.¹² The Curtiss Lumber Company name was maintained by A.B. Hammond until midnight on December 31, 1911 when all of his west coast holdings became Hammond Lumber Co.

⁷ McArthur and McArthur, *Oregon Geographic Names*, 7th Ed., (Portland, OR: Oregon Historical Society Press), 2003:642.

⁸ Reinhardt, Bob. "Mill City," found at www.oregonencyclopedia.com, (visited 22-July-2019).

⁹ For more information on the Oregon Pacific Railroad, see Culp, Edwin E. *Stations West: The Story of the Oregon Railways* (New York, NY: Bonanza Books), 1972, or Mills, Randall V., *Railroads Down the Valleys* (Palo Alto, CA: Pacific Books), 1950.

¹⁰ Gavin, Scott M., *Empire of Dreams: The Story of the Oregon Pacific*, (Yaquina, OR: Scott M. Gavin and the Yaquina Pacific Railroad Historical Society), 2016:170.

¹¹ *The Weekly Oregon [Salem] Statesman*, 3-January-1890, 11:2-3.

¹² *Oregonian*, 28-March-1935, 5:4.

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Andrew Benoni "A. B." Hammond (1848-1934) was a successful merchant, lumberman and shipping magnate with financial interests in mills, and railroads, throughout the Pacific Northwest.¹³ Based in Missoula, Montana, Hammond began the Hammond Lumber Company, which would become one of the largest lumber companies in the western United States.

The rail line to Mill City, originally the Oregon Pacific Railroad, ran from Yaquina Bay on the coast, eastward through Albany and into the mountains. Financed by European capital, the line was first envisioned by Colonel Thomas Egerton Hogg, who ultimately built a 140-mile-long line as far east as Idanha, on the planned-for connection east of the Cascades, before running out of funds. As early as 1892 timber companies were sending 100-foot-long "spars" from "up the Santiam" to Yaquina, where they were to be used "...in making derricks for the government...some of them are over 100 feet long."¹⁴ Nevertheless, Hogg was unable to make the required payments on his loans and the railroad fell into receivership.¹⁵ In 1895 A. B. Hammond, backed by H. E. Huntington, announced plans to purchase the Oregon Pacific Line and rename it the Corvallis and Eastern, the C&E. When asked of his plans for the line, Hammond responded with great enthusiasm for the line into the timber lands.

I was told in Portland that the eastern end of the road did not amount to much, but instead of such being the case, I can say truthfully that no railroad of the same length in the United States offers so much tonnage.... There is a timber region up the Santiam of nine or ten billion board feet [and] there is a great lumber industry to be developed there.¹⁶

As promised, the Hammond interests made considerable improvement. "The road in recent years has been placed in the very best of condition and today is one of the best constructed and equipped railroads in the northwest."¹⁷ Hammond developed a huge timber mill in Mill City, expanding on the earlier, smaller-scale, efforts. Historic photos prior to World War One show the Hammond mill occupying virtually all of the area north of the Santiam River, with huge warehouses and mills and complex railways. The Hammond Mill was, for decades, the largest employer in Mill City, representing virtually the entire area economy (see Figure 4).

In 1907 Hammond sold the Corvallis & Eastern line to E. B. Harriman, although management of the line did not fully transfer until 1915. The 1907 sale brought the C&E firmly into the powerful orbit of the Southern Pacific Rail Road.¹⁸ Hammond likely benefitted from SP's greater ability to operate the line and the improved connections into SP's large regional network. "East of Albany, 90 percent of the [C&E] railroad's traffic came from Hammond's Curtiss Lumber Company in Mill City."¹⁹ By 1910, with the Hammond Lumber Company controlling much of the local economy, and with good rail connections to markets via the Southern Pacific, Mill City was booming.

The Hammond mill continued to operate and as late as October 23, 1929, just one day before "Black Thursday" and the US stock market crash, the Mill City operation was still in full swing and buying timber land.²⁰ By the following year, however, as the Great Depression deepened, Hammond began to constrict his operations to cut expense. The plant at Mill City cut some workers beginning in 1930 and started to reduce operations before closing permanently in 1935, the year after A. B. Hammond's death. "The big sawmill at Mill City, Oregon cut its last logs March 23, 1935..."²¹ The closure threatened to transform the community into a ghost town and while

¹³ For a detailed history of Hammond and his many business ventures, see Gordon, Greg, *When Money Grew on Trees: A. B. Hammond and Age of the Timber Baron*, (Norman, OK: University of Oklahoma Press), 2014.

¹⁴ *Corvallis Gazette*, 6-May-1892, 1:5.

¹⁵ Culp, Edwin D., *Stations West: The Story of Oregon Railways*, (New York, NY: Bonanza Books), 1978:84-85.

¹⁶ *Corvallis Gazette*, 11-Apr-1895, 1:2-3.

¹⁷ *Oregon Journal*, 25-Dec-1904, 2nd, 9:1-4.

¹⁸ *Oregonian*, 21-Feb-1907, 1:3-4; Hofsommer, 1986:42. Several sources report the date of sale as July 1915, which perhaps was the formal transfer following regulatory approval or financial issues. See, for example, Austin & Dill, 1987:142 or Robertson, 1995: 72, both highly detailed sources.

¹⁹ Gordon, 2014:186.

²⁰ *Albany Democrat-Herald*, 23-October-1929, 1:2.

²¹ *Four L Lumber News*, 1-July-1935, as cited at <https://www.henrystrobels.com/saintboniface/canyon-timeline.pdf>, visited 20-July-2020).

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relief efforts sought to re-invigorate the mill, residents struggled. The Hammond Mill was scrapped, with its equipment sold for surplus, ending hope the closure might be temporary. Under the headline *The Mill City Crisis*, a Salem newspaper opined that “The plight of the citizens of Mill City, who were thrown out of employment by the closure of the Hammond lumber mill, which was the excuse for the town, and the subsequent sale of the plant as junk, is deplorable.”²² The planing part of the mill was purchased by Carl Kelly, Sr. and four other men from Mill City, who formed Mill City Planing and Processing. It was located at the site of the Hammond mill. Former employees from the Hammond mill pooled their resources, purchased a mill in Clatskanie, transported it to Mill City and formed a cooperative mill named Mill City Manufacturing Co. It was located on the Linn County side of the river at the east end of town.

In 1939 residents of Mill City, struggling to maintain the community, debated whether or not to incorporate, a move that Hammond Lumber Company had always strongly resisted. “While the town boasts 1500 inhabitants, there is no formal city government.”²³ World War Two and the complications of its location straddling two counties delayed any action in Mill City until 1947, when the Oregon Legislature passed changes to state law to allow a city located in two counties to incorporate.²⁴ The movement was inspired by expected growth, due the impending construction of the US Army Corps of Engineers plans to construct Detroit Dam to the east. In May 1947 the question of whether Mill City should incorporate or not was put to the voters. The voters approved, barely. “Margin in favor of incorporation, however, was small, the vote being 188 yes and 181 no.”²⁵ The new city prospered during dam construction, aided by improved access due to state-funded improvements to the North Santiam Highway. The timber industry revived in the 1950s, with small mills in the area processing logs and shipping them out via the railroad but they too eventually closed. Today timber plays little direct role in the Mill City economy.²⁶ Two large mills, Frank Lumber Company and Freres Lumber Company are located on the west end of town on the Linn County side of the river. Both companies primarily employ residents of the North Santiam Canyon area.

Mill City’s population rose to 1,792 in the 1950 census as the result of construction, but then declined by 28% in 1960 to 1,289 persons. The current population of Mill City is 1,993.²⁷

MILL CITY SOUTHERN PACIFIC RAIL ROAD BRIDGE

The original bridge over the Santiam, built by the Oregon Pacific Railroad, was an open timber span completed in November 1888 to carry the rail line over the North Santiam River near Elizabeth Creek. Later photos show this bridge enclosed, probably to protect the truss, but it retained an open roof, to allow the smoke from the locomotives to escape and reduce the risk of fire (see Figure 6). Subsequent to the 1907 purchase of the C&E line by the Southern Pacific, the line east of Albany became known as the SP’s Mill City Branch. In 1919 Southern Pacific replaced the timber structure over the North Santiam at Mill Creek with the Phoenix Column steel truss and concrete piers that still stands.

Various descriptions of the current, wrought-iron, Phoenix Column, Mill City SPRR Bridge document that it was manufactured by the Phoenix Bridge Company and initially built in 1880 for Southern Pacific Rail Road to carry train traffic over “Gienega Creek,” south of San Jose, California. No historic reference to the relocation of the bridge or of any place in California named Gienega Creek, can be located. “Gienega” is almost certainly a corruption or mis-transcription of “cienega” since there is no place name of any sort named Gienega Creek anywhere in the United States, according to the USGS “Geonames” query feature.²⁸ There are thirty-four (34)

²² *Capitol Journal*, 30-November-1935, 4:1-2.

²³ *Oregonian*, 19-February-1939, 8:8.

²⁴ *Oregonian*, 30-January-1947, 16:4, see also *Oregonian*, 11-Feb-1949, 27:5.

²⁵ *Statesman Journal*, 27-May-1947, 3:2.

²⁶ “About Mill City,” www.ci.mill-city.or.us, visited 4-August-2020.

²⁷ www.worldpopulationreview.com, visited 20-July-2020.

²⁸ See www.geonames.usgs.gov. A “cienega” is a spring or wet marshy area, at the edge of feature, where water bubbles to the surface. The features are generally found in the American Southwest. The Linn County inventory states the bridge was first erected on “Ciendga” creek.

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Cienega Creek entries in the US, including one "south of San Jose, California," that would be the most logical candidate as the original location of the Mill City bridge. Cienega Creek, in Monterey County, California, is a short, 2-mile-long stream tributary to the North Fork of the Big Sur River.²⁹

In 1885 the Phoenix Bridge Company published an album of its designs that included a listing of all the bridges that the company had built since 1869. That list documents five different bridge projects for the Southern Pacific Rail Road.³⁰ Three, and possibly four, of those bridges were located in California, consisting of a total of seventeen (17) spans of varying length ranging from 208-feet to 57-feet. Undated, but apparently presented in order of construction, the Phoenix Bridge Company manufactured a series of spans for the Southern Pacific Rail Road that are described as Santa Clara Creek Bridges. These bridges are inventoried near the end of the Phoenix Album list, perhaps indicating a construction date in the 1880s. These Santa Clara Creek Spans are further described as follows.

Seven spans of 100 feet, for a total length of 700 feet
Two spans of 120 feet, for a total length 240 feet
Two spans of 90 feet, for a total length of 180 feet
Three spans of 80 feet, for a total length of 240 feet
Three spans of 57 feet, for a total length of 171 feet³¹

Most reports document that the Mill City SPRR Bridge was relocated and assembled near Lake Oswego, Oregon, about 1900 where it stood until 1919, at which point it was again dis-assembled and relocated at Mill City. The most specific information on the relocation of the Mill City SPRR Bridge is from the Mill City landmark inventory, prepared by Mary K. Gallagher and May Dasch, apparently reliant upon information supplied by Lewis L. McArthur. Relocating Phoenix Column bridges was a common practice by railroad companies as their needs changed and earlier spur lines were abandoned or upgraded to carry more freight. Phoenix bridges were especially well suited to disassembly and relocation, and this all supports the likelihood that the Santa Clara Creek spans could have easily been disassembled for use elsewhere in the sprawling Southern Pacific network. Given the development of bridge technology and the history of the Phoenix Bridge Company itself, it is virtually impossible that a wrought iron, Phoenix Column, bridge such as the one at Mill City would have been fabricated and installed new in the second decade of the 20th century.

In 1919, after having acquired the former Corvallis & Eastern railroad line to Mill City, Southern Pacific moved the bridge to its current location, replacing the earlier timber frame span that had carried trains over the North Santiam. The Mill City Bridge was logically one of the spans first built in California, modified, and then modified and shortened for use in Mill City. The bridge, reported as having originally been 180 feet long, was reduced to the current 120 feet, modifying the outermost columns and replacing them with vertical, built-up, latticework columns.³²

In March 1946 Southern Pacific applied to abandon the easternmost 20.56 miles of the Mill City Branch, between Gates and Idanha. "On a Friday night sometime in 1950, the last train left Idanha with eighty cars of logs..."³³. With the completion of the Detroit Dam in 1952, portions of the rail line were inundated above the dam. In 1971 the last SP train left Mill City and crossed the railroad bridge before the line from Mill City to Frank Lumber Co.,

²⁹ Cienega Creek is located at 36.2435734, -121.6560582. Southern Pacific developed "The Monterey Branch" in 1879 and it was opened to traffic in 1880, connecting Monterey to San Francisco. It is unclear if this line passed over Cienega Creek or not, but such is at least theoretically possible.

³⁰ This includes three bridges (all single spans) commissioned by the Central Pacific Railroad, chartered by Congress in 1862 to build the western portion of the Transcontinental Railroad. Central Pacific was absorbed into the Southern Pacific Rail Road in 1885.

³¹ Phoenix Bridge Company. *Album of Designs*, (Philadelphia, PA: J. B. Lippincott & Company), 1885:7-10. The Mill City Southern Pacific Rail Road Bridge may well be one of the 120-foot spans first built at Santa Clara Creek but could just as easily be any other span built for Southern Pacific or another railroad and relocated to Mill City.

³² Mill City, *Welcome to the City of Mill City, Oregon* (at www.ci.mill-city.or.us, visited 29-July-2020). This statement appears to be the basis for all subsequent references to the Lake Oswego location. No other source has been located.

³³ Austin, Ed and Tom Dill. *The Southern Pacific in Oregon*, (Edmonds, WA: Pacific Fast Mail), 1987:143. It must be stated that none of the bridges ordered from Phoenix Bridge by the Southern Pacific were 180 feet in length.

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located at the west end of town, was abandoned.³⁴ By 1984 the bridge was in use as a pedestrian bridge. The Mill City Historic Resources narrative reports that the bridge is "...one of the most important visual aspects of Mill City."³⁵

WROUGHT IRON

For much of history, bridges were made of wood or stone. Wrought iron bridges, popular for just a short period of time, are rare. "Of all the basic American bridge types, including rustic covered wooden, stalwart stone or concrete arch, foursquare steel girder and graceful suspension, the rarest and least appreciated is the cast- and wrought-iron truss."³⁶ Wrought iron, simplistically, is created by removing carbon from iron and processing it in a manner that creates a grain line character that increases strength. Wrought iron has been known since pre-historic times but it was not possible to produce the material in large quantities until the 1830s, after the invention of new production refinements first developed by Henry Cort and then perfected by Joseph Hall. The new process became known as "puddling" and its adoption transformed the iron industry.

The most important fact about the puddling process was that the production of wrought iron was increased greatly, growing in one plant from ten tons per week by the old methods to two hundred tons per week with the new.³⁷

Advances in technology that made wrought iron a practical material for bridge construction occurred concurrently with the development and expansion of the railroad system. Locomotives and their heavy loads required stronger bridges to carry increased weight, while the rapid expansion of the rail network create a huge demand for rails as well as thousands of bridges as the lines extended outward from city centers. Speed of construction favored iron bridges, since they could be erected much faster than stone or timber construction and were capable of carrying significantly more weight, with less material, than bridges of timber. As a result of these and other factors, wrought iron spans became the first choice for railroads nationwide.

The introduction of iron bridges to support increasingly heavy locomotive loads in the latter half of the 19th century also coincided with a transition in bridge building from a craft tradition symbolized by the North American covered bridge to science-based professionally engineering designs.³⁸

Unlike cast-iron, which does well in compression but had a tendency to crack in tension, wrought iron is ductile. It works well in compression but, since it can flex without cracking, it worked well for tension members too. However wrought iron cost nearly twice what cast iron did. "On the other hand, wrought iron resists tensile force nearly four times as well as cast iron, and 12 or 15 times as well as wood, bulk for bulk."³⁹ In total, wrought-iron offered two significant advantages over cast-iron that made it preferable for bridge work, despite its higher cost. It was ductile and it could be riveted, both important factors in bridge design.

With the advent of railroads, bridge-building became an even greater necessity than it had ever been before, and the use of iron has enabled engineers to grapple with and overcome difficulties which only fifty years ago would have been considered hopelessly insurmountable. In this modern use of iron, advantage is taken of its great tensile strength, and many iron bridges, over which

³⁴ See http://www.abandonedrails.com/Mill_City_Branch, visited 20-Aug-2019.

³⁵ Mill City, op cit.

³⁶ Delony, Eric. "The Golden Age of the Iron Bridge," *American Heritage's Invention & Technology*. Volume 10, No. 2 (Fall 1994).

³⁷ Aston, James and Edward B. Story. *Wrought Iron: Its Manufacture, Characteristics and Applications*, (Pittsburg, PA: A. M. Byers Company), 1957:12.

³⁸ Kemp, Emory L. "The Introduction of Cast and Wrought Iron in Bridge Building," *Journal of the Society for Industrial Archeology*, Volume 19, Number 2, 1993.

³⁹ Whipple, Squire. *An Elementary and Practical Treatise on Bridge Building*, (New York, NY: D. Van Nostrand Publishers), 1872:132 (found online at www.books.google.com, visited 15-July-2020).

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enormous trains of heavily-loaded cars hourly, look as though they were spun from gossamer threads, yet are stronger than any structure of wood or stone would be.⁴⁰

Despite its advantages the use of wrought iron for structural members in bridges and buildings was a comparatively short-lived technology, as it was replaced after the widespread adoption of the Bessemer process and the introduction of huge blast furnaces that could produce steel in large quantities.⁴¹ Wrought iron bridges, once the state-of-the-art, largely fell out of favor and, with the passage of time, few examples remain standing today.

The age of iron, a transitional period between wood and steel, may be said to have begun in 1850 and to have ended forty years later.”⁴² Today, more than 120 years after its brief heyday as the ultimate bridge-building material, subject to abandonment or replacement, iron bridges are among the rarest bridge types in North America.

THE PHOENIX COLUMN

Most historic accounts of what would become the “Phoenix Column” credit the essential elements of the design to Wendel Bollman (1814-1884), a self-taught engineer who designed bridges for the Baltimore & Ohio Railroad and patented the “Bollman Truss” in 1852. Bollman, understanding the characteristics of wrought iron, designed a round column comprised of multiple sections that could each individually fit into the roller mill capacities of the day. At some point Bollman showed his column idea, which he never patented, to Samuel Reeves, who did.⁴³ Reeves’ patent for the “Improvement in the Construction of Wrought Iron Shafts or Columns” was granted on June 17, 1862.⁴⁴

The Phoenix Column, as the design came to be known, was made of a series of wrought iron segments with flanges, that were fabricated in different sizes. By riveting the arcs together at the flanges, they could be joined, into sets of four, six, or eight, to create round-section columns of varied diameter based on the load and need (see Figure 10). A “Phoenix Column,” is a wrought iron tubular fabrication constructed of a series of semi-circular segments with exterior radial flanges riveted together to form the round-section structural member.⁴⁵

The Phoenix Column, along with a host of similarly designed competitors, proved immensely popular and successful for bridges, structural supports, derricks, free-standing masts, and other elements. Phoenix Columns could be expanded vertically, into ever taller columns with the use of plugs that allowed the ribbed sections to be joined, end-to-end, to increase height. This made them incredibly useful for building construction, replacing bulky masonry columns. They were also adaptable, both as columns and top chords, for bridge design. Buoyed by access to the Phoenix Iron Company’s output, the Phoenix Bridge Company saw immediate success.

Many fabricating companies patented different kinds of columns, but the most widely used type was the Phoenix....of Clarke, Reeves & Company, the predecessor of the Phoenix Bridge Company. This establishment became one of the foremost and influential bridge-manufacturing concerns in American bridge history.⁴⁶

Phoenix Bridge Company spans, made with the patented Phoenix Column, were manufactured using what amounted to various stock parts, various-sized column sections, eye bars, bearing blocks, pins, and even decorative cast-iron portal brackets could be combined to meet the requirements of a particular span, with minimal modification. The columns were riveted in Phoenixville, and the other members were then carefully

⁴⁰ Rowland, Edward, “Iron Bridges and their Construction, *Lippincott’s Magazine*, Vol. 11 #22, (January 1873).

⁴¹ Guedes, Pedro. *Encyclopedia of Architectural Technology*, (New York, NY: McGraw-Hill Company), 1979:273.

⁴² Plowden, David. *Bridges – The Spans of North America*, (New York, NY: A Studio Book, The Viking Press), 1974:57,

⁴³ Plowden, op cit., 1974:65.

⁴⁴ U.S. Patent No. 35582 (see <https://historicbridges.org/info/patents>, visited 15-July-2020).

⁴⁵ *Engineering News*, 4-October-1884, pg. 161.

⁴⁶ Plowden, op cit., 1974:65.

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fitted together and assembled to fit at the company's massive Pennsylvania shops. All the pieces were then numbered and marked to create something like a "kit" and packaged for shipment to the site via rail. Phoenix Bridge prided itself on its exacting production standards, making re-assembly in the field quick and easy. "Our work can be assembled without fitting, filing or chipping."⁴⁷

The entire span (other than the abutments and staging, which had to be site built, presumably by others), would arrive at the end of the rail line where they were needed and assembled. Phoenix Bridge offered their own assembly crews to erect the span as an option and the entire process, from confirmed order to completed, could happen quickly, a major selling point to quickly expanded railroad clients.

Another key element of the Phoenix Bridge design, in addition to the riveted columns, was the use of pin-connections to hold the members together. The pins, also made of wrought iron for durability, function as a shear member and are used to connect compression and tension members at joints. The pin design was stable yet allowed some flex and movement under load, a key advantage, especially for railroad bridges.

Pin-connected is a type of construction where many of the truss members (especially the high-load members) are connected together by a pin, or bolt, that passes through holes in each of the members. This pin is typically threaded on both ends, smooth in the middle, and a Lomas nut is used to tighten the members together.⁴⁸

Pin-connections eliminated the need to rivet bridges in the field and eased construction, which helped speed assembly.

Pin-connections were used by Clarke, Reeves and other American firms up into the 1890s, while British and Europeans preferred rivets. Riveting required steam power, was slow, difficult, and expensive to perform outside the shop....a cadre of unskilled labor with a little supervision should be able to erect a [pin-connected] Clarke, Reeves bridge.⁴⁹

THE PHOENIX BRIDGE COMPANY

The Phoenix Bridge Company, the Phoenixville, Pennsylvania-based designer and manufacturer of the Mill City SPRR Bridge, was established in 1790 as the French Creek Nail Works, the first commercial manufacturer of nails in the United States. After a series of ownership changes, by the 1840s the company was under the control of David Reeves who had joined the company in 1827.⁵⁰ Four successive generations of the Reeves family would lead the company for the rest of its existence.

In 1827 the company adopted the puddling process, by which pig iron is converted to wrought iron. Soon the company expanded and began to produce iron rails for the Philadelphia and Reading Railway, helping to break US dependence on expensive imported rails from Britain. The company expanded its operation and by the mid-1840s, operating as Reeves, Buck and Company, was among the largest rail producers in the nation. In 1855, again reorganized and now operating as Phoenix Iron, with David Reeves as president and his son Samuel as vice-president and treasurer, the company expanded into the manufacture of structural shapes and beams, including I-beams and H-beams for building construction.⁵¹ The Phoenix Iron plant, in Phoenixville (which was named after the factory), grew to immense size, including several different divisions that were producing a wide variety of iron products. During the Civil War, Phoenix Iron manufactured cast iron canons and the famed "Griffen Gun" for the Union Army. The business and the surrounding town thrived.

⁴⁷ Winpenny, op cit., 1996:22.

⁴⁸ <https://bridgehunter.com/category/tag/pin-connected/> visited 16-July-2020. A "Lomas Nut" is a patented pin nut with a recess on the inner side used to hold the pin to an eye bar or other feature. The term became a generic term for any recessed nut. See Collier Engineering Company. *International Library of Technology, Volume 35* (New York, NY: Burr Printing House), 1899:1021.

⁴⁹ Winpenny, op cit., 1996:22.

⁵⁰ Winpenny, Thomas. *Without Fitting, Filing or Chipping: An Illustrated History of the Phoenix Bridge Company* (Easton, PA: Canal History and Technology Press), 1996:2.

⁵¹ Ibid, 1996:5.

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After the war, Samuel Reeves took over the leadership of the company from his father. Buoyed by his patented "Phoenix Column," Reeves determined to focus more effort on bridge manufacture and established a new division to produce iron bridges in quantity. He hired respected engineers, including Aldophus Bonzano, Thomas Curtis Clarke and, eventually, a young intern named John Alexander Low Waddell, to develop new bridge technologies and standardized designs to meet the growing demands of the railroad market.⁵² A new firm, Clarke, Reeves & Company, was formed as a subsidiary of Phoenix Iron to oversee bridge manufacture. By the 1880s the bridge company was using a significant portion of the total iron output of the Phoenix Iron Company. In 1884, after Clarke resigned to help establish a competitor, the Union Bridge Company, Samuel Reeves became the principal in the reorganized Phoenix Bridge Company.

Clarke, Reeves and Company, as well as the Phoenix Bridge Company, were built around the patented Phoenix Column and more than a dozen bridge-related patents held by Clarke, Bonzano, and others.⁵³ Phoenix Bridge was nationally recognized as a leader in what has been called the "catalog bridge movement." Due to their engineering acumen, and the close relationship with the iron company, the Phoenix Bridge Company was able to quickly and efficiently produce bridges based upon standardized designs that could be easily modified to fit the needs of the client.

In 1885 the Phoenix Bridge Company published an illustrated, bound catalog, entitled an *Album of Designs*, updating a similar work the company had first published in 1873. The *Album* documented a series of standardized designs, "Design A" through "Design J," for bridges, viaducts and highway bridges that could be ordered and built in any length required. The "List of Wrought-Iron Bridges, Viaducts and Piers" that were built or under fabrication by the company from 1869 to 1885 identified hundreds of spans manufactured by Phoenix Bridge, with customers that included virtually every major railroad company on the continent. The total length of the single track railway spans built by the Phoenix Bridge Company during the sixteen-year span totaled over 370,000 lineal feet — more than seventy miles.⁵⁴

In 1889 Phoenix Iron built its first steel plant and the bridge division quickly shifted into newer, steel bridge designs, while retaining its role in the catalog bridge industry. Declining an offer from Andrew Carnegie that would have resulted in a merger into the American Bridge Company, the Phoenix Bridge Company continued as an independent manufacturing concern, manufacturing steel spans. Phoenix Iron was renamed the Phoenix Iron and Steel Company in 1949 and, finally the Phoenix Steel Corporation, in 1955. The bridge division closed in 1962. Buffeted by increased competition, "Phoenix Steel Corporation eventually closed, and the last heat was on November 18, 1976."⁵⁵

PHOENIX COLUMN/WROUGHT IRON BRIDGES IN OREGON

As David Plowden noted in 1976, iron bridges are increasingly disappearing from the landscape. As victims of increasing traffic demands and time, there were an ever-decreasing number of such spans remaining, mostly on backroads or out-of-the-way places, with just a few of those expected to survive. "[E]ven these have not been immune to the ravages of time and progress and it seems inevitable that they too will be replaced."⁵⁶

The Phoenix Bridge Company reportedly manufactured some 1400 wrought iron bridges of wrought iron using Phoenix Columns before the company converted entirely to steel bridge construction in the 1890s.

⁵² Clarke and Bonzano were both respected railroad bridge engineers when Reeves brought them to Phoenixville to direct the company's design section. Waddell, who stayed with the company for just a short time, went on to become one the country's most celebrated bridge engineers. Waddell is credited as the inventor of the vertical lift bridge and, with a later partner, John Lyle Harrington, designed both Portland's Hawthorne Bridge, the oldest vertical lift bridge in the United States, and the Steel Bridge, also in Portland, the only double-vertical lift bridge in the world.

⁵³ Winpenny, op cit., 1996:17-19.

⁵⁴ Phoenixville Bridge Works. *Album of Designs of the Phoenix Bridge Company* (Philadelphia, PA: J. B. Lippincott & Company), 1885:10.

⁵⁵ Historical Society of the Phoenixville Area. *A Brief History of Phoenixville*, at www.hsapa.org/phoenixville_history.html, visited 16-July-2020.

⁵⁶ Plowden, op cit., 1976:57.

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Bridgehunter.com, an internet-based nationwide inventory of bridges, documents 183 bridges manufactured by the Phoenix Bridge Company, although that number includes demolished, removed, and “Derelict/Abandoned” spans, as well as later steel spans manufactured by the company after 1890. Seventy-one (71) spans are categorized as “Phoenix Column,” and forty-three (43) of those remain standing nationwide in varying states of repair. Some of these are clearly mis-categorized.⁵⁷ Bridgehunter lists fourteen (14) Phoenix Column bridges that have been listed on the National Register of Historic Places. None of these are farther west than the Hays Street Bridge, in Bexar County, Texas. In short, there are, at most, less than fifty “Phoenix Column” bridge spans remaining in the United States.

The number of surviving Oregon bridges manufactured by the Phoenix Bridge Company that rely upon Phoenix Columns is naturally more limited.⁵⁸ In addition to the Mill City Railroad Bridge, the following two bridges are the only Phoenix Column spans known to be present in the state.⁵⁹

Hayden Bridge (Springfield, Lane County, OR, 1882): A 224-foot long single track span, the Hayden Bridge (aka the Booth-Kelly Railroad Bridge) was first erected in Corrine, Utah, for the Central Pacific Railroad and was dismantled and reassembled at its current location over the McKenzie River in Springfield in 1901.⁶⁰ The bridge was nominated to the National Register in 1980 but not listed due to owner objection. In 1990 it was documented by the Historic American Engineering Records (OH-19) and is considered eligible for listing. The Hayden Bridge was transferred to Willamalane Parks and restored and re-opened in 2019.⁶¹ (see Figure 15)

Southern Pacific Rail Road Bridge (Brownsville, Linn County, OR, c1880s): A 156'-2" long span, this bridge was probably built circa 1880s at some unknown location and moved to this site circa 1916, according to a 1983 inventory. The bridge was located on the SP line west of Isher Street, and carried a spur line over the Calapooia River, in Brownsville. The Brownsville bridge was removed (n.d.) and no longer survives.

Both the surviving Hayden Bridge and the Mill City SPRR Bridge are early examples of Phoenix Column technology and the characteristic relocation and reuse of the spans as needed by Southern Pacific and other national or regional lines during the late 19th and early 20th century. The only two surviving Oregon examples know, both the Hayden Bridge and the Mill City SPRR are significant examples of the type.

No other documented Phoenix Column wrought iron bridges are known to have ever existed in Oregon. No Phoenix Column bridge can be documented as ever having been originally built on an Oregon railroad line. The project listing of the Phoenix bridge company published in 1885 does not include any Oregon spans and, given the state's rail development history and the replacement of Phoenix Column/wrought iron spans with steel trusses for railroad use in the 1890s, it's entirely possible, if not likely, that any other Phoenix Column spans that may have once been present in Oregon were, as are all the known examples, relocated from other states and placed on smaller spur lines by the Southern Pacific in the early 20th century.

SUMMARY

The Mill City SPRR Bridge is a rare surviving example of the Phoenix Column, a wrought iron bridge technology that was patented by Samuel Reeves and manufactured by the Phoenix Bridge Company, of Phoenixville,

⁵⁷ Another national site, www.historicbridges.org lists 47 “Phoenix Column” bridges, including several located in Canada.

⁵⁸ Multiple examples of post-1900 *steel* bridges manufactured by the Phoenix Bridge Company remain, including a series in northern California that were built for Southern Pacific Rail Road, one of which is located below Lake Shasta. At least one steel Phoenix Bridge Company span remains in Oregon, an 1896 span that was relocated to its current site in Tillamook County in 1930 and carries the Oregon Scenic Coast Railroad line (see www.bridgehunter.com, BH#62659, visited 16-July-2020).

⁵⁹ There is a series of 130-foot-long Phoenix column railroad spans in northern California. These were all built in the 1880s for use in Texas, recycled to various Southern Pacific branch lines in 1909 and then relocated again, for vehicular traffic on small rural roads, during the 1930s. See, for example, the Gualala Road Bridge, in Mendocino County, which has been nicely restored and remains in limited vehicular use. (<https://bridgehunter.com/ca/mendocino/10C0046/>, visited 16-July-2020).

⁶⁰ Link, Gary, with Lola Bennett, *Hayden Bridge*; OR-19, Historic American Engineering Record, 1992.

⁶¹ <https://bridgehunter.com/or/lane/hayden/>, visited 16-July-2020.

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Pennsylvania. The riveted wrought iron column marked a technological advancement in bridge building and was used for thousands of spans throughout the United States during the last four decades of the 19th century. The Mill City SPRR Bridge, typical of the easily-assembled Phoenix Column design, was first constructed in California about 1880 and then disassembled and reportedly used in Lake Oswego before being assembled in Mill City in 1919. The Mill City SPRR bridge remained in service, carrying trains, until 1971 and has been used as a pedestrian bridge since. The Mill City SPRR Bridge is one of only two surviving Phoenix Column bridges known in Oregon and is considered of statewide significance as a rare example of an influential engineering technology. Modified for reassembly in Mill City, the bridge reflects this traditional re-use of the Phoenix Column type over time and, while reduced in overall length, remains almost entirely as it was when first put into use at Mill City. A specific attributed of the Phoenix Column bridge type was the ability to be adjusted in length as needed for relocation and reuse.

Again modified for pedestrian use, the bridge retains very high integrity to its design, configuration and length as installed over the North Santiam River in 1919 and effectively relates its original historic character and Phoenix Column design and originally fabricated circa 1885. The Mill City SPRR Bridge is significant under Criterion C as a rare surviving example of a wrought iron bridge technology that includes the use of pin-connected Phoenix Columns, as manufactured by the Phoenix Bridge Company.

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9. Major Bibliographical References

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- Winpenny, Tom. *Without Fitting, Filing or Chipping – An Illustrated History of the Phoenix Bridge Company*. Easton, PA: Canal History and Technology Press, 1996.
- www.bridgehunter.com, Misc. entries as cited in text.

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:

- ☒ State Historic Preservation Office
- ☐ Other State agency
- ☐ Federal agency
- ☒ Local government
- ☐ University
- ☐ Other

Name of repository: _____

Historic Resources Survey Number (if assigned): N/A

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10. Geographical Data

Acreage of Property Less than one

(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: N/A

(enter coordinates to 6 decimal places)

1	<u>44.755252°</u> Latitude	<u>-122.477929°</u> Longitude	3	<u></u> Latitude	<u></u> Longitude
2	<u></u> Latitude	<u></u> Longitude	4	<u></u> Latitude	<u></u> Longitude

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

The nominated area consists of the main, wrought-iron, thru-truss span of the Mill City Southern Pacific Rail Road bridge, between Pier 1 and Pier 2 over the North Santiam River, including the concrete piers themselves, being a parallelogram approximately 120-feet long and 20-feet in width to encompass the entire iron span and the piers supporting it between the approach spans that carries the former railroad right-of-way (now bike/pedestrian path) over the river, in downtown Mill City, Oregon, as shown in the attached Figure No. 3.

Boundary Justification (Explain why the boundaries were selected.)

The nominated property includes the entire wrought iron span and concrete support piers as relocated and built at this location in 1919, excluding the non-historic approach spans.

11. Form Prepared By

name/title George Kramer, M.S, HP date December 2020
organization Heritage Research Associates, for Linn County telephone 541-482-9504
street & number 386 North Laurel email george@preserveoregon.com
city or town Ashland state OR zip code 97520

Additional Documentation

Submit the following items with the completed form:

- **Regional Location Map**
- **Local Location Map**
- **Tax Lot 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).

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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: Mill City Southern Pacific Rail Road Bridge

City or Vicinity: Mill City

County: Linn (Marion) **State:** OR

Photographer: George Kramer, M.S., HP, Ashland, OR

Date Photographed: June 2020

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

- Photo 1. of 14: (OR_Linn_MillCity_MillCitySPRRBridge_001)
Looking North, downstream from highway bridge
- Photo 2. of 14: (OR_Linn_MillCity_MillCitySPRRBridge_002)
Looking Southwest, upstream, from park, toward highway bridge
- Photo 3. of 14: (OR_Linn_MillCity_MillCitySPRRBridge_003)
Looking West, from approach span
- Photo 4. of 14: (OR_Linn_MillCity_MillCitySPRRBridge_004)
Looking East, from bikepath
- Photo 5. of 14: (OR_Linn_MillCity_MillCitySPRRBridge_005)
Looking West, Detail View
- Photo 6. of 14: (OR_Linn_MillCity_MillCitySPRRBridge_006)
Looking NW, Detail View, Mill City Bridge
- Photo 7. of 14: (OR_Linn_MillCity_MillCitySPRRBridge_007)
Looking W, Detail View, Mill City Bridge
- Photo 8 of 14: (OR_Linn_MillCity_MillCitySPRRBridge_008)
TYPICAL, Detail View, Phoenix Colum, pin connections, Typical
- Photo 9 of 14: (OR_Linn_MillCity_MillCitySPRRBridge_009)
Looking NW, Detail View, Mill City Bridge
- Photo 10 of 14: (OR_Linn_MillCity_MillCitySPRRBridge_010)
TYPICAL, Detail View, Phoenix Column (Diagonal)
- Photo 11 of 14: (OR_Linn_MillCity_MillCitySPRRBridge_011)
Looking SW, Detail View, Phoenix Column, upper and lower pin connections/eye bars, built up column,
- Photo 12 of 14: (OR_Linn_MillCity_MillCitySPRRBridge_012)
Looking NW, Western pier and substructure detail

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Photo 13 of 14: (OR_Linn_MillCity_MillCitySPRRBridge_013)
Looking East, Eastern pier and substructure detail

Photo 14 of 14: (OR_Linn_MillCity_MillCitySPRRBridge_014)
Looking West (downstream on the North Santiam River), Substructure.

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 100 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.

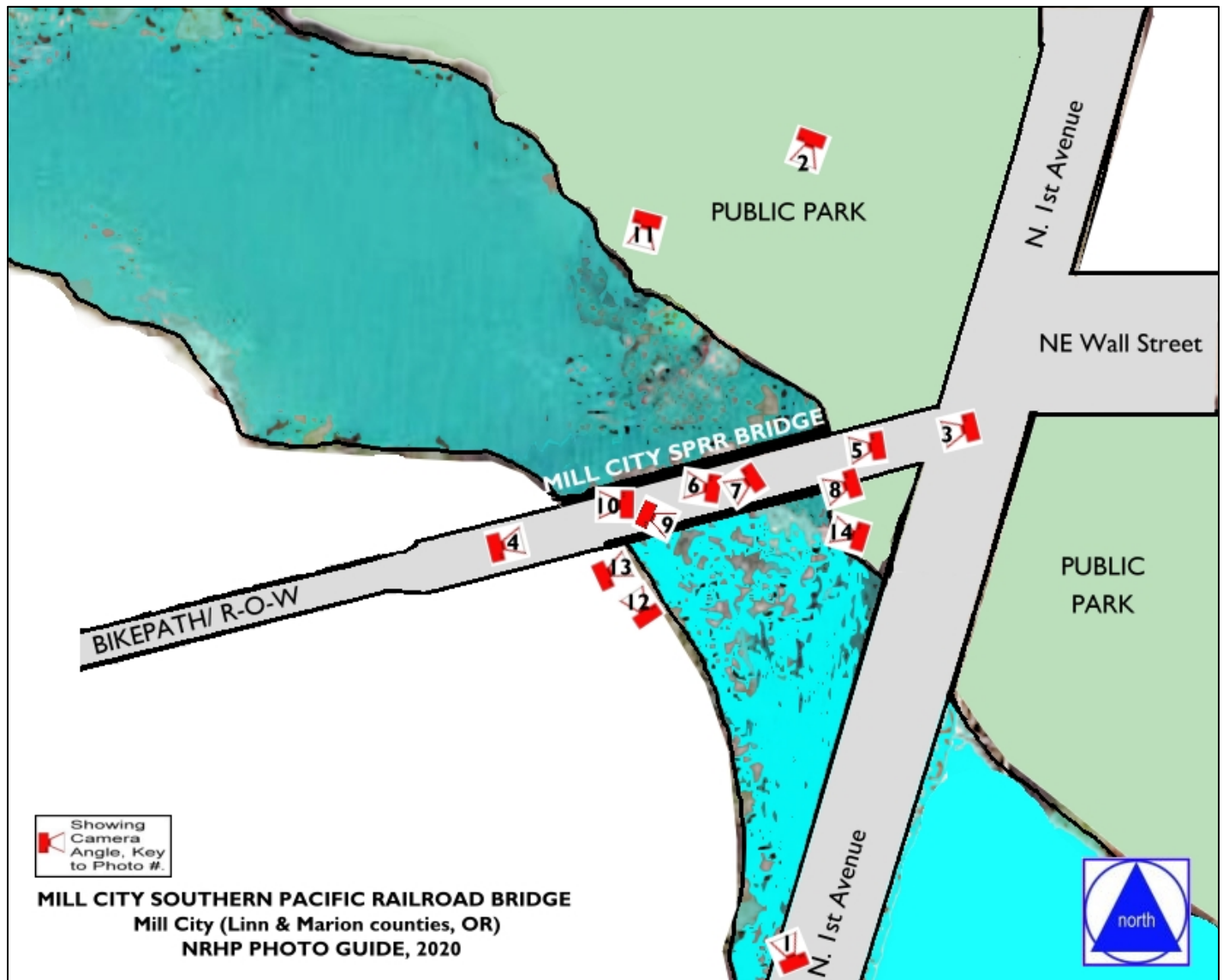
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PHOTO LOCATION MAP



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List of Figures

(Resize, compact, and paste images of maps and historic documents in this section. Place captions, with figure numbers above each image. Orient maps so that north is at the top of the page, all document should be inserted with the top toward the top of the page.)

- Figure 1: General Location Map (ODOT City of Mill City, Annotated).
- Figure 2: Local Location Map, Google Earth, May 2021.
- Figure 3: Map of the Nominated Area (ODOT Mill City Base Map, Annotated), with detail inset.
- Figure 4: Sanborn Fire Insurance Map, Mill City, OR, Feb. 1921 (US Library of Congress), Sheets 1 & 2.
- Figure 5: HISTORIC PHOTO: Corvallis & Eastern Railroad Bridge, c1900 (North Santiam Historical Society).
- Figure 6: HISTORIC PHOTO: Mill City, Looking South, RR Bridge at Right (North Santiam Historical Society), c1910.
- Figure 7: HISTORIC PHOTO: Mill City, Looking North, RR Bridge at Left (Salem Public Library, Maxwell Collection, Image No. 5275), c1915.
- Figure 8: HISTORIC PHOTO: Mill City (Southern Pacific) Railroad Bridge, Looking North (North Santiam Historical Society), c1919.
- Figure 9: HISTORIC PHOTO: First Avenue Bridge Construction, RR Bridge at Left (Oregon State Archives, Tom Lillebo Collection), 1934.
- Figure 10: US Patent 35,382, Samuel J. Reeves (Jun 1862), Page 1.
- Figure 11: US Patent 35,382, Samuel J. Reeves (Jun 1862), Page 2.
- Figure 12: Phoenix Iron Works, Postcard view (Author Collection), c1900.
- Figure 13: Sections of Phoenix Patent Wrought Iron Columns (Phoenix Iron Company), 1885.
- Figure 14: Type D Through Span, Single Intersection, (Phoenix Iron Company), 1885.
- Figure 15: Hayden Bridge, Springfield, showing Phoenix Bridge (Clark & Reeves) Portal Screen, Eastern Portland, Looking West (HABS Photo, ORE-20, SPRIF---1), 1992
(<https://www.loc.gov/pictures/collection/hh/item/or0289/>)

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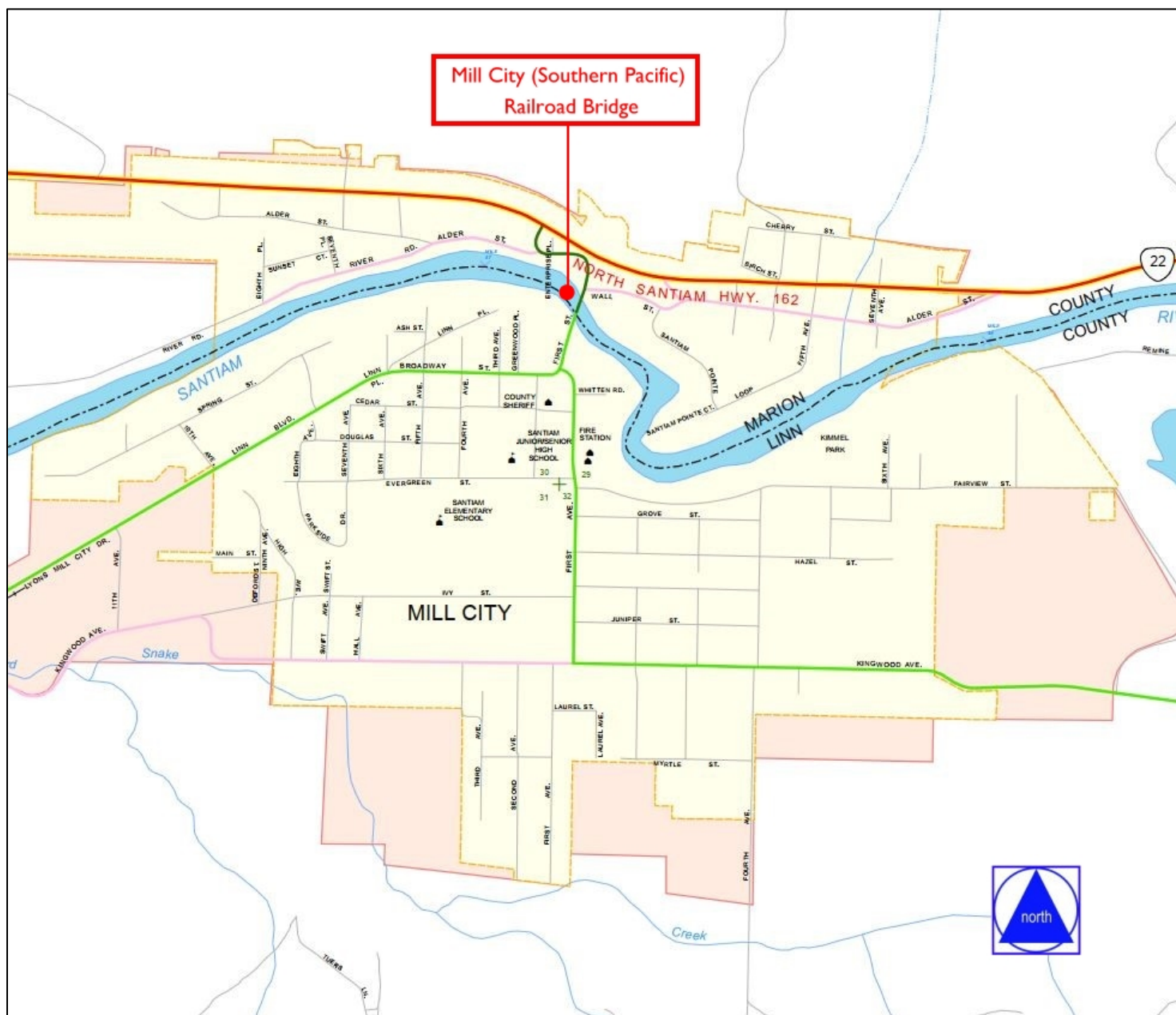
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Figure 1: General Location Map (ODOT City of Mill City, Annotated).
(Bridge Coordinates are 44.755252/-122.477929)



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Figure 2: Local Location Map, Google Earth, 2021. (Bridge Coordinates are 44.755252/-122.477929)



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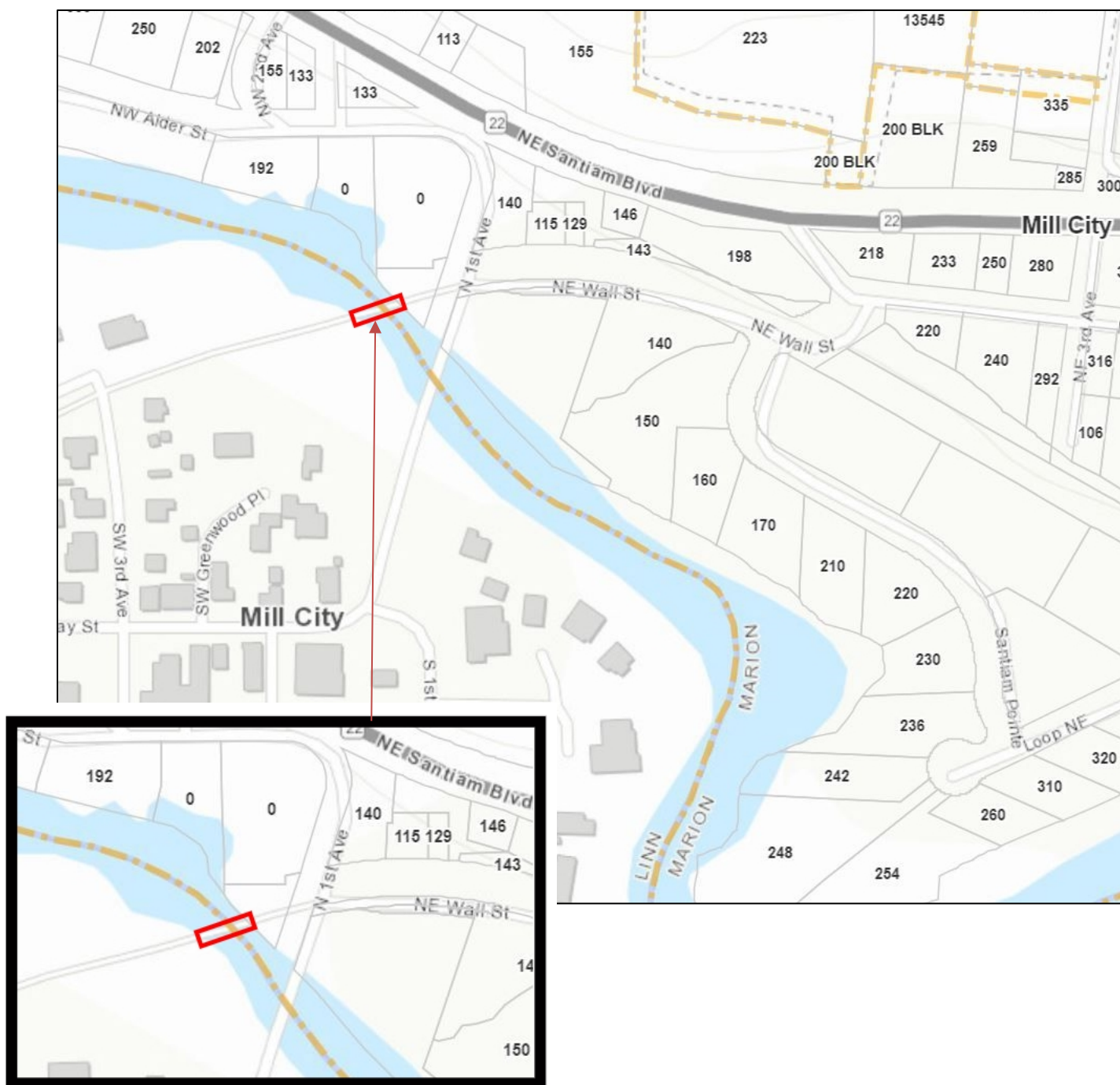
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Figure 3: Map of the Nominated Area (ODOT Mill City Base Map, Annotated), with detail inset.



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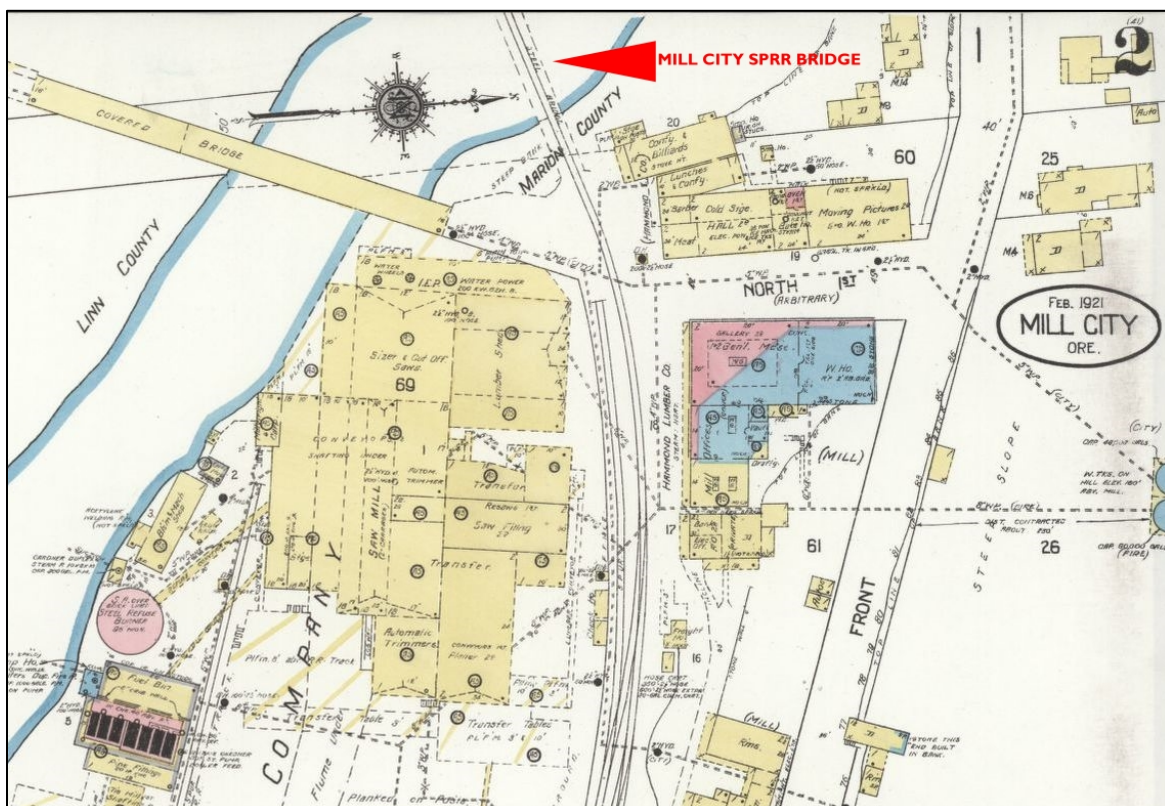
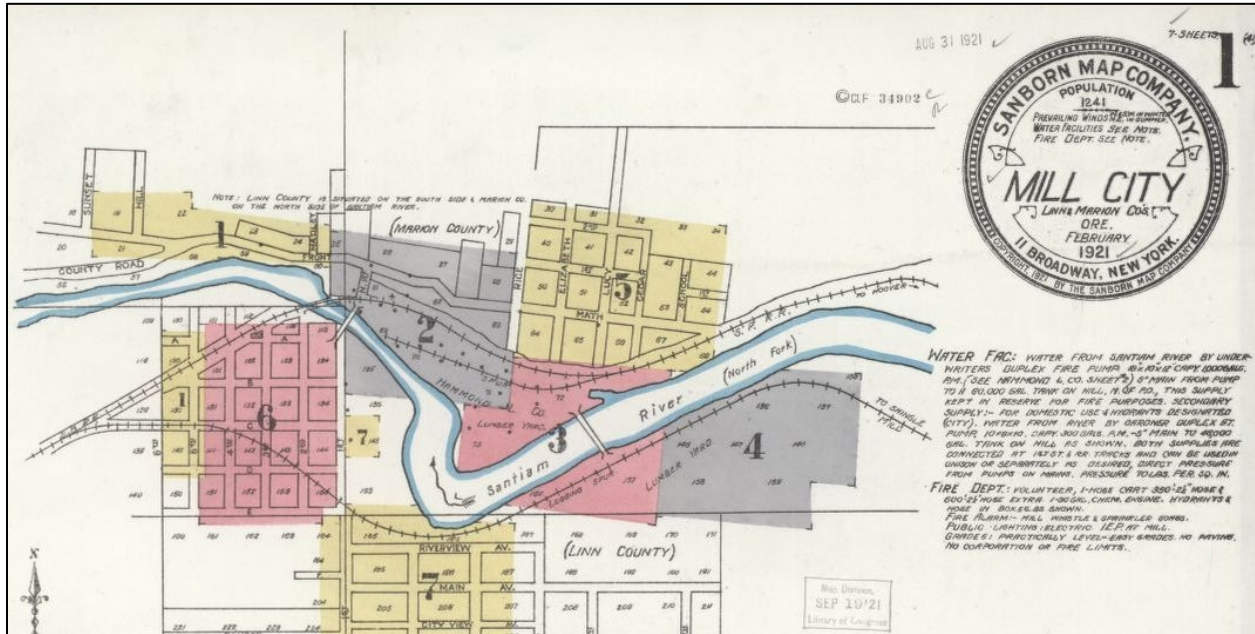
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Figure 4: Sanborn Fire Insurance Map, Mill City, OR, Feb. 1921 (US Library of Congress), Sheets 1 & 2.



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Figure 5: HISTORIC PHOTO: Corvallis & Eastern Railroad Bridge, c1900 (North Santiam Historical Society).

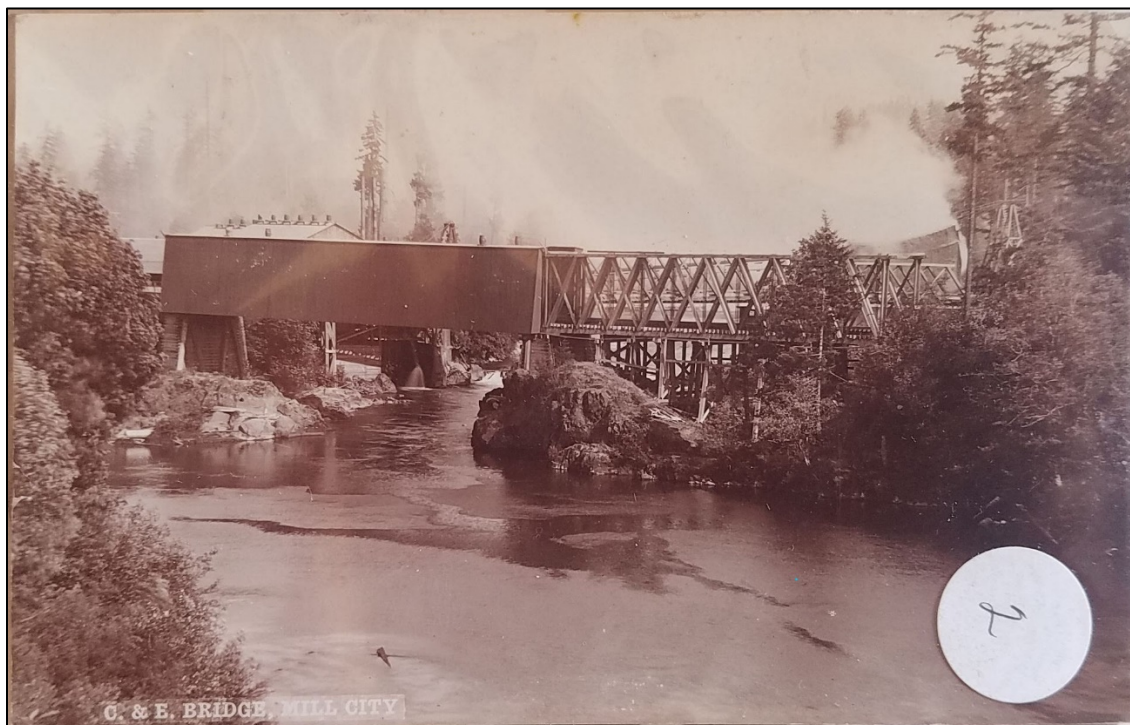


Figure 6: HISTORIC PHOTO: Mill City, Looking South, RR Bridge at Right (North Santiam Historical Society), c1910.



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Figure 7: HISTORIC PHOTO: Mill City, Looking North, RR Bridge at Left (Salem Public Library, Maxwell Collection, Image No. 5275), c1915.



Figure 8: HISTORIC PHOTO: Mill City (Southern Pacific) Railroad Bridge, Looking North (North Santiam Historical Society), c1919.



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Figure 9: HISTORIC PHOTO: First Avenue Bridge Construction, RR Bridge at Left (Oregon State Archives, Tom Lillebo Collection), 1934.



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Figure 10: US Patent 35,382, Samuel J. Reeves (Jun 1862), Page 1.

UNITED STATES PATENT OFFICE.

SAMUEL J. REEVES, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN THE CONSTRUCTION OF COLUMNS, SHAFTS, BRACES, &c.

Specification forming part of Letters Patent No. **35,582**, dated June 17, 1862.

To all whom it may concern:

Be it known that I, SAMUEL J. REEVES, of the city and county of Philadelphia, and State of Pennsylvania, have invented certain new and useful Improvements in the Construction of Wrought-Iron Shafts or Columns, Braces, or Chords for Houses, Piers, Bridges, &c.; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 represents a shaft or column partially in section. Fig. 2 represents a transverse section through the same. Fig. 3 represents a portion of a transverse section on an enlarged scale. Fig. 4 represents a transverse section of a column in a modified form.

I have invented a novel mode of making a shaft or column of wrought-iron, which combines the advantage of being useful as a vertical post, horizontal brace, or compression-chord in the construction of houses, piers, bridges, and other structures, and at the same time admitting (where several of them are to be used together to form a truss, as in a bridge, pier, or observatory) of a convenient and cheap arrangement for fastening the ties and braces.

I use three or more wrought-iron bars, similar to those marked *a a a* in the annexed drawings, to which reference is hereby made, of such shapes and dimensions, that when arranged together in the direction of their length, and fastened by rivets or bolts *c* through their flanges *b*, they shall form a hollow shaft or column. When it is intended to use two or more of these shafts in combination with ties

or braces, instead of bringing the flanges in contact with each other, I interpose washers of any desired thickness for the purpose of admitting the ends of the ties and braces between the flanges, and of riveting or bolting them together, thus uniting the whole in the most suitable manner and at small expense. The pieces *a a a* are so designed that they can be rolled, by raising or depressing the rollers, to any desired thickness without increasing the external diameter of the column proposed to be made, so that a series of columns resting one upon another may be made of different interior diameters and weights proportioned to the loads to be sustained, but having the external appearance of one uniform shaft.

The stiffness and strength of columns made in this manner may be increased at a very moderate expense by setting plain bars of iron between the flanges of the bars *a a a* and riveted to them, and extending outward from the center, thus in effect increasing the diameter of the column.

What I claim, and desire to secure by Letters Patent, is—

The uniting together three or more pieces of wrought-iron made with flanges, in the direction of their length, so that they shall form a column or shaft to be used as posts, and also as braces or compression-chords, in the construction of buildings, bridges, piers, or other structures.

SAML. J. REEVES.

Witnesses:
GEORGE GERRY WHITE,
R. LLOYD LEE.

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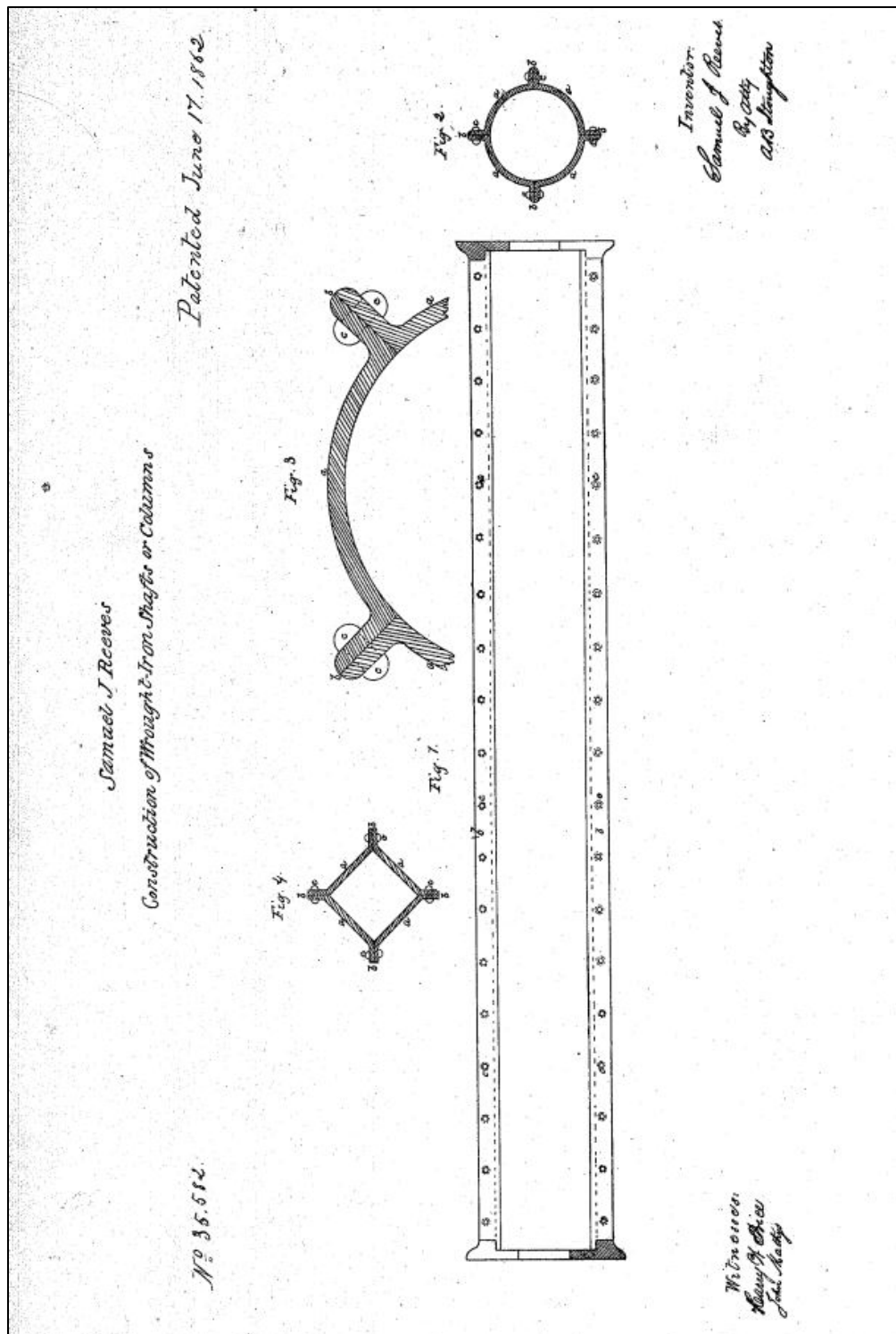
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Figure 11: US Patent 35,382, Samuel J. Reeves (Jun 17 1862), Page 2.



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Figure 12: Phoenix Iron Works, Postcard view (Author Collection), c1900.

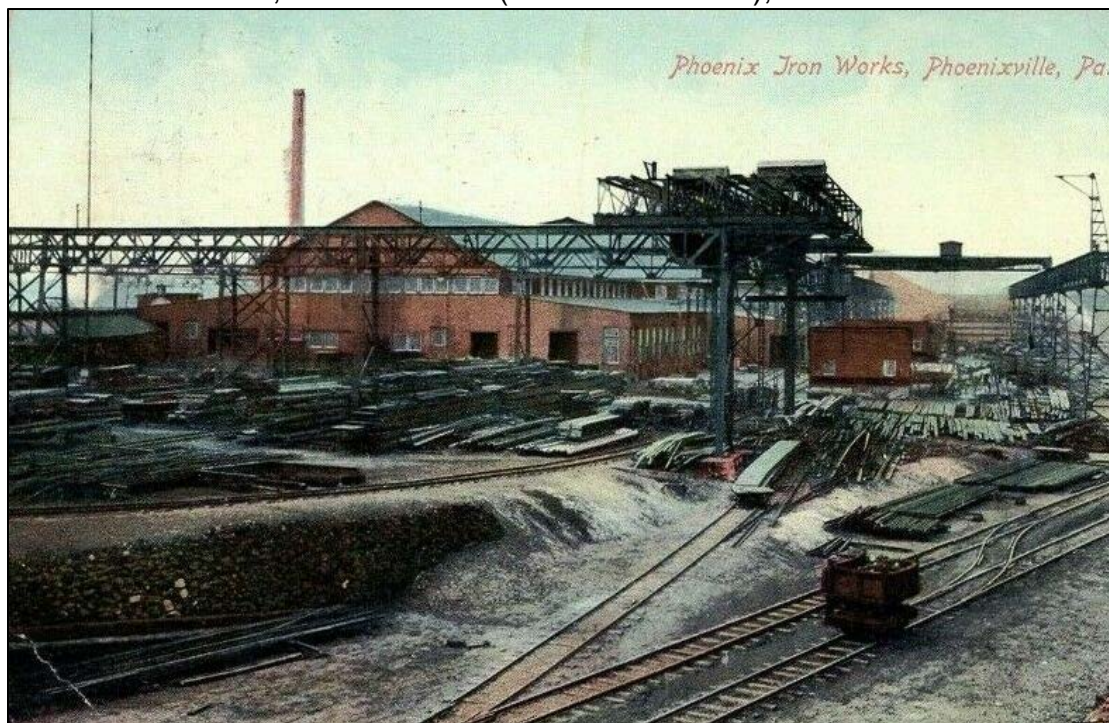
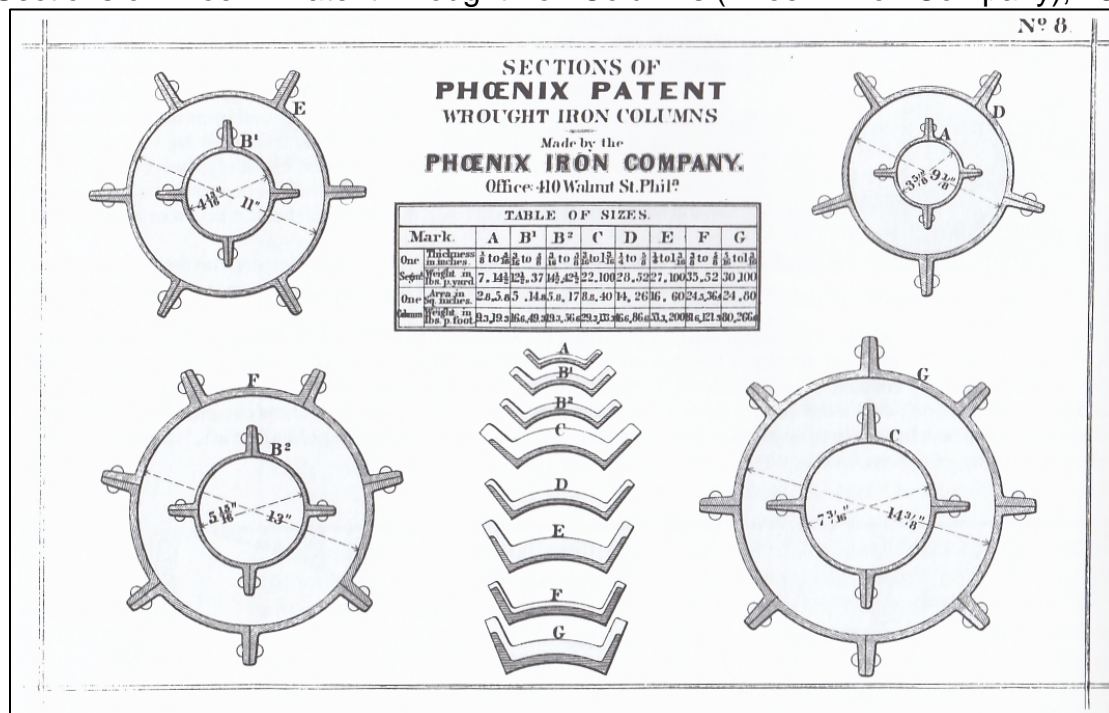


Figure 13: Sections of Phoenix Patent Wrought Iron Columns (Phoenix Iron Company), 1885.



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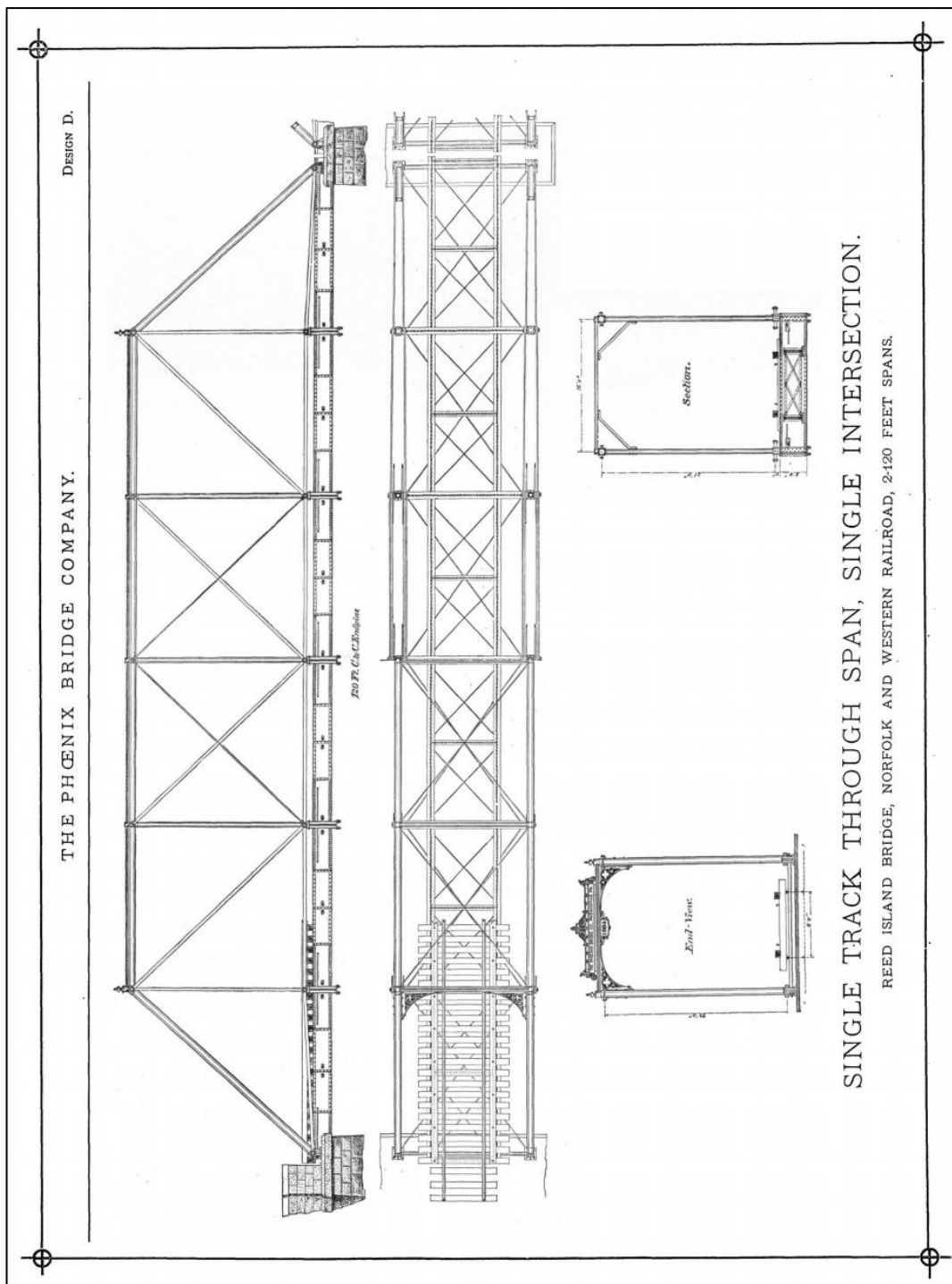
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Figure 14: Type D Through Span, Single Intersection, (Phoenix Iron Company), 1885.



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Figure 15: Hayden Bridge, Springfield, showing Phoenix Bridge (Clark & Reeves) Portal Screen, Eastern Portland, Looking West (HABS Photo, ORE-20, SPRIF---1), 1992



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01: CURRENT PHOTO: Mill City SPRR Bridge, 2020



02: CURRENT PHOTO: Mill City SPRR Bridge, 2020



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03: CURRENT PHOTO: Mill City SPRR Bridge, 2020



04: CURRENT PHOTO: Mill City SPRR Bridge, 2020



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05: CURRENT PHOTO: Mill City SPRR Bridge, 2020



06: CURRENT PHOTO: Mill City SPRR Bridge, 2020



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07: CURRENT PHOTO: Mill City SPRR Bridge, 2020



08: CURRENT PHOTO: Mill City SPRR Bridge, 2020



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09: CURRENT PHOTO: Mill City SPRR Bridge, 2020



10: CURRENT PHOTO: Mill City SPRR Bridge, 2020



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11: CURRENT PHOTO: Mill City SPRR Bridge, 2020



12: CURRENT PHOTO: Mill City SPRR Bridge, 2020



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13: CURRENT PHOTO: Mill City SPRR Bridge, 2020



14: CURRENT PHOTO: Mill City SPRR Bridge, 2020

