

Marsh Rainbow Arch Bridge  
West Eighth Street  
Newton  
Jasper County  
Iowa

HAER IA-4

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IOWA,  
SD-NEWT,  
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PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record  
National Park Service  
Department of the Interior  
Washington D.C. 20240

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HISTORIC AMERICAN ENGINEERING RECORD

Marsh Rainbow Arch Bridge

IA-4

Location: West 8th Street North between North 2nd Avenue West and North 4th Avenue West over Chicago, Rock Island and Pacific Railroad tracks in Newton, Iowa

Date of Construction: 1927

Present Owner: City of Newton  
City Hall  
Newton, Iowa 50208

Present Use: Vehicular and Pedestrian Bridge; closed to vehicular traffic in May, 1978

Significance: The West 8th Street North bridge in Newton is one of fifteen known concrete rainbow arch bridges in Iowa. It is considered an important structural form in the development of reinforced concrete technology and illustrates Iowa's significant civil engineering heritage. It was designed by the Marsh Engineering Company of Des Moines, Iowa, for the Chicago, Rock Island and Pacific Railroad.

Historian: David L. Cook, Iowa DOT, September, 1980  
Randall Faber, Iowa DOT, September, 1980

Transmitted by: Gary R. Arabak, 1983,

In June, 1927, the Chicago, Rock Island and Pacific railroad received plans from Marsh Engineering Company of Des Moines, Iowa, for a reinforced concrete "rainbow" arch bridge. This was to carry vehicular and pedestrian traffic on West 8th Street North over three sets of railroad tracks including the Rock Island's main east-west line through Iowa. West 8th Street carries a large amount of commercial and industrial traffic and for many years was the route of Iowa Highway 14. Today it is part of FAUS (Federal Aid Urban Systems) Route 5054. This system includes heavily traveled elements of the street system and streets which are functionally classified as collector routes. The bridge is located between North 2nd Avenue West and North 4th Avenue West (Fig. 1). It is near the west property line of the Maytag Company and its ammonia storage tanks and electric transformer. Residential neighborhoods surround the area to the north, west, and south.

The Marsh Rainbow arch bridge is a hybrid of the continuous concrete and the segmented steel arch bridge designs. James B. Marsh was granted patent number 1,035,026 on August 6, 1912, for his design which provided for "certain new and useful Improvements in Reinforced Arch Bridges". The bridge is designed to permit a limited amount of expansion and contraction both of the arches and of the floor, these being the longest members of the bridge.<sup>1</sup>

This bridge structure consists of two, 2' 3" wide, reinforced concrete arch ribs springing from the abutments which are located on either side of the railroad tracks. These arches are reinforced with four steel angles (6" x 3½" x 3/8") which are laced together by 2½" x 2" x 5/16" steel angles. The arch span measures 95' at the springing line with a rise of 33' to the intrados. The arches have a radius to the intrados of 50' 8¼" and a radius to the extrados of 54' 10 3/8".<sup>2</sup> The longitudinally reinforced concrete deck is supported by eight transverse floorbeams which are suspended from a series of eight hangers spaced at 9' 2" intervals along each arch rib support. The hangers are reinforced with four steel angles. The floor

beams and deck contain reinforcing bars. Pedestrian sidewalks are supported from the cantilevered ends of the floorbeams.<sup>3</sup>

Longitudinal curbs run along each edge of the 24' wide roadway slab. The slab, curbs, and sidewalks are constructed  $\frac{1}{2}$ " clear from the arch ribs where they pass through the plane of the bridge deck to allow for movement at these locations. Additional expansion is provided between the deck slab and the abutments above the springing.<sup>4</sup>

Both arch ribs are founded on reinforced concrete abutments supported on creosoted timber piling. Individual arch footings are tied together by the abutment backwall and a toewall adjacent to the railroad track ditch. Reinforced concrete T-beams supporting a reinforced concrete deck span the 22 feet from above the springing to the abutment backwall at either end of the structure.<sup>5</sup>

The overall length of the structure is 138 feet with the arch supported section measuring 98 feet and the approaches 20 feet each. The roadway measures 24 feet in width and 5 foot sidewalks are cantilevered on each side outside of the arches.<sup>6</sup>

The predominant architectural features of the bridge are the panelized arches plus the urn shaped balusters and onion topped pedestals which comprise the bridge handrails. Each balustrade segment measures eight feet and contains nine urn balusters. Fourteen inch pedestals separate the balustrade segments, except over the abutment walls where the pedestals measure two feet.<sup>7</sup>

There have been alterations to the bridge approaches since it was built but because of the loss of maintenance records, exact descriptions of these are not known. Though the bridge was touted as a tremendous improvement over the structure it replaced (see Construction History), it in turn has become obsolete by modern construction and safety standards. Sight distance across the arch bridge was much better than over the humped wood structure it replaced, but the approaches have a vertical geometry which is unacceptable by modern design standards.<sup>8</sup> The bridge has deteriorated and was closed to traffic in May 1978 after several holes opened in

the deck near the abutments.

### Construction History

The concrete "rainbow" arch bridge over the Chicago, Rock Island, and Pacific Railroad tracks in Newton replaced a wood structure which had stood on the same site.<sup>9</sup> Its construction was the subject of considerable comment in the local newspaper because of several delays which postponed completion of the bridge for almost three years. (See attached Construction Chronology.) Plans to replace the old wood viaduct with a modern concrete bridge became known in Newton early in 1927.<sup>10</sup> The new bridge was to be built in the same location but with a northwest-southeast alignment at a right angle to the railroad tracks.<sup>11</sup>

It was reported on April 15, 1927, that the State Highway Commission wanted the bridge aligned in a north-south direction diagonally across the railroad tracks as was the previous bridge. This was to facilitate a change being considered in the route of Highway 14 which would use the bridge.<sup>12</sup> Primary Road No. 14 in 1927 was a graded, but unsurfaced dirt road.<sup>13</sup> However the state was at that time involved in a major campaign to "get Iowa out of the mud". From 1920 to 1927 80% of the primary roads in the state had been graded and 52% surfaced with 650 miles of pavement and 2819 miles of gravel roads.<sup>14</sup> The Road Construction Program until this time was uncoordinated and primarily financed through county bond issues which produced unconnected sections of improved roads. However, in 1928, a \$100 million state bond issue was placed on the election ballot to provide a comprehensive road construction program.<sup>15</sup> The goal was to surface all of the state's primary roads with the most heavily traveled being paved. Then with all of the primary roads surfaced and maintained, the amount of pavement would gradually be extended throughout the primary system.<sup>16</sup> Road maps of the era indicate the final segment of Iowa 14 from Newton to Charles City and south as far as Knoxville was graveled within a year after the new arch bridge was completed in Newton.<sup>17</sup>

The route of Highway 14 in 1927 took it through Newton's Courthouse Square, north on First Street and under the railroad viaduct on First Street North. The Highway Commission felt that future traffic conditions would warrant relocating the highway from the business district to a route past the Newton Union Cemetery into the west side of Newton and over the new bridge.<sup>18</sup> Building the bridge with a northwest-southeast alignment as originally planned would create an awkward approach angle for the highway (Fig. 1).

Differences were resolved by May 31 and plans for the new bridge were approved by the Highway Commission, the railroad company, and the city. The bridge was to be aligned as desired by the Highway Commission. It would be large enough to span four railroad tracks, two mainlines and two passing tracks although it appears only three tracks were laid. It would clear the tracks by 23' 6" to accommodate the railroad's largest locomotives. The bridge would have a roadway width of 24' as then specified by the state for its primary road bridges. Costs were estimated to be \$30,000 with \$20,000 to be paid by the railroad and \$10,000 to be borne by the city in the construction of the approaches.<sup>19</sup>

V. H. Lear, Newton City Engineer, determined that 4000 cubic yards of earth fill would be needed by the city to construct the south approach to the bridge. He thought this could be obtained from the contractor who would excavate for the new tracks to be laid under the bridge by the railroad. The Highway Commission contracted for 2000 cubic yards of fill to be used to construct the north approach to the bridge.<sup>20</sup>

West 8th Street North was closed between North Second and North Forth Avenues and the end of North Third Avenue West was blocked before June 20 as the work on the bridge was expected to begin soon. People wishing to reach the area of Newton northwest of the bridge had to travel on First Avenue to West 11th Street North.<sup>21</sup> F. M. Thompson, Division Engineer, and A. T. Abott, Superintendent of the Iowa Division of the Rock Island Railroad announced on July 22 that contracts had been

let and work would soon start on the bridge.<sup>22</sup> Difficulty with obtaining pilings and some rainy weather caused another delay and it was mid-September before a representative from O'Rourke Construction Company arrived in Newton to make initial arrangements for labor and other preparations. Material and pilings for the concrete bases arrived and work was started by October 11.<sup>23</sup> In the meantime, the City of Newton was named in three damage suits seeking judgement for alleged property damage resulting for a change in the grade of West 8th Street North for the bridge approaches.<sup>24</sup>

By the end of October, support skeletons for the new bridge were in place across the tracks leaving a *minimum* space for trains to pass.<sup>25</sup> Construction of forms for the first arch had also been started.<sup>26</sup> By November 4, forms for the approach ramps were built and the concrete abutments had been poured.<sup>27</sup> The large concrete posts and crosspieces for the approach ramps were poured by mid-December and the steel framework of the arches were constructed.<sup>28</sup>

By February 10, 1928, work on the bridge structure was completed by the railroad. The bridge was called one of the most modern structures in central Iowa and according to railroad officials, it was one of the most beautiful bridges in the Iowa Division of the Rock Island Railroad which extended from Council Bluffs to Davenport. Yet to be constructed were the approaches by the City and the Highway Commission.<sup>29</sup> Local people were very pleased with the flat floor of the new bridge which eliminated the difficult rise of the old structure. A sharp turn and steep approach were also eliminated by the new approaches.<sup>30</sup> The final costs were approximately \$26,000 for the bridge and \$10,000 for the approaches with the railroad and highway commission paying \$20,000 and \$6,000 respectively toward the cost of the bridge structure.<sup>31</sup>

Delays in construction of the approaches and retaining walls prevented the opening of the bridge another fourteen months. On June 17, 1929, it was reported that when the approaches were graveled, the bridge would be complete.<sup>32</sup> By January

of 1930, action had been initiated to route Highway 14 over the new bridge and north past the cemetery.<sup>33</sup>

### The Rainbow Arch Bridge As A Significant Structural Form

The Rainbow Arch bridge possesses historical value and is a visually pleasing structural form lending aesthetic richness to the Iowa landscape. Although the use of the arch form in reinforced concrete dates to 1889, the flat slab mode of construction was the most common for reinforced concrete bridges in early 20th century America. It was not until after World War I that reinforced concrete arch bridges became popular. James Marsh promoted the rainbow arch during the 1920's as being among the most economical bridge types for relatively short spans.<sup>34</sup> This made it quite satisfactory to many of the local governments of the midwest because it did not strain their financial resources. These bridges represent an important structural form within the historical development of reinforced concrete technology and provide evidence of Iowa's long and diverse civil engineering heritage.<sup>35</sup>

Recent surveys have uncovered fifteen "rainbow" arch type bridges in Iowa, most of which are located on the secondary road system.<sup>36</sup> Several bridges exist in other midwestern states. Among the earliest and largest known examples of this type in the United States include two in the Marshalltown, Iowa, area and one in Mason City, Iowa.<sup>37</sup> There is also a 270 foot long, three arch structure located in Calhoun County, Iowa.

### Newton's Development in Historical Context

The bridge's construction is linked to Newton's remarkable extension westward that accompanied its years of rapid industrial development. Between 1900 and 1930, the population of Newton tripled as the city transformed itself from a local commercial outlet into a national center of the washing machine industry.

During the 1860's, the Mississippi and Missouri Railroad, predecessor of the Chicago, Rock Island and Pacific, was extended into Jasper County making the products and markets to the East more readily available to residents of the county.<sup>38</sup> Lumber milling and the manufacture of farm implements were two of the more important early industries. When a local incubator firm undertook the manufacture of "ratchet-slat washers" in 1898 it marked the beginning of Newton's washing machine industry. These were sold from the back of a one-horse spring wagon for \$5.00 each. Fred H. Bergman, owner of the company, secured patent rights for the manufacture of a hand powered washer in 1904 and formed the One Minute Manufacturing Company.<sup>39</sup>

F. L. Maytag held a quarter interest in the Parsons Band Cutter and Self-Feeder Company which manufactured washing machines as a sideline. Maytag introduced a hand powered washer in 1907 which was designed by Howard Snyder, inventor and demonstrator for the Self-Feeder Company. Other Snyder improvements and inventions which Maytag placed on the market were the addition in 1911 of an electric motor to the hand powered washer, the cabinet type cylinder washer in 1917, and the highly successful gyrafoam washer in 1922.<sup>40</sup>

By 1925 Newton's industrial boom had begun in earnest and from 1925 to 1929 developers spent \$3 million building homes for workers pouring into the city.<sup>41</sup> Today the city has a population of over 15,000. Over 4,000 people are employed in various industries in the city. These industries produce tools, combination doors and windows, washing machines and dryers, dishwashers and garbage disposals, commercial printing and advertising products, packing and insulation materials, food products, electric generators and molded plastic products. Manufacturing is still vital to the economic life of Newton.<sup>42</sup>

The concrete arch bridge on West Eighth Street North and the wood span which preceded it provided a direct route to the business district for residents of the northwest part of Newton. The construction of the arch bridge and the change in

the route of Iowa 14 removed through traffic from the business district. Highway (page 9)  
14 was again moved in 1965 with the opening of a new west bypass of Newton and the route over the arch bridge reverted to being a city street. It continued, however, to be important as a commercial route for business and industry in Newton. Prior to being closed in May, 1978, the bridge was carrying an average of 3,700 vehicles per day.<sup>43</sup>

### The Designer

James Barney Marsh, who was born in 1856 at North Lake, Wisconsin, moved to Iowa at the age of 18 to attend preparatory school at Fredericksburg. Subsequently, he graduated from Iowa State College of Agriculture and Mechanic Arts (Ames, Iowa) with a Bachelor of Mechanical Engineering degree in 1882.<sup>44</sup> He was a pioneer Des Moines, Iowa, bridge contractor and president of the Marsh Engineering Company. He died June 26, 1936, in Des Moines.

According to a professional biography published in April, 1912, in a directory of graduates from the Division of Engineering of Iowa State College, Marsh's first job after graduation was with the Des Moines office of the King Bridge Company of Cleveland, Ohio. Marsh's initial association with the King Bridge Company lasted from March 1883 through March 1887. During that time his duties included the design and marketing of metal bridges, as well as the supervision of the erection of such structures.<sup>45</sup>

From March 1887 to March 1889, Marsh worked for the Kansas City Bridge and Iron Company, serving as head of their northern agency office located in Des Moines. Then, in 1889, he returned to the King Bridge Company to become its General Western Agent and Contracting Engineer. Marsh remained in this capacity until March, 1896, when he established a private practice as a consulting and contracting engineer.<sup>46</sup>

Marsh remained in private practice until the early 1930's. He worked independently from 1896 to 1904 when he incorporated as Marsh Bridge Company, and subsequently, in 1909 the company was reorganized and became known as Marsh Engineering Company.<sup>47</sup> (page 10)

Among the earliest bridges designed by Marsh after he entered private practice were those over the Chippewa River at Eau Claire, Wisconsin, and over the Red River at Alexandria, Louisiana. Also, during the initial years when he was on his own, James Marsh often contracted bridges which he designed. One such structure for which he functioned as both designer and contractor was the Huefano Street Bridge in Colorado Springs, Colorado.<sup>48</sup>

It was apparently about 1900 that Marsh began to specialize in the design of reinforced concrete structures. During 1902 and 1903 Marsh designed concrete bridges for Kankakee and Peoria, Illinois, and for Kenosha, Wisconsin. Somewhat later he also designed three reinforced concrete bridges for three of Iowa's larger cities. These Iowa bridges designed by Marsh were the Walnut Street Bridge in Des Moines, the Second Avenue Bridge in Cedar Rapids, and the Fourth Street Bridge in Waterloo. In addition, it is known that Marsh undertook a substantial number of contracts for the Iowa State Highway Commission.<sup>49</sup>

FOOTNOTES

- 1 United States Patent Office, Patent No. 1,035,026, Reinforced Arch Bridge James B. Marsh, Des Moines, Iowa. August 6, 1912.
- 2 "Description of Rainbow Arch Viaduct", John C. Calhoun, Vice-President, Terry A. Shuck Structural Engineers, Inc., 611 Thirty-ninth, Des Moines, Iowa. September 7, 1980.
- 3 Ibid.
- 4 Ibid.
- 5 Ibid.
- 6 "General Details for Rainbow Arch Viaduct", Chicago, Rock Island & Pacific Railroad, Iowa Division, Main Line, Bridge No. 3232, Mile Post 323.2, Designed by Marsh Engineering Co. June, 1927.
- 7 Ibid.
- 8 Iowa Department of Transportation, Highway Division, Office of Urban Systems. Final Section 4(f) Document for Project No. BRM-5045(1) in Newton, Jasper County, Iowa. April, 1980. p. 2
- 9 Newton Daily News, May 31, 1927, courtesy of Mrs. Duane Antle, 823 North 3rd Avenue West, Newton, Iowa. September 8, 1980.
- 10 Ibid., October 11, 1927
- 11 Newton Daily News, April 15, 1927  
"General Details for Rainbow Arch Viaduct", C.R.I.&P. Railroad Design Plans
- 12 Newton Daily News, April 15, 1927
- 13 "Iowa Highway Maps", Iowa Department of Transportation Library, Ames, Iowa, 1927.
- 14 Iowa State Highway Commission Service Bulletin, Vol. XIV, nos. 10, 11, 12, p. 1, October-November-December, 1926.
- 15 Iowa State Highway Commission Service Bulletin, Vol. XV, nos. 10, 11, 12, pp. 3-5, October-November-December, 1927.
- 16 Iowa State Highway Commission Service Bulletin, Supplement to Vol. XVI, No. 5, p. 5, June, 1928.

- 17 "Iowa Highway Maps", Iowa Department of Transportation Library, Ames, Iowa, 1930.
- 18 Newton Daily News, April 15, 1927.
- 19 Ibid., May 31, 1927
- 20 Ibid., June 7, 1927
- 21 Ibid., June 7, 1927, and June 20, 1927
- 22 Ibid., July 23, 1927
- 23 Ibid., October 11, 1927
- 24 Ibid., August 24, 1927
- 25 Ibid., October 21, 1927
- 26 Ibid., October 26, 1927
- 27 Ibid., November 4, 1927
- 28 Ibid., December 14, 1927
- 29 Ibid., February 10, 1928
- 30 Ibid., October 11, 1927
- 31 Ibid., February 10, 1928
- 32 Ibid., June 17, 1929
- 33 Ibid., January 13, 1930
- 34 Letter from Douglas L. Griffin, Chief, National Architectural and Engineering Record, United States Department of the Interior, Heritage Conservation and Recreation Service to David B. Drake, Environmental Coordinator, Office of Project Planning, Planning and Research Division, Iowa Department of Transportation. March 10, 1978.
- 35 Letter from Adrian D. Anderson, Iowa State Historic Preservation Officer to Dr. William Murtagh, Keeper of the National Register, U.S. Department of the Interior, May 19, 1978.

- 36 Iowa Department of Transportation, Highway Division, Office of Secondary Roads. Rainbow Arch Bridge Survey. December, 1979.
- 37 Iowa Department of Transportation, Planning and Research Division, Office of Project Planning. Final Environmental Statement and Location Study Report for Iowa 14, Marshall County, p. 17. May, 1979.
- 38 State of Iowa, Federal Writers Project of the Works Progress Administration. Iowa: A Guide to the Hawkeye State, New York, The Viking Press. 1938 p. 489.
- 39 Ibid., p. 490
- 40 Ibid.
- 41 Ibid.
- 42 Iowa Development Commission, Directory of Iowa Manufacturers, 1979-1980. p. 259.
- 43 Iowa DOT, Final Section 4(f) Document for Project No. BRM-5045(1).
- 44 Alumni Association of Iowa State College. The Alumnus of Iowa State, Vol. XXXII, No. 1, p. 21. July, 1926.
- 45 Nichols, C. S. Directory of Graduates of the Division of Engineering, p. 112. Ames, Iowa, Iowa State College of Agriculture and Mechanic Arts.
- 46 Ibid.
- 47 Ibid.
- 48 Ibid.
- 49 Ibid.

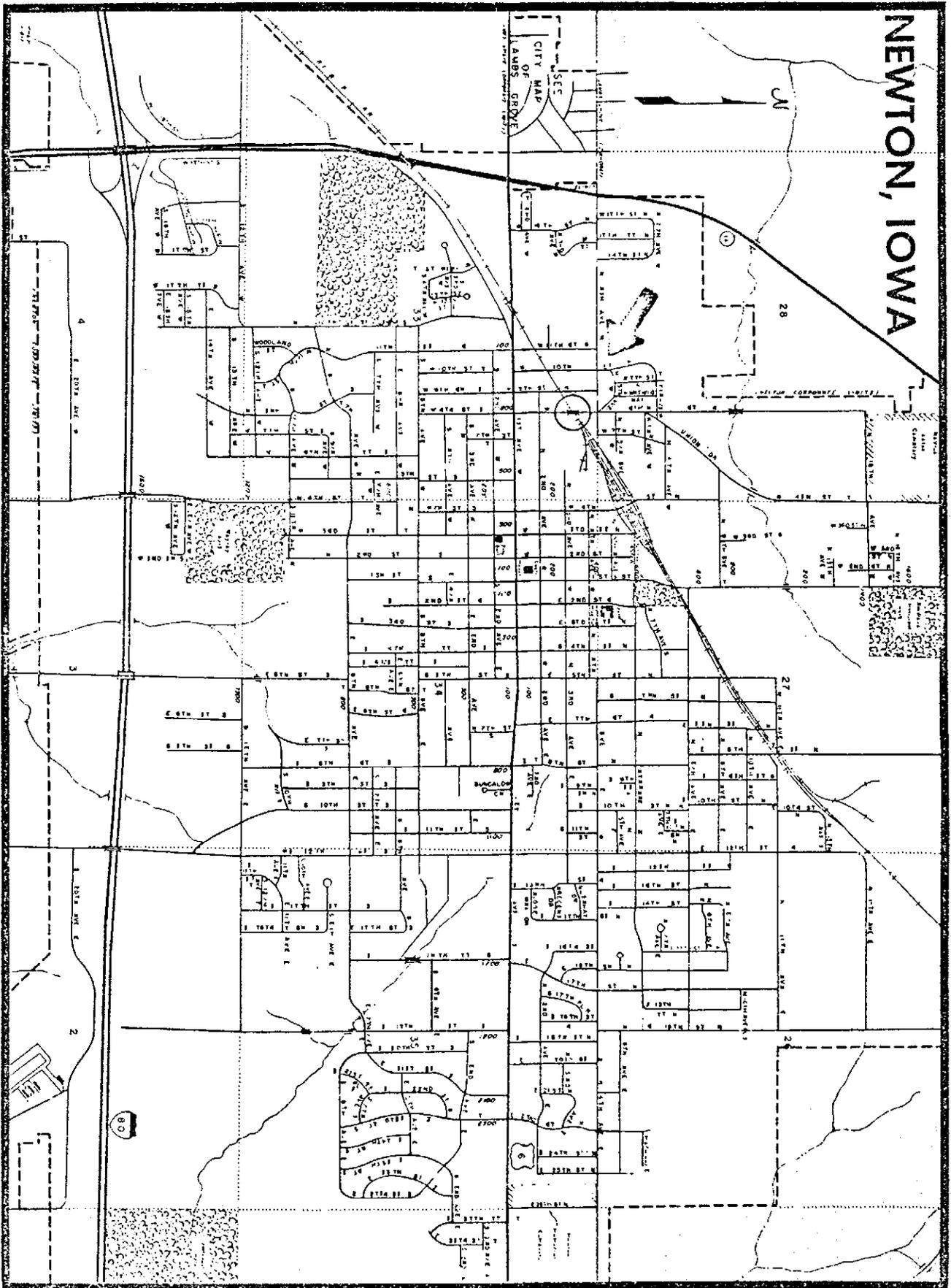


FIGURE 1

Construction Chronology for  
Marsh Rainbow Arch Bridge  
Newton, Iowa  
September, 1980

Researched by  
Mrs. Duane Antle  
823 No. 3rd Ave. West  
Newton, Iowa 50208

Paraphrased from the files of the Newton Daily News

April 15, 1927

OVERHEAD BRIDGE MAY BE CHANGED.

POSSIBILITY OF REROUTING PRIMARY NO. 14 ENTERS INTO ITS LOCATION AT PRESENT.

With work on the new overhead bridge delayed by rain, indications were today that it would be further delayed pending a decision on its location. Although it had been previously decided to angle the bridge across the Rock Island tracks, later developments may cause a change in the plans.

The State Highway Commission which has become interested in the bridge, has taken the stand that it should be constructed directly north and south across the tracks, so as to permit a change of primary road No. 14 to that bridge if such a step were found necessary in later years.

It is understood that the highway commission holds the view that the present routing of No. 14 under the viaduct on First Street North may have to be changed if traffic conditions in Newton should increase in that locality. Rather than route the highway up First Street, the commission might decide to route it past the Newton Union Cemetery and to the west into Newton, over the overhead bridge.

To slant the bridge southeast and northwest as planned at present would make it difficult to approach from a re-routed No. 14, it is said.

What action will be ultimately taken has not been decided.

April 27, 1927      NEW ROUTE PICKED FOR NO. 14 BRINGS TRAFFIC TO EIGHTH  
April 28, 1927      INSPECT NEW ROUTE FOR PRIMARY ROAD  
April 30, 1927      OBJECTIONS TO NEW LOCATION OF NO. 14 TO BE FILED MONDAY.  
May 31, 1927

CONSTRUCTION ON OVERHEAD BRIDGE WILL START SOON.

All difficulties in connection with the construction of the overhead bridge across the C.R.I & P Ry. on W. 8th St. North have been ironed out and construction work the bridge will begin soon, according to word recently received in Newton

from the State Highway Commission.

The plans for the bridge, as finally approved by the highway commission, the railroad company and the city, call for the erection of a structure on the site of the present wooden bridge. Planning for the future needs of the city, the bridge will be built large enough to span four tracks of rails (two main tracks and two side tracks).

From each side of the right-of-way, the arch of the bridge rises in a semi-circle, supporting the straight drive of the bridge. In the plans for the bridge the floor is perfectly level and whatever rise is necessary is achieved through the approach. This does away with the hump in the center as is found on the present bridge.

The bridge will measure 120 feet with 70 feet included in the span of the arch. There will be a clearance of 23 ft. 6 in. above the track, enough to accommodate primary road traffic if it should ever become necessary to route primary road No. 14 across the structure.

An expenditure of \$30,000 is expected to cover the cost of the bridge, \$20,000 of this to be paid by the railroad company in the actual cost of construction, while the additional \$10,000 will be borne by the city in the construction of the approaches.

June 7, 1927

#### WORK TO START SOON ON BRIDGE

CITY ENGINEER REPORTS RAILROAD AND HIGHWAY COMMISSION READY TO BEGIN.

Work of constructing the overhead bridge across the Rock Island tracks on W. 8th St. North will be started within the next few days, the city council was informed last evening by V. H. Lear, City Engineer.

Dirt for the fill on the city side of bridge may cost a trifle more than was expected Mr. Lear said but it can be obtained from the contractor who is excavating

for the railroad company in laying the new tracks which are to go under the bridge.

About 4,000 cubic yards of earth will be needed for the fill.

The highway commission has already contracted for the 2,000 cubic yards which will be necessary on the north end of the bridge, Mr. Lear said, and are ready to go ahead, while the railroad company has informed him that it is ready to begin work any time.

Widening of W. 8th Street was discussed but no definite decision was reached as it was decided that the earth needed for the fill could be piled up and spread to the proper width later. To make the street jibe with the road to the north of the bridge, it was pointed out that it would be necessary to widen both sides of the street, rather than only one side as had formerly been mentioned as possible.

The council passed a resolution closing W. 8th St. North between North Second and North Fourth avenues and also closing the end of North Third Ave. West. The streets are to be cut off by the city engineer as soon as it becomes necessary.

June 20, 1927

#### FILL ON THE NEW BRIDGE WILL BE COMPLETED SOON

The fill is about completed and work on the new bridge itself on W. 8th St. North will be started within a short time now was the information given out by the city engineer, H. V. Lear this morning.

The street has been blocked and it is necessary to go to W. 11th St. North on First Ave. in order to get to W. 4th Ave. and other streets north and west of 8th St.

Much of the dirt being used for the fill on the city side of the bridge is being obtained from the excavation made for the new railroad tracks.

July 23, 1927

WORK ON OVERHEAD BRIDGE TO START SOON

Contracts for the construction of the new overhead bridge across the Rock Island tracks on W. 8th St. North have been let and work will start within a short time according to F. M. Thompson, Div. Engr. and A. T. Abbott, Supt. of the Iowa Division of the Railroad, who were in town yesterday.

The bridge is expected to be completed this fall before cold weather sets in and it will be in use before the first snow, it was intimated by city officials. The approach to the bridge on the north side, under the supervision of the state highway commission has been practically finished and work has been halted until the bridge is in. The fill at the south end of the bridge will be done by the city and will not be started until the bridge has been constructed.

August 24, 1927

CITY NAMED IN TWO MORE SUITS

DAMAGES TOTALING \$6,500 NOW ASKED FOR CHANGE IN GRADE OF 8TH ST.

Two new damage suits, both naming the City of Newton as defendant were filed today in district court. Both suits seek judgement for alleged property damage resulting from a recent change in the grade of W. 8th St. North authorized by the city council to provide an approach for the overhead bridge which is to be installed across the Rock Island tracks. Lloyd Heaverlo, Katherine Heaverlo and R. C. Daly are the plaintiffs in one action asking damages to the amount of \$2,800 and George Savage, Fay Savage and Louie Aillaud in the other asking damages in the sum of \$1,200.

The filing of the two suits brings the total number of suits pending as a result of the change in the grade to three, a prior suit for \$2,500 having been filed earlier in the month by J. E. Patton & Louie Aillaud.

According to the petition in the case brought by Mr. & Mrs. Heaverlo, R. C. Daly is the owner and the record title holder of Lot 2 of Aillaud's subdivision and Mr. & Mrs. Heaverlo are the purchasers of the lot by land contract. It is asserted in the petition that many years ago the defendant city established among other grades the grade of W. 8th St. No. which passed directly in front and to the east of the lot and that they plaintiffs, prior to Jan. 1, 1927, improved the lot with reference to and in accordance with the grade thus established by the city and have built a dwelling house and other buildings.

#### CLAIM VALUE LOWERED

The allegation continues that on or about the 1st day of July, 1927, the city changed the grade of the street in front of the plaintiff's property by elevating the street by about 2 feet on the north edge of the lot and from four to six feet on and in front of the south edges of the premises and that the city has graded around on and in front of the street and that by such change in the elevation of the street, the property of the plaintiff's has been greatly reduced in value, making it less desirable for dwelling purposes.

It is also mentioned that prior to the grading by the city the street in front of the premises had been paved and curb had been established along the pavement at the cost of the plaintiffs and that the plaintiffs are informed and believe that the earth now graded in front of the premises will again be paved at their expense.

The suit brought by Mr. & Mrs. Savage is drawn along similar lines. The petition alleges that the change in grade is such as to almost destroy the place of egress and ingress to the street on the part of the plaintiff's by elevating the street from four to six feet to the east of their premises.

October 11, 1927

WORK STARTED ON OVERHEAD BRIDGE, MATERIALS ARRIVE  
ESTIMATE COST TO BE \$30,000 FOR ONE OF MOST MODERN STRUCTURES IN CENTRAL IOWA  
BRIDGE WILL CLEAR TRACK BY 23 FT. 6 IN. WILL HAVE FLAT FLOOR AND  
DIFFICULT RISE WILL BE ELIMINATED

Material and piling used for the building of concrete bases has arrived and work has been started on the erection of the new overhead bridge, P. M. Smith, Rock Island agent announced today. Delay in the starting of the bridge was due to the fact that the pilings could not be obtained at the time wanted. When these materials were obtained the rainy weather set in and the workmen were held up once more.

Since last winter when it was first known for certain that Newton would have a new bridge to replace the wooden frame structure, plans have been drawn, contracts let and all other work completed preparatory to the start of construction. Following each detail that was completed in the way of plans, the citizens of Newton were led to believe that the bridge would be started soon.

#### WORK DELAYED

This went on for several months and it was beginning to be rumored that the Rock Island Railroad did not intend to start the bridge this year. Near the middle of Sept. a representative of the O'Rourke Construction Co. came to Newton where he spend a day in making arrangements with various companies for workmen and aid in the initial work that he said would be commenced within a short time.

This was nearly a month ago and the talk was being given good grounds for proof of all statements once more when the material arrived and the rainy weather let up which permitted the work to start. People closely connected with the building of the bridge were given to understand at that time that the construction would be started as soon as material could arrive which had been ordered for some time.

TO COST \$30,000

Estimates on the cost of the bridge which is now under construction have been set at \$30,000 and will guarantee one of the most modern structures of its kind in this section of the state. The bridge will clear the track by 23 ft. 6 in. and will have a flat floor eliminating the rise that made the old bridge difficult to traverse. The span will be 70 ft. and the overall length of the bridge will be 120 ft. according to the plans used.

Future needs were taken into consideration when the plans were drawn up and the bridge is designed to accommodate 4 tracks of rails, 2 main tracks and 2 tracks for passing. From each side of the right-of-way, the arch of the bridge rises in a perfect semi-circle, supporting the straight drive of the bridge. The sharp turn and steep approach found in the old bridge will be eliminated entirely as the approach to the bridge will swing in an easy curve from North 3rd Ave. West and will join West 8th St. No. across the tracks.

October 21, 1927

SKELETONS FOR POSTS OF NEW BRIDGE BEING MADE

Skeletons for the posts which will support the new overhead bridge are now being placed while the large scoop shovel is transferring the mounds of dirt to the required places.

These skeletons are placed across the tracks at the place where the bridge will be built, leaving only enough room between for the trains to pass through.

October 26, 1927

TO POUR CEMENT FOR LARGE ARCH IN BRIDGE SOON

Forms for the first under arch of the new overhead bridge on the north side are now nearly completed and pouring of cement will start within a short time.

The large mixer was placed this noon preparatory to the starting of the mixing.

Work has been started on the form for the 1st arch on the south side of the new bridge and should be finished in several days. The forms were made of large planks and blocks of wood that are longer in length than many homes in this city are high.

Dirt which had been taken from the excavations made for the new site of the bridge is piled on the south side of the forms and is as high as the houses nearby. On the north side of the bridge are large piles of gravel and cement in readiness for the start of mixing cement for the forms.

November 4, 1927

#### FRAMEWORK FOR NEW BRIDGE IS NOW IN PLACE

A network of pillars, forms and braces on the new overhead bridge shows a casual observer that much progress is being made on the huge structure, although it is hard for the average person to tell just what is being done.

Forms for the large cement posts that will support the bridge at the place where the runways start, have been made on each side of the bridge. The curved forms for the arches above the bridge on each side are now being made. Cement has been poured at the ends of the bridge for the curved forms that go under the bridge and above the railroad tracks.

It is now believed the bridge will be completed by Dec. 1 it was announced by P. M. Smith of the Rock Island freight depot. Nearly all the material is here for the construction work. It was the delay of shipments of the heavy pilings from the south which held up the start of construction work on the bridge.

December 14, 1927

#### GENERAL IDEA OF OVERHEAD BRIDGE CAN BE PROCURED

Although it is hard to get close to the new overhead bridge because of the

mud and ice, a spectator can gain a general idea of what the structure will look like when finished in several weeks.

Cement has been poured and the forms removed from the large concrete posts and cross pieces of the approach to the bridge. These posts represent some of the largest cement structural work ever completed in Newton.

Above the floor on the bridge on the sides running from one end to the other, are the large arches which at present are but the steel skeletons of the final work. Beneath the floor of the bridge the large timbers are still supporting the heavy structure.

February 10, 1928 (this article is illegible in some areas - note omissions)

#### OVERHEAD BRIDGE WORK COMPLETED BY RAILROAD COMPANY

City and Highway Commission Have Yet to Construct Approaches. Structure is considered the most beautiful to be found on entire Iowa Division of Rock Island Railroad.

Work on the overhead bridge over the CRI & P tracks on W. 8th St. No. has been completed by the construction crew in charge of the railroad's end of the--- and the bridge will be ready for traffic as soon as the city and state highway commission have constructed the necessary approaches it was announced by P. M. Smith, agent of the railroad here.

The bridge, according to railroad officials, is one of the most beautiful in the Iowa Division of the Rock Island which extends from Council Bluffs to Davenport.

It is expected the bridge will be ready for traffic early this summer. It will be necessary for the ----- to build either a retaining wall on the approach on the south of the ----- or to make arrangements ----- property owners to build the ----- without the wall. On the north side the state highway commission will

have charge of the work. The bridge is of the rainbow-type and is designed to span four tracks of rails, which is expected to be used within a few years. Two of the tracks will be main tracks on the railroad and two side tracks were designed.

A span of 70 feet accommodates 4 tracks, while the overall length of the structure is 120 feet. The bridge clears the track by 23 ft. 6 in., enough to allow the passing of the largest locomotive.

The adoption of the rainbow arch type of architecture, the floor of the bridge is perfectly level, eliminating the hump which marked the old structure. The roadway of the bridge is 24 feet wide.

The entire cost of the bridge and approaches approximated \$36,000. The bridge itself cost about \$26,000, the railroad company paying \$20,000 and state highway commission \$6,000 as a result of its desire to use the bridge for primary No. 14 which would require a wider bridge than was originally planned.

The approaches and other matters ----- will be cared for by the city and are expected to cost \$10,000.

April 10, 1928

#### CITY BUYS LOT TO BUILD APPROACH TO NEW BRIDGE

Purchase of the lot lying on the SE corner of W. 8th St. No. and No. 3rd Ave. W. from Jesse F. Stevenson of Des Moines was accomplished last evening by the city council. The price paid was \$1,500.

The lot will be used by the city for construction of an approach to the grade which will lead to the overhead bridge across the CRI & P tracks on W. 8th St. No.

Work on the approach is expected to start early this spring and V. H. Lear, City Engineer, is expected to have plans and specifications for the necessary grading and retaining wall construction ready for the approval of the council next Monday evening.

TAKING BIDS FOR RETAINING WALL

Plans and Designs nearly finished; are on file for inspection.

Bids for construction of the retaining wall at the new overhead bridge on W. 8th St. No. will be received until April 30, V. H. Lear, City Engineer, announced last evening at the meeting of the council. Plans and designs for the wall are almost finished and are on file for the inspection of those wishing to make bids, he declared.

Alderman J. H. Harvey moved that the city advertise for bids on the building of the wall and received a second to his motion by C. E. Baker. Each of the six council members favored the motion when it was put to a vote.

Two separate bids will be taken for the work on the retaining wall, one for the construction of the wall and one for the grading which will be done following the completion of the wall.

Several minutes were spent in discussing the type of railing and steps most suitable for the wall. Mr. Harvey was of the opinion that perforated steel steps would be most desirable because ice and snow would melt quicker than would be the case on concrete steps. A step 7" x 12" was believed to be the best size.

April 17, 1928

RAILS ALL DANGEROUS

Mr. Lear suggested having two iron pipes for the railing, one set at the top and the other about halfway between the top and the base. Some of the men were against this plan at first, saying that the small children might fall through and injure themselves seriously. This idea was changed when it was pointed out that no matter what kind of a railing was built there would be danger. With a concrete railing, it was pointed out that the children would be climbing on top and might also fall.

May 1, 1928

[This article is very lengthy and details the specifics on each bid]

#### LANNING COMPANY PRESENTS LOWEST CONSTRUCTION BID

Will sign contract in few days for building retaining wall. Eight bids presented to city council at meeting last evening: winning bid totals \$6,672.50.

July 4, 1928

#### RETAINING WALLS NEAR COMPLETION

EAST WALL IS ENTIRELY FINISHED: CONCRETE FOR BASE OF WEST WALL POURED

Completion of all work on the two retaining walls for the new overhead bridge on W. 8th St. No. will probably be reached sometime this week, it was learned today through a report made from the office of the Lanning Construction Co., contractors for the job. At the present time the east wall is entirely finished and the base of the west wall has been poured and is practically dry.

Each of the walls are made of solid concrete strung with small strips of metal for reinforcing and prevention of cracking during change of temperature. The retaining walls are built on the south side of the bridge, each running straight back from the bridge. The east wall is 80 ft. long and about 14 ft. high where it ends just across the sidewalk on the south side of No. 3rd Ave. W.

Necessity demanded that the west wall be longer and it extends almost to the alley between 3rd and 4th Ave. being 250 ft. long and 6 ft. high at the south when completed. The cement mixer is located on the south end of the bridge and the concrete is poured through a large section trough which can be placed at any point on either wall by adding or taking off sections.

Before the gradual approach can be built up to the bridge, two large trees standing directly in the middle of where the road will be built, will have to be removed. The old house standing east of the east retaining wall, which was sold by the city for lumber, is half torn down.

August 1, 1928

### CITY PLANS TO OPEN NEW BRIDGE IS SHORT TIME

That the overhead bridge across the CRI&P Railroad tracks on W. 8th St. No. will soon be open for travel was announced today by Mayor W. R. Sayre. Grading of both approaches is expected to start next week and it is believed that the work may be accomplished within 10 days after it is started.

The city will have charge of the grading work on the approach on the south side of the bridge. This work will be done at the same time as the grading of the north side, which will be under the direction of the state highway department.

Completion of the bridge by the railroad company left the work finished except for the construction of the approaches. The higher level of the new bridge over that of the old structure made it necessary for approaches to be built on both sides and retaining walls were found necessary.

Installation of the retaining walls has been practically completed and the grading work will be attempted early next week.

There will be no attempt to surface either of the approaches this year, according to Mayor Sayre, but the road will be allowed to settle until next season when the fill will be in shape to pave.

Opening of the bridge will meet with the approval of residents of Newton who live to the north of the railroad tracks as a large section of the city has been cut off from direct communication with the business district. It has been necessary for both vehicles and foot passengers to make a wide detour around the bridge during the period of construction.

August 30, 1928

GRADING WORK ON NEW BRIDGE AT A STANDSTILL  
CITY HAS SHOVELED AROUND SOME DIRT ON SOUTH APPROACH,  
BUT RAILWAY COMPANY HAS NOT STARTED.

An attempt has been made to sort some large piles of dirt on the south side of the new overhead bridge on W. 8th St. No., but aside from that job, which is not near finished, the grading work necessary before the large structure can be used has hardly been started.

No grading work whatsoever, has been done on the north approach. Weeds have grown up until they are in many spots more than a foot high. The only place there are no weeds on this side is at the west end of the direct center where a cinder path has been maintained, which can be used by walkers only when the south approach is not muddy.

Little definite information can be obtained from city officials in regard to when the bridge will be entirely completed for use. They have to wait on the CRI&P Railway to do its share of work on the approaches. It is the voiced opinion of the local officials that it is best not to start on the city's job until it is known for certain when the railroad company will come to do its work.

September 11, 1928

HEAR PLANS FOR OVERHEAD BRIDGE  
HIGHWAY COMMISSION INTENDS TO START NORTH SIDE GRADING SOON

An inkling of definite information concerning completion of the new overhead bridge on W. 8th St. No. was gained last evening during a meeting of the city council.

In a conference with W. F. Beard, Dist. Engr. for the Iowa State Highway Commission; Kart Kastberg, city engineer, told the council that he had been told that the highway commission intended to let the contract soon for grading on the north approach. "Just what that means, no one knows" declared Mr. Kastberg, who has received numerous inquiries of late in regard to finishing the structure that has caused city officials much trouble and grief since it was started last year.

Not until the highway commission finishes the grading on its side of the

bridge can the city of Newton start the work of grading on the south side, according to the city engineer. When the north side is finished, dirt will be hauled over it to the south side, which can in all probability be finished within a short time after the start.

Plans have been made by the CRI&P Railroad for the erection of the retaining walls under the bridge for the purpose of preventing the dirt sliding down onto the tracks. The company expected to start the job within a short time, asserted Mr. Kastberg.

October 20, 1928

#### RAILWAY COMPANY STARTS RETAINING WALL FOR BRIDGE.

First steps have been taken in the construction of a retaining wall on the north side of the new overhead bridge on W. 8th St. No. by the CRI&P Railway. A small crew of workmen is now digging preparing the forms for the wall which will be along the tracks.

No word has been received from the Iowa State Highway Commission concerning the time that it intends to start grading the approach on the north side of the bridge. The city will be unable to grade the south approach until the commission completes its work because the dirt for the latter job will have to be hauled over the approach to be built by the state commission.

October 30, 1928

#### TO START FINAL WORK ON BRIDGE HIGHWAY COMMISSION WILL START PREPARING NORTH APPROACH IN A FEW DAYS

Filling in and grading on the north approach of the new overhead bridge on W. 8th St. No. by the Iowa State Highway Commission will be started the latter part of this week or the first of next, D. F. Raver, resident engineer of the commission announced today. Just as soon as this job is completed enough to travel over the

bridge from the north, work will be started on the south approach, which is to be carried on under the supervision of the city. Dirt for filling in the south approach will be secured from 10th and 11th Street parkings and will be hauled over the north approach.

Work on these two approaches was held up until this week because it was impossible for the Highway Commission to complete them until the retaining wall on the north side was built by the CRI&P Railroad.

In explaining the situation this morning, Mr. Raver said, "Although the Highway Commission has been blamed for the bridge not being opened because the approaches were not finished, it has been the fault of no person or concern other than the railway company.

The highway commission could not build up the approaches until the retaining wall on the north had been completed and that job was only finished last week. We have been ready for a long time to fix the approaches and evidence of this fact can be seen when the work on the approaches is to be started in less than a week's time following final work on the retaining wall."

November 17, 1928

#### WEATHER CAUSES DELAY IN GRADING BRIDGE APPROACHES

Approximately one half of the grading work for the approaches to the new overhead bridge on W. 8th St. No. has been accomplished, D. F. Raver, resident engineer for the Iowa State Highway Commission announced today. The Commission has the job of completing the north approach and the city has the south approach to finish, the same contractor working for both groups. Unfavorable weather conditions have been responsible for holding up completion of the work.

November 27, 1928

GRADING WORK HELD UP BECAUSE OF BAD WEATHER

Approximately 60% of the city grade (south approach) is done with 1/3 of the state (north approach) done. Work on the city approach has been done more rapidly as they are using a better quality of dirt. The state is building it up with clay which is impossible to dig and spread because of the weather conditions.

Foot passengers are no longer forced to wade through mud, because a cinder path has been formed on the west side of the bridge.

December 19, 1928

GOOD WEATHER IS NEEDED IF BRIDGE IS FINISHED SOON

The rainy spell prevented spreading of dirt and delayed finishing of the job in as short a time as was previously expected.

Dirt taken from the basement being dug in the Elmer Graber building which is to be torn down for construction of a new building for Montgomery Ward Co. is again being used for filling of the approaches. This dirt could have been used to a more satisfactory advantage had the ground dried slowly.

February 5, 1929

GROUND MUST BE THAWED OUT TO COMPLETE BRIDGE

The approaches have been in good enough condition for several months to allow motor traffic but they won't be completed until the ground is thawed out, according to Kart Kastberg, city engineer.

Additional dirt is needed for the county approach on the north and the south approach being built by the city before they will be in the final stages of completion.

June 11, 1929

CITY HEARS OF BRIDGE PROGRESS  
HIGHWAY COMMISSION READY TO GRAVEL APPROACHES WHEN CITY FINISHES APPROACH.

If the city of Newton and the State Highway Commission can reach a cooperative point within the next few days the overhead bridge which was started on W. 8th St. No. early in October of 1927 will be entirely finished before a month has passed, barring all unexpected obstacles.

June 17, 1929

OVERHEAD BRIDGE TO BE COMPLETED IN SHORT PERIOD

When both approaches are graveled the bridge will be finished - a project that has been running almost three years.

October 17, 1929

LOCATION OF ROAD NO. 14 IS CHANGED THROUGH SQUARE

The new location - No. 14 will continue south to intersect with No. 32 at First Street - will be in effect until No. 14 is finally located over its proposed route which will carry the highway across the new viaduct on 8th Street. The old location necessitated stop signs at all four corners of the square - the new location leaves one corner free.

December 7, 1929

APPRAISAL BOARD ARRIVES ON DECISION FOR LAND AFFECTED  
FOR CONSTRUCTION OF NO. 14 ACCORDING TO NEW ROUTE

January 13, 1930

FORMULATE PLANS FOR PAVING NO. 32 WEST OF NEWTON (Hwy. 6)

[excerpt:]

The other important development in the primary road work of the county is the cutting of No. 14 north of Newton from the cemetery through to the viaduct. While condemnation proceedings against the Baker land have been conducted and the case appealed by the defendant to the district court for consideration in the next term of court, it is anticipated that the road will go through in the end.

ADDENDUM TO  
MARSH RAINBOW ARCH BRIDGE  
West Eighth Street North  
Newton  
Jasper County  
Iowa

HAER No. IA-4

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WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD  
National Park Service  
1849 C Street, NW  
Washington, DC 20240

ADDENDUM TO  
MARSH RAINBOW ARCH BRIDGE  
HAER No. IA-4  
(Page 35)

HISTORIC AMERICAN ENGINEERING RECORD  
MARSH RAINBOW ARCH BRIDGE

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This appendix is an addendum to a 34-page report previously transmitted to the Library of Congress.

**APPENDIX: ADDITIONAL REFERENCES**

Interested readers may consult the Historical Overview of Iowa Bridges, HAER No. IA-88: "This historical overview of bridges in Iowa was prepared as part of Iowa Historic Bridges Recording Project - I and II, conducted during the summers of 1995 and 1996 by the Historic American Engineering Record (HAER). The purpose of the overview was to provide a unified historical context for the bridges involved in the recording projects."