

Chapel Street Swing Bridge
(State Bridge #3807)
Spanning Mill River on Chapel Street
New Haven
New Haven County
Connecticut

HAER No. CT-42

HAER
CONN,
S. NEWHA,
51-

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record
Mid-Atlantic Regional Office
National Park Service
U. S. Department of the Interior
Philadelphia, Pennsylvania 19106

HISTORIC AMERICAN ENGINEERING RECORD

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(State Bridge #3807)

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Location: Spanning the Mill River on Chapel Street,
New Haven, New Haven County, Connecticut

UTM: 18.674300.4574350
Quad: New Haven, Connecticut

Date of Construction: 1899

Builder: Elmira Bridge Company

Present Owner: City of New Haven, Connecticut

Present Use: Bridge closed to vehicular traffic. Placed in the
open position to allow marine navigation.

Significance: The Chapel Street Swing Bridge is historically
significant as an example of a Camelback Truss swing
bridge, a variation of the Pratt truss that was used
on many railroad bridges in the late 19th century.
This bridge also possesses machinery used in early
electric movable bridges.

Project Information: This document was undertaken in February 1988, in
accordance with the Memorandum of Agreement with the
Connecticut Department of Transportation, as a
mitigating measure prior to replacement of the bridge
superstructure.

Compiler: Keith Hall
Transportation Planner
Bureau of Planning
Connecticut Department of Transportation
Wethersfield, Connecticut

March 1988

A. HISTORICAL CONTEXT

History of the Crossing

The settlement of New Haven in 1637 was built around a natural harbor, into which three rivers drain, the Quinnipiac River in the eastern part of town, the West River in the west, and the Mill River in between. The peninsula-like section, which was formed between the Quinnipiac and Mill rivers, was known as the "New Township." The Mill River, so named because the first New Haven grist mill was built on it, was quickly bridged with a foot bridge and, as early as 1641, a town meeting ordered a cart bridge be built over the Mill River (Osterweis 1953:34), probably at or near the present Grand Avenue Bridge.

The large lower portion of the "New Township" peninsula was called Grape Vine Point and was isolated and virtually uninhabited for many years. But as the population of New Haven began to grow in the 19th century, so did the need for additional room. The advent of steamboat navigation in 1815, the completion of the Farmington Canal in the 1820s, and the construction of a large railway system after 1839 soon made New Haven the largest city in the State. With most of the industrial and transportation facilities concentrated in the harbor area, it was inevitable that Grape Vine Point would come under development pressure. Agitation for improved communication between that area and the city's commercial center grew rapidly during the 1860s and is typified by the following petition, which was presented to the Common Council on January 7, 1867, and later referred to the Committee on Roads and Bridges:

To the Honorable Court of Common Council of the City of New Haven:

The undersigned residents of the City of New Haven, respectfully presenting for the consideration of your honorable body:

1st. That in carrying on business between the City of New Haven and village of Fair Haven they are put to great inconvenience by reason of there being no bridge over the Mill River south of Grand Street - that such a bridge would reduce the distance passed over by the larger portion of the travel and transportation between those two places nearly or quite one half.

2nd. That the manufactories in the lower portion of the city are much embarrassed because their operatives can obtain no tenements to reside within reasonable distances from such manufactories, and that for the same reason such operatives are subjected to great inconveniences and loss of time - that

in Fair Haven opposite the foot of Chapel Street a large tract of land is lying unimproved which by its convenient location is eminently adapted to supply this need of our manufactories and operatives, if it were connected with the city by a bridge.

3rd. And further presenting for your consideration that if such a bridge were built an increase in the value of the taxable property of the city would immediate result - and that is prosperity would be thereby much enhanced.

Respectfully pray your honorable body to unite with the town of New Haven in causing to be built over Mill River from the foot of Chapel Street to some suitable point on its eastern bank, a bridge of such dimensions and materials as you may seem best, and so provided with a draw as not to impede navigation.

As can be seen from the petition, there was a plea for the city of New Haven to unite with the town of New Haven, as represented by the section known as Fair Haven to build the bridge, and discussion about who was responsible for building the bridge went on for months, even to the point of submitting petitions to the Connecticut General Assembly, asking them to resolve the issue. After the legal issues were settled, another argument arose concerning the exact placement of the bridge, some residents petitioning for a connection with Saltonstall Avenue and others for the present configuration.

Finally, in 1869, contracts were let for the construction of the bridge, which would be the predecessor to the present bridge. It is possible that the contract was for a Parker truss, which is not very different from the present Camelback truss.

It is also possible that the span was patterned after the Ithiel Town design, which was a lattice truss design patented in 1820 and used on a number of bridges in this area. There are several very early engineering documents in a special Ithiel Town collection at the New Haven Historical Society, and the assumption is that these documents exist because local bridge engineers were, in fact, building Town trusses at that time.

There is a January 1868 contract between Charles Waterhouse and the town of New Haven for construction of the piling sections and the masonry pier and abutments. Cost of the 300 feet of pile bridge was \$5,900, and the contract specified that piles should be of chestnut, 5-6 inches at small end and 12 inches at the large end, driven in bents 10 feet from centers lengthwise of the bridge and 5 feet crosswise, capped by 10 by 10 yellow

pine timbers. The abutments and center pier were to be made of solid ashlar masonry, with edges dressed back one inch in courses not less than 18 inches, and to be paid for at the rate of 50 cents per cubic foot. Assuming that work went according to the contract, Waterhouse was entitled to pay of 18 percent of the estimated cost each month.

Iron railings for the span were let as a separate contract to Pete Ferguson on June 28, 1869. Rate was \$1.03 per foot of railing, installed.

Evidently, there was more argument about how to pay for the bridge because, in February 1869, it became known that the selection proposed to tax the residents of Chapel Street for the full cost of the bridge, in a manner similar to sewer installation levies. One of the many petitions protesting this proposal was presented in February:

To the honorable Selectmen of the Town of New Haven,
Gentlemen:

We the undersigned owners of property in the eastern part of Chapel Street hear it rumored that we are to be assessed in addition to our regular town tax a certain percentage per foot on our property for the building of the Bridge at the foot of said St.

Now gentlemen, if this is true we do most earnestly protest against such assessment for the following reasons, to wit:

First. Among said owners of property are four or five widows and many men of limited means and small incomes on whom this tax, be it small or great, will fall heavily. Especially at this time when we have so recently been assessed for pavement and sewers.

Second. In our judgment men doing business and living in other parts of the city are equally benefited with us.

Third. Business men and others residing in the extreme northeast part of Fair Haven will find this new thoroughfare to the steamboat open to them. Will they not be more benefited thereby than ourselves?

We pray you gentlemen to consider the above reasons in the light of justice alone and exempt us as we in duty bound will ever pray.

The implication in some of the other documents is that the petitions were effective and the bridge was paid for by a general assessment. Certainly the bridge did what the petitioners claimed it would. The section of Fair Haven opened up by the bridge was first built up with housing and, as industry in New Haven grew, it too spilled over the bridge. Today, there is a mixed residential-industrial neighborhood.

The 1869 bridge remained in place until the present structure was built to replace it in 1899.

Portions of the center pier and abutments were retained from the previous structure. Several of the timber pilings for the fender pier had to be cut below areas of decay. Abutments were improved by covering them with concrete. The fender for the east abutment was rebuilt, requiring new timber piers and framework. It is also believed that similar work was done to the west abutment.

B. DESCRIPTION OF THE EXISTING STRUCTURE

The Chapel Street Bridge over the Mill River in New Haven was built in 1899 as a replacement for an earlier swing bridge built in 1869. The bridge is a single span, pin connected, through truss of the Camelback configuration. The present bridge has a structure length of 225.50 feet, excluding the two fixed ramp sections which jut out from shore and are supported by pilings. The roadway width is 33 feet, and there are 7-foot sidewalks on both sides of the bridge. Much, if not all, of the bridge was built by the Elmira Bridge Company. The top chord is arched but made up of five straight members. The two main sections are just over 85 feet long. The two end sections are 28 feet long each, and the top section is just over 19 feet.

The floor system consists of steel grating (concrete filled over turning machinery) supported by transverse channels which rest on longitudinal stringers framed into the floor beams. The floor beams are hung from the pinned lower chord panel points of the truss with "U"-bolt hangers and have cantilever sections outside the trusses to support the sidewalks. The existing roadway contains two 16 feet, 6-inch wide traffic lanes. The sidewalks consist of asphalt topping on wood planking carried by steel stringers, which in turn are carried by the floor beam cantilevers.

The bridge superstructure is symmetrical with 13 panels. Each of the six panels on each side of the bridge have different measurements. The center panel makes 13 panels in all.

The end panels have a bottom chord of just over 16 feet 10 inches. There are no top chords as the tops of these panels are actually diagonals,

measuring 28 feet 11 inches and angled 53 degrees to meet the next panel. The inside vertical chords measure just over 21 feet 20 inches.

The next panels toward the center have top chords of 17 feet, bottom chords of 16 feet 10 inches, outside vertical chords of 21 feet 10 inches, and inside vertical chords of 24 feet 1 inch. Diagonals are 29 feet 8 inches.

The next panels toward the center have top chords of 17 feet and bottom chords of 16 feet 10 inches, outside vertical chords of 24 feet 1 inch, and inside vertical chords of 26 feet 3 inch. Diagonals are just over 31 feet 5 inches.

The next panels toward the center have top chords of 17 feet and bottom chords of 16 feet 10 inches, outside vertical chords of 26 feet 3 inches, and inside vertical chords of just over 28 feet 8 inches. Diagonals are 33 feet 5 inches.

The next panels toward the center have top chords of 17 feet and bottom chords of 16 feet 10 inches, outside vertical chords of 28 feet 8 inches, and inside vertical chords of 31 feet. Diagonals are 35 feet 5 inches.

The next panels toward the center have top chords of 17 feet and bottom chords of 16 feet 10 inches, outside vertical chords of 32 feet, and inside vertical chords of 33 feet 6 inches. Diagonals are 37 feet 6 inches (see HAER Photograph No. CT-42-35).

The bridge rests on a pivot pier, having a diameter of 35 feet 8 inches. The pivot pier is enclosed by a fender system with the length measuring 141 feet 9 inches, and the width measuring 56 feet 4 inches.

The Chapel Street Bridge is a Camelback truss, a variation of the Pratt truss, and was used on many railroad bridges in the late 19th century. Like the Pratt, it was vertical members in compression and diagonal members in tension. On this truss, the diagonals in the second, third, eleventh, and twelfth panels are heavy, fabricated members, while all other diagonals are pinned eyebars. This may well be because of the extra stress on the unsupported ends.

Since construction, there have been many repairs and changes made to the bridge. Several of the main shaft bearings were replaced in 1921, fenders were put on the abutments in 1923 and, in 1930, solid additions replaced the abutment fenders. In 1942, a new fender was put on the pivot pier and repairs made to the gate chambers and flooring. More repairs were made to the flooring in 1972. The bridge has been damaged and put out of commission several times by barges hitting the pivot pier. Some of the original motors have been rebuilt, control units have been replaced

several times, and the end lift mechanisms have been both repaired and replaced. The bridge has been out of commission since July 1987, waiting for repairs to one of the end lifts.

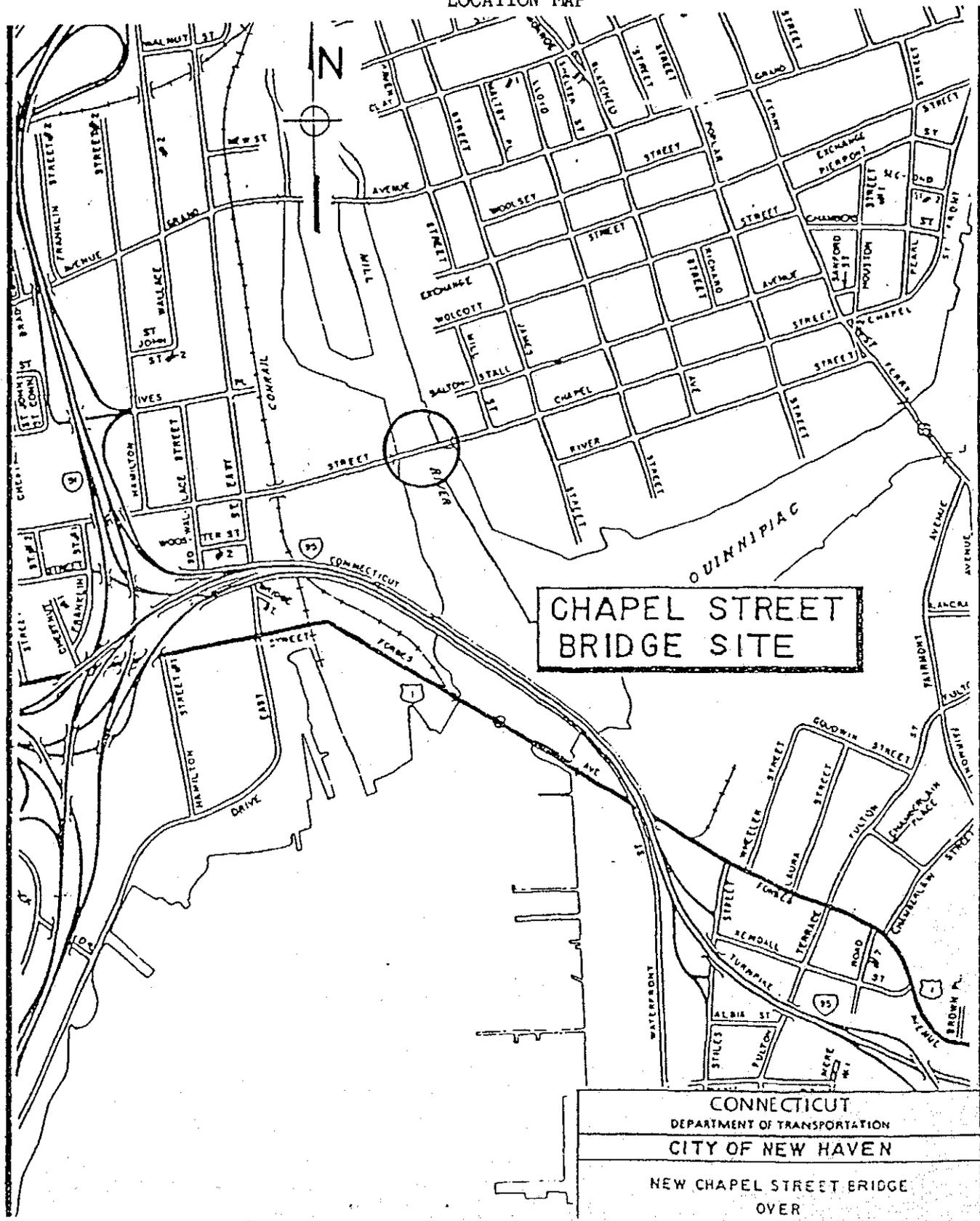
C. BIBLIOGRAPHY

- Aber, John
1971 A History of the Mill River. Typescript.
New Haven Historical Society.
- Atwater, Edward Elias, ed.
1887 History of the City of New Haven to the Present Time.
New York: W. W. Munsell.
- Barber, John Warner
1856 History and Antiquities of New Haven From Its Earliest
Settlement to the Present Time. New Haven: J. H. Benham.
- Bartlett, Ellen String
1897 Historical Sketches of New Haven.
New Haven: Tuttle, Morehouse & Taylor.
- Comp, T. Allan and Donald C. Jackson
1977 Bridge Truss Types: a Guide to Dating and Identifying.
- Osterweis, Rollin Gustav
1953 Three Centuries of New Haven, 1638-1938.
New Haven: Yale University Press.
- Rockey, J. L., ed.
1892 History of New Haven County, Connecticut.
New York: W. W. Preston.
- Town, Ithiel
1839 A description of Ithiel Town's improvement in the principle,
construction, and practical execution of bridges . . .
- Manuscript records of the New Haven Historical Society Library.
Engineering records at the Connecticut Department of Transportation.
- Consultant: Dr. Frederic W. Warner
Connecticut Archaeological Survey, Inc.
1615 Stanley Street
New Britain, Connecticut 06050

1000 SHEET PROTECTOR MY-13

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LOCATION MAP



CHAPEL STREET
BRIDGE SITE

CONNECTICUT
DEPARTMENT OF TRANSPORTATION
CITY OF NEW HAVEN
NEW CHAPEL STREET BRIDGE
OVER