

# FORM F – STRUCTURE (BRIDGE)

MASSACHUSETTS HISTORICAL COMMISSION  
MASSACHUSETTS ARCHIVES BUILDING  
220 MORRISSEY BOULEVARD  
BOSTON, MASSACHUSETTS 02125

Assessor's Number    USGS Quad    Area(s)    Form Number

**Town**    Holyoke

**Place** (*neighborhood or village*)    The Flats

## Photograph

- Site Sketch & Key to Photos, see Continuation Sheet 3
- Photographs, see Continuation Sheets 4-7

**Street/Route**    Pan Am Southern Railroad [former Connecticut River Railroad (CRRR); Boston & Maine Railroad (B&MRR)]

**Carried over**    Mosher Street  
(Railroad, river, brook, canal or road)

**Historic/Common name**    CRRR, B&MRR Bridge 7.89/ Pan Am Southern RR Bridge 7.89

**Ownership**    Private: Pan Am Southern Railroad  
(Name of state agency or municipality)

**Mass. Highway bridge no.**    N/A

**Bridge type**    Steel multi-beam system (a.k.a. steel stringer)

**Bridge typology code**    1            2            1            11

**Date of Construction**    1883, 1929

**Source**    Boston & Maine Railroad Engineering Department Fitchburg Division Bridge List Main Track Structures, 1956.

**Engineer/Designer**    CRRR Chief Engineer Wm. B. Harris (assumed for 1883 components); B&MRR Engineering Department; Plans dated 2-20-29; Boston Bridge Works, Inc. Plans dated 1-16-29

**Bridge company/Contractor**    Boston Bridge Works, Inc.

**Material (s)**    Steel, wood, stone, concrete

**Alterations** (*with dates*)    Original crossing at grade or bridge of unknown design replaced 1883 with iron deck stringer bridge (elements remain); 1883 bridge reconstructed with heavier steel members, 1929.

**Posted load limit** (*if any*)    N/A

**Condition**    Fair to good. Bridge is in use by Pan Am Southern Railroad for freight traffic.

**Moved**     no     yes    **Date**

**Acreage**    less than 1 acre; part of linear railroad parcel

**Setting**    Urban mixed-use area with industrial, commercial, residential land uses adjacent or near. Bridge rests on stone abutments and retaining walls that support elevated earth-fill railroad embankment built in conjunction with adjacent B&M Railroad Station in 1883, now abandoned.

## Topographic or Assessor's Map

- USGS Topographic Map, see Continuation Sheet 1
- Holyoke Property Tax Map, see Continuation Sheet 2

**UTM Reference**    18.698009.4675409

**Recorded by**    Richard M. Casella

**Organization:**    Historic Documentation Company, Inc.

**Date** (*month / year*)    10/2014

## STRUCTURE FORM (BRIDGE)

### Superstructure

Overall length: 54'-2"      Deck width: 48'-5"      Skew: 0  
Main unit No. of spans: 3      Span length: 18'-2"; 17'-6"; 17'-0" (c. to c. of bearings)  
Approaches: No. of spans: 0      Span length n/a

### Substructure (*structure below deck*)

Height above feature spanned: 11'-5"      Material of abutments or piers: Stone abutments; iron and/or steel bents

### ENGINEERING/DESIGN ASSESSMENT   Y   *see continuation sheet*

*Describe important design features and evaluate in terms of other bridges within the community or region.*

Pan Am Bridge 7.89 is a three-span steel stringer deck bridge designed to carry three lines of track. [Refer to Figures 4, 5, 6]. The three spans are approximately 17', 17'-6" and 18' in length between bearings. The stringer spans are carried on granite abutments and two steel framed bents. The bents are approximately 55' wide overall, consisting of five columns forming four bays: the easterly bay is 16' wide; the other three bays are 13' wide. The east bay of the bents predates the other bays as evidenced by its structural design and materials: the columns are built-up with channels, tie-plates and lacing bars and carry a plate-girder cross beam (or floor beam), "let-in" between the channels at the top of the column. The two extant stringers are built-up plate-girder stringers hung between the cross beams on flange brackets with their top flanges flush with the top flange of the cross beam. This earlier bent carried a sidewalk and utility pipes during the 20<sup>th</sup> c. and evidently dates to 1883 when the adjacent railroad station designed by H.H. Richardson (MHC Form HLY.41) was constructed by the Connecticut River Railroad and the line rebuilt and elevated to eliminate several street crossings at grade. The original design of the 1883 Mosher St. Bridge was not determined, but it was most likely a 3-bay repetition of the surviving frame. The three bays of the bents built in 1929 represent typical construction of that time, consisting of heavy rolled steel H-columns carrying transverse cross beams (referred to by others as floor beams) framed between the columns with brackets. The cross beams are 33" deep I-beams. Each cross beam carries six 14" wide-flange stringers, grouped three under each line of track. Only one active line of track remains, carried by the middle bent. The stringers carry a solid wood tie deck.

► *Go to Continuation Sheet Page 8*

### HISTORICAL NARRATIVE   Y   *see continuation sheet*

*Explain the history of bridge and how it relates to the development of the community.*

Pan Am Bridge 7.89 was built in part in 1883 by the Connecticut River Railroad, and in 1929 by the Boston & Maine Railroad (Connecticut River Line, Fitchburg Division). The line operated independently as the Connecticut River Railroad (CRRR), from 1846 until 1893 when the Boston & Maine Railroad (B&MRR) acquired operation of the line through a lease arrangement. The origin of the CRRR began in 1842 when the Northampton & Springfield Railroad was chartered to build a line along the Connecticut River between those towns. In 1845, with construction nearly completed, the line merged with the chartered but unbuilt Greenfield and Northampton Railroad, forming the Connecticut River Railroad Company. The line opened to Northampton in late 1845, to Deerfield in August 1846, to Greenfield in November 1846, and to South Vernon, Vermont in January 1849. At South Vernon the CRRR joined the Vermont & Massachusetts Railroad, giving the line thru service between Springfield and Brattleboro beginning in 1850. In 1877 the CRRR began a program of expansion, first acquiring the Vermont Valley Railroad from Brattleboro to Bellows Falls, then the Sullivan County Railroad from Bellows Falls to Windsor, Vermont, then the Connecticut & Passumpsic Rivers Railroad from White River Junction to the Canadian border at Newport, and finally the St. Johnsbury & Lake Champlain Railroad from St. Johnsbury west to Swanton.

► *Go to Continuation Sheet Page 8*

### BIBLIOGRAPHY and/or REFERENCES   Y   *see continuation sheet*

Massachusetts Bay Transportation Authority Bridge Rating, Pan Am Southern Connecticut River Mainline (CRML) over Mosher Street, Holyoke, MA, Pan Am Bridge No. 07.89, Mile Point 07.89. Prepared by HNTB Corporation, Boston MA. August 2013. [Cited as HNTB Rating Report, 2013].

► *Go to Continuation Sheet Page 9*

  ✓   Recommended for listing in the National Register of Historic Places. *If checked, you must attach a completed National Register Criteria Statement form.*

**INVENTORY FORM CONTINUATION SHEET**

[HOLYOKE] [Pan Am Southern Railroad Bridge 7.89]

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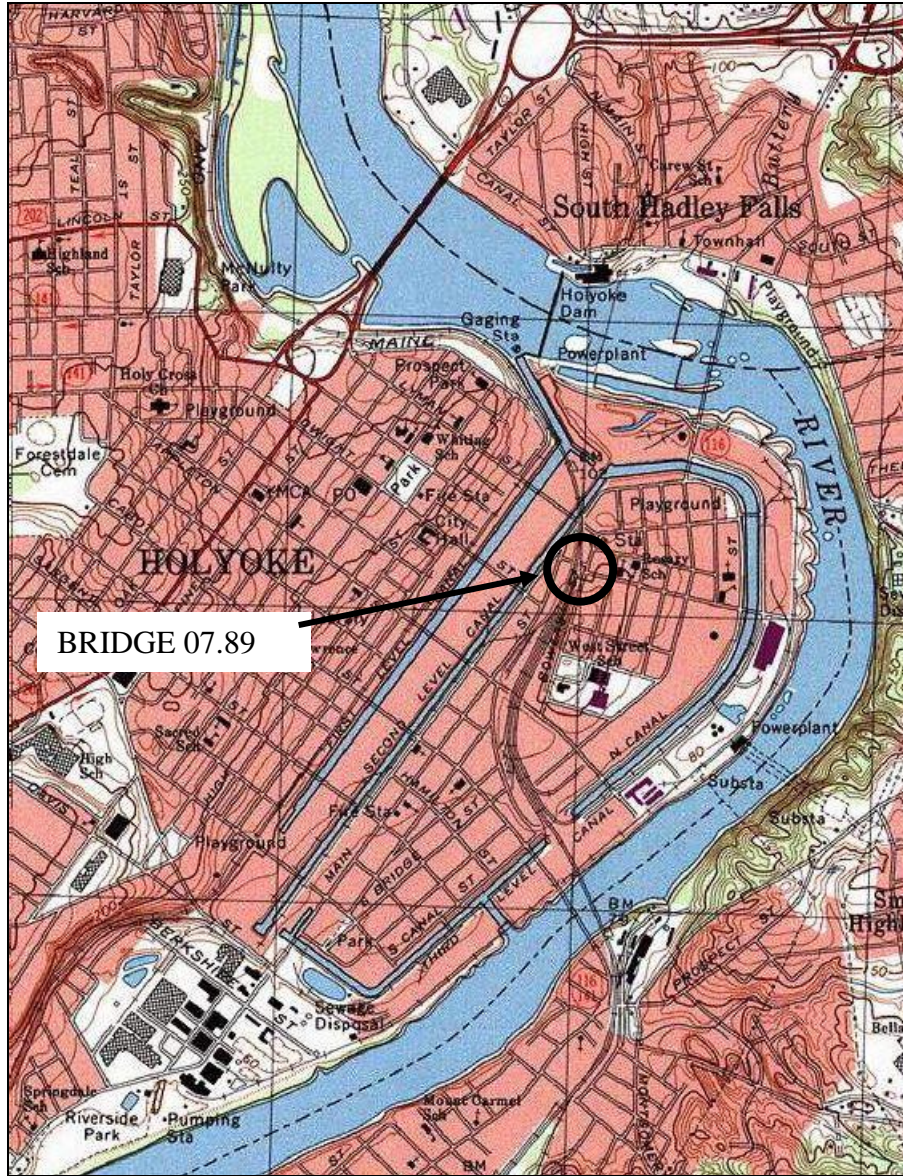


Figure 1: Topographic Location Map (source: Springfield North MA 7.5 min. quadrangle 1979)

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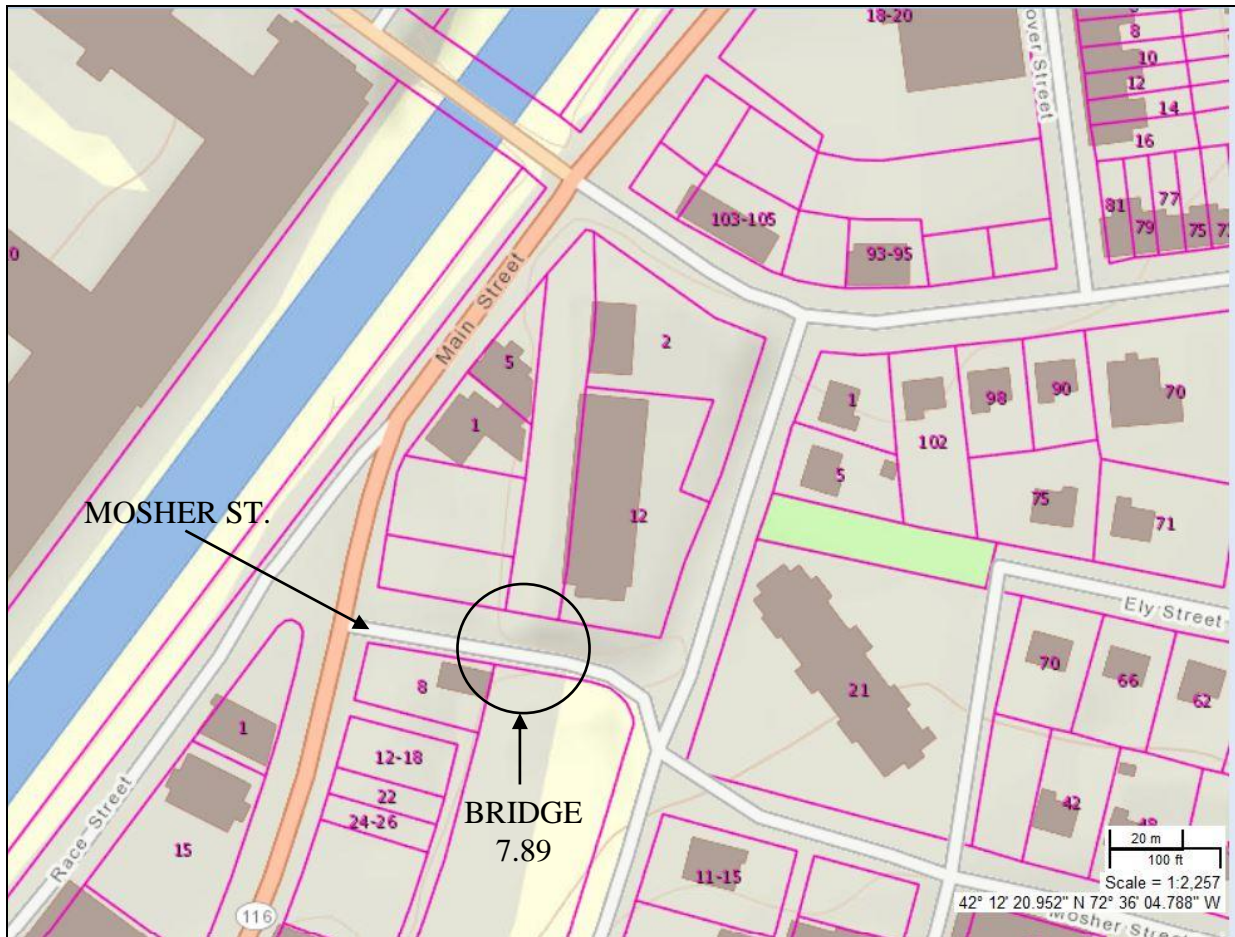


Figure 2: Location Map – Holyoke GIS Tax Parcel Map (source: OLIVER: MassGIS Online Mapping)

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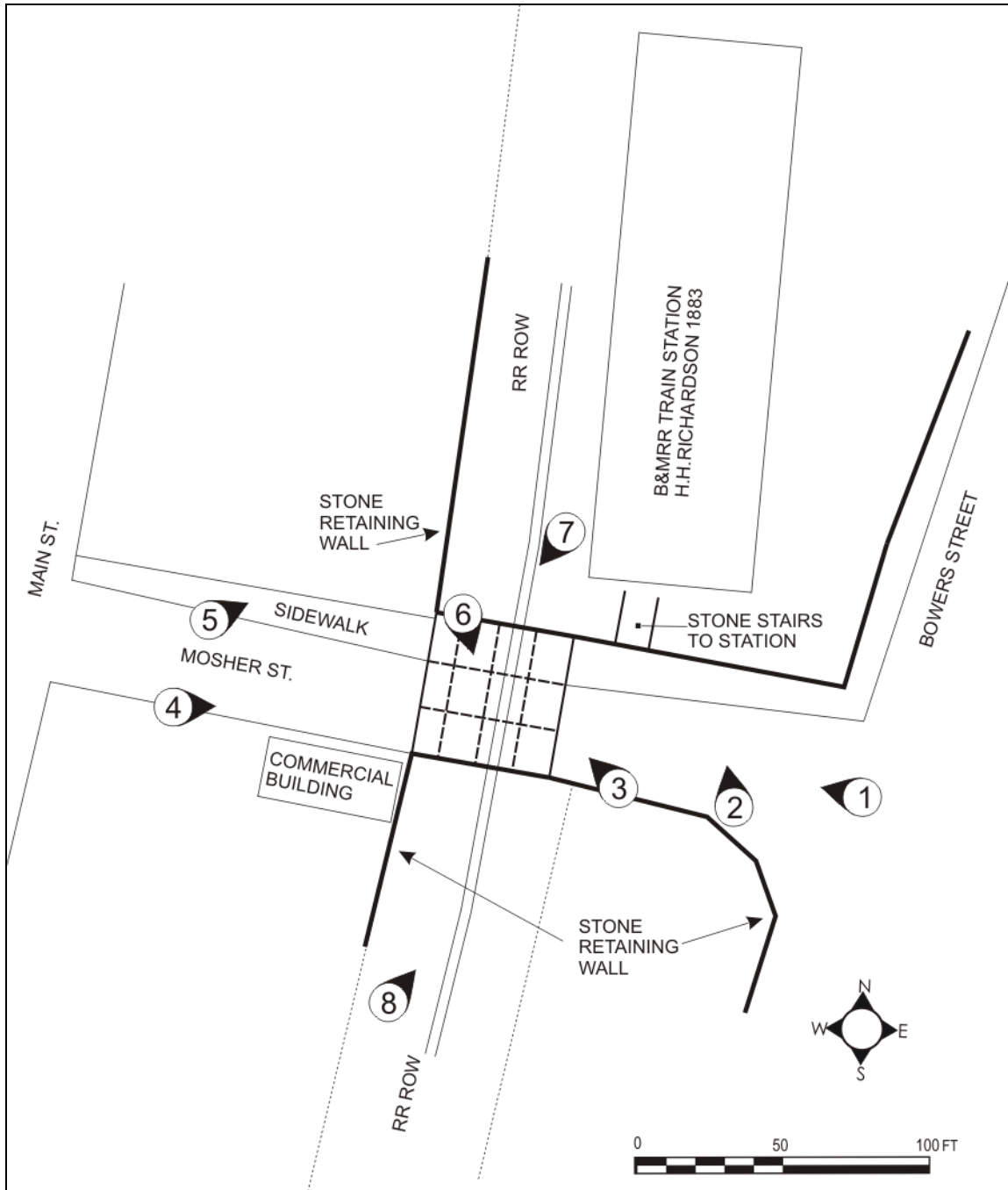


Figure 3: Site Sketch & Key to Photos

**INVENTORY FORM CONTINUATION SHEET**

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Photo No. 1: East elevation and approach from Bowers St. Note elevated sidewalk under north span. Looking W.



Photo No. 2: Sidewalk, retaining wall, and stone stairs to Train Station, visible at right. Looking N.

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Photo No. 3: Steel bents, showing remaining older frame with built-up column and floor beam at east end of bent. Looking NW.



Photo No. 4: West elevation and approach from Main St. Looking E.

**INVENTORY FORM CONTINUATION SHEET**

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Photo No. 5: Detail of north abutment stonework and retaining wall supporting elevated track bed. Looking NE.



Photo No. 6: Detail of steel bent, built 1929, with rolled columns and floor beam. Looking SE.



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Photo No. 7: Bridge deck, showing solid wood tie construction. Looking SW.



Photo No. 8: Bridge deck, showing rail approach from south and former railroad station in background. Looking N.

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**ENGINEERING/DESIGN ASSESSMENT (continued).**

The abutments are constructed of cut granite, consisting of large squared blocks, rough faced, laid with tight mortared joints in even courses. This ashlar masonry extends as wing walls to meet stone retaining walls that support the elevated railroad bed. The retaining walls are also of granite construction but of a lower class of masonry, consisting of random quarry-split stones of varying sizes with little coursing.

*Engineering/Design Significance Summary:*

The 1929 portion of Bridge 7.89, carrying the three track spans – constituting perhaps 90% of the overall bridge structure – represents typical 20<sup>th</sup> century steel stringer railroad bridge design. With minor exceptions, the engineering technology can be considered common to dozens of other Massachusetts railroad bridges of the period. The columns, cross beams and stringers are all heavy rolled members of the wide-flange beam type introduced and widely adopted for bridges in the early 20<sup>th</sup> century. The wide-flange stringer was commonly used by the B&MRR to increase load carrying capacity of bridges in the period from the late 1920s to the 1950s for spans under 20'. Examples, however, on the Connecticut River Line, are actually few. According to the B&MRR Track Structures List, dated 1956, two other I-beam stringer bridges were extant on the line at that time; both survive today. Bridge 7.55, Appleton St., Holyoke, built 1929, is a three-span structure of similar design to 7.89 except wider to carry additional lines of track (siding tracks). Bridge 20.84 (Bridge St., West Hatfield, 1929) is single span, with the stringers carried on stone abutments. As multi-span structures, Bridge 7.55 and 7.89 (subject bridge) are good examples of the type since they include steel bents which provide a representation of the engineering design of that feature at that time.

The c.1883 section of the bridge, consisting of the east bent frame that most recently carrying a sidewalk and utility line, represents a less common engineering type, at least in terms of the Connecticut River Railroad line and certainly in terms of surviving examples today. The metal structural elements may be wrought iron or steel; if steel they would represent an early application since it was not until after about 1890 that structural steel widely replaced the use wrought iron. The cast iron column shoes are a characteristic feature of the wrought-iron bridge type, but were utilized with steel construction as well. The use of riveted plate-girders as stringers reflects the limited depth to which rolled-I-beams could be fabricated at the time. The inseting of the plate-girder cross beam between the channel members of the column, although not of particular engineering significance, is an unusual feature, providing an example of a specific design and fabrication practice of the time. Other similar surviving examples of this period and type of bridge technology were not identified along the CRRR line.

The bridge is primarily an example of a standard railroad bridge type built during the first half of the 20<sup>th</sup> century. The small portion of the superstructure built in 1883 that remains is representative of late 19<sup>th</sup> c. iron bridge engineering technology. The cut granite abutments, and the retaining walls and stairs integral to the 1883 grade elevation and station construction project, survive in original condition and provide excellent examples of the high quality masonry work employed in all aspects of the 1883 project. Although the bridge itself arguably lacks the importance necessary for individual listing in the National Register, the property is an important contributing element of a potentially eligible Connecticut River Railroad Station historic district, contributing to both the history (Criterion A) and engineering (Criterion C) of the district.

**HISTORICAL NARRATIVE (continued)**

By 1890 the CRRR was an important link in the passenger route between New York City and Montreal and a profitable freight line serving a large swath of western New England. In 1893 the management of the New York, New Haven & Hartford (New Haven) saw the rich opportunity and negotiated the lease of the CRRR, obtaining an agreement signed by the presidents of both railroads. But the lease required the approval of the stockholders, and through an exceedingly clever and secret program of CRRR stock acquisition by the Boston & Maine Railroad, the lease was snatched away from the unwary New Haven management. In referring to the deal, the Massachusetts Railroad Commission stated that "no more unconscionable transaction has occurred in the railroad history of the State."<sup>1</sup>

The Boston & Maine Railroad (B&MRR) had begun an expansion program in 1884 with acquisition of the Eastern Railroad, followed by the Worcester, Nashua & Rochester Railroad, the Boston & Lowell, the Connecticut River and the Concord & Montreal. The leasing of the Fitchburg Railroad in 1900 added 458 miles to the B&MRR system, which with the CRRR and other smaller lines gave the B&M over 795 miles of track in northern Massachusetts, enabled connections with lines west of the Hudson, and brought the B&M to its mature size.<sup>2</sup> The B&MRR continued to upgrade its track, bridges, stations, yards and other facilities up to about World War II, after which a sharp decline in

<sup>1</sup> Massachusetts Railroad Commissioners Report of 1893, as quoted in Baker, 1937, p. 174.

<sup>2</sup> Baker, 1937, p. 176.

# INVENTORY FORM CONTINUATION SHEET

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business led to the abandonment of many lines. The B&MRR became part of Guilford Transportation Industries in 1983 which changed its name to Pan Am Railways in 2006.

## *Historical Significance Summary:*

Pan Am Bridge 7.89 was built in 1883, with later reconstruction of most of the superstructure in 1929. The bridge was constructed as part of a comprehensive improvement and upgrading of the line through Holyoke. The centerpiece of the project was the construction of a new passenger station and depot, designed by H.H. Richardson (MHC Form HLY.41). The line was elevated to eliminate several street crossings at grade, making it a very early example of a grade elimination project. Immediately north of the station a significant truss bridge was erected over Lyman Street (MHC Form HLY.908, rebuilt 1928); immediately south of the station is the subject bridge over Mosher Street, built with stone stairs and retaining walls integral with the station. Several blocks further south is Pan Am Bridge 7.55, carrying the line over Appleton Street, a bridge similar to Mosher Street, also built 1883 and rebuilt 1929. Together these resources comprise a cohesive collection of railroad resources, significant in the history of the City of Holyoke, the transportation history of Massachusetts and the architectural and engineering of railroad stations and bridges. They comprise a potentially eligible National Register district centered on the station (Connecticut River Railroad Holyoke Station Historic District).

Pan Am Bridge 7.89 therefore meet the necessary historical significance for listing in the National Register under Criterion A and C as a contributing resource in a potentially eligible historic district.

## BIBLIOGRAPHY

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Skinner, Frank W., *Types and Details of Bridge Construction* (New York: McGraw Publishing Company, 1906).

W. C. Thompson. *The Design of Typical Steel Railway Bridges*, (New York: McGraw-Hill Book Company 1908), p. 17.

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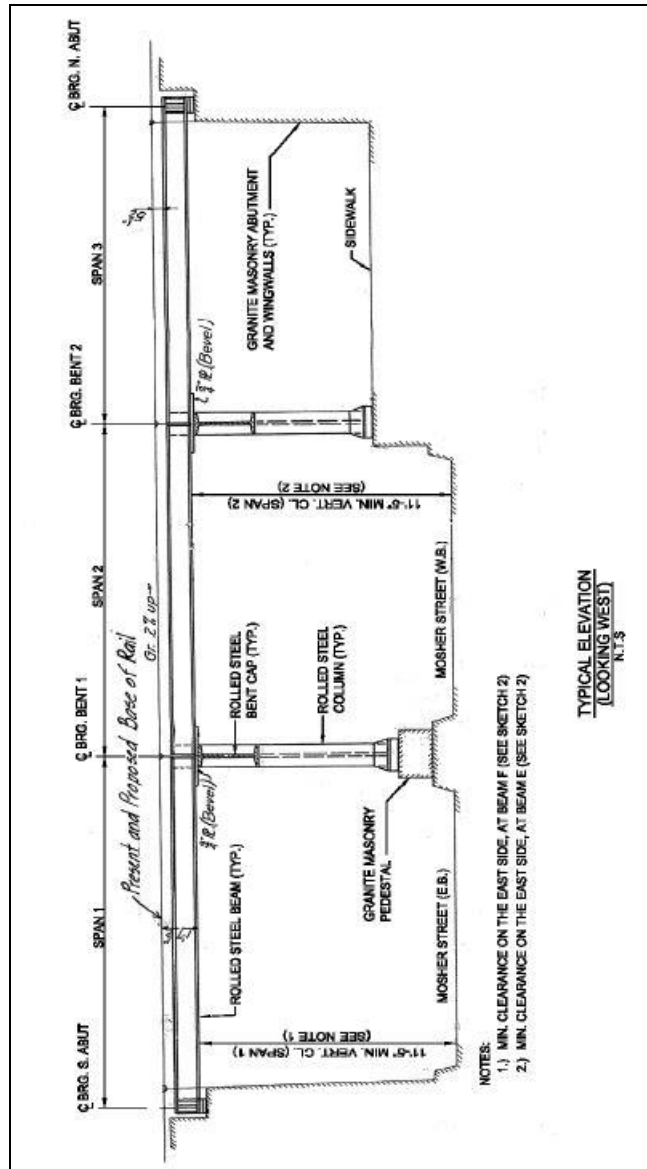


Figure 4: Typical Elevation (source: HTNB Bridge Load Rating Report, August 2013).

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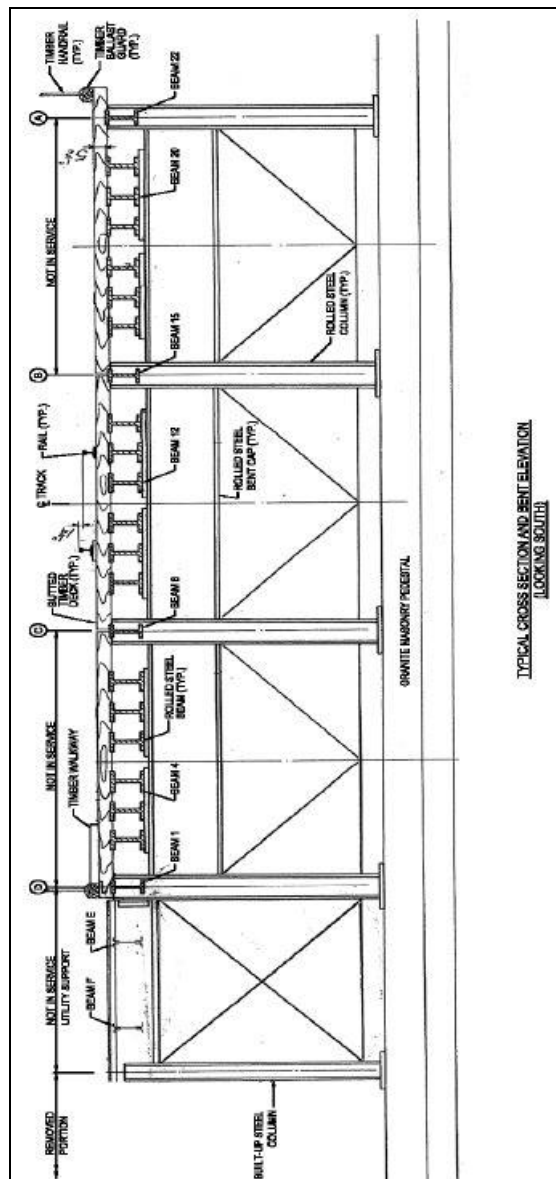


Figure 5: Typical Cross Section. Easternmost frame of bent, shown at left of figure, evidently remains from 1883 construction; other three frames are 1929 construction (source: HTNB Bridge Load Rating Report, August 2013).

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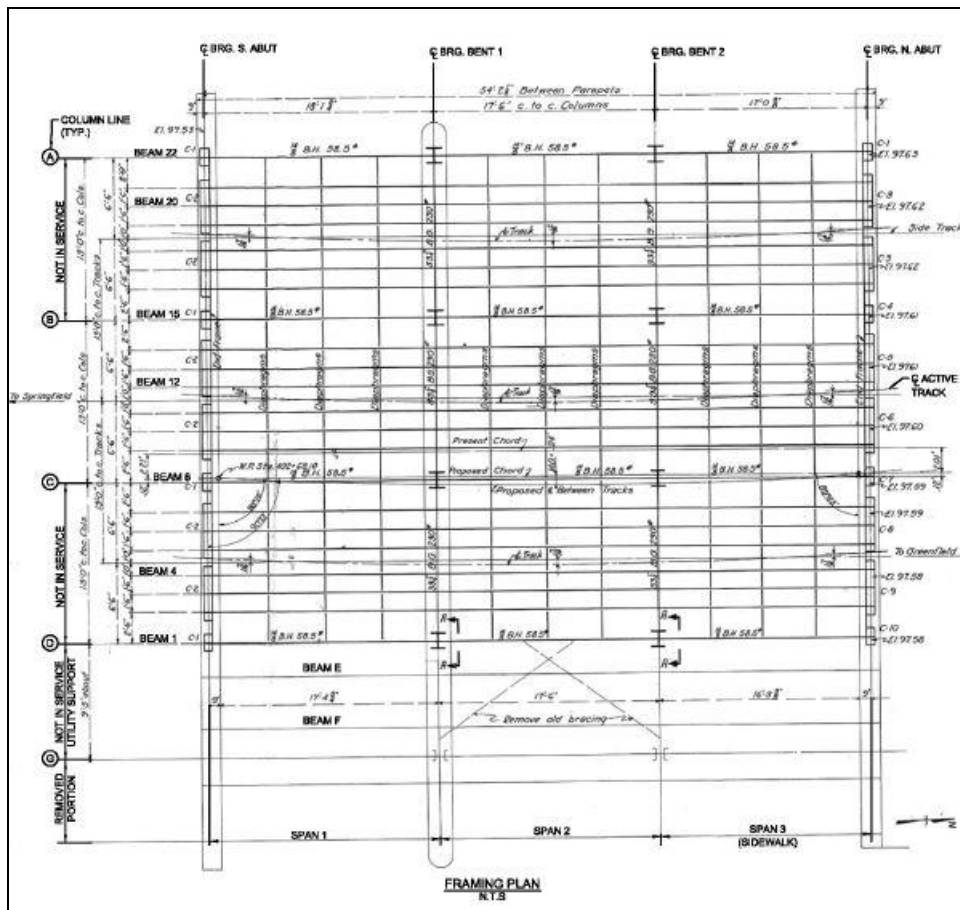


Figure 6: Framing Plan (source: HTNB Bridge Load Rating Report, August 2013).

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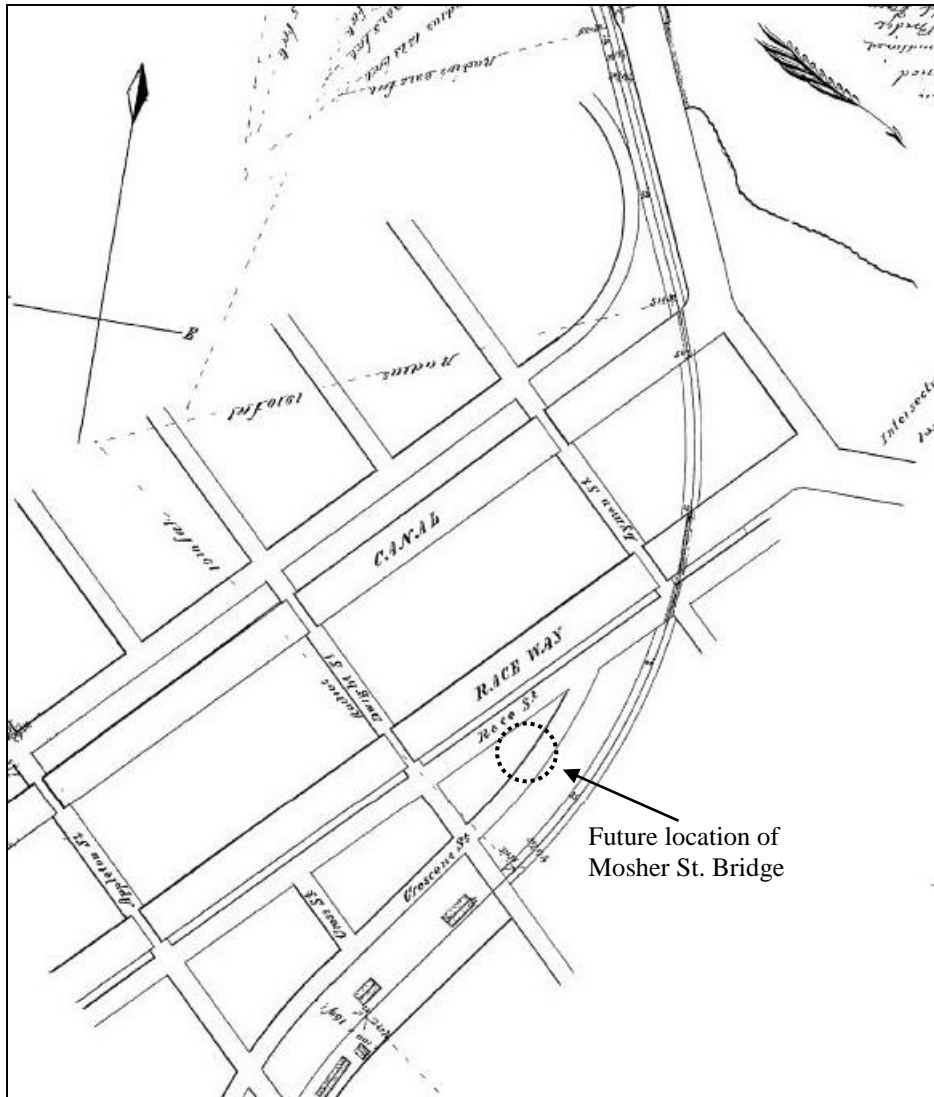


Figure 7: Plan Connecticut River Railroad in City of Holyoke, April 16, 1849, showing original track layout before elevation of line and building of new (1883) station. Note that Mosher Street is not present; Dwight Street crossing is at grade. (Source: Railroad Index Book, Hampton County Register of Deeds, Shelf 10, p. 1, April 16, 1849. Hampton County Railroad Project, digital record, pg. 787).

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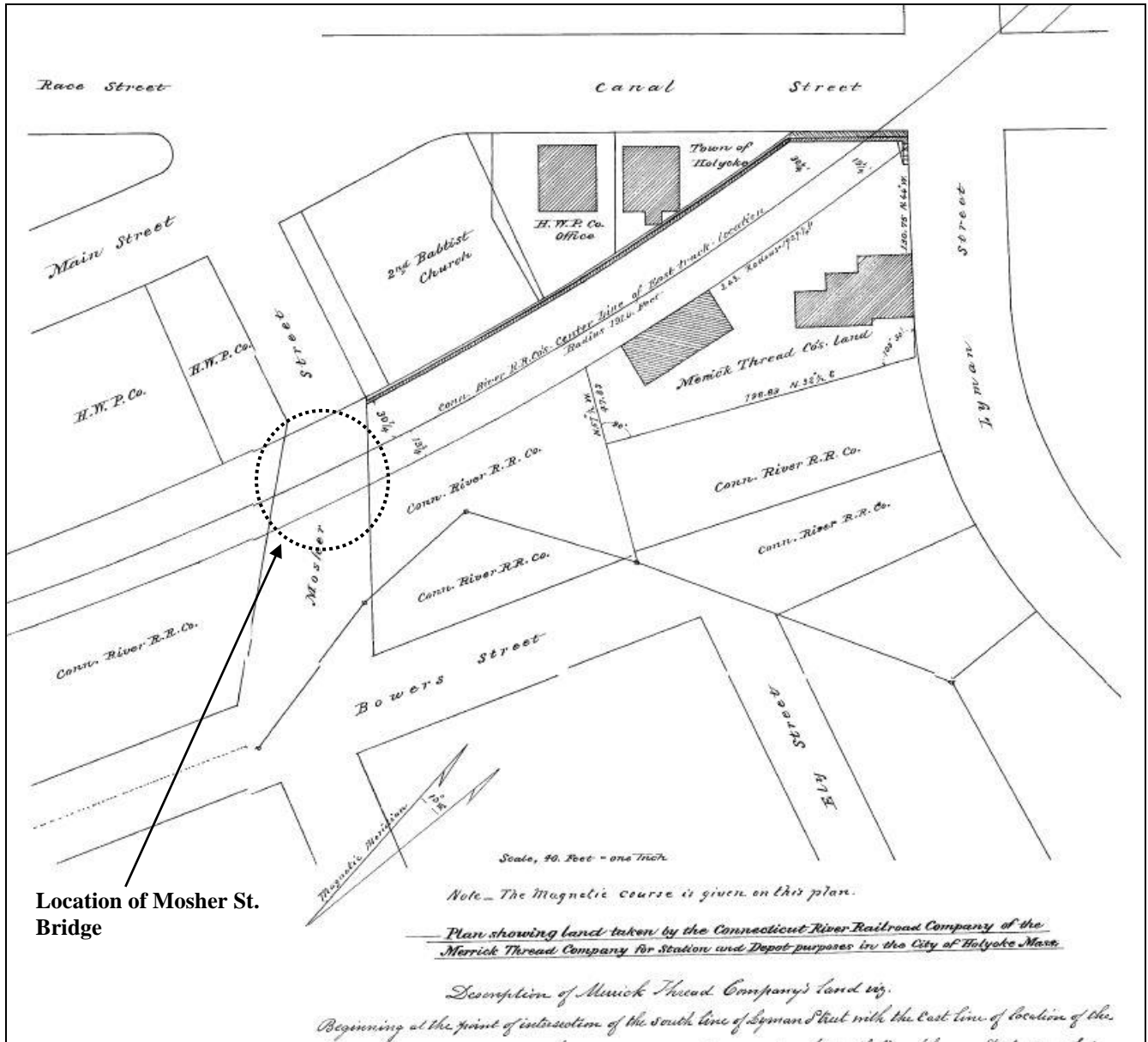


Figure 8: "Plan showing land taken by Connecticut River Railroad Company of the Merrimack thread Company for Station and Depot purposes in the City of Holyoke, Mass." Prepared by CRRR Chief Engineer Wm. B. Harris, October 4, 1883. Note Moshers Street now present. (Source: Railroad Index Book, Hampton County Register of Deeds, Shelf 10, p. 3, February 18, 1884. Hampton County Railroad Project, digital record, pg. 791).



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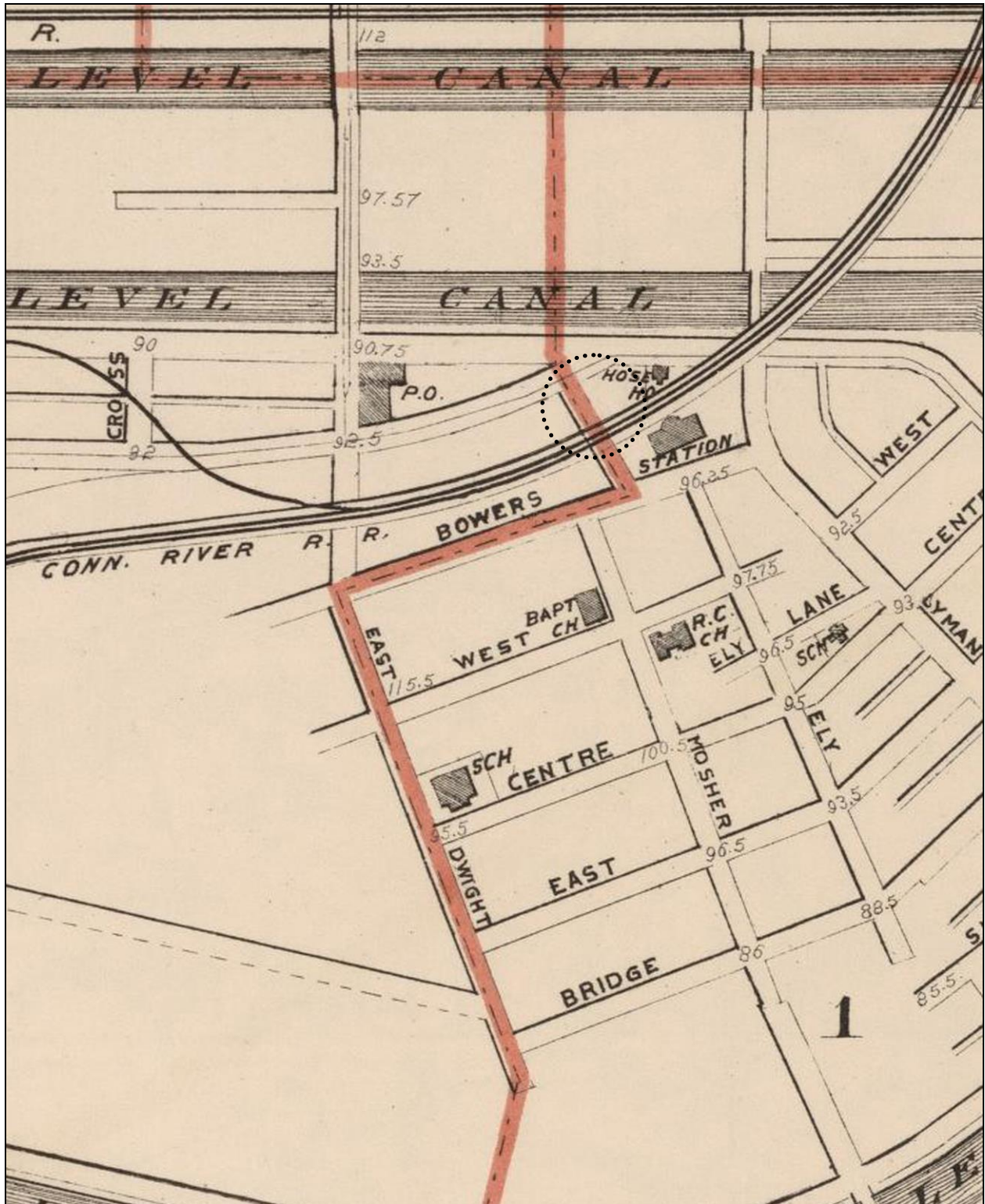


Figure 9: Map of City of Holyoke, 1891 showing completion of improvements to the line including elevation, construction of the new station and overpass bridges at Moshier and Dwight streets. Dashed circle denotes Moshier Street bridge location. (Source: Geo. H. Walker & Co. 1891).

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## National Register of Historic Places Criteria Statement Form

Check all that apply:

- Individually eligible       Eligible **only** in a historic district  
 Contributing to a potential historic district       Potential historic district

Criteria:     **A**     **B**     **C**     **D**

Criteria Considerations:     **A**     **B**     **C**     **D**     **E**     **F**     **G**

Statement of Significance by Richard M. Casella

*The criteria that are checked in the above sections must be justified here.*

The bridge is primarily an example of a standard railroad bridge type built during the first half of the 20<sup>th</sup> century. The small portion of the superstructure built in 1883 that remains is representative of late 19<sup>th</sup> c. iron bridge engineering technology. The cut granite abutments, and the retaining walls and stairs integral to the 1883 grade elevation and station construction project, survive in original condition and provide excellent examples of the high quality masonry work employed in all aspects of the 1883 project. Although the bridge itself arguably lacks the importance necessary for individual listing in the National Register, the property is an important contributing element of a potentially eligible Connecticut River Railroad Station historic district, contributing to both the history (Criterion A) and engineering (Criterion C) of the district.

Pan Am Bridge 7.89 was built in 1883, with later reconstruction of most of the superstructure in 1929. The bridge was constructed as part of a comprehensive improvement and upgrading of the line through Holyoke. The centerpiece of the project was the construction of a new passenger station and depot, designed by H.H. Richardson (MHC Form HLY.41). The line was elevated to eliminate several street crossings at grade, making it a very early example of a grade elimination project. Immediately north of the station a significant truss bridge was erected over Lyman Street (MHC Form HLY.908, rebuilt 1928); immediately south of the station is the subject bridge over Mosher Street, built with stone stairs and retaining walls integral with the station. Several blocks further south is Pan Am Bridge 7.55 carrying the line over Appleton Street; it is a deck deck stringer bridge similar to Mosher Street also built 1883 and rebuilt 1929. Together these resources comprise a cohesive collection of railroad resources, significant in the history of the City of Holyoke, the transportation history of Massachusetts and the architectural and engineering history of railroad stations and bridges. They comprise a potentially eligible National Register district centered on the station [a proposed *Connecticut River Railroad Holyoke Station Historic District*].

Pan Am Bridge 7.89 therefore meet the necessary historical significance for listing in the National Register under Criterion A and C as a contributing resource in a potentially eligible historic district.