NPS Form 10-900 (Rev. 8-86)

United States Department of the Interior National Park Service

NATIONAL REGISTER OF HISTORIC PLACES REGISTRATION FORM

REGISTRATION FORM	NAT REGISTEN P			
1. Name of Property				
historic name: SHEFFIELD STREET BRIDGE				
other name/site number: Bridge No. 5038				
2. Location				
street & number: Sheffield Street over Har				
city/town: Waterbury	not for publication: N/A vicinity: Waterville			
state: CT county: New Haven	code: <u>009</u> zip code: <u>06704</u>			
3. Classification ====================================				
Category of Property: <u>structure</u>				
Number of Resources within Property:				
Contributing Noncontributing				
buildings sites structures objects Total				
Number of contributing resources previously Register: 0	listed in the National			
Name of related multiple property listing: _	N/A			

OMB No. 1024-0018

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4. State/F =======	ederal Agency Certification	. = = = = =		========
As the des of 1966, a request fo standards Historic P set forth	signated authority under the as amended, I hereby certify or determination of eligibility for registering properties of places and meets the procedure in 36 CFR Part 60. In my or not meet the National Regist	that to the thick the thick the thick the thick the thick the the thick the the the thick the the thick th	al Historic Preser his X nominations to the documentation National Register professional required the property X	vation Act on on of irements meets
	of certifying official		Date	
John W. Sha	nnahan, Director, Connecticut Hist	corical (Commission	
State or F	ederal agency and bureau			
	tion, the property meets riteria See continuati			National
Signature	of commenting or other offic	cial	Date	
	ederal agency and bureau		===========	=======
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enter deter Nati deter Nati	certify that this property is ed in the National Register See continuation sheet. The mined eligible for the onal Register See continuation sheet. The mined not eligible for the onal Register and red from the National Register and red from the National Register.		an H. Boall	4,12-0
other	(explain):		~	
			gnature of Keeper	Date of Action
6. Functio	n or Use			
	TRANSPORTATION			
Current:	Not in use	Sub:		
		- ·		

7. Description	
Architectural Classification:	
Other: lenticular pony truss	
Other Description: N/A	
Materials: foundation walls	roof other METAL: iron STONE
Describe present and historic physical app sheet.	earance. <u>X</u> See continuation
8. Statement of Significance Certifying official has considered the significance of t	======================================
Criteria Considerations (Exceptions) : N/	<u>A</u>
Areas of Significance: ENGINEERING INDUSTRY	
Period(s) of Significance: <u>1878-1900</u>	
Significant Dates: 1884	
Significant Person(s): N/A	
Cultural Affiliation: N/A	
Architect/Builder: <u>Berlin Iron Bridge Com</u>	pany (fabricator)

State significance of property, and justify criteria, criteria considerations, and areas and periods of significance noted above. $\underline{\mathbf{X}}$ See continuation sheet.

NATIONAL REGISTER OF HISTORIC PLACES CONTINUATION SHEET

Description

Sheffield Street Bridge
Waterbury, New Haven County, CT

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The Sheffield Street Bridge is a wrought-iron single-span lenticular pony truss built in 1884 by the Berlin Iron Bridge Company for the Town of Waterbury, Connecticut (Photographs 1-4). It crosses Hancock Brook in a wooded residential area just outside the built-up part of the section of town known as Waterville. The bridge measures 56 feet long and is 18 feet wide; it crosses the brook, which runs in a deep ravine, some 20 feet above the water, adjacent to an active quarrying operation. The truss is about eight feet deep at the center. Abutments are constructed of large pieces of randomly sized granite blocks, with a tooled mortar joint that probably dates back to about 1920. Currently out of service, the bridge has a wooden deck which is broken through in many places, and concrete traffic barriers have been placed across the west end.

All the major joints in the four-panel bridge are pinned connections (Photographs 5-7). The end posts and upper chord consist of 6" by 12" box girders formed from plates and angles; the open underside is braced only by stay plates spaced three feet apart. The lower chord, which imparts the bridge's distinctive lens-shaped profile by slanting up to meet the upper chord at the top of the end posts, consists of a pair of 3" eyebars. Verticals are all lattice girders. The middle panels have a diagonal cross-bracing of 7/8" tension rods with turnbuckles. The lower panel points are braced by means of an unusual longitudinal stiffener that extends the whole length of the bridge; it is formed of two parallel bars between which has been rivetted a series of diagonal bent bars (Photograph 8). The bridge has a railing of two slender rods bolted to the inside of the trusses.

The floor system consists of a wood-plank deck atop timber stringers, which in turn rest upon plate-girder floor beams that taper to greater depth at the center. The beams are held by U-shaped hangers, or "hairpins," that pass through the beam flanges and are held in place by plates and nuts. The floor beams are stabilized by rod cross-bracing beneath the roadway.

The bridge is almost entirely unaltered (except for deterioration) from its original appearance. In addition to the severely deteriorated deck, the bridge suffers from surface rusting (no vestige of paint remains) and loose tension members. Also, one end stiffener is severely distorted, and some sections of lower cross-bracing and railing are displaced.

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Significance

Sheffield Street Bridge Waterbury, New Haven County, CT 8-1

Summary

The Sheffield Street Bridge is significant as a representative example of late 19th-century bridge engineering (Criterion C) and as a product of the Berlin Iron Bridge Company, a major manufacturing concern and Connecticut's only large 19th-century bridge fabricator (Criterion A). Although the Berlin Iron Bridge Company built hundreds of bridges throughout the Northeast, relatively few have survived to the present; Sheffield Street Bridge is one of only 17 of the company's distinctive lenticular trusses remaining in its home state of Connecticut. Sheffield Street Bridge embodies many distinctive characteristics of the early years of metal-truss design, including wrought iron as the principal material, pinned connections, and an unusual truss pattern. By 1900, all of these features had virtually disappeared from American bridge building. In their place, a standardized design emerged for small highway bridges based on the use of steel members, rivetted connections, and only two major truss patterns, the Warren and the Pratt trusses. The Sheffield Street Bridge thus represents a rare survivor of the era before standardized design prevailed.

Engineering Significance

The Sheffield Street Bridge's lenticular truss was one of a myriad of patented designs that characterized the American bridge industry in its formative stage. In part, such designs were an attempt to improve the technology of bridge building, but they also served to distinguish the products of one fabricator from another. Berlin Iron Bridge's design offered some savings of material over a comparably sized Pratt truss, though the savings must have been largely offset by the greater complexity in fabricating the curved top chord's multiple angles. Equally important, the design's unique profile provided something distinctive that Berlin agents could exploit when trying to convince local highway officials of their product's superiority.

In other respects, the bridge is similar to the vast majority of its metal-truss contemporaries. In the 1880s, steel had not yet replaced wrought iron for structural forms, so most bridges of the 1880s and early 1890s were built with wrought-iron members. Similarly, pinned connections were only beginning to give way to rivetted joints. Pinned connections were popular because they simplified the erection of the bridge, requiring only large wrenches to join prefabricated members, instead of the more demanding technique of field rivetting. Many engineers also claimed that pinned joints allowed forces to be transferred less ambiguously, though all agreed that riveted bridges

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Significance

Sheffield Street Bridge Waterbury, New Haven County, CT 8-2

were more rigid. A final characteristic of the period evident in the Sheffield Street Bridge is the use of complicated details such as the unusual longitudinal struts and the tapered floor beams, both of which achieved a minor savings in material. Like the lenticular truss itself, such idiosyncratic details soon gave way to simpler, more standard forms.

The Berlin Iron Bridge Company

Unlike most American bridge firms, which were closely tied to iron and steel makers, Connecticut's leading manufacturer of bridges began as an offshoot of the tinware industry. Roys and Wilcox, an East Berlin maker of tinners' tools and other metal-forming machines, set up a company in 1868 to market sheet-iron products made with its rolling The Corrugated Metal Company, as it became known, produced roofing material and metal-clad firedoors and shutters. The company became involved in structural iron work when it began to provide roof trusses as well as the exterior material. The company was not particularly successful until a new investor in 1877, S. C. Wilcox, realized that the plant had the capacity to manufacture highway bridges. The following year, the Corrugated Metal Company purchased rights to William Douglas's patented "parabolic" truss and produced the first of the lenticular bridges that would soon dot the landscape of the Northeast. Douglas, educated at West Point, joined the company as treasurer and executive manager and continued to refine his design; he was awarded a second patent in 1885, two years after the company had changed its name to the Berlin Iron Bridge Company.

The late 19th century was a good time to be in the bridge business. As the industry developed, the price of iron trusses steadily dropped until they were competitive with wooden spans, especially when their superior durability and resistance to the ravages of high water were figured in (wooden bridges had an average lifetime of about 25 years). The only other alternative, for shorter spans only, was building in stone, which remained very expensive. Throughout America, local highway officials opted to replace their wooden bridges with iron, and firms such as the Berlin Iron Bridge Company were happy to oblige.

At its height, the Berlin Iron Bridge Company was probably the largest structural fabricator in New England. Some 400 workers were employed at its East Berlin plant (no longer extant), with many others employed as erectors during the construction season. There is no definitive count of the company's bridges, though at least 600 are known to have been completed during its first ten years. Most were in the Northeast, but even today Berlin trusses survive as far away as Texas. A few

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Significance

Sheffield Street Bridge Waterbury, New Haven County, CT

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multiple-span bridges were of tremendous size, but most were single-span bridges, with through-trusses for lengths over 100 feet and pony trusses, such as this bridge, for shorter spans. The lenticular design accounted for the bulk of the company's output, with other types of bridges, ironwork for roofs and buildings, and specialized industrial structures rounding out its line.

The Berlin Iron Bridge Company was absorbed in 1900 by the American Bridge Company, a largely successful attempt by J. P. Morgan to monopolize the country's structural fabricating industry. However, almost immediately a firm started by former Berlin Iron Bridge employees, the Berlin Construction Company, resumed the bridgebuilding business and quickly regained much of its predecessor's influence in the New England market; it remains in business today as Berlin Steel.

Of the hundreds of bridges known to have been built in Connecticut by the Berlin Iron Bridge Company, no more than 17 lenticular trusses survive, and two of these are scheduled for imminent removal. Although the bridges are similar, no two are exactly alike. The Sheffield Street Bridge, for example, preserves some details that are not commonly found in the company's other projects, such as the use of stay plates rather than lacing for the underside of the upper-chord box girder (also found in an earlier Waterbury bridge) and the lower end strut, an extremely rare and presumably difficult-to-fabricate component. Since 1981, at least six lenticular trusses are known to have been demolished in Connecticut. Sheffield Street Bridge is thus one of a dwindling number of heritage resources left to illustrate this important chapter in Connecticut industrial history.

Historical Background

Like many towns in the Northeast, the growing industrial city of Waterbury was a steady customer for the Berlin Iron Bridge Company. Even in the company's first year of operation, the city government began purchasing small bridges for the numerous brooks and streams that lay within the city limits, and the town government, responsible for bridges outside of the city limits (such as Sheffield Street), as well as the larger bridges within the city, bought exclusively from the Berlin company as well. Both city and town officials furnished testimonials for the company's 1889 catalog, and several engravings of Waterbury bridges graced its pages.

One catalog illustration (p. 38) almost certainly shows the Sheffield Street Bridge, since it matches it in every construction detail and dimension and is described as being in a "suburban" location. The town

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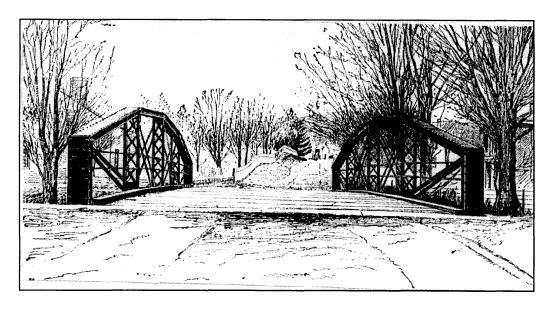
Significance

Sheffield Street Bridge Waterbury, New Haven County, CT

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report for 1885 lists expenditures for three Berlin bridges in Waterbury, two by name as well as \$2,050.00 for an unspecified project or projects. Since the Sheffield Street Bridge is not otherwise mentioned, it is likely that this sum represents the cost for this bridge. Typically, the town government hired the City of Waterbury's engineer to make a preliminary survey, bought the truss from the Berlin Iron Bridge Company, and erected both the masonry abutments and the bridge using contracted labor.

Waterville is an outlying industrial village within the Town of Waterbury. At the time the bridge was built, it had several large industrial enterprises, including cutlery and brass-pin factories. The heaviness of construction and the roadway width of the bridge are unusual in such a rural location, but Sheffield Street was at one time a major route from Waterville to points east. As explained in the 1889 catalog, the bridge was designed with the needs of manufacturers in mind, and so it was made to accommodate heavy loads and two lanes of traffic.



View of bridge, from Berlin Iron Bridge Company 1889 catalog

9. Major Bibliographical References	=======================================		
X See continuation sheet.			
Previous documentation on file (NPS):			
<pre>_ preliminary determination of individual listing (36 CFR 67) has been requested previously listed in the National Register _ previously determined eligible by the National Register _ designated a National Historic Landmark _ recorded by Historic American Buildings Survey # recorded by Historic American Engineering Record #</pre>			
Primary Location of Additional Data:			
<pre>X State historic preservation office X Other state agency Federal agency Local government University Other Specify Repository:</pre>	Connecticut Historical Commission 59 South Prospect Street Hartford, Connecticut 06106 Conn. Dept. of Transportation Newington, Connecticut 06111		
10. Geographical Data Acreage of Property: <u>less than one acre</u>			
UTM References: Zone Easting Northing	Zone Easting Northing		
A 18 662710 4606680 B C D See continuation sheet			
Verbal Boundary Description: See continuation sheet. The nominated property includes the bridge and its abutments.			
Boundary Justification: See continuation sheet. The boundary includes only the components of the bridge itself.			
11. Form Prepared By			
Name/Title: <u>Bruce Clouette and Hoang</u>			
Organization: <u>Historic Resource Consultation</u> Public Archaeology Survey			
Street & Number: P. O. Box 209	Telephone: <u>860-547-0268</u>		
City or Town: Storrs	State: <u>CT</u> Zip: <u>06268</u>		

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Bibliography Sheffield Street Bridge (Bridge No. 5038) 9-1 Waterbury, New Haven County, CT

Berlin Iron Bridge Company. Catalog, 1889.

- Clouette, Bruce and Matthew Roth. Connecticut's Historic Highway Bridges. Connecticut Department of Transportation: 1991.
- Connecticut Department of Transportation. Historic Bridge Inventory. 1991.
- Darnell, Victor. "Lenticular Bridges from East Berlin, Connecticut," *Industrial Archeology* 5 (1979): 19-32.
- Roth, Matthew. Connecticut: An Inventory of Historic Engineering and Industrial Sites. Washington, D.C.: Society for Industrial Archeology, 1981.
- "The Plant of the Berlin Iron Bridge Company," *Engineering News* 3 (October 3, 1891): 87-91.

Waterbury, Town of. Annual Report, 1885.

NATIONAL REGISTER OF HISTORIC PLACES CONTINUATION SHEET

Photographs Sheffield Street Bridge (Bridge No. 5038) Photos-1 Waterbury, New Haven County, CT

All photographs:

- 1. Sheffield Street Bridge (Bridge No. 5038)
- 2. Waterbury, New Haven County, CT
- 4. April, 1998
- 5. Negative filed with Connecticut Historical Commission Hartford, CT

Captions:

West end of bridge, camera facing northeast Photograph 1 of 8

East end of bridge, camera facing west Photograph 2 of 8

South elevation, camera facing north Photograph 3 of 8

North elevation, camera facing southeast Photograph 4 of 8

Detail of portal joint, northwest end post, camera facing north Photograph 5 of 8

Detail of typical upper joint, north side, camera facing east Photograph 6 of 8

Detail of typical lower joint, south side, camera facing east Photograph 7 of 8

Detail of longitudinal bracing, south side, camera facing northeast Photograph 8 of 8