NPS Form 10-900-a
(8-86)

OMB Approval No. 1024-0018

United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Section number _____ Page _____

SUPPLEMENTARY LISTING RECORD

NRIS Reference Number: 04001095 Date Listed: 9/29/04

Reynolds Bridge	Litchfield	CT
Property Name	County	State

N/A
Multiple Name

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

Entered in the National Register — 9-29-04

Signature of the Keeper — Date of Action

==========

Amended Items in Nomination:

8. Statement of Significance: Period of Significance:

The period of significance for this property's historical and engineering significance under criteria A and C is 1921.

This was confirmed with CTSHPO staff by telephone.

DISTRIBUTION:
National Register property file
Nominating Authority (without attachment)

NPS Form 10-900
(Oct. 1990)

OMB No. 10024-0018

16

United States Department of the Interior
National Park Service

National Register of Historic Places Registration Form

This form is for use in nominating or requesting determinations for individual properties and districts. See instructions in *How to Complete the National Register of Historic Places Registration Form* (National Register Bulletin 16A). Complete each item be marking "x" in the appropriate box or by entering the information requested. If an item does not apply to the property being documented, enter "N/A" for "not applicable". For functions, architectural classification, materials, and areas of significance, enter only categories and subcategories from the instructions. Place additional entries and narrative items on continuation sheets (NPS Form 10-900a). Use a typewriter, word processor, or computer to complete all items.

1. Name of Property

historic name **REYNOLDS BRIDGE**

other names/site number Bridge No. 603

2. Location

street & number Waterbury Road (Route 848) at Naugatuck River ☐ not for publication

city or town Thomaston ☐ vicinity

state Connecticut code CT county Litchfield code 005 zip code 06787

3. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act, as amended, I hereby certify that this ☒ nomination ☐ request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60. In my opinion, the property ☒ meets ☐ does not meet the National Register criteria. I recommend that this property be considered significant ☐ nationally ☒ statewide ☐ locally. (☐ See continuation sheet for additional comments.)

08/10/04

Signature of certifying official/Title Date

J. Paul Loether, Division Director, Connecticut Commission on Culture & Tourism
Deputy State Historic Preservation Officer

State or Federal agency and bureau

In my opinion, the property ☐ meets ☐ does not meet the National Register criteria. (☐ See continuation sheet for additional comments.)

Signature of certifying official/Title Date

State or Federal agency and bureau

4. National Park Service Certification

I hereby certify that the property is:

☒ entered in the National Register.
☐ See continuation sheet.
☐ determined eligible for the National Register.
☐ See continuation sheet.
☐ determined not eligible for the National Register.
☐ removed from the National Register.
☐ other, (explain): _____

Signature of the Keeper Date of Action

Entered in the National Register 9-29-04

5. Classification

Ownership of Property
(Check as many boxes as apply)

- ☐ private
- ☐ public-local
- ■ public-State
- ☐ public-Federal

Category of Property
(Check only one box)

- ☐ building(s)
- ☐ district
- ☐ site
- ■ structure
- ☐ object

Number of Resources within Property
(Do not include previously listed resources in the count)

Contributing	Noncontributing	
		buildings
		sites
1		structures
		objects
1	0	Total

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

N/A

Number of contributing resources previously listed in the National Register

0

6. Function or Use

Historic Functions
(Enter categories from instructions)

TRANSPORTATION: road-related

Current Functions
(Enter categories from instructions)

TRANSPORTATION: road-related

7. Description

Architectural Classification
(Enter categories from instructions)

Other: open-spandrel concrete arch

Materials
(Enter categories from instructions)

foundation N/A
walls N/A
roof N/A
other N/A

Narrative Description
(Describe the historic and current condition of the property on one or more continuation sheets.)

Description:

Reynolds Bridge, carrying Waterbury Road across the Naugatuck River in Thomaston (Photograph 1), includes three open-spandrel concrete arches, along with four concrete-beam approach spans at either end, for an overall length of 487 feet. The center arch over the river is the longest, with a clear span of 169 feet; the east and west arches are both 97 feet long. The east arch (Photograph 2) carries the roadway over the single-track right-of-way of the Naugatuck Railroad; the west arch (Photograph 3) formerly had a similar function in crossing a streetcar line, of which little trace remains. To accommodate the steepness of the valley, the side arches spring from a point 15 feet higher than the center arch. The roadway, which includes two vehicular travel lanes and pedestrian sidewalks along both sides (Photograph 4), is at a height of approximately 40 feet above the water and crosses the valley at an angle of about 45 degrees. The area is generally wooded, with scattered buildings visible nearby, including a modern manufacturing plant on the west side of the river downstream from the bridge.

Each arch consists of two parallel ribs connected by cross struts; there are eight struts for the center arch ribs and four for the side arches. The ribs are five feet in width and taper in thickness from their springing points to the crown. The center arch ribs are three feet thick at the crown and the ribs for the side arches are two feet thick at the crown. A series of columns rises from the arch ribs to support cross beams for the concrete-slab deck; the spaces between columns are articulated as round-arched openings. The overall width of the deck (42 feet) is greater than the 23-foot spacing of the arch ribs, requiring the sidewalks to be cantilevered on extensions of the floor beams (Photographs 3 and 6). The bridge's concrete railing (Photograph 5) is modern but echoes the paneled appearance of the original on its outer surface. The railing panels, as well as the large panels on the piers between arches, were originally given a hammered finish that exposed the aggregate in the concrete. The wing walls that flank the abutments at the ends of the bridge are finished with rubble stone masonry (Photograph 8).

The bridge, designed by J. W. Cross, L. G. Sumner, and J. F. Willis of the Connecticut Highway Department, was completed in 1930. The contractor was Charles A. Haggerty of Webster, Massachusetts, with the approaches built by John DeMichiel and Brothers of Torrington, Connecticut.

Next page: Plan for Construction of Reynolds Bridge in the Town of Thomaston, May 19, 1926, Connecticut Department of Transportation File 9-02.

8. Statement of Significance

Applicable National Register Criteria
(Mark an "x" in one or more boxes for the criteria qualifying the property for National Register listing.)

- ■ **A** Property is associated with events that have made a significant contribution to the broad patterns of our history.
- ☐ **B** Property is associated with the lives of persons significant in our past.
- ■ **C** Property embodies the distinctive characteristics of a type, period, or method of construction or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components lack individual distinction.
- ☐ **D** Property has yielded, or is likely to yield, information important in prehistory or history.

Criteria Considerations
(Mark "x" in a ll the boxes that apply.)

Property is:

- ☐ **A** owned by a religious institution or used for religious purposes.
- ☐ **B** removed from its original location.
- ☐ **C** a birthplace or grave.
- ☐ **D** a cemetery.
- ☐ **E** a reconstructed building, object, structure
- ☐ **F** a commemorative property.
- ☐ **G** less than 50 years of age or achieved significance within the past 50 years.

Areas of Significance
(Enter categories from instructions)

ENGINEERING
TRANSPORTATION

Period of Significance
1915-1935

Significant Dates
1928

Significant Person
(Complete if Criterion B is marked above.)
N/A

Cultural Affiliation

Architect/Builder
Connecticut Highway Department, engineer
Charles A. Haggerty, contractor

Narrative Statement of Significance
(Explain the significance of the property on one or more continuation sheets.)

9. Major Bibliographic References

Bibliography
(Cite the books, articles, and other sources used in preparing this form on one or more continuation sheets.)

Previous documentation on file (NPS):

- ☐ preliminary determination of individual listing (36 CFR 67) has been requested
- ☐ previously listed in the National Register
- ☐ previously determined eligible by the National Register
- ☐ designated a National Historic Landmark
- ☐ recorded by Historic American Building Survey # _____
- ☐ recorded by Historic American Engineering Record # _____

Primary location of additional data:

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

Name of repository:

Connecticut Historical Commission,
59 South Prospect Street, Hartford, CT 06106

Statement of Significance:

Summary

Reynolds Bridge is significant as a substantial example of the open-spandrel concrete arch (Criterion C) and as a historic resource that recalls an important episode in Connecticut's transportation history, the development of the state highway system in the early 20th century (Criterion A). Open-spandrel arches were the pinnacle of concrete-bridge design in that period. They were used for the longest and most expensive bridge projects, and they were also valued for their light and graceful appearance. High-level crossings such as this one took full advantage of the form, in which the load-bearing components of the arch were reduced to slender ribs supporting a system of columns and floor beams, thereby minimizing the weight of the bridge itself and achieving substantial cost savings. Reynolds Bridge, one of six open-spandrel-arch bridges in Connecticut, recalls the technical capabilities and aesthetic sensibilities of the State Highway Department engineers who worked to replace Connecticut's antiquated roads and bridges in the 1920s and early 1930s. It was one of eight bridges enumerated by name in the Department's 1935 history for its serviceability and beauty.

Engineering Significance

The Connecticut Highway Department recognized reinforced-concrete as a superior material for bridge construction even before it had any direct responsibilities for bridges: in 1907, the Department developed a number of concrete designs which it recommended to the towns for their bridge-replacement projects. Reinforced-concrete, in which a mixture of sand, gravel, Portland cement, and water is poured into wooden forms in which steel reinforcing rods have been placed, has tremendous strength both in compression and tension once it hardens. Except for the reinforcement, it is made up of inexpensive materials. Reinforced-concrete is more labor-intensive than other bridge-building methods, but for many highway officials this too was an advantage, since a large part of the cost of the bridge ended up in the pockets of local contractors and workers. Engineers of the period also favored concrete because they expected it to last indefinitely, needing none of the painting and other maintenance associated with metal bridges. Typically concrete slab or beam designs were used for short spans, solid-spandrel arches for medium-length bridges, and open-spandrel arches for long bridges.

Compared with solid-spandrel arches (also called filled-spandrel arches), the open-spandrel design was more complicated to design and detail and the formwork needed to create the ribs, struts, columns, and floor beams was much more complex. However, by reducing the load-bearing component to a pair of thin ribs, and eliminating the tons of fill in favor of the system of columns and floor beams, the open-spandrel design saved a great deal of weight. By minimizing the dead load of the bridge, the arch could be made as thin as possible, and the bridge footings could also be correspondingly reduced. In short, the trouble of building the open-spandrel design was worth it for spans of 80 feet or more. Open-spandrel arches were built throughout the country in the 1920s and 1930s, wherever there were broad or deep river valleys to be crossed, and they were usually the pride of the state highway departments that designed and built them. As to why the era of the concrete-arch came to end, it was probably a combination of

factors: a change in the relative importance of material and labor costs, a greater ability to transport prefabricated steel and concrete beams, and the simple fact that by World War II states had completed the replacement of most inadequate bridges on their major roads.

Transportation History Significance

The Connecticut State Highway Department had been given authority over the state's major bridges in 1915 and had immediately set about assessing the needs and planning for replacement of inadequate bridges. Its first priority was the heavily traveled shoreline route that paralleled Long Island Sound, but in the 1920s the Department was able to turn its attention to the state's other important roads. Waterbury Road was the principal north-south highway connecting Waterbury with Torrington, Winsted, and other parts of the upper Naugatuck Valley, and the old narrow bridge that crossed the river in Thomaston was not adequate for the growing motor vehicle traffic of the period. As with its other large bridge projects, the state engineers were able to solve multiple problems by building a new bridge. In addition to addressing issues of width and load capacity, the new bridge did away with the sharp curves at both ends and eliminated two at-grade crossings with railroad and streetcar lines. Planning for the bridge began in 1925, construction started in the summer of 1926, and the bridge was opened to traffic in 1928. The bridge itself cost approximately $196,000, but with all the work needed to blast away rock and construct the approaches, the total project cost came to $350,000. Federal-aid funds paid about 40% of the amount, with the State funding most of the remainder. The Town of Thomaston paid $10,000 to cover the cost of the sidewalks, which were regarded as a local convenience rather than a necessity. The New Haven Railroad, which at that time operated the Naugatuck line, contributed $56,000 because of the grade separation; at the railroad's request, the east arch was made wide enough to accommodate future double-tracking of the line.

It is clear that the State Highway Department appreciated the aesthetic qualities of the open-spandrel arch as well as its practical advantages. As Leslie G. Sumner, the engineer responsible for the bridge's conceptual design, reported in the *Proceedings* of the Connecticut Society of Engineers:

> The valley at the point of crossing is one of considerable natural beauty, with its rugged ledges and tree-covered hills forming a setting and background for the new work. And in the final selection of type, an attempt has been made to provide a structure that will add to rather than mar the beauty of the site. . . . No structure quite equals the arch for grace and beauty. . . . Investigations showed that a saving could be effected by using a steel structure of a strictly utilitarian type, but it was felt that this economy was not sufficient to outweigh the advantages of permanency and sightliness inherent to the arch.

Reynolds Bridge's river span was the largest arch attempted to date by the state highway engineers, though a few years later it was surpassed by the structure at Cornwall Bridge over the Housatonic River. With few modifications from its original appearance, and a craggy, wooded setting that retains the scenic qualities it had in the 1920s, Reynold's Bridge stands as a fitting monument to the talent and effort of Connecticut's early bridge engineers.

Bibliography:

Clouette, Bruce, and Matthew Roth. Connecticut Historic Bridge Inventory. Connecticut Department of Transportation, 1990.

_____. *Connecticut's Historic Highway Bridges.* Newington, Conn.: Connecticut Department of Transportation, 1991.

Condit, Carl W. *American Building: Materials and Techniques from the First Colonial Settlements to the Present.* Chicago: University of Chicago Press, 1968.

Connecticut State Highway Department. *Forty Years of Highway Development in Connecticut, 1895-1935.* New Haven: Connecticut Tercentenary Commission, Publication No. 46, 1935.

Hool, George A., and W. S. Kinne. *Reinforced Concrete and Masonry Structures.* New York: McGraw-Hill Book Company, 1924.

Legat, Arthur W. *Design and Construction of Reinforced Concrete Bridges.* London: Concrete Publications, 1948.

McCullough, Conde B. *Economics of Highway Bridge Types.* Chicago: Gillette Publishing Co., 1929.

Sumner, Leslie G. "Reynolds Bridge," *Connecticut Society of Civil Engineers Proceedings* (1928), 75-82.

Urquhart, Leonard C., and Charles-Edward O'Rourke. *Design of Concrete Structures.* New York: McGraw-Hill Book Company, 1926.

Waddell, J. A. L. *Economics of Bridgework.* New York: John Wiley and Sons, 1921.

Reynolds Bridge (Bridge No. 603) — Name of Property

Litchfield County, CT — County and State

10. Geographical Data

Acreage of Property less than one

UTM References
(Place additional UTM references on a continuation sheet.)

	Zone	Easting	Northing
1	18	660080	4612820
2			
3			
4			

☐ See continuation sheet

Verbal Boundary Description
(Describe the boundaries of the property on a continuation sheet.)

Boundary Justification
(Explain why the boundaries were selected on a continuation sheet.)

11. Form Prepared By

name/title Bruce Clouette, Historian

organization Public Archaeology Survey Team, Inc. date March 31, 2003

street & number P.O. Box 209 telephone 860-429-1723

city or town Storrs state CT zip code 06268

Additional Documentation

Submit the following items with the completed form:

Continuation Sheets

Maps

A **USGS map** (7.5 or 15 minute series) indicating the property's location.

A **Sketch map** for historic districts and properties having large acreage or numerous resources.

Photographs

Representative **black and white photographs** of the property.

Additional Items
(Check with SHPO or FPO for any additional items.)

Property Owner

(Complete this item at the request of SHPO or FPO.)

name Connecticut Department of Transportation

street & number 2800 Berlin Turnpike telephone 860-594-3000

city or town Newington state CT zip code 06141-7546

Paperwork Reduction Act Statement: This information is being collected for applications to the National Register of Historic Places to nominate properties for listing or determine eligibility for listing, to list properties, and to amend existing listings. Response to this request is required to obtain a benefit in accordance with the National Historic Preservation Act, as amended (16 U.S.C. 470 *et seq.*).

Estimated Burden Statement: Public reporting burden for this form is estimated to average 18.1 hours per response including time for reviewing instructions, gathering and maintaining data, and completing and reviewing the form. Direct comments regarding this burden estimate or any aspect of this form to the Chief, Administrative Services Division, National Park Service, P.O. Box 37127, Washington, DC 20013-7127; and the Office of Management and Budget, Paperwork Reductions Projects (1024-0018), Washington, DC 20503.

Verbal Boundary Description:

The nominated property includes the bridge, abutments, and piers.

Boundary Justification:

The nominated property embraces the entire historic structure.

All Photographs:

1. Reynolds Bridge (Bridge No. 603)
2. Thomaston, Litchfield County, CT
3. PAST, Inc. Photo
4. March 2003
5. Negative filed with PAST, Inc., Storrs, CT

Captions:

Overview of bridge, showing south side, camera facing north
Photograph 1 of 8

Span of Naugatuck Railroad line, east end of bridge, south side, camera facing north
Photograph 2 of 8

West arch, north side, camera facing west
Photograph 3 of 8

View of roadway from west end, camera facing east
Photograph 4 of 8

Detail of outside of parapet, south side, camera facing northwest
Photograph 5 of 8

Detail of columns and sidewalk cantilever, north side, camera facing west
Photograph 6 of 8

Underside of bridge from east end, camera facing northwest
Photograph 7 of 8

Detail of stonework applied to abutment wing wall, east end, camera facing southeast
Photograph 8 of 8