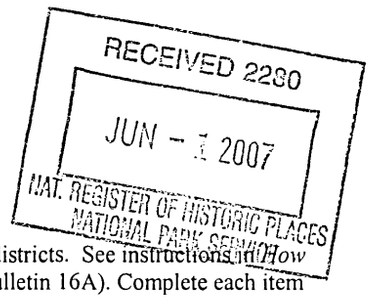
NPS Form 10-900
(Rev. Aug. 2002)

OMB No. 1024-0018
(Expires Jan. 2005) 692




**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 by marking "x" in the appropriate box or by entering the information requested. If any 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: Foundry Bridge

other names/site number: Bridge 31

### 2. Location

street & number: Town Highway 25 (Foundry Road) not for publication N/A

city or town: Tunbridge vicinity: N/A

state: Vermont code: VT county: Orange code: 017 zip code: 05077

### 3. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act, as amended, I hereby certify that this X 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 X meets ____ does not meet the National Register Criteria. I recommend that this property be considered significant ____ nationally X statewide X locally. (See continuation sheet for additional comments.)

Suzanne C. Jamele, National Register Specialist 5-31-07
Signature of certifying official Date

Vermont State Historic Preservation Office
State or Federal Agency or Tribal government

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

Signature of commenting official or other official and title Date

State or Federal agency and bureau

## 4. National Park Service Certification

I, hereby certify that this 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 |
|---|---|
| Carol D. Ball | 2.16.07 |
| | |
| | |
| | |

## 5. Classification

**Ownership of Property:** (Check as many boxes as apply)
_____ private
__x__ public-local
_____ public-state
_____ public-Federal

**Category of Property:** (Check only one box)
_____ building(s)
_____ district
_____ site(s)
__x__ structure(s)
_____ object(s)

**Number of Resources Within Property:**

| | Contributing | Noncontributing |
|---|---|---|
| buildings: | _____ | _____ |
| districts: | _____ | _____ |
| sites: | _____ | _____ |
| structures: | 1 | _____ |
| objects: | _____ | _____ |
| total: | 1 | _____ |

**Number of Contributing Resources Previously Listed in the National Register:** 0

**Name of Related Multiple Property Listing:** Metal Truss, Masonry, and Concrete Bridges in Vermont
(Enter "N/A" if property is not part of a multiple property listing.)

## 6. Function or Use

**Historic Functions:** (Enter categories and subcategories from instructions)

| Category: | Subcategory: |
|---|---|
| Transportation | Road-related |

**Current Functions:** (Enter categories and subcategories from instructions)

| Category: | Subcategory: |
|---|---|
| Transportation | Road-related |

## 7. Description

**Architectural Classification:** (Enter categories from instructions)

other: Warren pony truss

**Materials:** (Enter categories from instructions)

foundation: stone abutments
roof:
walls:
other: iron structural elements

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

## 8. Statement of Significance

**Applicable National Register Criteria:**
(Mark "X" in one or more boxes for the criteria qualifying the property for National Register listing)

__x__ 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.
__x__ 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 all the boxes that apply.)

_____ A. Owned by a religious institution or used for religious purposes.
_____ B. Removed from its original location.
_____ C. A birthplace or a grave.
_____ D. A cemetery.
_____ E. A reconstructed building, object, or structure.
_____ F. A commemorative property.
_____ G. Less than 50 years of age or achieved significance with the past 50 years.

| **Areas of Significance:** (Enter categories from instructions) | **Period of Significance:** |
|---|---|
| Transportation | 1889-1955 |
| Engineering | |

| **Significant Person:** (Complete if Criterion B is marked above) | **Significant Dates:** |
|---|---|
| N/A | 1889 |

**Cultural Affiliation:**
N/A

**Architect / Builder:**
Vermont Construction Company

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

## 9. Major Bibliographical References

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

**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 for the National Register.
_____ Designated a National Historic Landmark.
_____ Recorded by Historic American Buildings Survey No. _____
_____ Recorded by Historic American Engineering Record No. _____

**Primary Location of Additional Data:**
_____ State Historic Preservation Office.
__x__ Other state agency: Vermont Agency of Transportation
_____ Federal agency.
__x__ Local government.
__x__ University.
_____ Other. Name of repository: Vermont State Library

## 10. Geographical Data

**Acreage of Property:** Less than one

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

| | Zone | Easting | Northing | | Zone | Easting | Northing |
|---|---|---|---|---|---|---|---|
| 1. | 18 | 702574 | 4865247 | 2. | | | |
| 3. | | | | 4. | | | |

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

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

## 11. Form Prepared By

Name / Title: Robert McCullough

Organization: Vermont Agency of Transportation, Historic Bridge Program Date: December, 2006

Street & Number: National Life Building, Drawer 33 Telephone: 802-828-3615

City or Town: Montpelier State: VT Zip Code: 05633-5001

## 12. 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 the SHPO or FPO for any additional items)

## 13. Property Owner

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

Name / Title: Town of Tunbridge

Organization: _____ Date: _____

Street & Number: P.O. Box 6 Telephone: 802-889-5521

City or Town: Tunbridge State: VT Zip Code: 05077

## Narrative Description

The Foundry Bridge (Bridge 31), fabricated in 1889 by the Vermont Construction Company of St. Albans, carries Foundry Road (Town Highway 25) across the First Branch of the White River in the town of Tunbridge in Orange County. Foundry Road extends in an easterly direction from Vermont Route 110 in the village of North Tunbridge, and the Foundry Bridge is located a short distance, approximately one hundred feet, from that intersection. Road and bridge take their common name from a nearby foundry, no longer standing, and the bridge is adjacent to a former grist mill, now converted to residential use. The bridge is a rare surviving example of a 19th century wrought iron truss bridge and is the state's sole surviving example of a highway bridge fabricated by Vermont's lone manufacturer of iron truss bridges. The bridge retains an exceptionally high degree of integrity in terms of location, design, setting, materials, workmanship, feeling and association. A builder's plate confirms the bridge's date and provenance, and the structure has been scheduled for rehabilitation and limited highway use under the Vermont Historic Bridge Program's Preservation Plan for Metal Truss Bridges.

The Foundry Bridge is a single span, Warren pony truss with trapezoidal profile and vertical posts at panel junctures, typical supplements to the counter-directional diagonals that characterize the web design for Warren trusses. The bridge spans seventy-two feet, six inches, with six panels; the trusses are approximately nine feet in depth; the single-lane roadway is eleven feet, six inches (rail to rail) and the truss width is a full thirteen feet (center-of-truss to center-of-truss). The bridge's floor system employs timber stringers supported by iron floor beams and topped by a timber plank deck. Although web members, chords, floor beams, and all connections are fully riveted, the bridge's modestly-sized beams and girders, as well as the unusual configuration of its web members, give the structure a light, graceful form that distinguishes it as representative of 19th century bridge-fabricating techniques that would be obsolete within a decade. However, the absence of pin connections mark the bridge as an advance from earlier bridges (and a few later bridges) that did not utilize field-riveting.

In its present form, the Foundry Bridge reveals most of its original features. The inclined end posts are built-up deep channel girders using flat iron bars on three sides, joined by angles riveted to the outside surfaces of the flange plates and underside of the top plate; stay bars are riveted to the channel girder's underside, also with angles, at three-foot intervals. Including the bottom stay plates and angles, the end posts were fabricated with eight separate members. Top chords are similar to the end posts but with lacing bars replacing the top plates except at mid-span, where a twelve-inch plate is used. Bottom chords are paired, wide plates with single angle bars riveted to the bottoms of the plates and joined by stay bars placed at varying intervals; no top plates or stay bars are used on the bottom chords.

In the truss web, composition of diagonals varies, ranging from flat, seven-inch wide unflanged plates (first and tenth diagonals); paired angles stiffened by lacing bars and joining the inside flanges of upper and bottom chords (second, fourth, seventh, and ninth diagonals); similarly paired angles but joining the outside flanges of upper and bottom chords (fifth and sixth diagonals); and paired angles,

**Narrative Description** (continued)

unconnected, fitted to the outside flanges of the upper and bottom chords (third and eighth diagonals). Web verticals are paired angles joined by lacing bars, but they are tapered from a wide base that connects to the floor beams, to a narrow top that fits within the top chord flanges.

The floor system consists of I-section girders with paired angles as upper and lower flanges and a solid plate web. Timber stringers are mounted on angle shelves riveted to the plate web, and the floor system is stiffened by angle-bar cross-bracing. The deck surface consists of transverse timber planks, and railings are angles riveted to the truss web members. The substructure consists of dry-laid masonry abutments that appear to be stable.

## Statement of Significance

The Foundry Bridge in Tunbridge is being nominated pursuant to the existing multiple property submission titled "Metal Truss, Masonry, and Concrete Bridges in Vermont," under the property type, "metal truss bridges," and the crossing clearly meets the registration requirements for this property type. The structure is exceptionally significant as the state's last remaining highway bridge fabricated by the Vermont Construction Company of St. Albans, the state's only manufacturer of metal truss bridges. The bridge is also significant as one of very few wrought iron truss bridges surviving in Vermont, whether still serving highways or adapted to pedestrian or bicycle use. Moreover, the bridge's built-up girders represent an unusual combination of post-Civil War and late-nineteenth century fabrication technology, requiring the riveting of an excessive number of angles, plates and bars, but also making use of advances in field riveting. By the time the Foundry Bridge was fabricated, 1889, rolling mill equipment had already improved sufficiently to reduce the number of pieces required in the assembly process, making the Vermont Construction Company's mills out-of-date. At the same time, however, the Foundry Bridge is also fully riveted, discarding as unnecessary the pin-connections that continued to serve many bridges designed during the last decade of the 19th century, in spite of the availability of field riveting. As in other important river corridors in Vermont, metal truss bridges are very visible landmarks, albeit increasingly scarce. In addition to its visually distinctive profile and travel corridor, the Foundry Bridge also continues to stand at a locally important crossing in the village of North Tunbridge, providing a valuable glimpse of that community's industrial heritage.

Following the Civil War, railroads transformed the iron industry by making possible the movement of large quantities of raw materials and heavy finished products. Iron works with easy access to the iron ore, coal, and limestone necessary for smelting, became the most profitable ones, and smaller firms, by necessity, concentrated on the fabrication of specialized products such as bridges. As competition among these bridge manufacturers increased, quick, simplified assembly became essential, and an era of pre-fabricated bridges erected from parts of standard sizes and shapes, mass-produced by mills, rapidly developed. Shops provided a centralized, controlled work environment for manufacturing, and companies purchased iron bars, channels, plates, and angles directly from mills, cut them, punched holes, joined the parts mechanically with rivets, and then shipped partly assembled bridges to distant sites by rail. Field crews or local contractors then completed the assembly. By this time, too, designs produced by independent fabricating shops were giving way to exacting specifications prepared by engineers, and more efficient truss systems were being developed. The Warren truss, initially patented in England by James Warren and Willoughby Monzani in 1848, developed into a very common design for iron bridges. In its earliest form, the truss used no vertical posts but instead relied entirely on diagonals set in opposite directions, each absorbing both tension and compression. Later versions employed vertical struts at panel intersections to increase rigidity, and the truss typically assumed a trapezoidal rather than rectangular profile.

**Statement of Significance** (continued)

Among a number bridge manufacturers competing for business in rural Vermont, one enterprise, the R. F. Hawkins Iron Works of Springfield, Massachusetts, appealed to loyalty among Vermonters by establishing a subsidiary manufacturer in St. Albans, the Vermont Construction Company. Hawkins had begun working for the Springfield business in 1853 as an office boy, eventually becoming sole owner of a firm that manufactured a variety of iron products, including architectural castings, boilers, and machinery, as well as bridges. In May, 1885, he won a major contract with the town of North Hero, Vermont, to build a lengthy iron span across a narrow passage in Lake Champlain. Construction began that June, and the bridge opened in October, 1886, to great publicity because it finally opened the Champlain Islands to vehicular traffic from the mainland.

For the North Hero project, Hawkins acquired rights to use the idle rolling mills of the St. Albans Iron and Steel Works and put part of the plant into operating order by the fall of 1885, convincing St. Albans officials to grant an exemption from property taxes for five years. Articles of incorporation for the Vermont Construction Company were signed in July, 1886, with Hawkins as president and principal shareholder. Plant manager George Ayer, who also served as company sales agent, together with Charles and Edward Babbitt, respectively superintendents of the iron and wood divisions, also signed the document, each as the owner of a single share. E. B. Jennings, associated with Hawkins's Massachusetts business, served as consulting engineer. With some justification, Hawkins advertised as the only bridge-building concern in the state, and the company soon erected separate bridge and girder shops on two parcels of land owned by the Central Vermont Railroad lying northerly of Aldis Street, not far from the rolling mill and near the railroad's sprawling yards. Two leases, the first signed in September, 1890, and the second in September, 1892, authorized construction of the buildings, and for its part the railroad company agreed to provide a side track.

Hawkins' strategy proved successful, and the firm developed into one of Vermont's most important bridge fabricators. In particular, he foresaw the vulnerability of Vermont's timber railroad crossings and won contracts to replace two important bridges that collapsed in 1886 and 1887, disasters that generated enormous public concern. The publicity that followed helped the Vermont Construction Company gain a succession of other contracts for railroad bridges, and the firm specialized in these large projects. However, many town selectboards must have been swayed by company pleas to support Vermont-based industries, and smaller highway bridges were built in more than twenty towns throughout the state, including Tunbridge. The annual report prepared by town officials in 1890 (covering expenses during the twelve month period between February, 1889 and February, 1890) indicates that Tunbridge paid the company $876.00 for the bridge.

**Statement of Significance** (continued)

The bridge served two principal industries in North Tunbridge, Smith's Foundry, established in 1855 by Wallace Smith, and the Corliss Grist Mill, still standing, erected during the early years of settlement of the village. During its first decade, Smith's foundry produced plows, but successor owners, Royal and C. B. Smith, began fabricating stoves and cultivators as well as plows after the Civil War. Finished products were transported to the railroad yard at South Royalton. Initially, the Smith family also operated the grist mill, but James Corliss purchased it in the 1880s and began providing custom milling of grain. Both industries were served by a timber-crib dam adjacent to the grist mill.

Although the Vermont Construction Company actively solicited business from Vermont towns, by 1900 a transformation in bridge design and fabrication had begun to occur, and the ripples of this change reached the state. During the preceding decade, steel production became more economically efficient and reliable, and consolidation of steel companies ensued. Industrial monopolies became an important factor in the bridge industry when the American Bridge Company was incorporated in 1900 by J. P. Morgan. That year, twenty-eight firms representing a large percentage of the country's bridge fabrication business were acquired by Morgan's emerging conglomerate. Eventually, his bridge empire became part of Andrew Carnegie's U.S. States Steel Corporation. Standardization of bridge design and fabrication was one important consequence, the dominance of American Bridge Company in New England and other regions, another.

By the time of American Bridge Company's genesis, business opportunities for the Vermont Construction Company had already begun to decline. Moving heavy materials to and from shops in remote St. Albans must have been expensive, and fabrication costs also depended considerably on the efficiency of the machinery being used. As new technology developed, small firms faced difficult competition from large concerns able to invest in new equipment. For these or other reasons that are unclear, the company had increased its capital stock in 1890 and again in 1897. During that period, Paul Hawkins, the son of Richard Hawkins and a graduate of Massachusetts Institute of Technology, assumed an increasingly dominant role in the management of the Massachusetts-based parent corporation.

By 1897, Richard Hawkins probably had very little direct involvement in the Vermont bridge business, although presumably he remained a principal shareholder. When directors of the Vermont Construction Company voted to increase capitalization that year, a banker from Springfield, Massachusetts, Henry S. S. Heyde, had become president and director of the Vermont firm. Two other directors, Mase S. Southworth and lawyer William W. McClench, lived in the Springfield area as well. Two local men, Arthur L. Davis and Herbert A. Warren, also signed the document as directors. Davis, Secretary and Treasurer, served briefly as plant manager in St. Albans before moving to Berlin, Connecticut, probably in 1898 or early 1899. Years later, he would become Vice President and General Contracting Manager of American Bridge Company. Warren, superintendent of streets and water works

**Statement of Significance** (continued)

in St. Albans, resigned his municipal job to serve as the assistant engineer, and subsequently treasurer and general manager, of the Vermont business.

Davis, and then Warren, continued to negotiate bridge contracts for a few years, and the company manufactured bridges for a number of towns or cities between 1898 and 1900, including Bennington, Chester, Richmond, and Montpelier. However, the company's name was conspicuously absent from the list of firms bidding on twelve bridges for the Rutland-Canadian Railroad's Island Line in 1899. That route traversed the Champlain Islands and required three movable spans, similar to those fabricated by Richard Hawkins for Alburg, North Hero, and Grand Isle a dozen or so years earlier.

Forced to confront the prospects of declining profitability in St. Albans and the inevitability of a monopoly controlled by American Bridge Company, the Massachusetts-based parent firm sold its Vermont bridge business in 1901. In January of that year, Herbert Warren and James C. Walker from St. Albans were joined by New Yorkers C. W. Smith, W. H. Bennett, and T. P. Elmose, and together these five shareholders formed the New England Bridge Works, immediately purchasing the stock and equipment of the Vermont Construction Company. Almost nothing is known about this new corporation, other than the very short duration of its tenure in Vermont. Both Warren and Walker eventually worked in the New York offices of American Bridge Company's contract division, and Warren latter served in a similar capacity for the company in Baltimore. Exactly when these employment transitions occurred, however, is not known. The Vermont Construction Company's charter was finally revoked in 1906, the year another business with an identical name obtained a new charter. That second corporation was formed by a group of prominent businessmen and investors from Burlington, including city engineer Frank Sinclair, and was unrelated to the St. Albans concern, except in name.

## Major Bibliographic References

Farnham, Euclid. Tunbridge Past. A Pictorial History of Tunbridge, Vermont. Randolph, Vermont: Herald Printing for the Tunbridge Historical Society, 1981.

Lichtenstein Consulting Engineers, "Historic Metal Truss Bridge Plan for Tunbridge No. 31, Town Highway 25 Over the First Branch of the White River, Tunbridge, Vermont," typewritten report available at the Vermont Agency of Transportation, Historic Bridge Program, Project Development Division.

McCullough, Robert. Crossings. A History of Vermont Bridges. Montpelier, Vermont Historical Society and the Vermont Agency of Transportation, 2005. Portions of the statement of significance are excerpts from this work.

Roth, Matt and Bruce Clouette, "Vermont Historic Bridge Survey," OG-02. Typewritten survey available at the Vermont Division for Historic Preservation, Montpelier, Vt.

Town of Tunbridge, Annual Report (1890), 3.

## Section 10: Geographical Data

### Verbal Boundary Description

The boundary of the property is the bridge and its abutments. The bridge carries Town Highway 25 (Foundry Road) in Tunbridge across the First Branch of the White River.

### Boundary Justification

The boundary includes all the land historically associated with the bridge.

## Section 12: Photograph Labels

The following information is the same for all photographs:

| | |
|---|---|
| Name of Property: | Foundry Bridge (Bridge 31) |
| Location: | Tunbridge, Orange County, Vermont |
| Credit: | Robert McCullough |
| Date: | 2005 |
| Negatives: | Filed at the Vermont Division for Historic Preservation |

Photograph No. 1: View from the southwest
Photograph No. 2: View from southeast