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

878

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

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: Bridge 22

other names/site number: Creamery Bridge

2. Location

street & number: Town Highway 27 (Creamery Road) not for publication N/A

city or town: Bradford vicinity: N/A

state: Vermont code: VT county: Orange code: 017 zip code: 05033

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 ____ statewide _x_ locally. (See continuation sheet for additional comments.)

Nancy E. Boone DSHPO June 22, 2010
Signature of certifying official Date

Vermont Division for Historic Preservation
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:

	Signature of the Keeper	Date of Action
✓ entered in the National Register		
___ See continuation sheet.		
____ determined eligible for the National Register	Edson H. Beall	11.3.10
____ See continuation sheet.		
____ determined not eligible for the National Register		
____ removed from the National Register		
____ other (explain): _____		

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:	____	1
total:	1	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: steel

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	1934-1960
Engineering	

Significant Person: (Complete if Criterion B is marked above)	**Significant Dates:**
N/A	1934

Cultural Affiliation:
N/A

Architect / Builder:
American Bridge 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	730105	4874342	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: February, 2010

Street & Number: National Life Building Telephone: 802-828-0762

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 Bradford

Organization: _____ Date: February, 2010

Street & Number: Post Office Box 33 Telephone: 802-222-4727

City or Town: Bradford State: VT Zip Code: 05033

Narrative Description

Bridge No. 22 is a well-preserved, single span, steel Warren pony truss bridge built in 1934 and fabricated by the American Bridge Company at its plant in Elmira, New York. The structure carries Town Highway 27 (Creamery Road) across the Waits River in Bradford. In 2007 the bridge was rehabilitated for continued highway use, its original intended purpose, and it retains substantial integrity in location, design, setting, materials, workmanship, feeling and association.

The village of Bradford is a small, linear settlement in the Connecticut River Valley, and Bridge 22 is located at the edge of that community, southerly of the commercial district on Main Street (U.S. Route 5) and adjacent to a creamery. The bridge spans 105 feet (center to center of the bearings) with ten panels (each panel ten and one-half feet). Its width is 17 feet 6 inches (center to center of trusses), with a travel way of sixteen feet, one inch (rail to rail). Original plans are dated October 1934, and drawings were prepared at the company's No. 5 Plant at Ambridge, Pennsylvania.

The truss top chord and inclined end posts are box-shaped sections, made up of paired channel beams with a continuous top cover plate and lattice bars on the underside. The vertical and diagonal web members consist of rolled I-beam sections framed with gusset plates, but vertical hip members are single angles with small plate connections. The bottom chord consists of paired angle bars with top stay plates spaced at four-foot intervals. Although fabricators used shop rivets for some connections, other sections were field-assembled with bolts, an unusual feature. Typically, truss bridges of this era were fully riveted.

The floor system was assembled with rolled I-section floor beams and stringers, braced by cross-lateral tie rods. The original deck was timber, and although the floor itself was not part of the contract, American Bridge Company supplied the bolts, floor plates, and nails necessary to complete the deck. In 1984, the existing floor system and deck were replaced with corrugated steel deck pans and asphalt surface. Guard rails are angle bars riveted to the trusses.

Plans for rehabilitating Bridge 27 were prepared in 1995 with only minor modifications to design. Changes included the use of wide-flange floor beams and wide-flange stringers on a new floor system, modifying the original connection design for stringers and floor beams. A new timber laminated deck was also installed and the original railing removed and replaced with steel box beams. Other than the new floor system, replacement of existing materials was very limited. New parts included minor features such as chord cover plates, splice plates, repair plates, chord connection angles, thread bars, and thread bar anchorages; rivets at panel junctures were replaced with bolts. Work was completed in 2007, and the southerly truss of the rehabilitated bridge now carries a newly-fabricated water utility pipeline.

Statement of Significance

Bridge 22 on Creamery Road in Bradford is being nominated to the National Register of Historic Places under the multiple property documentation form titled "Metal Truss, Masonry, and Concrete Bridges in Vermont," and the property type, "metal truss bridges." The bridge clearly meets the registration requirements for this property type under Criteria C, as an excellent example of a structural type, the Warren pony truss. In addition, the bridge also contributes to the broad patterns of engineering and transportation history in Vermont under Criteria A. Although other bridge types had gained dominance in Vermont by 1934, engineers continued to design small numbers of Warren trusses throughout the twentieth century where site-specific constraints made them practical alternatives. Such versatility has long been important to Vermont's engineering profession, and remains so today. Moreover, a number of Vermont towns have built new Warren trusses in recent decades, tapping that versatility and also acknowledging the enduring utility of this increasingly scarce, historic bridge type. Thus, the bridge's period of significance is an unbroken continuum. The structure will remain in continued highway use under the Vermont Historic Bridge Program's *Preservation Plan for Metal Truss Bridges*, and the Town of Bradford has enrolled Bridge 22 in that program, conveying a preservation easement in perpetuity for the bridge as part of that agreement.

As a bridge type, the Warren truss evolved during the second half of the 19th century and had achieved its most efficient form, structurally and economically, by the end of that century. Long before 1934, Warren pony truss bridges had become a very common bridge type in Vermont, particularly for short or moderate-span crossings where they proved to be easily designed and fabricated, as well as structurally reliable. However, the decades of the 1920s and 1930s represented an era of shifting emphasis in bridge and highway design in this state, changes hastened by the need for reconstruction following Vermont's devastating 1927 flood and propelled by several factors, including: (1) the realigning of preferences from reinforced concrete to steel beams and girders for most of the state's new bridges; (2) the continued development of standardized plans; (3) advances in structural and materials technology; and (4) the increasing volume of automobile traffic.

Although a very common bridge type in Vermont during the early decades of the twentieth century, Bridge 22 is very nearly an anomaly in 1934, a hold-over from earlier engineering practices and noticeably out-of-date among more modern bridge designs and materials employed for short or moderate spans by the mid-1930s. Indeed, the choice of a Warren truss for this site in 1934 is one of the most interesting aspects of the bridge's history, underscoring a growing versatility among Vermont's transportation engineers. Bridge designers were able to choose from an expanding portfolio of structural types to meet varied demands, and that versatility contributed significantly to construction of the state's highways and bridges, particularly so as engineers struggled to keep pace with the advancing automobile.

Statement of Significance (continued)

A brief summary of the context for bridge design in Vermont during the late 1920s and early 1930s will help to explain why selection of a Warren truss bridge in 1934 was unusual, even though a large number of metal truss bridges of various types were built only five years earlier, as part of the rebuilding campaign following the 1927 flood.

Generally, the process of developing standardized designs for Vermont bridges had begun soon after World War I, and had advanced slowly during the early 1920s. However, the need for rapid rebuilding after the flood caused increased emphasis on standard plans and modern bridge types. Designs for reinforced concrete T-beam and slab bridges, as well as for rolled steel I-beam bridges, were developed for a succession of span lengths at five-foot intervals. By necessity, many examples of all three types were built in 1928 and 1929, but the number of reinforced-concrete structures exceeded those of other types by substantial margins. By 1934, the year Bridge 22 opened, reinforced concrete T-beam and slab structures had been the most common types of new bridges erected in Vermont for short or moderate crossings for more than a decade. Yet within a year or two, rolled steel beam bridges would become more economically efficient and thus begin to dominate new construction. In addition, the span lengths of standard plans for rolled I-beam bridges surpassed those of reinforced-concrete T-beam bridges in 1935, the year that the number of new steel I-beam bridges built in Vermont exceeded those of reinforced concrete for the first time. Advances in steel fabrication technology, particularly improvements in electrically powered rolling machinery, contributed to these developments. Those trends continued throughout the next several decades, pausing during World War II but resuming immediately after.

The urgent rebuilding efforts following the 1927 flood focused primarily on the need to put Vermont's network of roads back into service, and the success of that endeavor depended upon rapid, cost-efficient construction methods reliant upon standardized plans. Vermont's transportation engineers also developed standard plans for steel truss bridges as part of that effort, and these plans became available in increments of ten feet for spans shorter than one hundred feet or twenty-foot increments for longer bridges. Generally, Warren pony trusses with straight upper chords served spans between sixty and one hundred feet, and polygonal upper chords typically were used for Warren trusses exceeding one hundred feet; most structures were twenty-one feet wide.

Many of the metal truss bridges that survive in Vermont today were part of that rebuilding effort, which was largely in place by 1930. Remarkably, during the two preceding years more than 1600 bridges were built, most according to standard plans. Although Bridge 22 was not part of the immediate rebuilding effort, the effects of this campaign had far-reaching implications and are part of the historical context for Bridge 22. The obvious cost efficiency and availability of standard plans represent important

Statement of Significance (continued)

contributions of that rebuilding campaign, and undoubtedly those aspects facilitated the design for Bridge 22. Granted, its span length extends slightly beyond the upper range of standard plans for trusses with straight upper chords, but the bridge's comparatively narrow width, sixteen feet, probably made additional capacity obtainable with polygonal chords unnecessary.

Nevertheless, the short four years that separate completion of that rebuilding campaign and the date of Bridge 22 represent a time of dynamic change in bridge design and construction in Vermont. Efforts to rebuild following the flood quickly gave way to another concern among transportation engineers: the inadequacy of the state's roads and bridges for the growing volumes of automobile traffic. The immediacy of that need would become increasingly apparent by the mid 1930s, and these developments are also part of the historical context for Bridge 22. In general, transportation projects funded solely by local coffers declined, and state or federal funds paid for a substantial share of most new construction. In those instances involving federal aid, government programs mandated a formal design process and affirmed oversight by professional engineers, a process that encouraged economy of materials and ease of construction. In addition, the formal administration in place for those projects could be applied just as easily to projects funded through state programs. Ultimately, the highway improvement initiatives that had begun during the late nineteenth and early twentieth centuries, known as the Good Roads Movement and intended simply to make rural roads passable, expanded during the 1930s into a much more complex system intended to provide safe travel for legions of motorists.

Placing the Creamery Bridge into the context of bridge design in Vermont in 1934 also creates better footing for discussion about the reasons for selecting a Warren truss at this site. Although copies of the original plans have survived, there is little conclusive evidence to explain that decision. Cost is almost always an overriding factor in design choices, but hydraulic clearance may have influenced the decision as well. Standard plans for rolled I-beam bridges did not extend to 99 feet until 1939, and the span length of Bridge 22 probably placed it just beyond the reach of that bridge type in 1934, economically as well as structurally. Plate girders would have required substantial depth and would have been more expensive to fabricate than rolled beams, probably making a truss design cost-competitive. In addition, the great practical advantage of truss bridges is that the superstructure stands above the travel corridor, not below it where the beams or girders can impede flood-prone water. Several small truss bridges were built recently in Vermont for this reason. Moreover, if bridge elevation is increased to improve hydraulic clearance below the superstructure, travel approaches must also be graded, adding to costs and creating cumbersome roadway slopes. Where industry is located nearby, as in Bradford, such slopes can be an inconvenience.

Statement of Significance (continued)

Town governments also served as vital partners in the process of building local roads and bridges, and concerns of local businesses, the nearby creamery for example, may have been a factor. In any case, if the Creamery Bridge had been built a few years later, it is very likely that a different design would have been used.

On September 5, 1934, residents of Bradford convened a special village meeting and voted to replace the old wooden Creamery Bridge. Bradford's annual report for 1935 provides a careful accounting of the community's share of the cost: $5,039.95. Local businesses and labor helped to build the bridge, and the report lists more than twenty-five men who received modest payments for work, ranging from $1.00 to $50.50. The practice of allowing residents to provide labor on highways and bridges in lieu of paying taxes is one of long-standing in Vermont, and Bradford may have relied on that custom for Bridge 22, and for a second structure, the Martin Bridge, also built that year. Unfortunately, the Vermont State Highway Board's Biennial Report for 1936 does not clarify the state's share of that cost. One person, Edward L. Knight, may have served as the principal contractor or materials supplier, and he received two payments totaling $4,494.08. By 1934, too, the American Bridge Company was well established as part of the United States Steel empire and had long been one of the region's principal bridge fabricators.

The new bridge continued to carry the colloquial name of the old bridge, acquired from the nearby creamery plant that survives today in much-altered form. Although located at the very edge of Bradford village, the bridge is nevertheless visually and physically connected to that village district and provides access to the creamery from the south, eliminating the need to travel to and from the village center.

Major Bibliographic References

American Bridge Company, plans titled "Creamery Bridge, Bradford, VT," dated October 17, 1934. Copy available at the Vermont Agency of Transportation, Project Development Division, Montpelier, Vermont.

Haskins, Harold W. A History of Bradford, Vermont. Littleton, New Hampshire: Courier Printing Co., 1968.

McCullough, Robert. Crossings. A History of Vermont Bridges. Montpelier, Vt: Vermont Historical Society and the Vermont Agency of Transportation, 2005. Portions of the Statement of Significance borrow from this source.

Roth, Matt, and Bruce Clouette, "Vermont Historic Bridge Survey," OG-06. Typewritten survey available at the Vermont Division for Historic Preservation, Montpelier, Vt.

Town of Bradford, Annual Reports (1934 and 1935).

Vermont Agency of Transportation, plans titled: "Bradford, TH3330," dated August, 1983. Montpelier: Vermont Agency of Transportation, Project Development Division.

Vermont Agency of Transportation, plans titled: "Bradford STP 1447 (28)," dated November, 2006. Vermont Agency of Transportation, Project Development Division.

Vermont State Highway Board, Eighth Biennial Report (two years ending June 30, 1936).

Section 10: Geographical Data

Verbal Boundary Description

The boundary of the property is the bridge and its abutments. The bridge carries Town Highway 27 (Creamery Road) in Bradford across Waits River.

Boundary Justification

The boundary includes all the land historically associated with the bridge and its abutments.

Section 12: Photograph Labels

The following information is the same for all photographs:

Name of Property:	Bridge 22
Location:	Bradford, Orange County, Vermont
Credit:	Robert McCullough
Date:	2008
Negatives:	Filed at the Vermont Division for Historic Preservation

Photograph No. 1: View looking northwest.
Photograph No. 2: View looking southeast

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

NATIONAL REGISTER OF HISTORIC PLACES
EVALUATION/RETURN SHEET

REQUESTED ACTION: NOMINATION

PROPERTY NAME: Bridge 22

MULTIPLE NAME: Metal Truss, Masonry, and Concrete Bridges in Vermont MPS

STATE & COUNTY: VERMONT, Orange

DATE RECEIVED: 9/20/10 DATE OF PENDING LIST: 10/18/10
DATE OF 16TH DAY: 11/02/10 DATE OF 45TH DAY: 11/04/10
DATE OF WEEKLY LIST:

REFERENCE NUMBER: 10000878

REASONS FOR REVIEW:

APPEAL:	N	DATA PROBLEM:	N	LANDSCAPE:	N	LESS THAN 50 YEARS:	N
OTHER:	N	PDIL:	N	PERIOD:	N	PROGRAM UNAPPROVED:	N
REQUEST:	N	SAMPLE:	N	SLR DRAFT:	N	NATIONAL:	N

COMMENT WAIVER: N

✓ ACCEPT ___RETURN ___REJECT 11-3-10 DATE

ABSTRACT/SUMMARY COMMENTS:

Entered in
The National Register
of
Historic Places

RECOM./CRITERIA_____

REVIEWER_____ DISCIPLINE_____

TELEPHONE_____ DATE_____

DOCUMENTATION see attached comments Y/N see attached SLR Y/N

If a nomination is returned to the nominating authority, the nomination is no longer under consideration by the NPS.

BRIDGE 22
BRADFORD, ORANGE COUNTY, VERMONT
PHOTOGRAPH NO. 1

BRIDGE 22
BRADFORD, ORANGE COUNTY, VERMONT
PHOTOGRAPH NO. 2

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

FAIRLEE QUADRANGLE
VERMONT–NEW HAMPSHIRE
7.5 MINUTE SERIES (TOPOGRAPHIC)
NW/4 MT. CUBE 15' QUADRANGLE

BRIDGE 22
BRADFORD, ORANGE
COUNTY, VERMONT
UTM REFERENCE
18/730105/4874342

Mapped, edited, and published by the Geological Survey

Control by USGS and NOS/NOAA

Topography by photogrammetric methods from aerial photographs taken 1973. Field checked 1975. Map edited 1981

Projection: Vermont coordinate system, (transverse Mercator)
10,000-foot grid ticks based on Vermont coordinate system and New Hampshire coordinate system
1000-meter Universal Transverse Mercator grid, zone 18
1927 North American Datum
To place on the predicted North American Datum 1983 move the projection lines 3 meters south and 37 meters west as shown by dashed corner ticks

Fine red dashed lines indicate selected fence and field lines where generally visible on aerial photographs. This information is unchecked

Map photoinspected 1983
No major culture or drainage changes observed

UTM GRID AND 1981 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24 000

CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY
DENVER, COLORADO 80225, OR RESTON, VIRGINIA 22092
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

QUADRANGLE LOCATION

ROAD CLASSIFICATION
Primary highway, hard surface
Light-duty road, hard or improved surface
Secondary highway, hard surface
Unimproved road
Interstate Route U. S. Route State Route

FAIRLEE, VT.–N. H.
NW/4 MT. CUBE 15' QUADRANGLE
N4352.5–W7207.5/7.5

1981
PHOTOINSPECTED 1983
DMA 6571 I NW–SERIES V813

INTERIOR–GEOLOGICAL SURVEY, RESTON, VIRGINIA–1990

ISBN 0-607-56744-9
9 780607 567441

55A

VERMONT

State of Vermont
Division for Historic Preservation
One National Life Drive, Floor 2
Montpelier, VT 05620-1201
www.HistoricVermont.org

[phone] 802-828-3211
[Division fax] 802-828-3206

Agency of Commerce and Community Development

September 17, 2010

J. Paul Loether
National Park Service
National Register of Historic Places
1201 Eye Street, NW 8th floor
Washington, DC 20005

Dear Mr. Loether:

Enclosed please find the National Register nomination for the following property:

Bridge 22, Bradford, Vermont
This property is being nominated under the "Metal Truss, Masonry, and Concrete Bridges in Vermont" MPDF.

This property is being submitted under the Preservation Act of 1966, as amended in 1980, for inclusion in the National Register of Historic Places.

If you have any questions concerning the nomination please do not hesitate to contact me at (802) 828-3045 or nancy.boone@state.vt.us .

Sincerely,
DIVISION FOR HISTORIC PRESERVATION

Nancy E. Boone
State Architectural Historian / Deputy State Historic Preservation Officer