Rehabilitation of Fitch's Bridge
Groton

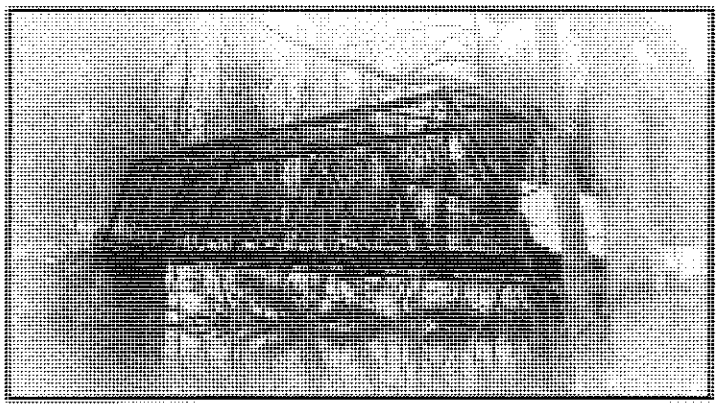
Application

to the

Transportation Enhancements Program

for

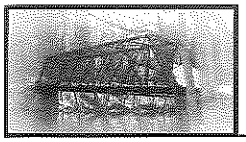
Construction Funding



Prepared by

Town of Groton
Board of Selectmen
Groton Greenway Committee
Friends of Fitch's Bridge

February 15, 2006
Revised May 31, 2006



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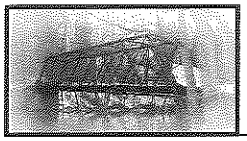

1 Introduction

Fitch's Bridge represents an important transportation connection that has played a role in Groton's history since before the American Revolution. The current structure also has historic significance for the area. As a functional bridge it would create an intermodal transportation system for the 21st century, creating a link for conservation land accounting for just under ten percent of the Town and linking 600 acres of conservation land in West Groton to non-vehicle routes between four towns.

In 2001 the Town committed funds for a preliminary study of the Bridge. In 2005 the Town committed funds for a final design of the Bridge. As part of the efforts to rehabilitate the bridge, The Town is now seeking Transportation Enhancement funds for construction.

This application was prepared as an application for Transportation Enhancement funding in accordance with the Commonwealth of Massachusetts Transportation Enhancement Program Guidelines.

This document was prepared by the Friends of Fitch's Bridge Subcommittee of the Groton Greenway Committee with help and support from the Groton Board of Selectmen, Groton Greenway Committee, and Amman & Whitney (MA), P.C., consulting engineers.

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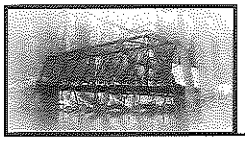


2 History of Fitch's Bridge

Fitch's Bridge and the location of the bridge have a long and sometimes colorful history in Town. Significant research has been dome to document the history of the Bridge and its predecessors. Some of this research is summarized in this section.

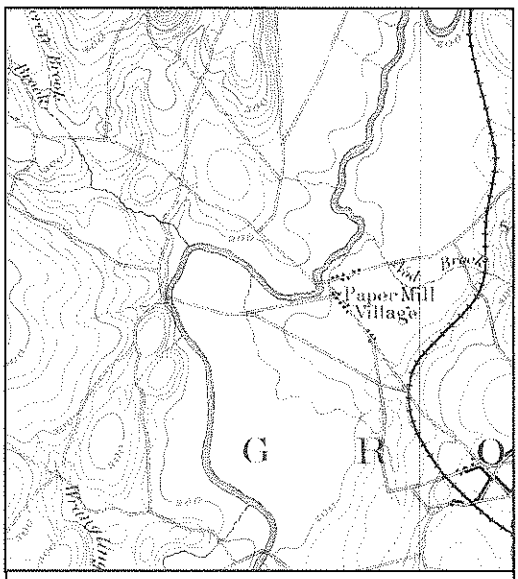
2.1 Previous Bridges

The first mention of a bridge in the area of current Fitch's Bridge was at town meeting of May 1760, where a committee was chosen to raise money to maintain the four bridges over Lancaster river between Groton, Pepperell and Shirley. There appears to have been a bridge in the same location as the present day Fitch's Bridge called Kemps Bridge.

In 1848 there were five bridges over the Nashua River, one over the Squanacook, two over Cow Pond Brook, one over Nonacoicus, one over Sandy, one over Unquetenasset and nine over James Brook. Twenty bridge crossings in all were in the town of Groton.

2.1.1 Captain Zacharia Fitch

Captain Zacharia Fitch was a commander during the early part of the American Revolution. Born in Bedford in 1734 his uncle was John Fitch for whom Fitchburg was named. After the war Captain Fitch married a local girl, settled on the west side of the Nashua and became a very prominent local figure.



Portion of 1893 USGS – From MassGIS

The following record of events is chiefly taken from memoranda kept by Captain Fitch during his years living near the Nashua:

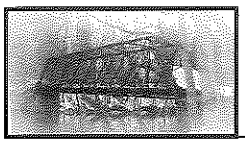
March 18, 1794: "a great flood, without any rain carried off mine and stoney-wading place bridges."

March 1st, 2nd, and third 1818: " A warm rain and a south wind melts a deep snow and causes a severe flood which does immense damage to mills, damns (sic) and bridges. Fitch's and Jewett's bridges carried away."

In 1803 Captain Zacharia Fitch proposed to the town that he would support the bridge and two highways leading to it on the east side of the river the distance of twenty rods for the sum of thirty dollars per year. The proposal was accepted and Captain Fitch and his heirs have supported the bridge ever since.[1]

Town bridges at this time appeared to have their own proprietors all living on the west side of the river. The town would pay for the construction of the bridge by a resident or group of residents

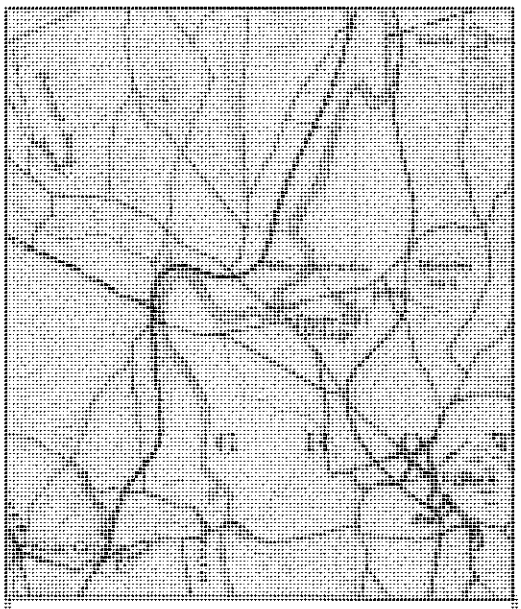
1 Butler, Caleb. History of the Town of Groton, 1848.



however the maintenance of the structures appeared to continuously be a matter of discussion and debate.

2.1.2 Current Bridge

The current bridge was constructed in 1898 by the Berlin Iron Bridge Company. The cost was $2,000. The bridge is a riveted steel double intersection Warren through truss. It is 126 feet long with a span of 119 feet. It is 14 feet wide. As of 1986, Fitch's Bridge was the third oldest of seven double intersection Warren[2] through trusses in the Massachusetts Department of Public Works (MDPW) database.



Portion of 1917 USGS – From MassGIS

The bridge has wood decking and stone abutments. It was repaired in 1921, and there are no records of repairs since then.[3] The bridge was closed to traffic in 1965.[4] The bridge was removed from the National Bridge Inspection Standards inventory in 1994 and was last inspected in November, 1994.[5]

2.2 History of Rehabilitation Efforts

At various intervals over the past ten years efforts were made to restore Fitch's Bridge. Activity in this area has ebbed and flowed at various times but 1998, 1999 and 2000 saw the greatest concentration of lobbying on the venerable bridge's behalf. Past support for the rehabilitation project has been both broad and deep; copies of support letters are appended to this document.

In 1998 and 1999 letters of support were gathered from various town departments and other organizations in the area. They include the following:

- Groton Conservation Commission dated March 25th 1998
- Groton Conservation Trust dated March 2, 1999
- Groton Board of Selectmen in support of the Greenway Committee's application to the State of Massachusetts D.E.M. "Greenway and Trails Demonstration" grant for an

[2] The bridge was also referred to as a Whipple truss in a January 21, 1992 bridge inspection report (MDPW Contract No. 91430).

3 Massachusetts Department of Public Works (MDPW), Historic Bridge Inventory & Evaluation, Bridge No. G-14-4, Bridge Key TWN 419-001-100, 1982, revised 1986. MDPW, Structure Inventory and Appraisal, May 19, 1981 #24506 Maintenance Inspection.

[4] Town of Groton Memorandum dated March 26, 1984, from Margaret Soper, Administrative Assistant, to Board of Selectmen, Regarding Fitch's Bridge for Town Meeting 1984.

[5] MassHighway, letter dated December 13, 1994 and report dated November 3, 1994, regarding Bridge Key No. Twn-419-001-100

engineering study of Fitch's Bridge. Dated 12/21/99.

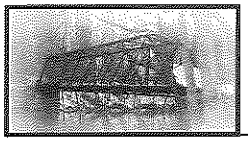
- Nashua River Watershed Association dated 1/3/2000 also in support of the D.E.M. grant proposal.
- Squanacook-Nashua-Nissitissit Regional Preserve Initiative (no date).

In the spring of 1999 one hundred and sixty eight signatures were gathered in support of the Greenway Committee seeking state funds to accomplish the rehabilitation of Fitch's Bridge as a pedestrian, bicycle and equestrian byway.

On May 23, 2000 Virginia Wood on behalf of the Board of Selectmen wrote a letter stating the town's intention to record a 10-year preservation restriction on Fitch's Bridge contingent on Town Meeting approval and the awarding to the town of Groton of the Massachusetts Preservation Project Fund grant of $15,000.00 for engineering study. However, this preservation restriction was never recorded.

On April 24th, 2000 an article at the Annual Town meeting passed to fund a $15,000.00 engineering study to provide a cost estimate and outline the specific repairs needed to make the bridge safe for non-vehicular traffic. The study was completed by Greenman – Pedersen, Inc in 2001. A copy of that report is appended to this document.

There have been various applications to different State of Massachusetts departments seeking funding for both the engineering study costs and the costs of reconstruction. The Committee has a copy of a D.E.M. application requesting $4,950 for a preliminary engineering study dated December 21, 1999. It also a copy of grant application to the Massachusetts Preservation Project fund requesting $15,000.00 for an engineering study dated May 23, 2000. The Committee has submitted a past application to the Massachusetts Highway Department under the "Transportation Enhancement Program". It did not receive that grant.



3 Project Description

3.1 Rehabilitation Purpose

The Friends of Fitch's Bridge Subcommittee of the Groton Greenway Committee (herein known as the Committee) has identified four points, discussed below, that identify the purpose of the rehabilitation project:

1. To rehabilitate the current bridge to a state suitable for pedestrian, bicycle, and equestrian use;

2. To create a link between Groton, West Groton, and Pepperell;

3. To rehabilitate a significant historic Groton landmark; and

4. To create a guarantee that the bridge will never be opened to motorized vehicular traffic.

1. To rehabilitate the current bridge to a state suitable for pedestrian, bicycle, and equestrian use

As the Town has grown the number of people using the Town's trails for walking, biking, and horse riding has also increased. However, neither of the vehicle bridges over the Nashua (Route 225 and Route 111/119) have sidewalks for pedestrian access. Fitch's Bridge can become a vital link to connect trails in Groton with West Groton, thereby keeping pedestrians, equestrians, and bikers off the primary vehicular bridges on Route 225 and 111/119.

2. To create a link between Groton, West Groton, and Pepperell

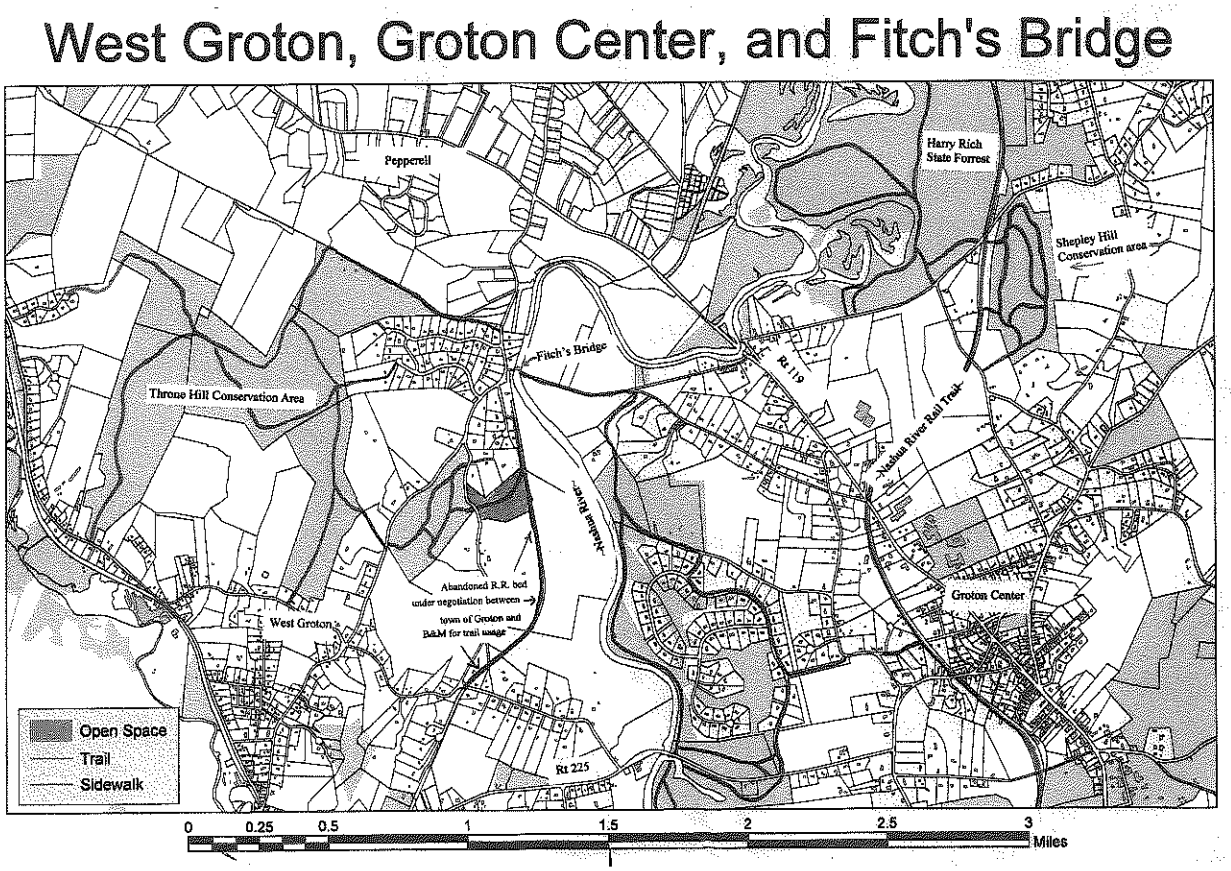
With respect to Fitch's Bridge, the ultimate goal of the Groton Trails Committee is to create a trail network that would link the major conservation and trail areas in Groton from East to West and from North to South. There are a few major obstacles to that goal, the most significant being the Nashua River which separates the East and West trail systems. Existing crossings of the river at Highways 119 and 225 are extremely hazardous for the casual hiker, cyclist or equestrian, especially when children are involved.

The Groton Trails Committee has worked for several years with this goal in mind. An easement has been obtained, a trail built and a bridge constructed that will connect Groton Place/Sabine Woods on Route 225 to Fitch's Bridge Road and hence to Fitch's Bridge. This was finalized in early 2004 with the construction of the trail and bridge over Tuity Brook. The bridge is the largest yet constructed on the Groton Trail network, being 20' long and 6' wide, sufficiently strong to carry two horses with riders. From this new bridge it is an easy walk along the unpaved Town road to Fitch's Bridge.

On the western side of the Nashua, conservation lands including "The Throne" extend from Fitch's Bridge to the Squannacook River. In the last few years trails were completed on the New

England Forestry Foundation property connecting the Throne with Hayes Woods and through the Johnson Conservation Area to Wallace Road and Fitch's Bridge. These conservation lands total approximately 600 acres.

The rehabilitation of Fitch's Bridge would be the single largest contribution that could be made to the Groton Trails network. The map below shows the bridge in relation to local trails.



3. To Rehabilitate a Significant Historic Groton Landmark

Constructed in 1898 Fitch's Bridge exists as the third oldest of only seven remaining Warren Through Truss Bridges in State of Massachusetts. The Massachusetts Historical Commission identified Fitch's Bridge as being potentially eligible for the National Register of Historic Places in 1982 and 1986. The design for the rehabilitation will adhere strictly to the Secretary Of The Interior's Standards For The Treatment Of Historic Properties. The property will retain its historic use and distinctive features, finishes and materials will be preserved.

The Town of Groton is committed to the rehabilitation of this historic structure with local and National significance. The Town has signified its support by passing unanimously a Town Meeting Article granting $60,000 of Community Preservation Funding towards this project.

4. To create a guarantee that the bridge will never be opened to motorized vehicular traffic

The scope of this project does not allow for reopening the bridge for vehicular traffic. This has been proposed for multiple reasons. The use of the bridge for pedestrians, equestrians, and bicyclists may clash with vehicular traffic. In addition, the cost of restoring the bridge to current vehicular load codes would increase the project cost dramatically.

4 Project Plans

Preliminary project plans have been prepared in accordance with the regulations of the Massachusetts Highway Department, the American Association of State Highway and Transportation Officials (AASHTO) "Guide Specifications for Design of Pedestrian Bridges, the Massachusetts Architectural Access Board, and the Americans with Disabilities Act Accessibility Guidelines. They have also been prepared within the parameters set forth by the Secretary of the Interior's Standards for the Treatment of Historic Properties.

4.1 Preliminary Design Report

A Preliminary Design Report is appended to this report. It was prepared by the Town's consultant, Ammann & Whitney (MA), P.C. The Report includes a summary of the results of a condition inspection and structural evaluation performed in January 2006 and provides recommendations for rehabilitation and an estimate of associated construction costs. The report also includes drawings, photos and structural calculations.

5 Project Eligibility Criteria

The Fitch's Bridge project meets the three eligibility criteria as identified in the Transportation Enhancement Program Guidelines. These criteria are described below.

5.1 Eligibility Criterion 1: Relationship to Surface Transportation System

This project meets eligibility criterion 1 primarily through function and impact, but also through proximity.

5.1.1 Function

Fitch's Bridge, by its nature as a link for pedestrians, equestrians, and bicyclists, will serve as a functional component of the intermodal surface transportation system. It will provide safe access between Fitch's Bridge Road on the Groton side and Pepperell Road on the West Groton side. The figure below shows the conservation lands and public access that will be linked by the Bridge. It will connect 600 acres of conservation land on the West Groton side with 1230 acres of conservation land on the Groton. This total, 1830 acres, is approximately 9% of the total area of the Town. It will also connect 21 miles of trails. The rehabilitation of Fitch's Bridge would be the single largest contribution that could be made to the Groton Trails network since it would connect the entire community west of the Nashua River to the Town Center without the hazard of vehicular traffic. From a regional perspective, the bridge would connect West Groton to the Nashua River Rail Trail and its Ayer terminus at the Ayer commuter rail station. The map below shows the bridge relative to local conservation lands all of which contain trails well marked by the Groton Trails Committee.

5.1.2 Impact

The rehabilitation of Fitch's Bridge would restore an historic link between Groton and West Groton and provide a safe connection for pedestrians, equestrians, and bicyclists. The project will have a significant beneficial impact on the surface transportation system. It would restore an historic and safe non-vehicle connection within the Town of Groton's surface transportation system.

5.1.3 Proximity

Fitch's Bridge is contiguous to public rights of way at both ends of the bridge (Fitch's Bridge Road on the Groton side and Pepperell Road on the West Groton side). It is within walking distance of trails on both sides of the Nashua River. It is within a mile of the Nashua River Rail Trail, connecting Ayer, Groton, Pepperell, and Dunstable.

Fitch's Bridge Trail System
and Conservation Land
From Squannacook River to Town Center

5.2 Eligibility Criterion 2: Non-Traditional Transportation Project

This project is not typically eligible for funding under more traditional transportation funding programs. The project will include rehabilitation according to the Secretary of the Interior's Standards for Treatment of Historic Properties. It will restore a pedestrian/equestrian/bicycle bridge in accordance with the American Association of State Highway and Transportation Officials (AASHTO) "Guide Specifications for Design of Pedestrian Bridges, the Massachusetts Architectural Access Board, and the Americans with Disabilities Act, activities not typically eligible for traditional funding.

5.3 Eligibility Criterion 3: Includes a Transportation Enhancement Activity

To be considered eligible, a project must include at least one eligible project activity as identified in the Transportation Enhancement Guidelines. This project includes at least three activities, described below.

5.3.1 Activity 1: Provision of facilities for pedestrians and bicycles

As mentioned earlier in this report, this project will provide a connection across the Nashua River by public access to 1830 acres of conservation land (600 acres in West Groton and 1230 acres in Groton) and 21 miles of trails in Groton stretching from the border of Townsend into Ayer and Pepperell.

The project will also be consistent with the safety and educational objectives of the most recently approved Massachusetts Pedestrian Transportation Plan and Massachusetts Statewide Bicycle Transportation Plan. In 1997 the Massachusetts Pedestrian Transportation Plan identified the eastern portion of Groton as having one of the highest percentages of working population that walks to work in the MRPC region.[6] Since that time, there has been significant development along the Nashua River and to its west. This project will help link these areas to an area of already higher than average pedestrian use.

As the project has developed it has become clear that there is public support for use of Fitch's Bridge as an alternate means of access from West Groton to the center of Groton. Some of the attached letters of support mention this opportunity.

5.3.2 Activity 6: Historic preservation

This project will include the preservation of an historic bridge. The Bridge has been identified by the Groton Historical Commission as having historical significance. It will be rehabilitated in accordance with the Secretary of the Interior's and Standards for Treatment of Historic Properties. The historic preservation work will be carried out under the direction of professionals meeting the standards published in the Code of Federal Regulations (36 CFR Part 61).

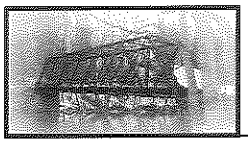
Fitch's Bridge was built by the Berlin Iron Bridge Company. The Berlin Iron Bridge Company was one of the premier 19th century bridge companies in the northeast and was Connecticut's only large-scale fabricator of metal-truss bridges in the 19th century. Some 400 employees worked at its East Berlin plant, and hundreds of others worked in the field erecting the bridges. Over 1,000 Berlin bridges are believed to have been built before 1900. Most were in the Northeast, but even today Berlin bridges survive as far away as Texas. The company mostly built small-town highway bridges using its patented lenticular or parabolic truss. However, the Berlin Iron Bridge Company was prepared to take on any kind of fabrication work, including multiple-span city bridges, suspension bridges, drawbridges, and railroad bridges.[7]

5.3.3 Activity 7: Rehabilitation and operation of historic transportation buildings, structures, or facilities (including historic railroad facilities and canals)

This project intends to rehabilitate Fitch's Bridge so as to allow it to function as a pedestrian, equestrian, and bicycle bridge while preserving its significant historical features. The Bridge is eligible for listing in the National Register of Historic Places.

[6] MA Bureau of Transportation Planning and Development, The Massachusetts Pedestrian Transportation Plan, 1997.

[7] CT Department of Transportation, History of the Berlin Iron Bridge Company, http://www.past-inc.org/bibco/



6 Project Appropriateness

The Fitch's Bridge project meets or exceeds the minimum criteria for determination of appropriateness, as defined in the Transportation Enhancements Guidelines. These criteria are described below.

6.1 Compliance with Application Guidelines

This application has been prepared in compliance with the Transportation Enhancement Program Guidelines.

6.2 Eligibility

The project is eligible to receive Transportation Enhancement funding for construction by meeting the three eligibility criteria.

6.3 Compliance with Design Standards

This project will designed in accordance with all applicable design standards, including the American Association of State Highway and Transportation Officials (AASHTO) "Guide Specifications for Design of Pedestrian Bridges, the Secretary of the Interior's Standards for Treatment of Historic Structures, The Americans with Disabilities Act accessibility Guidelines, and the Rules and Regulations of the Massachusetts Architectural Board.

6.4 Consistency with Other Plans

This project is consistent with other state, regional, and local plans. The rehabilitation of Fitch's Bridge for pedestrian access and passive recreation has been an Open Space and Recreation Planning Goal since the 1980's. The rehabilitation of Fitch's Bridge falls within the Town's overall open space goals and objectives as identified in the 2002 Groton 2020 Update Planning Directive, the 2005 Open Space and Recreation Plan and the 2005 Groton Community Preservation Plan.

A pedestrian walkway spanning the Nashua River was identified in the 2005 Groton Open Space and Recreation Plan as a special recreational opportunity: "a) Explore developing a river walk along the Nashua and/or Squannacook Rivers. b) Consider Fitch's Bridge for east and west Groton connection." Another objective identified in the Plan is to work with neighboring towns to link adjacent open space and recreation areas. The action item in the Plan is to "Consider old railroad bed lines to link with adjoining communities, i.e., the Brookline branch to Pepperell and the Peterborough and Shirley branch of the Fitchburg line to Townsend."

6.5 Organization of Submission

The submission is organized in a report format to provide background documentation on the project as well as provide relevant information in an organized manner. Required forms are completed and submitted as appendices to this report.

6.6 Readiness for Implementation

This project exceeds the minimum requirements for readiness for implementation. Preliminary design is complete and final design will be complete by summer 2006. If funding were secured for fiscal year 2007, the project would be capable of construction in the fall of 2006.

6.7 Completeness of Project Scope

The project has been prepared in accordance with the Transportation Enhancement guidelines. The project scope has been reviewed by the sponsoring committees of the Town and its consultant.

6.8 Appropriate TIP Funding Schedule

The following schedule for TIP funding has been proposed if selected for FY 2007:

TIP Funding Schedule				
FY/Quarter	**FY 2006/2nd Quarter**	**FY 2006/3rd Quarter**	**FY 2006/4th Quarter**	**FY 2007/1st Quarter**
Dates	**1/2006-3/2006**	**4/2006-6/2006**	**7/2006-9/2006**	**10/2006-12/2006**
Phase				
1. TEP Application	Submitted to MRPC by 2/15/06 with 25% design			
2. TIP Scheduling and Advocacy		MHD spearheads 25% review of application	Final TIP development and MPO endorsement	
3. Final Design and Permitting		Town completed Final Design		
4. Construction				Construction

6.9 Budget and Scope of Work

6.9.1 Budget

A preliminary cost estimate has been prepared for the project. The budget listed below has been proposed. It includes the design, a bid contractor package, and additional related work to support the project. The budget does not include design, which will be completed exclusive of the Transportation Enhancement application. The contractor package is listed in detail in the preliminary design report. The Town intends to provide in-kind services for additional related work to provide support the project would impeding the work of the contractor on the main bridge work. These services are listed below.

Preliminary Cost Estimate		
Work Item	**Cost**	**Proposed Funding Source**
Bridge Rehabilitation (see Preliminary Design Report)	$402,228	Transportation Enhancement
Field Stone Masonry End Posts	$10,080	Town of Groton
Regrading Approach Areas	$5,000	Town of Groton
Informational Kiosk	$4,000	Town of Groton
Regrading for Stormwater Management	$6,000	Town of Groton
Culvert Repairs	$5,000	Town of Groton
Trail Signage for Bridge/Trail Connections	$1,000	Town of Groton
Tree Removal/Clearing of Brush	$3,000	Town of Groton
Construction Inspection Services	$20,000	Town of Groton
Construction Subtotal	**$456,308**	
Estimating and Design Contingency (15% of construction subtotal)	$68,446	
General Conditions (5% of construction subtotal and contingency)	$26,238	
Overhead and Profit (10% of construction subtotal, contingency, and general conditions)	$55,099	
PROJECT TOTAL	**$606,091**	
TE Funds Requested (90% of Project Total)	**$545,482**	

6.9.2 Scope of Work

The scope of work is the basis for the budget proposed and can be described by the Work Items.

Bridge Rehabilitation

This work includes the necessary steps in rehabilitation the bridge according to codes to a condition suitable for continued use as a pedestrian/equestrian/bicycle bridge. It is described in more detail in the Preliminary Design Report.

Field Stone Masonry End Posts

This item includes the installation of field stone masonry end posts at each end of the bridge as per the project drawings. This work will be accomplished by volunteer labor made up of Groton Greenway Committee members and other interested organizations. This item is currently included in Ammann & Whitney's cost estimate but has been subtracted out.

Regrading Approach Areas

The soft surface approach areas extending approximately 100' on each side of the bridge will require regrading and the application of new stone dust material (subtracted from Ammann & Whitney estimate). This work will be accomplished by volunteer labor made up of Groton Greenway Committee members and other interested organizations.

Informational Kiosk

An informational kiosk is proposed next to the bridge on an approach path to provide information about the bridge history, restoration efforts, trail connections, and conservation lands connected by the bridge. Funding would come from a combination of in-kind services and grant's from organizations which have helped fund similar projects in the past.

Regrading for Stormwater Management

Some erosion has been noted around the abutments. Some regarding will be needed to help mitigate potential for additional damage to the bridge and trails due to stormwater.

Culvert Repairs

The approach path on the east side approach has a small granite field stone culvert. This feature will be reconstructed by volunteer labor made up of Groton Greenway Committee members and other interested organizations

Trail Signage for Bridge/Trail Connections

Additional signage will be needed along the trails adjacent to the bridge. This can be done in conjunction with the Groton Trails Committee.

Tree Removal / Clearing Of Brush

The approach areas on either side of the bridge have become overgrown with brush and several trees are encroaching on the bridge structure and need to be removed. This work will be accomplished by volunteer labor made up of Groton Greenway Committee members and other interested organizations.

Construction Inspection Services

A Groton resident and professional Construction Manager has volunteered to provide project inspection services during construction. This individual will be the Town's representative and main point of contact for the Contractor for the duration of the construction period.

6.10 Applicant's Share of Funding

As described in the Application, the Town of Groton will provide approximately 11% of the total project funding, broken down as shown in Section 6.9.1.

6.11 Disclosure of Unresolved Issues

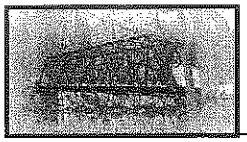
To the best of the Town's knowledge, there are no unresolved issues.

6.12 Adequacy of Community Support

This project has received significant community support from private residents, organizations, Town Boards and Commissions, and the Town Meeting. Letters of support and petition signatures are included in the report appendices.

6.13 Site Visits

The project sponsors would welcome a site visit to describe the project and help show the relevance of the site to project.



7 Appendices

A TEP Application Form

B Environmental Questionnaire

C 2006 Preliminary Design Report

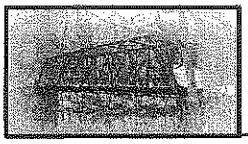
D 2001 Greenman Pederson Report

E Town Meeting Warrant Article and Votes

F Letters of Support

G Articles, Open Letters, Etc.

H Petition Signatures



Appendix A

COMMONWEALTH OF MASSACHUSETTS

Executive Office of Transportation
Massachusetts Highway Department

APPENDIX B

FOR EOTC/MHD OFFICE USE ONLY
Project File #_____
Total Project Cost: $_____
Enhancement Funds Requested: $_____

COMMONWEALTH OF MASSACHUSETTS
TRANSPORTATION ENHANCEMENT PROGRAM GUIDELINES
EFFECTIVE NOVEMBER 2003

APPLICATION FORM

☒ PRE-APPLICATION ☐ FINAL APPLICATION

(ONLY PROJECT PROPOSALS THAT HAVE SUCCESSFULLY COMPLETED THE PRE-APPLICATION PROCESS ARE ELIGIBLE FOR SUBMITTING A FINAL APPLICATION.)

DATE: 5/31/06

Before filling out this application, please see attached Application Form Instructions (Appendix A).

All questions must be answered.

1. Project Name: Reconstruction of Fitch's Bridge

2. Project Applicant:

   Applicant Name: Town of Groton

   Agency Name: Board of Selectmen

   Address: 173 Main Street, Groton, MA 01450

   Telephone Number: 978-448-1111 Fax Number: 978-448-1115

   E-mail address:selectmen@townofgroton.org

   Is there more than one project applicant? ☐ Yes ☒ No

3. Applicant's Contracting Officer:

   Name: Jean Kitchen

   Title: Chief Procurement Officer

   Address: 173 Main Street, Groton, MA 01450

   Telephone Number: 978-448-1111 Fax Number: 978-448-1115

   E-mail address:jkitchen@townofgroton.org

4. Contact Person:

   Name: David Manugian

   Title: Chair, Friends of Fitch's Bridge Subcommittee

   Address: 7 Shepley Street, Groton, MA 01472

   Telephone Number: 978-369-8188 Fax Number: 978-369-8380

   E-mail address: dmmanugian@ambient-engineering.com

5. Is the project to be managed by a sponsor other than the applicant? ☐ Yes ☒ No

   If yes, please give:

   Sponsor Name:

   Contact Name:

   Title:

   Address:

   Telephone Number: Fax Number:

   E-mail address:

6. Regional Planning Agency(s):

Name: Montachusett Regional Planning Commission Name:

Address: R1427 Water Street, Fitchburg, MA 01420 Address:

Contact person: Sheri Dufour Contact person: Brad Harris

Phone #: 978-345-7376 Phone #:

7. MassHighway District Office(s):

District #: 3 District #:

Address: 403 Belmont Street, Worcester, MA 01604 Address:

Contact person: Sarah Bradbury Contact person: Arthur Frost

Phone #:_____ Phone #:_____

8. Project Type: (Check Only One) ☒ Regional ☐ Statewide

9. Type of Work Category: (Include even those work category(s) that are being proposed as the non-federal share/applicant match.)

☐ Program ☐ Property Acquisition ☐ Final Design ☒ Construction

A.) Are all work categories requesting Enhancement funding included in this one application?

☒ Yes ☐ No

If you answered "No" to 9A, please explain?

B.) Are any of these work categories requesting credit toward the non-federal share and applicant match?

☐ Yes ☒ No

If you answered "Yes" to 9B, please explain?

C.) Is this project part of a larger MassHighway and/or municipal roadway project?

☐ Yes ☒ No

If you answered "Yes" to 9C, please describe the nature of that project. (Include the type of funding, status of funding, and total project cost, including the Enhancement funding):

D.) Is there funding, other than Enhancement funding, either being applied for or already approved for this project?

☒ Yes ☐ No

If you answered "Yes" to 9D, please describe the other funding and what work categories it applies to. (Include the type of funding, status of funding, and total project cost, including the Enhancement funding):

Category	Amount	Source	Status
25% & Final Design	$ 60,000	Groton CPA	Secured
Construction	$606,091	90% TE	Seeking
		10% Fund Raising&In Kind	Seeking
Total Project Amount:	$666,091		
Total TE Funds Requested:	$545,482 (90% of $606,091)		

10. Has this project proposal received prior funding approval under the Transportation Enhancement Program? ☐ Yes ☒ No

If yes, please list project proposal name:

Fiscal Year the application was approved:

Amount of approved project proposal funding:

What Work Categories were approved:

What is the present status:

11. Brief Project Proposal Description: (A detailed project proposal description is requested in item 23. In the space provided, describe the Enhancement component of the project only.)

Fitch's Bridge was built in 1898 to provide vehicle access across the Nashua River between Groton and West Groton. It is currently not passable. The purpose of this project is to restore the bridge for pesestrian, equestrian, and bicycle use The restored bridge would be the only pedestrian link between Groton and West Groton and would provide public access between pedestrian, equestrian, and bicycle trails on both sides of the river.

12. Eligibility for Funding:

A.) Transportation Enhancement Activities:

TABLE OF TRANSPORTATION ENHANCEMENT ACTIVITIES
1) Provision of facilities for pedestrians and bicycles
2) Provision of safety and educational activities for pedestrians and bicyclists
3) Acquisition of scenic easements and scenic or historic sites
4) Scenic or historic highway programs (including the provision of tourist and welcome center facilities)
5) Landscaping and other scenic beautification
6) Historic preservation
7) Rehabilitation and operation of historic transportation buildings, Structures, or facilities (including historic railroad facilities and canals)
8) Preservation of abandoned railway corridors (including the conversion and use thereof for pedestrian or bicycle trails)
9) Control and removal of outdoor advertising
10) Archeological planning and research
11)Environmental mitigation to address water pollution due to highway runoff or reduce vehicle-caused wildlife mortality while maintaining habitat connectivity
12) Establishment of transportation museums

List only the eligible enhancement activities from the table above:

(The primary enhancement activity should be listed first and any secondary activities to follow.)

(You are only required to indicate one eligible activity to qualify, so please do not add activities that do not apply.)

a) Activity 1

b) Activity 6

c) Activity 7

d)

B.) Direct and Substantial Relationship to Surface Transportation System:

In the space provided, check all relationships that apply to the project proposal and briefly describe.

☒ Function

Fitch's Bridge, by its nature as a link for pedestrians, equestrians, and bicyclists, will serve as a functional component of the intermodal surface transportation system. It will provide safe access between Fitch's Bridge Road on the Groton side and Pepperell Road on the West Groton side.

☒ Proximity

Fitch's Bridge is contiguous to public rights of way at both ends of the bridge (Fitch's Bridge Road on the Groton side and Pepperell Road on the West Groton side). It is within walking distance of trails on both sides of the Nashua River.

☒ Impact

The restoration of Fitch's Bridge would restore an historic link between Groton and West Groton and provide a safe connection for pedestrians, equestrians, and bicyclists.

C.) Non-Traditional Transportation Project Proposal:

Briefly explain how the "Enhancement" project proposal is a "Non-Traditional Transportation Project Proposal":

This project is not typically eligible for funding under more traditional transportation funding programs. The project will include restoration according to the Secretary of the Interior's Standards for Treatment of Historic Properties. It will be restored in accordance with the Massachusetts State Building Code, the Massachusetts Architectural Access Board, and the Americans with Disabilities Act, activities not typically eligible for traditional funding.

D.) (For Statewide Project Proposals Only) Briefly explain how the project proposal meets statewide criteria:

NA

13. Funding Breakdown for Transportation Enhancement funding:

Work Categories	Breakdown Of Funding			TOTAL for each row across
	Federal Share (80%)	State Share (10%/20%)	Applicant Share (10% min.)	
Programs	0	0	0	0
Property Acquisition	0	0	0	0
Final Design	0	0		
Construction	$484,873	$49,386	$71,832	$606,091
Cash				
TOTAL	$484,873	$49,386	$71,832	Total Project Cost: $606,091

*Applications submitted by a federal or state agency require a 20% applicant match.

Please indicated the percentage of funding shares, and explain the proposed applicant match, including its source and percentage of overall project costs: (For example, is the applicant match in the form of cash or in-kind services and explain.)

Percentage of Federal Funds requested: 80%
Percentage of State Funds requested: **9%**
Percentage of applicant match: **11%**

The Town of Groton has appropriated $60,000 as approved by Town Meeting for use in 25% design and final design. An additional $2,000 has been raised by private fund raising. The balance of approximately $69,832 will be a combination of additional fund raising and in-kind services.

14. Project Proposal Location/Limits: (Please be as specific as possible.)

The project is a bridge connection across the Nashua River in Groton, connecting Fitch's Bridge Road in Groton to Pepperell Road in West Groton.

15. Project Proposal Status: (All applicants must complete the following information.)

A.) Program work category, please answer the following:

Is the Planning Phase complete? ☒ Yes ☐ No

If "yes", by whom? Town

If "no", please explain why?

B.) Property Acquisition work category, please answer the following: (All applicants must complete the following information.)

1) Is there any property acquisition necessary to complete this project? ☒ Yes ☐ No

If "yes", please explain.

Town

2) Was there any property acquisition already completed for this project? ☐ Yes ☐ No

If "yes", please explain.

3) Has all necessary land acquisition been identified? ☒ Yes ☐ No

If "no", please explain.

4) Does the applicant have permission to all the land? ☒ Yes ☐ No

If "yes", in what way? (answer the following)

Land in Fee:	☒ Yes	☐ No
Permanent Easements:	☒ Yes	☐ No
Temporary Easements:	☒ Yes	☐ No
Eminent Domain:	☐ Yes	☐ No

Please explain.

5) Will this project application impact private property in any way? Ie. Does any part of this project application require construction on or through private property? ☐ Yes ☒ No

If "yes", please explain?

6) Are there any encroachments? ☐ Yes ☒ No

If "yes", please explain.

7) Has there been or will there be any land takings by eminent domain? ☐ Yes ☒ No

If "yes", please explain whether they were or will be of a friendly or hostile nature?

8) Is the land acquisition for: ☐ Preservation or ☐ Construction (Check one).

C.) Final Design and/or Construction Work categories, please answer the following: (All applicants must complete the following information.):

1) Is the Planning/Feasibility Phase complete: ☒ Yes ☐ No

a.) If yes, by whom: Town

b.) If no, explain:

2) Is the Preliminary Design (25%) Phase complete: ☒ Yes ☐ No

a.) If yes, by whom: Consulting Engineer, Ammann & Whitney, to the Town of Groton
b.) What is the status of the MassHighway review? :
Not yet initiated MassHighway review; pending evaluation of Transportation Enhancement application.
c.) Is the designer a MassHighway-approved consultant?: ☒ Yes ☐ No

3) Is the Final Design (75%) Phase Complete: ☐ Yes ☒ No

a.) If yes, by whom:
b.) What is the status of MassHighway review:

c.) Is the designer a MassHighway-approved consultant? ☒ Yes ☐ No

4) Is the Final Design (100%) Phase Complete: ☐ Yes ☒ No

a.) If yes, by whom:
b.) What is the status of MassHighway review:

c.) Is the designer a MassHighway-approved consultant? ☒ Yes ☐ No

5) If the designer is not a MassHighway-approved consultant, please check one of the following:

☐ local volunteer ☐ city or town engineer

☐ consulting firm ☐ Other

If the designer is not a MassHighway-approved consultant, please explain why this consultant has been selected?

6) If design has begun, but is not complete, please give the design status and estimated completion date:

Design Status:

25% Preliminary Design - Complete

Final Design - Complete 7/1/06

Estimated completion date: sumbitted 2/15/06

7) Estimated date to begin construction/implementation: 2006

8) Estimated date to complete construction/implementation: 2007

16. Party Responsible for Future Maintenance & Operation:

Department Name: Groton Highway Department

Dept. Representative: Tom Delaney, Highway Surveyor

Address:

Telephone Number: 978-448-1162 Fax No. 978-448-1174

E-mail address: highway@townofgroton.org

17. Americans with Disabilities Act:

A.) Has this project proposal received a waiver under the Americans with Disabilities Act?

No ☒ Yes ☐

If yes, please include a copy of the waiver as an attachment.

B.) Does this project require a waiver under the Americans with Disabilities Act?

No ☒ Yes ☐

If yes, please explain.

C.) Is this project application requesting funding to meet ADA requirements?

No ☒ Yes ☐

If yes, please explain.

18. Public Participation:

A.) Has a public hearing been held on the project proposal? ☒ Yes ☐ No

If "no", please explain why and whether you intend to hold a public hearing.

B.) Does your proposal have an affirmative town meeting vote, city council approval or municipal referendum? ☒ Yes ☐ No

If yes, by whom:

Board of Selectmen

If "no", please explain why.

C.) Is there any known support to the project proposal? ☒ Yes ☐ No

If "yes", please explain who and why.

See attached letters from supporting Town Boards, community organizations, residents, and legislative representatives

D.) Is there any known opposition to the project proposal? ☐ Yes ☒ No

If "yes", please explain who and why.

E.) Have you solicited public opinion in any way? ☒ Yes ☐ No

If "yes", please explain how and to whom.

All planning has been done as part of the Groton Greenway's Friends of Fitch's Bridge. Meetings were posted and open to the public.

19. Copies of city council, town votes or municipal referendums: To be attached
20. Copies of minutes from public hearings, including any votes: To be attached
21. Any Public Support Documentation: To be attached
22. Any Public Opposition Documentation: To be attached
23. ***"Detailed"*** Enhancement Project Proposal Description: To be attached
24. Any site plans and/or locus maps: To be attached
25. Environmental Requirements: To be attached
26. ***"Detailed"*** Scope and Budget: To be attached
27. Brief description of Regional Planning Agency Selection Process: To be attached
28. Funding Schedule by TIP year: To be attached

29. Authorizing Signature:

Signature : _____ Date: 13 feb 06

Name: George F. Dillon
Type Official's Name

Title: Chairman, Board of Selectmen Groton
Type Official's Title

Please note: the individual who is authorized to contract on behalf of the City/Town/Agency must sign Application.

Appendix B

APPENDIX C

COMMONWEALTH OF MASSACHUSETTS
TRANSPORTATION ENHANCEMENT PROGRAM GUIDELINES
EFFECTIVE NOVEMBER 2003

ENVIRONMENTAL QUESTIONNAIRE

Enhancement projects are intended to improve the transportation system through landscaping, scenic protection, historic preservation, bicycling projects, and pedestrian facilities. Although proposed projects are designed to meet the above goals, it cannot be presumed that an enhancement project automatically complies with federal and state regulations for environmental protection and historic preservation.

As federal funds are being provided to implement enhancement projects, MassHighway and the Federal Highway Administration must formally determine that a proposed enhancement project conforms to the requirements of the National Environmental Policy Act, the National Historic Preservation Act, and the Massachusetts Environmental Policy Act as well as other applicable federal and state regulatory provisions.

For many projects, MassHighway and the Federal Highway Administration can document compliance with applicable regulations by using the Categorical Exclusion Determination Checklist. MassHighway is responsible for completing and signing the Categorical Exclusion Determination Checklist but the applicant must supply the relevant information. To complete an Enhancement Application Form, the applicant must answer all of the following questions. This information will provide the basis for MassHighway's completion of the Categorical Exclusion Determination Checklist.

Project name: _____

1. **Wetlands**

Will bordering vegetated wetlands, saltmarsh or tidelands be dredged, filled, removed or altered by the project?	☐ Yes ☒ No
Will any work take place in a water body (pond, lake, canal, river, or ocean?)	☐ Yes ☒ No
Will any work take place within 100 feet of a wetland or water body, within 200 feet of a river or stream?	☒ Yes ☐ No
Will any work take place within 100 year floodplain?	☒ Yes ☐ No
Will drainage patterns be altered as a result of this project?	☐ Yes ☒ No
Is any portion of the site subject to a Wetlands Restriction Order pursuant to	☐ Yes ☒ No

G.L. c.131, §40A or c. 130, s 105?

Is the project within estimated habitat which is indicated on the most recent Estimated Habitat Map of State-listed Rare Wetlands Wildlife published by the Massachusetts Natural Heritage and Endangered Species Program? ☒ Yes ☐ No

If you have answered yes to any of the above questions, review by the local Conservation Commission is required to complete this application.

Has the local Conservation Commission reviewed this project? ☐ Yes ☒ No

Has the Conservation Commission issued a Determination of Applicability or Order of Conditions for this Project? ***If yes, include a copy with the Application.*** ☐ Yes ☒ No

2. Water Quality

Does the project involve stormwater management? ☒ Yes ☐ No

Will the project change drainage patterns or increase paved or impervious surfaces? ☐ Yes ☒ No

Does the project involve dredging? ☐ Yes ☒ No

3. Historic and Archaeological Resources

Will the project involve work on or near a historic property or archaeological site that is eligible to be listed or listed in the National Register of Historic Places, or listed in the State Register of Historic Places? ☒ Yes ☐ No

Will the project affect a designated Scenic Road or land adjacent to a Scenic Road? ☐ Yes ☒ No

Will the project involve work on or near a historic property or impact any cultural historic or archaeological resource? ☒ Yes ☐ No

4. Scenic Roads

Will the project affect a designated Scenic Road or land adjacent to a Scenic Road? ☐ Yes ☒ No

5. Section 4(f) Lands

Does the project include work within or adjacent to a publicly owned park, Recreation area, or wildlife and waterfowl refuge, or land of a historic site? ☐ Yes ☒ No

Does the project include work within a publicly owned park or recreation area? ☐ Yes ☒ No

6. Hazardous Materials Sites

Has the project site previously been used for use, generation, transportation, storage, release, or disposal of potentially hazardous materials? ☐ Yes ☒ No

Is the project site listed or adjacent to a site listed on the most current List of Confirmed Disposal Sites and Locations to be Investigated? ☐ Yes ☒ No

7. Endangered Species

Does the project occur in an area where there are federally listed endangered or threatened species or critical habitat? ☐ Yes ☒ No

Have the U.S. Fish and Wildlife Service and the Massachusetts Natural Heritage and Endangered Species Program made a determination in this regard? ☐ Yes ☒ No

8. Coastal Zone

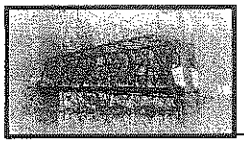
Is the project within the Massachusetts Coastal Zone? ☐ Yes ☒ No

If yes, is the project consistent with the Massachusetts Coastal Zone Management Plan (MCZM)? ☐ Yes ☐ No

Has CZM made a determination of concurrence? ☐ Yes ☐ No

9. MEPA Environmental Review

Does the project exceed thresholds for filing under the Massachusetts Environmental Policy Act (MEPA)? ☐ Yes ☒ No



Appendix C

REHABILITATION OF FITCH'S BRIDGE
GROTON, MA

PRELIMINARY DESIGN REPORT

FEBRUARY 10, 2006

Prepared By:

AMMANN & WHITNEY

12 Marshall Street
Boston, MA
02108

REHABILITATION OF FITCH'S BRIDGE
GROTON, MASSACHUSETTS

PRELIMINARY DESIGN REPORT

TABLE OF CONTENTS

REHABILITATION OF FITCH'S BRIDGE
GROTON, MA

PRELIMINARY DESIGN REPORT

I. EXECUTIVE SUMMARY

The purpose of this project is to reopen the historic Fitch's Bridge over the Nashua River in Groton, MA for use as a pedestrian, equestrian and bicycle bridge. The bridge, closed to traffic since 1965, will serve as an important crossing of the Nashua River to provide linkage to various new and existing trails.

Ammann & Whitney (MA), P.C. of Boston was retained by the Town of Groton to perform a condition inspection and structural evaluation of the existing bridge and to prepare contract documents for its rehabilitation. Condition inspections were conducted on January 12, 2006 and January 20, 2006 to identify structural and safety deficiencies that need to be addressed during the rehabilitation design.

Section IV of this report summarizes the structural and safety deficiencies observed during the condition inspection. In general, the primary structural elements of the bridge, the two trusses, are in fair condition with several localized areas of heavy corrosion. The deck planking and curbing is missing or in very poor condition. Secondary braces are also in generally fair condition, with several heavily corroded connections. The substructures appear to have settled/rotated, and the stone pedestals supporting the bridge bearings appear to be somewhat unstable.

Section VII lists the proposed recommendations for structural rehabilitation as well as safety improvements. Preliminary Design drawings showing the locations of the proposed repairs are included in Appendix C. The proposed rehabilitation includes the following major items:

- Structural steel repairs
- Replacement of all bearings
- Replacement of timber decking, nailers and curbing
- Replacement of longitudinal steel stringers
- Replacement of two severely deteriorated floor beams
- Construction of new abutments and modifications/repairs to the existing stone masonry abutments and wingwalls.
- Restoration of the existing bridge rail and construction of new independent bridge rails and stone masonry parapet walls to conform with current safety standards.
- Painting of all existing steel (optional, but highly recommended)

A major goal of this project is to maintain the historic character of the bridge which is eligible for listing on the National Register of Historic Places. To this end, all work will be designed in accordance with the Secretary of Interior's "*Standards for Rehabilitation.*" Based on a review of the standards, we believe the proposed rehabilitation work will receive a finding of "No Adverse Effect" from the Massachusetts Historical Commission.

An itemized estimate of probable construction costs is provided in Section VIII.

In conclusion, although there are a number of structural and safety deficiencies that need to be addressed, the bridge has the structural capacity to be restored as a pedestrian, bicycle and equestrian bridge linking various new and proposed trails, thus preserving an historic landmark for the Town of Groton.

II. INTRODUCTION

The purpose of this project is to reopen the historic Fitch's Bridge over the Nashua River in Groton, MA for use as a pedestrian, equestrian and bicycle bridge. The reopened bridge, closed to traffic since 1965, will be an important river crossing for the pedestrian trails linking the J. Harry Rich State Forest and town conservation lands at Throne Hill and Hayes Bridge, linking Groton, West Groton and Pepperell.

The engineering firm, Ammann & Whitney (MA), P.C. of Boston, was retained by the Town of Groton to perform a condition inspection and structural evaluation of the existing bridge and to prepare contract documents for its rehabilitation. Ammann & Whitney performed its work under the guidance and direction of the Friends of Fitch's Bridge Committee (Bridge Committee).

The primary objectives to be achieved by this bridge rehabilitation project include:

- Repair all existing structural and safety deficiencies;
- Rehabilitate the bridge in accordance with the Secretary of Interior's "Standards for Rehabilitation" as codified in 36 CFR 67 to achieve a finding of "No Adverse Effect" by the Massachusetts Historical Commission;
- Design the rehabilitation repairs to meet the latest applicable bridge codes including the American Association of State Highway and Transportation Officials (AASHTO) "*Guide Specifications for Design of Pedestrian Bridges*" and the MassHighway Bridge Manual;
- Extend the service life of the bridge for a minimum of 75 years; and,
- Minimize future maintenance of the bridge as much as possible.

This Preliminary Design Report includes a summary of the results of the condition inspection and structural evaluation, recommendations for rehabilitation, and estimates of associated construction costs.

III. BRIDGE DESCRIPTION

History

The existing Fitch's bridge was constructed in 1898 by the Berlin Iron Bridge Company of Connecticut. There is evidence that the existing bridge replaced an earlier bridge at the same location, and that portions of the existing stone abutments may have pre-dated the existing bridge.

Fitch's Bridge was determined to be potentially eligible for inclusion on the National Register of Historic Places by the Massachusetts Historical Commission. As of 1986, the

Massachusetts Highway Department determined that Fitch's Bridge was the third oldest of seven surviving double-intersection Warren truss bridges in Massachusetts.

The last records of repairs are from 1921. The bridge was closed to vehicular traffic in 1965 due to poor structural condition and insufficient vehicular load carrying capacity. More recently, concrete barriers and chain link fence were placed at each end of the bridge to prevent pedestrians from accessing the bridge due to unsafe conditions caused by the loss of deck planking. The bridge was removed from the National Bridge Inspection Standards inventory in 1994 and was last inspected by the Massachusetts Highway Department in 1994. There are no records of previous underwater inspections or scour surveys.

Bridge Structure

The bridge is a single-span, simply-supported, riveted steel, double-intersection Warren through-truss (Photos 1 and 2 in Appendix A). No original drawings of the structure could be located. Therefore, base plans of the structure were developed using field measurements obtained during the inspection.

Figure 1 shows the orientation of the bridge and identifies the major structural elements, which include the following:

Trusses – The top chord and inclined end post compression members are built-up members made up of a single top plate with two side web plates connected with continuous angles riveted to the plates. The bottom chord tension members are double angles. The bottom chords in the first two panels at either end are braced with lacing bars riveted to the angles, while the angles in the remaining panels are larger in size with no bracing. Vertical and diagonal tension members are double angles, while compression diagonals consist of double angles connected together with steel lacing bars on the top flange. The truss elements are connected at panel points with secondary gusset plates riveted to the truss elements.

Deck and Floor System - The deck is a timber plank deck supported by longitudinal steel stringers and timber nailers which are both supported by transverse steel floor beams located at each truss panel point. The deck dead load and live load are carried by the steel stringers, but the planks are nailed to the timber nailers. Raised timber curbs supported on timber blocking to allow for drainage are attached to the deck planks along the edge of deck.

Lateral Truss Bracing – The north and south trusses are braced laterally with diagonal X-bracing made up of single steel angles. Top chord bracing members are attached directly to the top flange of the top chord with rivets. Bottom chord bracing members are attached to the bottom of the floor beams using gusset plates and rivets.

Bearings – The trusses are supported by steel expansion bearings on the west abutment and steel fixed bearings at the east abutment. The bearings are anchored with 1¼"

diameter steel anchor bolts grouted to pedestal stones below. It appears that the expansion bearings consist of some type of roller mechanism, although this could not be verified due to the amount of corrosion.

Substructure – The east and west substructures consist of gravity abutments and wingwalls constructed with a combination of loose-laid granite block and field stones which are not mortared together. The trusses are supported on large cut rectangular granite pedestals which are supported on the abutment bridge seats. The pedestals do not appear to be connected to the abutment, but rather simply rest on the bridge seat.

Bridge Railings - On the bridge, there are bridge rails attached to the trusses consisting of continuous double-angle top and bottom rails with steel flat-bar verticals and diagonals between the top and bottom rails. At the intersection of the railing diagonals there are ornate metal plate medallions.

Approach Roadways – The approach roadways appear to be dirt roads with no pavement system visible. There does not appear to be any evidence of any approach slabs. There are post and cable guard rails along each wingwall that attached to the inclined end posts of the trusses.

IV. SUMMARY OF THE CONDITION INSPECTION

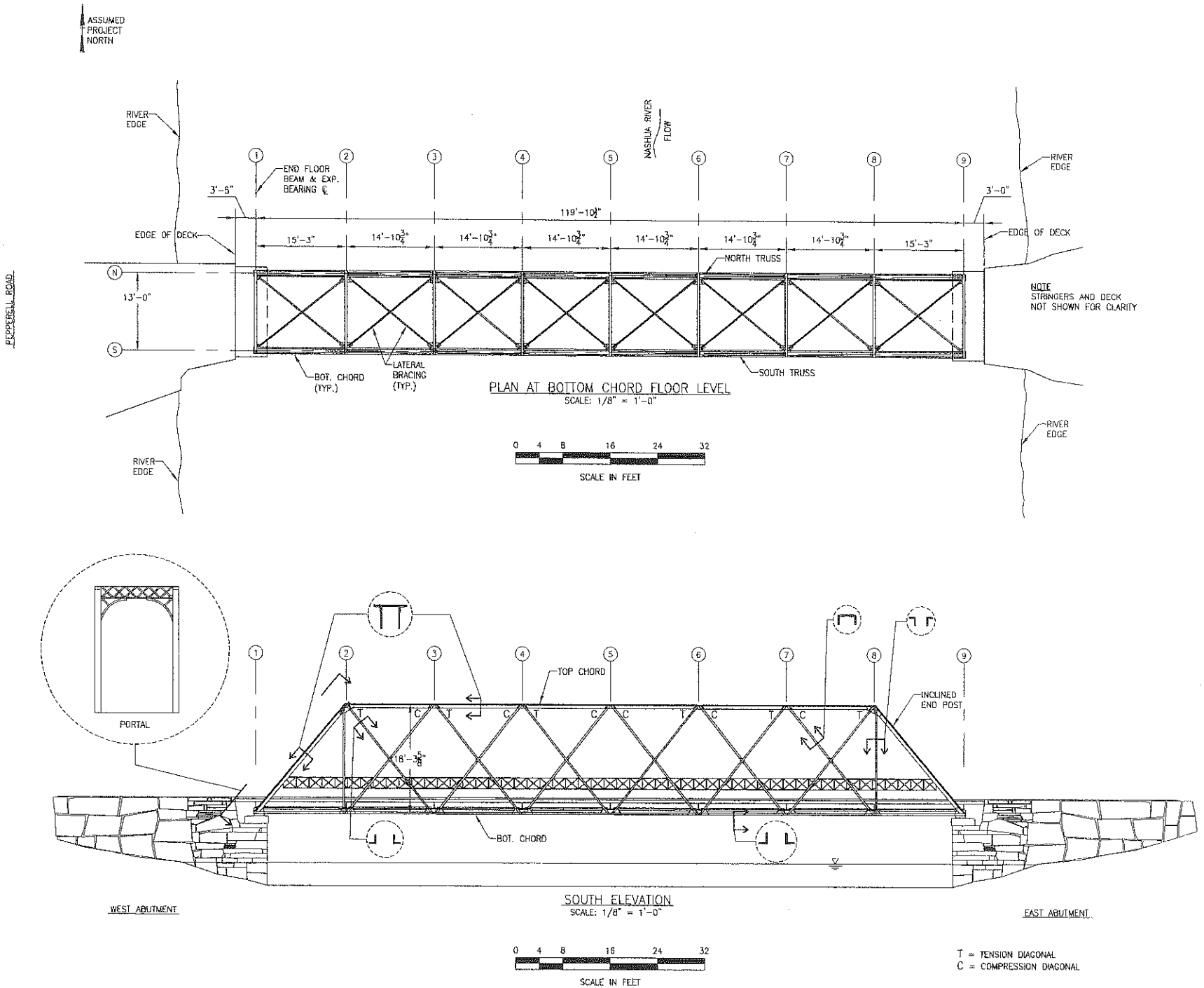
Condition inspections were conducted on January 12, 2006 and January 20, 2006 by Ammann & Whitney engineers to identify structural and safety deficiencies that need to be addressed during the rehabilitation design. Team Leader for the inspections was Andre Martecchini, P.E. Visual and hands-on inspections were conducted for the entire structure using ladders and free-climbing.

For ease of locating members on the bridge, a grid numbering system was developed as shown in Figure 1. Truss nodes are numbered from 1 to 9 starting from the west side (Pepperell Road side). For example, a deficiency located at N9 would be at the north truss at row 9.

The following is a summary of the structural and safety deficiencies that were observed. Photos referred to in the text can be found in Appendix A.

Trusses

The most important structural elements of the bridge are the two trusses, because a failure of either would cause collapse of the bridge. Except as described below, all members of the trusses exhibit light to moderate corrosion on all surfaces with scattered minimal loss of section. There are remnants of paint on some members, although any remaining paint is loose and peeling.



BRIDGE ORIENTATION DIAGRAM

FIGURE NO. 1

At three locations on the north truss (one at node 2 and two at node 8), there is heavy localized corrosion on the underside of the bottom chord angles with holes approximately 1 in^2 in size. (Photo 3) The overall corroded area is very small, and is located immediately adjacent to bottom gusset plates or bottom flange lacing bars.

The inner web plates at all four inclined end posts are heavily corroded with large holes at the intersection of the portal framing curved angles. (Photo 4). The curved portal angles are also heavily corroded. The outer web plates and top flange plates in the same location are in generally good condition.

The top flanges of the top chords are heavily corroded with holes in several locations. At nodes N2, N8 and S2, there is heavy corrosion and pack rust between the portal frame top angle connection plates and the top flange plate of the top chord with large holes in the top flange plate. (Photo 5) Pack rust is corrosion build-up between two metal surfaces which continues to expand as the corrosion continues. In addition, there are several locations with heavy pack rust and corrosion between the top chord bracing angles and the top chord flange plate which has resulted in heavy corrosion and holes in the top chord flange plates. (Photo 6). In one case, the expansive force of the pack rust actually popped a rivet.

Several vertical gusset plate connections at the lower chord truss nodes have heavy corrosion with small holes. (Photo 7) In addition, at several lower chord nodes, the secondary bottom gusset plate between lower chord angles is heavily corroded with large holes. (Photo 8).

The vertical gusset plates at truss supports at nodes N1, N9 and S1 are heavily corroded. (Photo 9) In addition, there is a hole from corrosion at the top flange plate at node N1.

Deck and Floor System

Approximately 40% of the timber plank decking is missing. Much of the remaining decking is rotted and loose. (Photo 10). Only one small section of raised timber curb and blocking remains between rows 8 and 9 along the north truss.

Most of the steel stringers have heavy corrosion with up to 30% loss of section, especially in the top flanges. (Photo 11) Many of the timber nailers are missing. Those that remain, are sagging and are very deteriorated with numerous checks and rot. (Photo 11) The exterior steel deck channels have light to moderate corrosion throughout, and are in generally good condition.

The steel transverse floor beams at rows 2 through 8 are in generally good condition with generally light corrosion throughout and scattered areas of moderate corrosion with minimal loss of section. The transverse floor beams at rows 1 and 9 have extensive corrosion at the truss ends, especially in the web areas where there are holes over several feet at the north ends in the vicinity of the truss. (Photo 12) The beam seats for floor beams 1 and 9 consist of bent plates riveted to the truss inclined end posts. These seats

are heavily corroded and bent. The seat at N9 is very heavily corroded and essentially has collapsed such that the floor beam has dropped approximately 2 inches which has caused the entire deck structure from row 8 to warp towards N9. (Photo 12)

Bottom Chord Lateral Truss Bracing

Lateral bracing are secondary bracing members. 9 of 18 gusset plates which attach the diagonal bracing to the bottom flange of the floor beams are heavily corroded, in some cases large holes. (Photo 8 and 13) The gusset plate at N1 has completely corroded away and the end of the angle brace is not attached to the floor beam. (Photo 14) The remaining gusset plates have light to moderate corrosion with minimal loss of section.

The diagonal bracing under the deck is in generally good condition with light corrosion throughout and scattered areas of moderate corrosion with minimal loss of section. The diagonal at truss connection S1 has heavy corrosion of the angle where it attaches to the gusset plate, especially the vertical leg of the angle which has essentially corroded away. (Photo 15)

Top Chord Lateral Truss Bracing

The top chord diagonal and lateral angle bracing is in generally good condition with light to moderate corrosion throughout and minimal loss of section. At several connections between the diagonals and the top chords of the trusses, there is heavy pack rust that is causing corrosion of the chord top flange plate and jacking and warping of the angle braces. (Photo 16) In one case, the rust jacking has popped a rivet. (Photo 6)

Portal Bracing

The bottom chords of the portal bracing have areas of heavy corrosion and scattered holes. The curved diagonal angles under the portal frames have heavy corrosion and substantial loss of section at the connections with the inclined end posts (Photo 4). The remainder of the portal framing members are in generally good condition with light corrosion throughout and scattered areas of moderate corrosion with minimal loss of section.

Bearings

The expansion bearings at the west abutment are heavily corroded and may be frozen. (Photos 9, 14 and 15) The 1¼ inch diameter anchor bolts at the west abutment bearings are bent towards the west. This may be due to settlement/rotation of the abutments or because the slotted holes in the bearings were not large enough to accommodate expansion of the bridge. (Photo 15)

The fixed bearing at the east abutment at the north truss has heavy corrosion at the top of the masonry plate in the vicinity of the truss bottom chord. (Photo 12).

Substructure

The stone masonry of the abutments and wing walls appears to be generally intact, but there are large gaps between many stones where there is evidence of loss of soil fines from behind the walls. Although there are large gaps between stones, there were no large "sink holes" or other signs of roadway instability behind the abutment or wingwalls. (Photo 17 and 18) However, we do not know the repair history of the approach roadway and if earlier sinkholes were filled.

It does appear that both abutments have settled and rotated slightly towards the south side. This can be observed in Photos 17 and 18 against the level water line. It is difficult to determine when such settlement may have occurred. The settlement and rotation of the abutments appears to be relatively uniform across the entire width of the abutments. Comparing photos taken in 2000 with photos taken during our inspection, we do not note any significant changes in the stone masonry which indicates that the settlements may have occurred a long time ago.

We were unable to perform an underwater inspection at this time to probe for scour holes in the vicinity of the substructure. Loose-laid stone masonry substructures situated in a flowing river, are particularly susceptible to damage by scour and loss of support under the masonry. We do intend to perform a scour survey in the near future.

The truss bearings are anchored to 3 ft. wide by 4 ft. long by 15 inch deep rectangular granite pedestals. All four pedestals themselves appear to be sound. The two pedestals on the east abutment appear to be somewhat unstable as they are not fully supported, and the bearing load is eccentric to the centroid of the pedestal stone. (Photo 19 and 20) The stone pedestals on the west abutment appear to be slightly more stable. None of the pedestal stones appear to be anchored in any way to the abutment bridge seat masonry.

Bridge Railings

The bridge rails have several large sections on the south side that are missing. The top and bottom chords of the railing that remains have light to moderate corrosion with minimal loss of section. Many of the verticals and diagonals between the top and bottom rails are slightly to moderately bent, and in several cases missing.

The geometry of the bridge rails does not meet current AASHTO safety standards. The railing height is approximately 3'-5" inches above the deck surface, while the current AASHTO standard requires a minimum top rail height of 4'-6" for pedestrian/equestrian bridges. The maximum opening on the existing railing exceeds the 6 inch maximum opening required by AASHTO within the bottom 27 inches of the railing and 8 inches above the 27 inch level. Also, it does not appear that the existing railing will meet the current AASHTO loading requirements.

Paint System

The condition of the paint system is extremely deteriorated. There are remnants of a paint system throughout the steel members. What paint remains is flaking and very loose. There are areas with a reddish color which probably indicates a primer coat, and other areas with a light colored top coat.

Samples of paint chips were scraped, collected and tested for the presence of lead using a lead testing kit. Tests indicated that lead is present. Additional testing is required to determine the lead concentration levels.

Approach Roadways

The approach roadways appear to be stable and do not have any large "sink holes" or depressions. There is some erosion at the end of the southeast wingwall which is caused by surface runoff from the roadway. (Photo 21) This wingwall does not appear to be long enough to contain the approach roadway in this location.

The cable guide rails and posts at both approaches are broken and misaligned. They also do not meet current AASHTO safety standards.

V. STRUCTURAL EVALUATION

A structural analysis was performed to determine the structural load carrying capacity of the existing bridge, and to determine if any strengthening of existing structural members is required to meet current AASHTO loading criteria. Based on geometric information obtained during the field survey, a 2-dimensional computer model was developed using the STAAD structural analysis software. The proposed use of the bridge will be for pedestrians, bicycles, and equestrians. As such, the loading criteria in the AASHTO "*Guide Specifications for Design of Pedestrian Bridges*" was used. A summary of the results of the structural analysis, computer model and calculations are included in Appendix B.

Section properties were calculated based on measurements obtained during the field inspection. To account for scattered corrosion and loss of section, the section properties were reduced by 10%. Section properties did not take into account major loss of section observed in the field. In such cases, the deterioration will have to be repaired to restore the member to its original section property.

Due to the short schedule, it was not possible to cut coupons and have them tested for material properties. Based on visual observations and the year of construction, the structural members are steel and not cast iron. For unknown steel constructed prior to 1905, the AASHTO "*Manual for Condition Evaluation of Bridges*" recommends using a design yield stress of 26,000 psi. This yield stress was used during the analysis to

determine allowable stresses in the existing steel members. New steel members will have a minimum yield stress of 36,000 psi.

The dead load of the structure was based on the self-weight of the existing structural members, without taking into account any loss of section. The decking weight was based on 3 inch thick timber planking with raised timber curbs similar in size to the existing curbs. The deck stringers were assumed to be new W6 x 15 steel beams replacing the existing deteriorated stringers. The dead load of the railings was doubled to take into account the weight of a new independent bridge rail.

The analysis was performed using a uniform pedestrian live load of 65 psf in accordance with the AASHTO "*Guide Specifications for Design of Pedestrian Bridges.*" The bridge was also checked for a truck live load as required by the guide specification. Based on the proposed curb-to-curb dimension of 9'-4½", the design truck is an H5 truck which has a total weight of 5 tons. This size truck would be considered similar to a pick-up truck but would not include larger emergency vehicles such as ambulances or fire trucks. The pedestrian live load and truck load are not applied simultaneously. The bridge does not have to analyzed for a truck if trucks are physically prevented from crossing the bridge through the use of barriers such as bollards. Although it is the intent of the Bridge Committee to prevent trucks from using the bridge, we believe that it is prudent to check the bridge for an occasional maintenance vehicle that might cross the bridge in the future.

Based on the analysis, a rehabilitated structure will have sufficient structural capacity to carry the proposed pedestrian and H5 truck live loads. The pedestrian live load results in higher overall truss loads than the H5 truck. The controlling tension members are the truss bottom chord members between nodes 4 and 6. Including an assumed 10% section loss, the maximum tensile stress in these members is 10.54 ksi which is less than the allowable tensile stress of 14.3 ksi. The controlling compression members are the truss top chords between nodes 13 and 14. Including an assumed 10% section loss, the maximum compressive stress in these members is 8.14 ksi which is less than the allowable compressive stress of 10.8 ksi.

The floor beams are also controlled by the pedestrian live load. Including an assumed 10% section loss, the maximum bending stress in the existing floor beam is 11.21 ksi which is less than the allowable bending stress of 14.3 ksi.

VI. HISTORICAL ISSUES

Because Fitch's Bridge is an historic structure eligible for listing on the National Register of Historic Places, one of the main goals of this project is to rehabilitate the bridge in a way that preserves the historical integrity of the structure.

According to the Secretary of Interior's "*Standards for Rehabilitation*", "Rehabilitation" is defined as "the process of returning a property to a state of utility, through repair or alteration, which makes possible an efficient contemporary use while preserving those

portions and features of the property which are significant to its historic, architectural, and cultural values."

The following are the ten standards for rehabilitation as defined in the "Standards for Rehabilitation," and how we address each of the standards with the proposed rehabilitation work.

Standard 1 - A property shall be used for its historic purpose or be placed in a new use that requires minimal change to the defining characteristics of the building and its site and environment.

After rehabilitation, the bridge will remain in service as a bridge, although traffic will be limited to pedestrian, bicycle and equestrian users.

Standard 2 - The historic character of a property shall be retained and preserved. The removal of historic materials or alteration of features and spaces that characterize a property shall be avoided.

What makes the bridge historic is the structural system itself – a double-intersection Warren truss – one of only seven remaining examples of such bridges in Massachusetts. The proposed rehabilitation work will not alter the historic character of the bridge structural system. Removal and replacement of historic features is limited to those elements that have deteriorated or are unsafe.

Standard 3 - Each property shall be recognized as a physical record of its time, place, and use. Changes that create a false sense of historical development, such as adding conjectural features or architectural elements from other buildings, shall not be undertaken.

As noted above, the historic bridge will remain essentially intact. The only new architectural elements being added are new bridge rails mounted on the timber curb inboard of the existing railing which will be restored and new stone masonry parapet walls to terminate the bridge rail off the bridge. Both of these new features are required to meet current railing safety standards.

Standard 4 - Most properties change over time; those changes that have acquired historic significance in their own right shall be retained and preserved.

No significant changes were made to the original bridge since it was constructed.

Standard 5 - Distinctive features, finishes, and construction techniques or examples of craftsmanship that characterize a property shall be preserved.

Other than the structural system itself, the most architecturally significant feature of the original bridge is the existing railing. Missing sections of the railing will be

restored, including the metal plate medallions at the intersections of the railing diagonals, and the remainder of the railing will be repaired so that it can be preserved as an important architectural feature. Other structural elements will be repaired whenever possible.

Standard 6 - **Deteriorated historic features shall be repaired rather than replaced. Where the severity of deterioration requires replacement of a distinctive feature, the new feature shall match the old in design, color, texture, and other visual qualities and, where possible, materials. Replacement of missing features shall be substantiated by documentary, physical, or pictorial evidence.**

In general, all structural members with less than 10% section loss will remain and not be repaired. Other members with more significant corrosion will be repaired whenever possible. Repairs may involve adding additional splice or backing plates that will be installed out of view. Exposed heads of new bolts will be round button-head bolts that closely resemble rivet heads. When it is not practical or cost effective to repair severely deteriorated members such as the timber deck planking and longitudinal stringers, they will be replaced with new members closely matching the old in design and materials. In the case of the expansion bearing replacements, we anticipate using new elastomeric bearings shielded by steel angles. This is similar to the existing bearings, except that the sliding part of the bearing will be modernized to minimize future maintenance.

Standard 7 - **Chemical or physical treatments, such as sandblasting, that cause damage to historic materials shall not be used. The surface cleaning of structures, if appropriate, shall be undertaken using the gentlest means possible.**

The existing steel members of the bridge will have to be prepared for repainting to remove existing corrosion and contaminants. We anticipate that the cleaning techniques will include a combination of sand-blasting, pressure washing, and hand and power-tool cleaning. Neither of these preparation techniques will be very abrasive to the steel, especially given that the existing paint system is so loose and in such poor condition. The specifications will require the contractor to use the least abrasive cleaning system to prepare the surface for painting.

Standard 8 - **Significant archeological resources affected by a project shall be protected and preserved. If such resources must be disturbed, mitigation measures shall be undertaken.**

No archeological resources are expected to affected by the proposed rehabilitation work. The only excavation required for the project is removal of the upper portions of the abutments and wingwalls, and minor regrading of the approach roads.

Standard 9 - **New additions, exterior alterations, or related new construction shall not destroy historic materials that characterize the property. The new work shall be differentiated from the old and shall be compatible with the massing, size, scale, and architectural features to protect the historic integrity of the property and its environment.**

As mentioned above, the only new architectural features proposed are new bridge rails and stone masonry parapets off the bridge to meet current safety standards. The new bridge rail will be a more modern railing with a steel pipe top rail and horizontal cables at 6 inches on center. The new railing will be painted black to minimize its aesthetic impact. It will be relatively light and airy as seen from off the bridge, and will be clearly differentiated from the existing.

Standard 10 - **New additions and adjacent or related new construction shall be undertaken in such a manner that if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired.**

The only new additions to the bridge are the independent railing on the bridge and stone masonry parapets off the bridge. Should these elements be removed in the future, the bridge will revert back to its original design.

Based on our review of the above standards for rehabilitation, we believe that the proposed rehabilitation work will result in a finding of "No Adverse Effect" by the Massachusetts Historical Commission.

VII. REHABILITATION RECOMMENDATIONS

To reopen the bridge for pedestrian, bicycle and equestrian use, the bridge will require rehabilitation of many structural members to restore them to their original capacity properties, as well as safety improvements to meet current safety standards.

The following recommendations for rehabilitation are organized by structural rehabilitation, safety improvements, and optional, but highly recommended repairs. The repairs are not listed in any particular order of priority because they are all required, unless otherwise noted. Preliminary design drawings illustrating these recommendations are included in Appendix C.

Structural Rehabilitation Recommendations

1. Remove and replace all deck planking and nailers with new timber deck planking and nailers. Install new raised timber curbing of the same size as the original curbing. Install new nailers on top of the new stringers and bolt timber planking through stringer flanges. All timber will be CCA pressure treated timber to protect against decay and rot.

2. Remove all existing wide flange steel deck stringers and replace them with new W6 x 15 steel wide flange beams. The W6 beam proposed is the same depth as the existing stringer, but has a slightly wider flange to allow for easier attachment of the decking. The existing edge channels can remain. The new steel stringers will be primed and painted.

3. Replace the deteriorated floor beams and their seat connections at rows 1 and 9. The new floor beams will be S12 x 35 beams which closely resemble the size and shape of the original beams. The new seat connections will be designed and detailed to prevent accumulation of debris as the existing connection does. The other seven floor beams can remain. The new floor beams will be primed and painted.

4. Replace the deteriorated double-angle bottom chords of the portal framing at both portals, including the curved double-angle brackets.

5. Repair the four deteriorated inner webs at the inclined end posts at the portal frame connection to the curved brackets.

6. Rebuild the upper portions of both the east and west abutments and wingwalls as shown on Drawings S-1 and S-6. The rebuilt abutments will include new reinforced concrete abutment seats and backwalls supported by the lower portion of the existing stone masonry to remain. The exposed faces of the new concrete bridge seats and backwalls will be faced with new stone masonry attached to the concrete. The intent is to reuse the existing stone where possible and to duplicate the stone pattern and jointing layout of the remaining stone. New stone matching the existing will be blended in as required. The new concrete bridge seat will be sloped to drain, and will have level pockets for resetting the pedestal stones. The wingwalls beyond the abutments will be rebuilt using the existing stone in a loose-laid pattern similar to the existing. A geotextile filter fabric will be placed behind the rebuilt sections of wingwall to prevent loss of soil fines through the voids. Extend the southeast wingwall approximately 5 ft. to eliminate the surface erosion problem that currently exists. In order to rebuild the substructures, it will be necessary to jack and support the ends of the bridge on a temporary shoring system.

7. Repair various corroded steel truss members and gusset plates as shown on Drawings S-2 through S-4. Repairs shall be made using bolted connections using round headed bolts on exterior areas exposed to view. Members shall be braced as required during the repair process so that the structure remains stable.

8. Remove and replace the expansion and fixed bearings. Steel for the new bearings shall be hot-dip galvanized and painted. Install new anchor bolts.

9. Conduct a scour survey to determine if any areas of the abutments or wingwalls are locally undermined or unstable due to scour.

Recommended Safety Improvements

10. Restore missing sections of the existing bridge railing system using similar detailing as the original. Install new independent, curb-mounted bridge railings meeting current AASHTO standards with a height of 4'-6" above the deck and a maximum opening of 6 inches . The proposed new independent railing will consist of a horizontal top pipe rail and horizontal vinyl-coated 3/16" diameter stainless steel cables supported by steel posts. The top rail will be braced back to the trusses. Paint the new railing black to differentiate the new railing from the historic bridge and to minimize overall aesthetic impacts.

11. Construct four new stone masonry end posts above the wingwalls as shown on Drawings S-1 and S-5.

12. Provide neoprene compression seals at the joints between the deck and abutment backwall as shown on Drawing S-6. The intent of the seals is to provide an ADA compliant joint surface while accommodating thermal expansion and movement of the bridge. The seals will also help to prevent water and debris from flowing onto the bridge seats.

13. Reconstruct the approach roadways with a gravel subbase and stone dust topping.

14. Install two concrete-filled steel pipe bollards, one at either end of the bridge, to prevent vehicles from crossing the bridge and accessing the path system.

Optional, but Highly Recommended Rehabilitation Work

15. Clean and repaint all existing steel to remain after all repairs are made. Cleaning will include a combination of sand blasting, pressure washing and hand and power-tool cleaning. Appropriate containment and disposal measures will be required to prevent lead contaminated debris from polluting the river, surrounding land and air.

VIII. COST ESTIMATES

An estimate of probable construction cost is included in Table 1. This estimate reflects our opinion of the fair construction value of this project, and should not be construed as the prediction of the lowest contractor bid.

This estimate is based on the following assumptions:

1. The project will be publicly bid which will require prevailing wages.

2. Prices are based on current dollars escalated (by 4%) to August 2007, the assumed mid-point of construction.

3. A design contingency of 15% is included for unforeseen design issues and design detail development. This contingency will be reduced and then eliminated as the design progresses to final bid documents. This contingency is not to be considered as a construction contingency which the Town of Groton should assign separately.

4. Subcontractor mark-ups are included in each unit rate.

5. General Contractor mark-up includes general conditions such as bond, insurance, site office overheads, and permit applications.

6. The duration of construction will be approximately five to six months.

7. An allowance of $5,000 for scour remediation is included. The need for this work will be verified after the scour survey is complete.

Several items denoted with an asterisk (*) may be suitable for construction by town or volunteer labor. If these items of work are performed by town or volunteer labor, these may be considered as "in-kind" services when applying for various funding grants.

REHABILITATION OF FITCH'S BRIDGE
GROTON, MA

PRELIMINARY DESIGN CONSTRUCTION COST ESTIMATE
TABLE 1

2/10/2006

ITEM DESCRIPTION	QUANTITY	UNITS	UNIT COST	TOTAL
Deck Planking	1,494	SF	$ 8.00	$ 11,952
New W6x15 Deck Stringers	7,575	LB	$ 2.00	$ 15,150
Remove Existing Steel Stringers and 2 Floor Beams	1	LS	$ 4,200.00	$ 4,200
New Floor Beams at Rows 1 and 9 with New Seats	980	LB	$ 4.00	$ 3,920
Timber Curbing	253	LF	$ 8.50	$ 2,151
New Bridge Railing	253	LF	$ 120.00	$ 30,360
Repair Existing Historic Bridge Railing	1	LS	$ 4,200.00	$ 4,200
Steel Repair Type B1	95	LB	$ 3.00	$ 285
Steel Repair Type B2	2	EA	$ 2,200.00	$ 4,400
Steel Repair Type B3	7	EA	$ 2,300.00	$ 16,100
Steel Repair Type B4	4	EA	$ 1,800.00	$ 7,200
Steel Repair Type T1	4	EA	$ 2,300.00	$ 9,200
Steel Repair Type T2	3	EA	$ 3,000.00	$ 9,000
Steel Repair Type T3	5	EA	$ 2,200.00	$ 11,000
Steel Repair Type T4	1	EA	$ 2,300.00	$ 2,300
Steel Repair Type T5	4	EA	$ 3,500.00	$ 14,000
Steel Repair Type T6	4	EA	$ 2,200.00	$ 8,800
Steel Repair Type T7	2	EA	$ 3,500.00	$ 7,000
Straighten Webs at Inclined End Post	1	LS	$ 1,150.00	$ 1,150
New Portal Framing	550	LB	$ 11.00	$ 6,050
Replace Expansion Bearing	2	EA	$ 3,200.00	$ 6,400
Replace Fixed Bearing	2	EA	$ 2,000.00	$ 4,000
Field Stone Masonry End Posts (*)	240	SF	$ 42.00	$ 10,080
Substructure Rehabilitation	1	LS	$ 66,360.00	$ 66,360
Temporary Shoring	1	LS	$ 31,050.00	$ 31,050
Stone Dust for Approach Roadway (*)	67	SY	$ 8.00	$ 536
Painting	4,800	SF	$ 25.00	$ 120,000
Bollards (*)	2	EA	$ 500.00	$ 1,000
Scour Remediation	1	LS	$ 5,000.00	$ 5,000
SUBTOTAL				**$ 412,844**
ESTIMATING AND DESIGN CONTINGENCY (15%)				$ 61,927
GENERAL CONDITIONS (5%)				$ 23,739
OVERHEAD AND PROFIT (10%)				$ 49,851
TOTAL ESTIMATED CONSTRUCTION COST				**$ 548,359**

(*) Denotes items of work suitable for Town/Volunteer Labor

ESTIMATED COST OF CONSTRUCTION PHASE ENGINEERING SERVICES	**$ 14,000**

Warrant, Summary, and Recommendations

TOWN OF GROTON

SPECIAL TOWN MEETING

Groton-Dunstable Middle School Auditorium

Beginning Monday, October 24, 2005 @ 7:00 PM

Attention – Voters and Taxpayers:

PLEASE BRING THIS REPORT TO TOWN MEETING

Summary: *This first segment of the project will complete a community survey of at least 150 structures and/or resources in the Town of Groton.*

ARTICLE 16: To see if the Town will vote pursuant to Massachusetts General Laws, Chapter 44B, Section 5, to appropriate an amount of $60,000 from the Community Preservation Historic Resource Reserve and/or the Community Preservation FY06 Budget Reserve and/or the Community Preservation FY06 Community Preservation Committee FY06 Operating Expenses to fund Community Preservation Application 2005-09, "Fitch's Bridge Restoration Design," or take any action thereon.

Sponsored By:	**COMMUNITY PRESERVATION COMMITTEE & (Friends of Fitch's Bridge, Greenway Committee)**
Board of Selectmen:	**Recommendation – 4 at Town Meeting**
Finance Committee:	**Recommendation – 3 Not support; 4 at Town Meeting**

Summary: *These funds will be used to generate a design for restoration of Fitch's Bridge. Having this design in hand will allow the town to seek state and federal funds to assist in the restoration of the bridge as a pedestrian and equestrian crossing of the Nashua River.*

ARTICLE 17: To see if the Town will vote to accept the provisions of Section 4, Chapter 73 of the Acts of 1986, as amended by Chapter 126 of the Acts of 1988 to allow an additional property tax exemption for Fiscal Year 2006 for certain persons who qualify for a property tax exemption under Massachusetts General Laws Chapter 59, Section 5, or take any action thereon.

Sponsored By:	**BOARD OF ASSESSORS**
Board of Selectmen:	**Recommendation – 4 Support**
Finance Committee:	**Recommendation – 7 Support**

Summary: *This is a yearly article which allows the Town to increase the exemption from $500 to $1,000 for Elderly, Blind or Service Disabled Veterans.*

ARTICLE 18: To see if the Town will vote to accept as a public way Wharton Row as laid out by the Board of Selectmen on September 6, 2005, and as shown on a Plan entitled "Street Acceptance Plan, Wharton Row, Ames Meadow in Groton, Mass." dated January 29, 2004 by Doucet Survey Inc., a copy of which is on file in the office of the Town Clerk, or take any action thereon.

Sponsored By:	**BOARD OF SELECTMEN**
Board of Selectmen:	**Recommendation - 4 Support**
Finance Committee:	**Recommendation – No position**

Summary: *To accept Wharton Row as a public way.*

BOARD OF SELECTMEN
OCTOBER 24, 2005
REGULAR SESSION MINUTES
APPROVED

Present: George F. Dillon, Jr., Chair; John L. Saball, Vice Chair; Robert W. Nordblom, Clerk; Peter S. Cunningham, Member; Mihran Keoseian, Member; Administrative Officer Jean E. Kitchen

The meeting opened at 6:05 P.M.

Tom Delaney, Highway Department RE: Advertising Vacant Position

Mr. Delaney requested permission to fill a vacancy for the position of Truc Driver/Laborer due to a resignation. Mr. Delaney noted it would be more affordable t hire a replacement than to hire a temporary or private contractor.

Mr. Saball moved to authorize the Highway Surveyor to fill the vacancy of Truc Driver/Laborer. Seconded by Mr. Cunningham. Unanimous vote.

OTHER BUSINESS

Appointment ‼ Old Burying Ground ‼ Eleanor Gavazzi

Mr. Saball moved to appoint Eleanor Gavazzi to the Old Burying Ground for the one year term, term to expire June 30, 2006. Seconded by Mr. Nordblom. Unanimous vote.

Appointment ‼ Scholarship Committee ‼ Alberta Erickson

Mr. Saball moved to appoint Alberta Erickson to the Scholarship Committee for the one-year term, term to expire June 30, 2006. Seconded by Mr. Nordblom. Unanimous vote.

Appointment ‼ Old Burying Ground ‼ Marcia Beal Brazer

Mr. Saball moved to appoint Marcia Beal Brazer to the Old Burying Ground Committee for the one-year term, term to expire June 30, 2006. Seconded by Mr. Nordblom. Unanimous vote.

Appointment ‼ Personnel Board ‼ Linda DeCiccio Fanning

Mr. Saball moved to appoint Linda DeCiccio Fanning to the Personnel Board for the three-year term, term to expire June 30, 2008. Seconded by Mr. Nordblom. Unanimous vote.

Positions on Special Town Meeting Articles

Article 1 ‼ 6 ‼ Mr. Nordblom supported
Article 7 ‼ 5 Support Postponement
Article 8 ‼ 5 Support
Article 9 ‼ 5 Support
Article 10 & 11 ‼ Mr. Nordblom supported
Article 13 ‼ 1 Support (Saball), 3 Not Support, 1 at Town Meeting (Dillon)

Minutes 2005-08-22
Minutes 2005-08-29
Minutes 2005-09-06
Minutes 2005-09-12
Minutes 2005-09-19
Minutes 2005-09-26
Minutes 2005-10-03
Minutes 2005-10-17
Minutes 2005-10-20
Minutes 2005-10-24
Minutes 2005-11-01

Article 14 ‼ Mr. Nordblom supported
Article 15 ‼ 2 Not Support (Keoseian and Nordblom), 3 Support
Article 16 ‼ 5 Support
Article 17 ‼ 25 Mr. Nordblom Supported

Groton Residential Gardens ‼ The Board needs to clarify authority over who has control as it relates to drainage at Groton Gardens/Mill Run Place. The Board will contact Mike Tusino, Building Commissioner to issue a stop work order on Building 5 once it is buttoned up.

Review Goals Sheet
Mr. Keoseian noted page 3 of 4 stating the format was a result of the goal meeting and gave the members a last draft date. Mr. Dillon stated the principal would not change and to make sure that any affected parties are contacted and we should set a deadline for Monday, October 31, 2005.

Mr. Cunningham moved to enter into Executive Session in accordance with MGL Chapter 39, Section 23B, for the purpose of considering the purchase, exchange, taking, lease, or value of real property is such discussion may have a detrimental effect on the negotiating position and will reconvene in Open Session. Seconded by Mr. Saball. Roll Call vote: Dillon ‼ yes; Saball ‼ yes; Nordblom ‼ yes; Cunningham ‼ yes; Keoseian ‼ yes.

Approved: _____
Robert W. Nordblom, Clerk

respectfully *submitted,*
for Jean E. Kitchen,
by Kathleen Newell
Office Assistant

Enclosure: Draft Goals

Date Approved November 7, 2005

Mail to a friend

November 14, 2005
David Manugain
7 Shepley Street
West Groton, MA 01472

Dear David:

First, on behalf of the Community Preservation Committee, please accept our sincere congratulations on gaining Town Meeting approval for your project! The CPC is very excited to begin working with you to initiate each project, and see to it that ALL projects are completely successful.

To that end, we have begun the process of developing a contract for each of you to use in your negotiations with your respective vendor/contractor. As a committee, we are working as fast as possible to develop, and distribute this for you to begin using. Our goal is to have this done, and made available on, or before, 1/1/2006. In addition, Valerie Jenkins will be sending out procurement guidelines, and instructions regarding the payment procedure to be used with CPA vendors for you to follow. These are taken from Mass Procurement Law chapter 30B. Copies will be mailed to you shortly. Please review these very carefully. We cannot stress enough the need to adhere to these guidelines throughout the process. Failure to do so will jeopardize the initiation/continuation of any project.

Last, we want to thank you for your participation in the CPA process. Our combined efforts, and teamwork over the next year will ensure that this groundbreaking year for CPA in Groton is a very successful one.

Sincerely,

The Community Preservation Committee

Robert DeGroot

Bruce H. Easom

Dan Emerson

Rick Hughson

Carolyn Perkins

Mike Roberts

Jim Cantrill

Appendix F

COMMONWEALTH OF MASSACHUSETTS

MASSACHUSETTS SENATE

STATE HOUSE, BOSTON 02133-1053

SENATOR STEVEN C. PANAGIOTAKOS
FIRST MIDDLESEX DISTRICT
ROOM 218
OFFICE TEL. (617) 722-1630
FAX. (617) 722-1001

VICE CHAIRMAN:
SENATE WAYS AND MEANS

February 15, 2006

Montachusett Regional Planning Commission
R1427 Water Street
Fitchburg, MA 01420

RE: **Application for Transportation Enhancement Funding for Fitch's Bridge in Groton, Massachusetts**

Dear Planning Commission,

I hope this letter finds all is well. I write you today to express my strong support for the application for Transportation Enhancement Funding for rehabilitation of the Fitch Bridge in the town of Groton, Massachusetts.

Fitch's Bridge has been a landmark of Groton for over 100 years. Connecting West and East Groton, the bridge allows for pedestrians to leisurely travel across the scenic Nashua River without the dangers of heavy automobile traffic. Restoration Fitch's Bridge would preserve a historic structure while also fitting items 2 and 6 of the "Table of Transportation Enhancement Activities" outlined in the Commonwealth of Massachusetts' Transportation Enhancement Program guide.

I feel providing funding for Fitch's Bridge is important not just for safety and convenience it brings to Pepperell and Groton pedestrian travelers but for the preservation of this historic structure. I urge you to support this application and trust that if you have questions you will not hesitate to contact my office at (617) 722-1630.

Sincerely,

Steven C. Panagiotakos
State Senator
First Middlesex District

SCP/mi

The Commonwealth of Massachusetts

House of Representatives

State House, Boston 02133-1020

ROBERT S. HARGRAVES
REPRESENTING THE PEOPLE OF
AYER, GROTON, LUNENBURG,
PEPPERELL, AND TOWNSEND
21 TEMPLE DRIVE
GROTON, MA 01450
TEL. (978) 448-5456

ROOM 237, STATE HOUSE
TEL: (617) 722-2305
FAX: (617) 722-2598

Committees:
Ways and Means
Long Term Debt
Post Audit and Oversight

RONALD C. ENGLADE
LEGISLATIVE ASSISTANT
E-Mail: ronald.englade@hou.state.ma.us

February 14, 2006

Montachusett Regional Planning Commission
R1427 Water Street
Fitchburg, MA 01420

To Whom It May Concern,

I am writing in support of the application by the Town of Groton for Transportation Enhancement funding for the rehabilitation of Fitch's Bridge over the Nashua River.

The Fitch's Bridge project will significantly benefit the communities of Groton and Pepperell by re-linking East Groton and West Groton and the western corner of Pepperell with a non-vehicular crossing of the Nashua River. Its completion will provide the residents of both towns with an alternative to driving their automobiles on heavily traveled roadways in order to visit friends and neighbors, access scenic trail networks, or shop in downtown Groton.

This project conforms with items 2 and 6 of the "Table of Transportation Enhancement Activities" as outlined in the Commonwealth of Massachusetts' Transportation Enhancement Program guide. The bridge is an historic structure dating back over 100 years and once restored would provide a safe and scenic connection to trails and back roads for pedestrians and bicyclists.

The Town of Groton has demonstrated its support by voting to allocate town monies for preliminary and final designs for the restoration of Fitch's Bridge. It is now seeking approximately $606,000 in construction funding, at least 10% of which it will provide with other monies and in-kind services. Given the project's many virtues, I am confident that your agency will give this application the attention that it deserves.

Very truly yours,

Robert S. Hargraves

ROBERT S. HARGRAVES
State Representative

TOWN OF GROTON

173 Main Street
Groton, Massachusetts 01450
(978) 448-1105
FAX: (978) 448-1113
e-mail: mcollette@ci.groton.ma.us

Office of the
PLANNING BOARD

August 15, 2005

Community Preservation Committee
Town Hall
173 Main Street
Groton, MA 01450

Re: Fitch's Bridge

Dear Members of the Committee:

At its regular meeting on August 11, 2005, the Planning Board voted unanimously to support the application for Community Preservation Funds submitted by the Groton Greenway Committee for funding the structural design work for Fitch's Bridge.

The restoration of the bridge for pedestrian access and passive recreation has been a goal since the 1980's. The bridge will provide the only non-motorized link between trails on the east and west sides of the Nashua River. The restoration of the bridge also qualifies as an important historic preservation project.

The Planning Board urges the Community Preservation Committee to act favorably on the Groton Greenway Committee's application.

Very truly yours,

Michelle Collette

Michelle Collette
Planning Administrator

cc: Greenway Committee

TOWN OF GROTON

173 Main Street
Groton, Massachusetts 01450-1237
(978) 448-1111
FAX: (978) 448-1115

Groton Trails Committee

Fitch's Bridge Committee/
Groton Greenway Committee
173 Main Street
Groton, MA 01450

August 19, 2005

RE: Letter of support for closing the link across Fitch's Bridge

Dear Committee members,

As the Town of Groton has grown, so has the number of people using the Town's trails for walking, biking, and horse back riding. The ultimate goal of the Groton Trails Committee is to create a trails network that would link the major conservation and trail areas in Groton from East to West and from North to South, thereby better serving the growing demands for a non-vehicular trail system.

The Groton Trails Committee has worked for several years with this goal in mind. An easement has been obtained, a trail built and a bridge constructed that will connect Groton Place/Sabine Woods on Route 225 to Fitch's Bridge Road and hence to Fitch's Bridge. This was finalized in early 2004 with the construction of the trail and bridge over Tuity Brook. From this new bridge it is an easy walk along the unpaved Town road to Fitch's Bridge.

On the western side of the Nashua, conservation lands including "The Throne" extend from Fitch's Bridge to the Squannacook River. A small link is still missing in this connection but negotiations are currently underway to close that gap. This past year trails were completed on New England Forestry Foundation property connecting The Throne with Hayes Woods and through the Johnson Conservation Area to Wallace Road and Fitch's Bridge.

The last major obstacle to completing the east – west trail connection is the Nashua River. Existing crossings of the river at Highways 119 and 225 are extremely hazardous for pedestrians, cyclists or equestrians, especially when children are involved. Fitch's Bridge location makes it the best geographical choice for connecting these trail systems over the Nashua River. Preserving the bridge for non motorized vehicle use makes it the safest connection for these trails.

Closing of the connection over Fitch's Bridge would be the single largest contribution that could be made to the Groton Trails network and therefore the Trails committee whole heartedly supports any initiative that leads to its completion.

Sincerely yours,

Joachim Preiss, Chair
Groton Trails Committee

Groton Historical Commission
173 Main St.
Groton, MA 01450

August 11, 2005

Community Preservation Committee
173 Main St.
Groton, MA 01450

re: Fitch's Bridge

Dear CPC Members,

The Groton Historical Commission certifies the Fitch's Bridge located on Fitch's Bridge Rd., Groton to be a historic structure.

Further we would like to ask the CPC to ensure, insofar as they are able, that the all funded work performed on historic structures adheres to the Secretary of the Interior's ***Standards for Rehabilitation*** and/or ***Standards for Historic Preservation Projects.*** The intent of the Standards is to assist the long-term preservation of a property's significance through the preservation of historic materials and features. The Standards pertain to historic structures of all materials, construction types, sizes, and occupancy and encompass the exterior and interior of the structures. They also encompass related landscape features and the structure's site and environment, as well as attached, adjacent, or related new construction.

Respectfully,

Alvin B. Collins Jr., Chairman
Groton Historical Commission
173 Main St.
Groton, MA 01450
978-392-0605

Groton Historical Commission
173 Main St.
Groton, MA 01450

August 11, 2005

Groton's Greenway Committee's Friends of Fitch's Bridge
173 Main St.
Groton, MA 01450

re: Fitch's Bridge

Dear Committee Members,

As dedicated preservationists, The Groton Historical Commission strongly supports any project that will help protect, maintain, repair or replace any portion or all of Fitch's Bridge. It could be a vital link to Groton's many acres of open space which has been acquired and preserved for the use and enjoyment of present and future generations. It is also a piece of this town's rich history that could be lost forever if your efforts are not rewarded.

We would like to ask, as you move through your project of reclaiming the Fitch's Bridge, you work towards preparing a permanent record of all your efforts (a narrative with pictures) that can eventually be housed in the Groton History Room at the Groton Public Library. Documenting historic preservation and making it available to the public, may help motivate others to join in the crusade of preserving the pieces of Groton's vast heritage.

Along with our full support, we encourage you to use us as a resource if there is any way you feel we can help.

Respectfully,

Alvin B. Collins Jr., Chairman
Groton Historical Commission
173 Main St.
Groton, MA 01450
978-392-0605

Nashoba Conservation Trust

P.O. Box 188
Pepperell, Massachusetts 01463
Email address: nct@nashobatrust.org
Website: www.nashobatrust.org

18 August 2005

Groton Community Preservation Committee
Town Hall
Groton, MA 01450

Dear Groton Community Preservation Committee:

The Nashoba Conservation Trust strongly supports the appropriation of $60,000 for a design study for the restoration of Fitch's Bridge.

The restoration of Fitch's Bridge would help to provide a critical link in a trail system between Pepperell and Groton. For many years, the Nashoba Conservation Trust, the Town of Pepperell, and the Commonwealth of Massachusetts have worked together on a trail in Pepperell that, we hope, would one day connect to trails in Groton. The Pepperell trail offers scenic views of the Nashua River and continues through a wetland area, which includes Robinson's Brook, and views of several hundred acres of fields which have been farmed for centuries. The completion of this trail in Pepperell will offer miles and miles of recreational opportunities, including some of the best birding in town. We do not want this trail system to end at the town line.

The restoration of Fitch's Bridge is a wonderful opportunity and we wholeheartedly support this effort. Please support this appropriation so, as neighbors, we can share these amazing trails we have all worked so hard to complete.

Very truly yours,

Paula Terrasi

Paula Terrasi
Vice President

Pepperell Conservation Commission

Town Hall
One Main Street
Pepperell, Massachusetts 01463

978-433-0325

August 18, 2005

Community Preservation Committee
Town Hall
Groton, MA 01450

Dear Committee Members:

The Pepperell Conservation Commission is pleased to learn that Groton is considering restoring Fitch's Bridge for pedestrian, equestrian, and bicycle use. At its August 16th meeting, the Commission authorized me to write this letter in support of the project.

One of the goals in Pepperell's Open Space & Recreation Plan (February 2005) is "Promote a cooperative and regional approach to open space and recreation planning." The Pepperell Conservation Commission feels that paying special attention to connections between trails in adjoining towns meets this goal. While Fitch's Bridge's restoration would be a vital link between trails within Groton itself, it would also provide easier access to trails in Pepperell, effectively increasing the readily-available trails in both of our towns.

The Commission, in partnership with the Nashoba Conservation Trust, has been actively working in recent years to establish and add to trails near the area of the bridge, just over the Pepperell line. In 2002 the Town bought more than a mile of the old Boston & Maine Railroad corridor along the west side of the Nashua River just north of Route 119. Last year the Trust purchased approximately a quarter mile along the same line to the south of Route 119. That acquisition extends the Trust's Hopkins parcel on Shirley Street, which also contains a portion of the same rail line. If Fitch's Bridge were to be available for area trail users, it would provide a vital connection between the growing networks of trails in both of our towns.

One final consideration is the unique views of the Nashua River which would be available from the bridge. For the reasons listed above, the Pepperell Conservation Commission encourages you to pursue the restoration of Fitch's Bridge.

Sincerely,

Ellen Fisher

Ellen Fisher
Conservation Administrator

Nashua River Watershed Association

592 Main Street, Groton, Massachusetts 01450-1230
Tel: 978/448-0299 Fax: 978/448-0941
www.NashuaRiverWatershed.org

August 17, 2005

Michael Roberts
Chairman
Community Preservation Act Committee
Town Hall
Groton, MA 01450

Dear Mr. Roberts,

The Nashua River Watershed Association would like to support the Fitch's Bridge Committee in its efforts to restore Fitch's Bridge. The restoration of this historic bridge would, in our opinion, be a good use of Community Preservation Act (CPA) funding.

Fitch's Bridge is not only a historic structure but it features in Groton's recreational schema as well for it can be used as a multi-use (pedestrian/bicycling/equestrian) bridge between Groton and West Groton. It also features in the Town of Groton's Open Space Plan as a proposed project that would maintain scenic vistas including the cultural and overall rural landscape. A trail across the bridge is a logical idea that townspeople will make use of and enjoy.

It is our understanding that $60,000 is being sought for structural design which when done will allow the Fitch's Bridge Committee to apply for other funding sources to complete the project. CPA funding could be instrumental to the success of this important project.

The NRWA realizes that each town in the watershed needs to evaluate the competing demands on its limited financial resources. Thank you for your consideration of the Fitch's Bridge Committee's effort to secure CPA funding.

Sincerely,

Al Futterman
Land Programs and Outreach Director

TOWN OF GROTON
Groton Conservation Commission
173 Main Street
Groton, MA 01450-1237
(978) 448-1106
Fax: 978-448-1113
e-mail:bganem@townofgroton.org

August 3, 2005

Michael Roberts, Chairman
Community Preservation Committee
Town Hall, 173 Main St.
Groton, MA 01450

RE: Greenway Committee - Fitch's Bridge Sub-Committee
CPA Application - 2005

Dear Mr. Roberts:

The Groton Conservation Commission fully supports the Community Preservation application by the Fitch's Bridge Sub-committee of the Groton Greenway Committee for $60,000 to be used for the structural design phase of the planned restoration of Fitch's Bridge. A pedestrian walkway spanning the Nashua River presents a special recreational opportunity which has been identified in the *2005 Groton Open Space & Recreation Plan*: "a.) Explore developing a river walk along the Nashua and/or Squannacook Rivers. b.) Consider Fitch's Bridge for east and west Groton connection." Another objective identified in the *Plan* is to work with neighboring towns to link adjacent open space and recreation areas. The action item is to "Consider old railroad bed lines to link with adjoining communities, i.e., the Brookline branch to Pepperell and the Peterborough & Shirley branch of the Fitchburg line to Townsend."

To the north of Fitch's Bridge, the Pepperell Conservation Commission has recently worked with the state Department of Environmental Management (now the Department of Conservation and Recreation) to purchase a portion of an abandoned railroad bed adjacent to the west side of the Nashua River. Closer to Fitch's Bridge, the Nashoba Conservation Trust, has acquired for permanent protection another segment of the railroad bed to preserve future recreational trail opportunities. To the south, a trail easement off Wallace Rd. links with the Johnston parcel on Maple Avenue and eventually with the Groton Conservation Trust's Hayes parcel and New England Forestry land on the Throne. There is the potential for the creation of an extensive network of trails originating with the restoration of Fitch's Bridge.

THE GROTON HISTORICAL SOCIETY

The Boutwell House - 1851

August 26, 2005

CPA Committee
Town Hall
Groton, MA 01450

To whom it may concern,

The Groton Historical Society is dedicated to preserving Groton's past. We feel it is important to make available to current and future residents significant facts, items and lore that have shaped our town. Fitch's Bridge is one such important item. As I am sure you are aware, bridges or in some case the lack thereof were a major factor in the development of Groton. For instance, a bridge on Broadmeadow was required before Groton residents would accept placing the First Parish Church (supported then by the town) where it currently sits. Fitch's Bridge was an important link between West Groton and Groton and probably played a role in preventing West Groton from forming a separate township.

The Groton Historical Society strongly supports the Fitch's Bridge Committee's efforts to preserve and restore the bridge.

Thank you,

Ted Roselund

Ted Roselund, President

Squannacook River Runners Groton, MA
www.sqrr.org

20 September 2005

Mr. Michael Roberts, Groton Community Preservation Commission
173 Main Street
Groton MA 01450

Cc: Marion Stoddart, David Manugian; Groton Greenway Committee

Subject: Fitch's Bridge Renovation Study

Dear Mr. Roberts,

We, the Squannacook River Runners of Groton, have recently learned of the proposal to study the potential renovation of Fitch's Bridge in Groton. We want to voice our very enthusiastic support for this study, and we urge the Community Preservation Committee, the Greenway Committee, and the Conservation Commission to proceed immediately. While we understand that the feasibility, cost and other implications of this project are not fully known at this time, we are eager to speak to the benefits that this would bring to our organization and to the health, safety and recreation of the people of Groton.

We take our name to heart, and spend many of our weekly hours running along the trails of the Squannacook and Nashua rivers. Our most frequent routes take us through the Town Forest, Sabine Place, Lawrence Woods and Partridgeberry Woods, but these areas are all "blind alleys" from a trail standpoint. Meanwhile, the Throne area, which is arguably the jewel in Groton's crown, is quite difficult to access on foot unless one is willing to make the trek out Rt. 225 and/or Pepperell Rd. Fitch's Bridge is the available and perfect lynchpin in this otherwise terrific chain of open spaces.

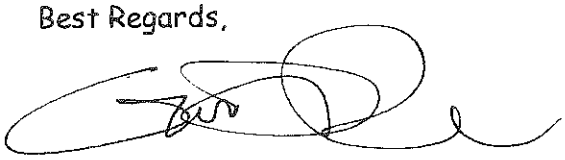
Groton is increasingly special in its creation of long uninterrupted chains of trail systems. We are extremely grateful to the Trails Committee and others who have made a mission of creating, maintaining, marking and advertising these chains. Fitch's Bridge would neatly create yet another of these extended loops.

We would like to add a special emphasis on behalf of our West Groton members and neighbors. At present, our access to and from Groton proper is limited entirely to the high-traffic routes of West Main Street (Rte. 225) and Rte. 119. Both of these roads are high-speed commuter routes, and are risky for pedestrian and bicycle traffic. We cross the

river at Long Hill Rd. and Rt. 119 only when we must, and many of us will not permit our children to do so in any circumstance. In short, safe and readily available pedestrian/bicycle access to the central areas of town is severely limited by the 2 crossings of the Nashua. Our safety and (healthy) mobility would be improved by a non-vehicular river crossing. The benefit is reciprocal - West Groton is a largely undeveloped and beautiful area, which our eastern townsfolk will enjoy exploring on foot or by bike. Our community would benefit very much from the rejoining of the towns.

We thank you for taking the initiative to study this issue, and hope that you will take our support as evidence of broader support in the community. Please do not hesitate to contact me if we can provide further advocacy or support.

Best Regards,



Gordon D. Row
Squannacook River Runners

Gordon D. Row, Race Director
47 Town Forest Road
Groton MA 01450
978.448.0432

TOWN OF GROTON
173 Main Street
Groton, Massachusetts 01450-1237
Tel: (978) 448-1111
Fax (978) 448-1115

April 29, 1998

Mr. Brad Harris
Montachusett Regional Planning Commission
R1427 Water Street
Fitchburg, Massachusetts 01420

Dear Mr. Harris,

The Town of Groton is willing to maintain Fitch's Bridge, if the Town is successful in obtaining the transportation enhancement grant to restore the bridge.

Sincerely,
Board of Selectmen

Ronald C. Englade, Chairman

Peter S. Cunningham, Clerk

Richard W. Powell, Member

BOS/dw

TOWN OF GROTON

173 Main Street
Groton, Massachusetts 01450
Fax (978) 448-1115
Tel. (978) 448-1111

Office of the
Board of Selectmen

Virginia C. Wood, *Chairman*
Peter S. Cunningham, *Clerk*

December 21, 1999

Jennifer Howard, Greenways Coordinator
c/o Department of Environmental Management
Office of Natural Resources
136 Damon Road
North Hampton, Massachusetts 01060

Dear Ms. Howard,

The Groton Board of Selectmen on behalf of the residents of the town would like to express its strong support for the Greenway and Trails Demonstration grant, submitted by the Town of Groton Greenway Committee, to fund the design for the restoration of the historic Fitch's Bridge. The design is the first step to have this bridge restored which will provide a vital link in our trails network and a closer connection between the Towns of Groton, West Groton and Pepperell. We hope that you will fund the initial design work so that we can proceed with our trail expansion plan as well as preserve a former historic route.

Sincerely,
Board of Selectmen

Virginia C. Wood, Chairman

Peter S. Cunningham, Clerk

BOS/dw
Enclosure

TOWN OF GROTON

173 Main Street
Groton, Massachusetts 01450-1237
(978) 448-1106
FAX: (978) 448-1115

OFFICE OF THE
CONSERVATION COMMISSION

MEMORANDUM

DATE: March 25, 1998

TO: Greenway Committee

FROM: Conservation Commission EMM

RE: Fitch's Bridge Renovation

The Groton Conservation Commission voted unanimously at its meeting on March 24, 1998 to support the project for the renovation of Fitch's Bridge.

A Notice of Intent must be filed for this project.

If you have any questions please contact our office.

Groton Conservation Trust

March 2, 1999

To Whom It May Concern,

The Groton Conservation Trust enthusiastically supports the efforts of the Groton Greenway Committee to restore Fitch's Bridge.

Fitch's Bridge exists as one of the most significant historic structures in the town of Groton. Constructed over one hundred years ago, it originally served as a carriage road between the town of Groton and West Groton. If restored it could once again serve the two towns by connecting trails on both sides of the Nashua River for future generations to enjoy.

We welcome the opportunity to support this restoration effort and recommend the project for your consideration.

Sincerely,

Dann Chamberlin

Dann Chamberlin
President, Groton Conservation Trust

TOWN OF GROTON

173 Main Street
Groton, Massachusetts 01450-1237
(978) 448-1111
FAX: (978) 448-1115

Groton Trails
Committee

January 19, 1999

Montachusett Regional Planning Committee
R1427 Water Street
Fitchburg, MA 01420

The Groton Trails Committee was created and appointed by the Groton Board of Selectmen last spring. The Trails Committee's charter covers all issues related to trails on public land in the town. A particular focus of that charter is the protection and development of that trails network, a special concern during this period of rapid growth and residential development in Groton.

One of Groton's scenic and natural treasures is the Nashua River and the greenway along its banks. A very large portion of that greenway is already protected and open to the public. That greenway is also an important link in a rich collection of public trails; a network that is especially important to equestrians, skiers, runners, and other long-distance trail travelers.

There are only two crossings on the Nashua River in Groton. Both are on state highways (Route 225 and Route 119), and they lie over three miles apart. Neither is safe for pedestrian or equestrian use. The town has a unique opportunity to restore and preserve Fitch's Bridge as a scenic and safe route across the Nashua River. Fitch's Bridge would provide an essential link in a network of trails threatened by new homes and busier highways. This bridge presents a rare opportunity to preserve a historically important structure and to significantly enhance the town's recreational resources. The Groton Trails Committee has already volunteered skills and labor to support this project, and voted unanimously to recommend your support for funding.

Sincerely,

Ed McNierney

Groton Trails Committee
Ed McNierney, Chairman

Local Horse Owners Association

(LHOA)

March 27, 1998

To Whom It May Concern,

As President of the Local Horse Owners Association, est. 1973, I feel I speak for all of our over 100 members when I say we fully endorse any effort to restore the Fitch Bridge in Groton. Not only is this an historic structure, it also provides a vital link with trails in West Groton, and to those trails east of the Nashua River.

For safety sake we always encourage our members to ride on trails as opposed to paved roads where vehicular traffic may present a danger to horse, rider and driver. This bridge greatly enhances our ability to stay away from heavily traveled, paved roads by eliminating the need to use Rt. 225, Shirley Rd. and Rt. 119 when riding from East to West Groton.

The trails along the Nashua River are particularly beautiful, and are used often by our membership. We have informal as well as organized rides in Groton throughout the year. The Fitch Bridge connects the trails located directly on the east and west banks of the river, thereby extending the trail network by many miles.

Thank you for your consideration of this project.

Sincerely,

Mary C. Duffy

Squannacook-Nashua-Nissitissit Regional Preserve Initiative

c/o Nashua River Watershed Association
592 Main Street
Groton, MA 01450

Jennifer Howard
DEM Greenway Coordinator
136 Damon Road
North Hampton, MA 01060

Re: Greenway and Trails Demonstration Grant
Fitch's Bridge, Groton, MA

Dear Ms. Howard:

I am writing in support of the application for a Greenway and Trails Demonstration Grant for the reconstruction of Fitch's Bridge in Groton, Massachusetts.

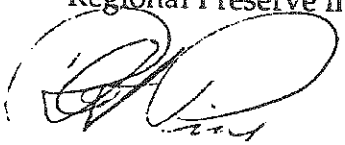
The Squannacook-Nashua-Nissitissit Regional Preserve is an ecologically diverse set of protected properties interconnected by the Squannacook, Nashua, and Nissitissit Rivers. The preserve consists of approximately 10,000 acres of land which have remained ecologically connected through the natural corridors of this river system.

The Squannacook-Nashua-Nissitissit Regional Preserve Initiative is a coalition of groups from the 6 towns included within the preserve area. The Nashua River Watershed Association provides coordination for our work. Our purpose is to protect the integrity of this natural ecological system, to document and understand its function, and to expand the protected lands to include other connected, ecologically important land for wildlife preservation and recreational opportunities.

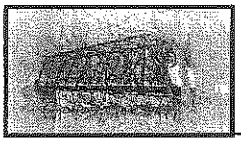
Fitch's Bridge is a key link in establishing an interconnected set of trails in this area. Trail systems radiate from this location into the undeveloped areas of Throne Hill to the west and along the Nashua River to the north and south. This system of trails in turn connects with the proposed Ayer to Dunstable rail trail, allowing major public access. Without reconstruction of this bridge for pedestrian, bike and equestrian use, major segments of this trail system are effectively severed.

The Groton Greenway Committee has been working toward reconstruction of this bridge for several years and has gained considerable support from the community in these efforts. We hope that DEM will support this grant to help make this bridge a reality.

For the Squannacook-Nashua-Nissitissit
Regional Preserve Initiative



Robert Pine, Chair



Appendix G

February 1, 2006

Fitch's Bridge Restoration Committee
c/o Ray Ciemny
54 Fitch Bridge Road
Groton, MA 01450

Dear Committee Members:

I would like to offer my whole hearted support to the restoration of Fitch's Bridge.

Our family lives four houses from Fitch's Bridge. Since moving to Groton in 1998, we have often hoped that the bridge would one day be opened for pedestrian use. Its restoration would dramatically impact our family in a positive way. We would literally be connected to the rest of Groton.

Like most Groton parents, we drive our children everywhere. With the opening of the bridge, our children will be able to safely travel to friend's houses, bike to school, the library, Town Field, and Main Street without traveling along Routes 119 or 225. The possibilities are endless.

Furthermore, when the Nashua River Rail Trail was opened in 2002, we looked forward to using it frequently for both recreation and fitness. But our trips to the Rail Trail have been hampered by the hassle of getting there - strapping the bike rack onto the car, loading the bikes, and then driving to one of the available parking lots. Opening the bridge will allow us to access the Rail Trail directly from our home.

Also, as a Nashua River resident, I would like others to experience the river close up rather than from their car window. Hopefully, it will inspire them to rent a canoe, paddle downstream, and enjoy the quite beauty and abundant wildlife of the river.

I would like to thank your committee for all of the work toward this restoration project, if I can be of any assistance, please do not hesitate to contact me.

Sincerely,

Patricia A. Modzelewski
532 Pepperell Road
Groton, MA

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Article Launched: 01/20/2006 11:31:49 AM

Groton finally crosses the bridge

By RITA SAVARD, Sun Staff

GROTON -- It's not exactly walking on water, but restoring the town's 100-year-old footbridge is the closest thing residents will have to strolling over the Nashua River into Pepperell.

Fitch's bridge has been off limits to the public for the past 65 years, but plans to reopen the bridge for foot, bicycle and horse traffic are under way.

After receiving eight proposals from engineering firms, the Friend's of Fitch's Bridge Committee hired Boston-based company Ammann and Whitney to oversee rehabilitation of the 126-foot, steel structure. According to Committee Member David Manugian, the group is now applying for a construction grant to cover an estimated $450,000 rebuilding cost.

"Fitch's bridge is a vital link between the two towns," Manugian said. "The only other bridge crossing the Nashua River in Groton does not have a pedestrian walkway on it."

With a number of trails along the water on the east side of Pepperell, the old steel junction has been a missing link to natural recreation resources in the area, Manugian added. The committee has been working to preserve the former public crossing for a number of years but finally gained momentum this year after receiving $60,000 in community preservation funds to hire a project designer.

Manugian said Ammann and Whitney was hired for its overall proposal, including past projects overhauling aging bridges like the University Avenue bridge in Lowell and the current restoration of the Carlton Street bridge in Brookline.

Andre Martecchini, project manager for the engineering firm, said Fitch's bridge -- a double-intersection Warren truss bridge -- is a dying breed. There are seven left in Massachusetts.

"This bridge is the third-oldest out of the seven," Martecchini said. "Our goal is to preserve its historic character. We don't want to take away from it."

Built in 1898, the bridge was originally owned and operated by ancestors of the

late Harlan Fitch. Manugian said early members from Fitch's clan ran some of the town's first ferry and bridge crossings along the river.

"We have documented crossings dating back to the Revolutionary War," said Manugian. "The timing for restoring the bridge is appropriate because of Groton's 350th anniversary and Harlan's passing. It's nice doing this, in part to keep his memory alive."

If funding for construction is granted by the Montachusett Regional Planning Commission, the Friends of Fitch's Bridge Committee anticipates restoration to begin by 2007.

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The Lowell Sun
15 Kearney Square
Lowell, MA 01852

Appendix H

Fitch's Bridge Petition
Friends of Fitch's Bridge
Groton Greenway Committee

Fitch's Bridge is an historic structure that spans the Nashua River connecting Fitch Bridge Road with Pepperell Road in West Groton. Based on the unique historic and architectural aspects of the bridge and its link with the current greenway trail project along the Nashua River we the undersigned residents of Groton fully support the effort by the Groton Greenway Committee to acquire Groton CPA, federal, state, and private funding to for the restoration of Fitch's Bridge as a pedestrian, bicycle and equestrian byway.

Name	Address	Phone (Optional)
Bev Rodrigues	5 Balsam Walk	448-2705
Joanne Lyf	450 Old Dunstable Rd	448-8445
Rachel Harris	5 Oak St, Haverhill, MA	978 372 5161
Linda Asperlagh	700 Old Dunstable Rd Groton	8-5573
Janet Jennings	311 Reedy Meadow Rd.	448-6868
Jason Jennings	311 Reedy Meadow Rd	448-6868
George Mark	194 Redden Rd - Groton	448-2995
Karen Greenough	459 Old Dunstable Rd	448-5434
Seth Morrison	60 Bulfinch St, N. Attleboro, MA	508-695-7221
Ron Farnsworth	18 Brown Rd Shirley MA	425 9604
Bob Burkhardt	12 Harvard Rd #10 Shirley	425 0947
Bonni Acaelni	43 Chapney St. Groton	448-9158
Dani Hodnick	202 Gary Road, Groton	

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Name	Address	Phone (Optional)
	104 Hill St Groton	978-697-8527
	62 Gibbons Groton MA	978-448-6587
Elizabeth Student	59 Long Hill Road, Groton	448-5865
Margaret Colbert	158 Hemlock Rd Groton	448 5885
Sarah F Hopkins	107 South St Groton	448.5251
	100 Hollis St Groton	448-2710
	8 Ecm St. Groton	448 2223
	37 Boxwood Meadow	448-2564
Michelle Collette	43 Windmill Hill	448-6606
Richard Pope Helm	109 Common Street	447-5426
Bill Clement	274 Boston Road	448-5820
Carl B Zink	92 Reedy Meadow Rd	448-2813
	402 Chicopee Row	448-6048
	46 Lovell Lane	448-3436
	60 Tarbell Rd	448-2145
	136 Lakeview Rd	448-2695
	20 Westbrook Lane	448-5167
Lee Burton	46 Wood Ln	8-3436
	19 High Oaks Path	8-3624

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Name	Address	Phone (Optional)
Nancy Rich Turtle		
Nancy Rich Turtle	29 Britt Lane Groton	978 448 6225
Richard Curtis	176 Main St	877537
Barbara Rich	104 Mill St Groton	978 448 3375
Becky Pine	100 Hollis St Groton	978 448 2710
Suzanna Hack	427 Lost Lake Drive	978-448-6310
Lili Ott	545 Farmers Row	448-1192
EVAN OWEN	5 RIDGE RD GROTON	448-6364
Georgess McHarque	51 Hollis Groton	448-5002
M E [illegible]	51 Hollis Groton	448-5002
[illegible]	206 Mill St.	448583
[illegible]	38 Martins Pond R	448-3486
[illegible]	73 Hill Rd. Groton	448 2544
Laura Semple	177 Gratuity Rd Groton	448-9009
Bob Hamlin	99 Rockingham Rd. Londonderry NH 03053	1-603 434-6459
Dave Minott	20 Rocky Hill Lane Groton	448 9574
A Potenaude	12 VILLAGE ROAD PEPPERELL	433-8570
Bob Asch & Kathleen F. Ash	Box 247 Groton, MA	448-8016
HAYNES TURTLE	29 BRITT LANE GROTON	448-7232
[illegible]		

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Name	Address	Phone (Optional)
TODD MCGILLIVRAY	103 HOLLIS ST GROTON	
Stacey Chilcoat	210 Chicopee Groton	
REBECCA O'ROURKE	43 MAIN ST. GROTON	
Laurie Morgan	357 Riverbend Dr, Groton	
Richard Muellike	109 Farmer St. Groton	
[illegible]	91 Country Way Ayer	
Paula Mydell	26 Hunter Rd, Harvard	
Alice Reba	17 Devens St Maynard	
Thomas Perry	238 Longley Rd Groton MA	
Brad Paul	18 Nod Rd Groton MA	978-448-0973
RAY CIEMNY	54 FITCH'S BRIDGE Rd	978-448-0028
Wendy Frank	54 Fitch's Bridge Rd	978.448.9555
Ed Lawler	43 Main Street	" " 3038
M. Archambault	36 Elmwood Ave Nashua NH	
Donna M Lyons	94 Hill Rd Groton MA	978-448-8346
Ellen Bangs	263 Whitney Rd Groton MA	978 448-3053
Kevin Johnson	43 Champney St. Groton MA	978-448-9153
[illegible]	11 Sawmill Groton	978-448-6226
David Mannigan	7 Shepley Street, W. Groton	978-448-2803
Ellen Fowler	28 Pleasant St, Groton	978.448.3831
John Jackson	28 Pleasant St Groton	
[illegible]	9 Shepley St W Groton	448-2823

APPENDIX A

PHOTOGRAPHS

Photo 1 - South Elevation

Photo 2 - North Elevation

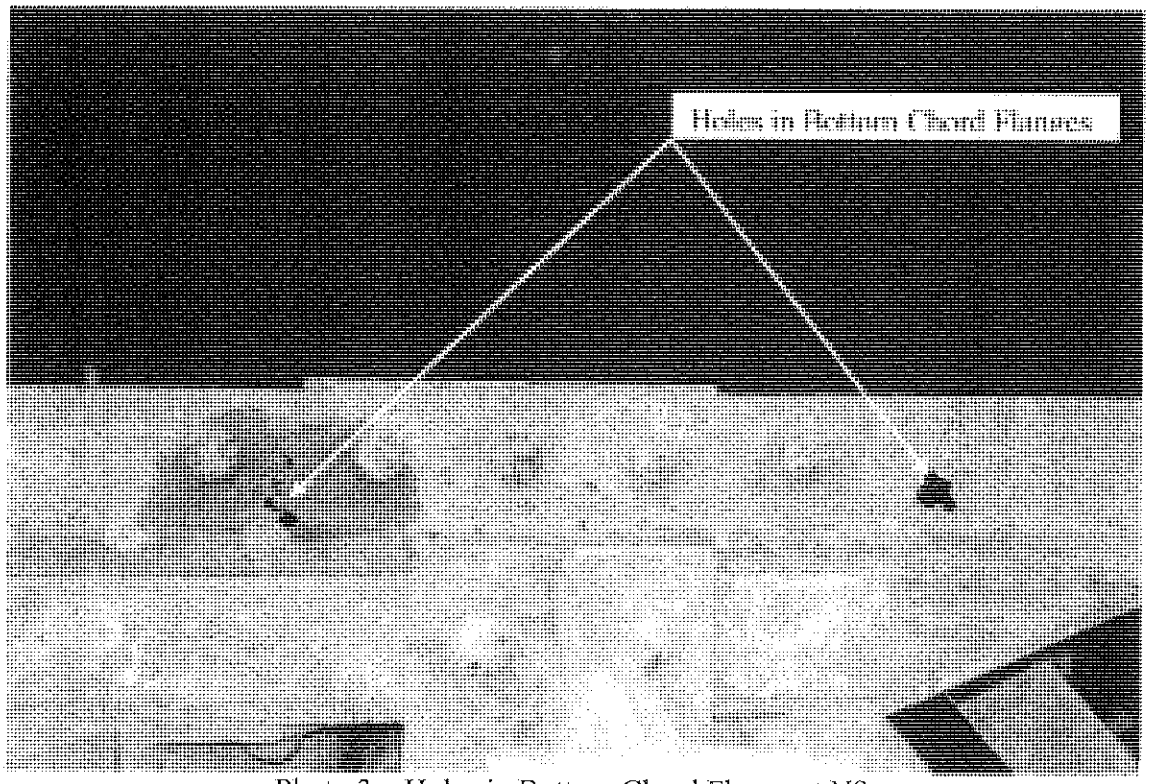

Photo 3 – Holes in Bottom Chord Flange at N8

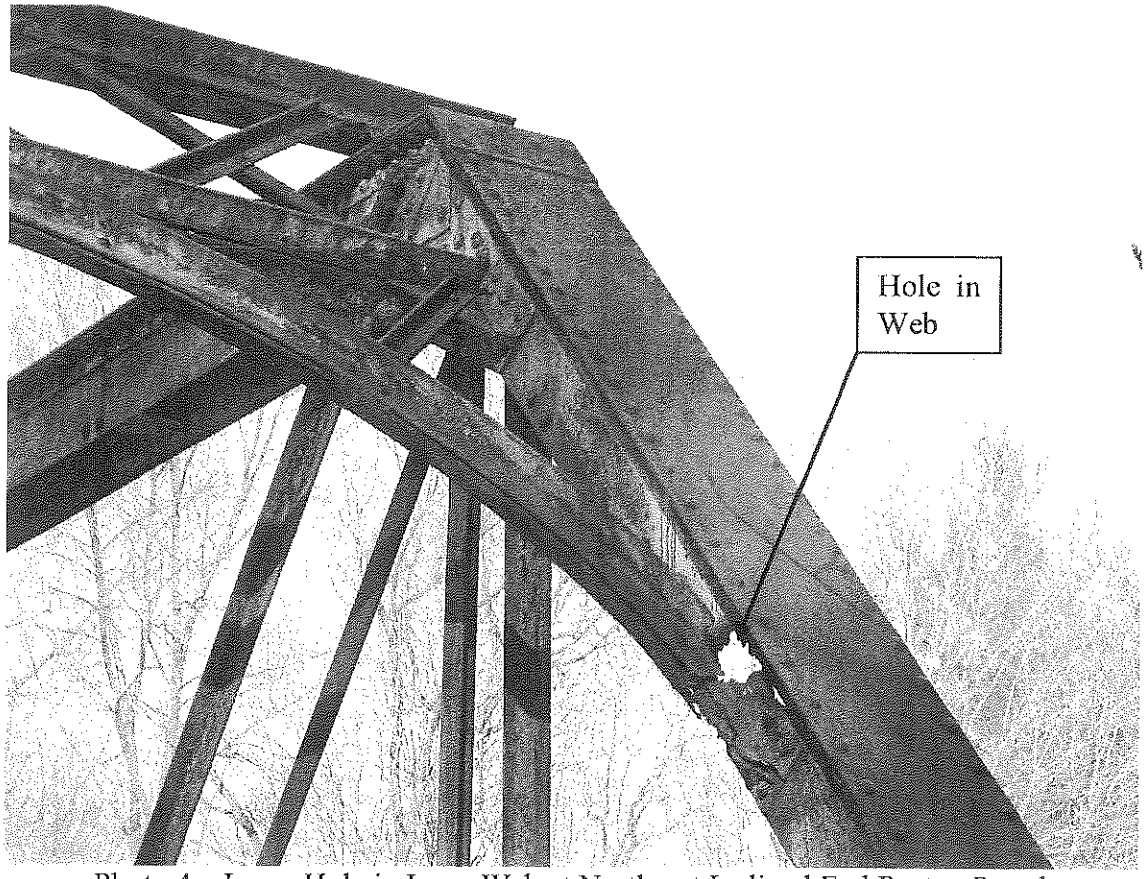

Photo 4 – Large Hole in Inner Web at Northeast Inclined End Post at Portal

Photo 5 – Corroded Brace Connection and Hole in Top Flange Plate at Portal Connection at N2 Top Chord

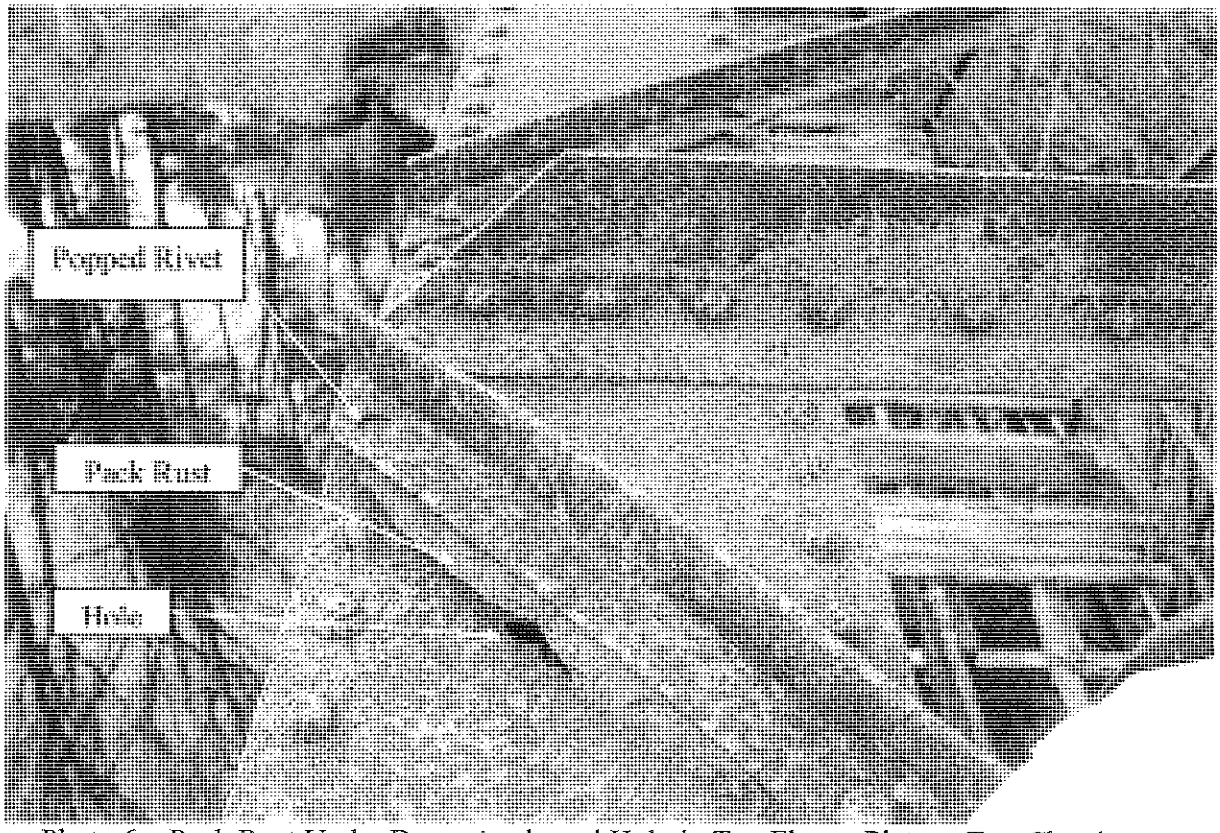

Photo 6 – Pack Rust Under Brace Angle and Hole in Top Flange Plate at Top Chord Diagonal Connection with Popped Rivet

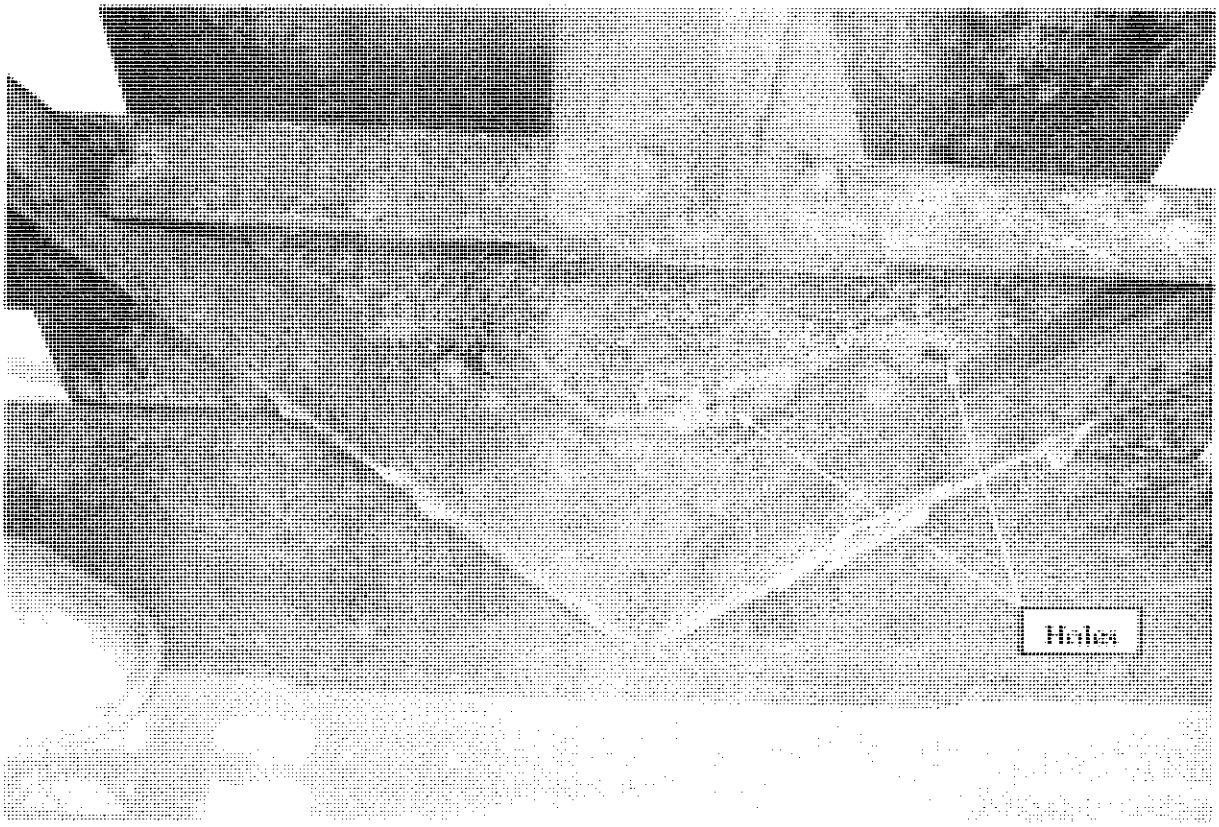

Photo 7 – Heavy Corrosion and Holes in Outer Vertical Gusset Plate at Node N5

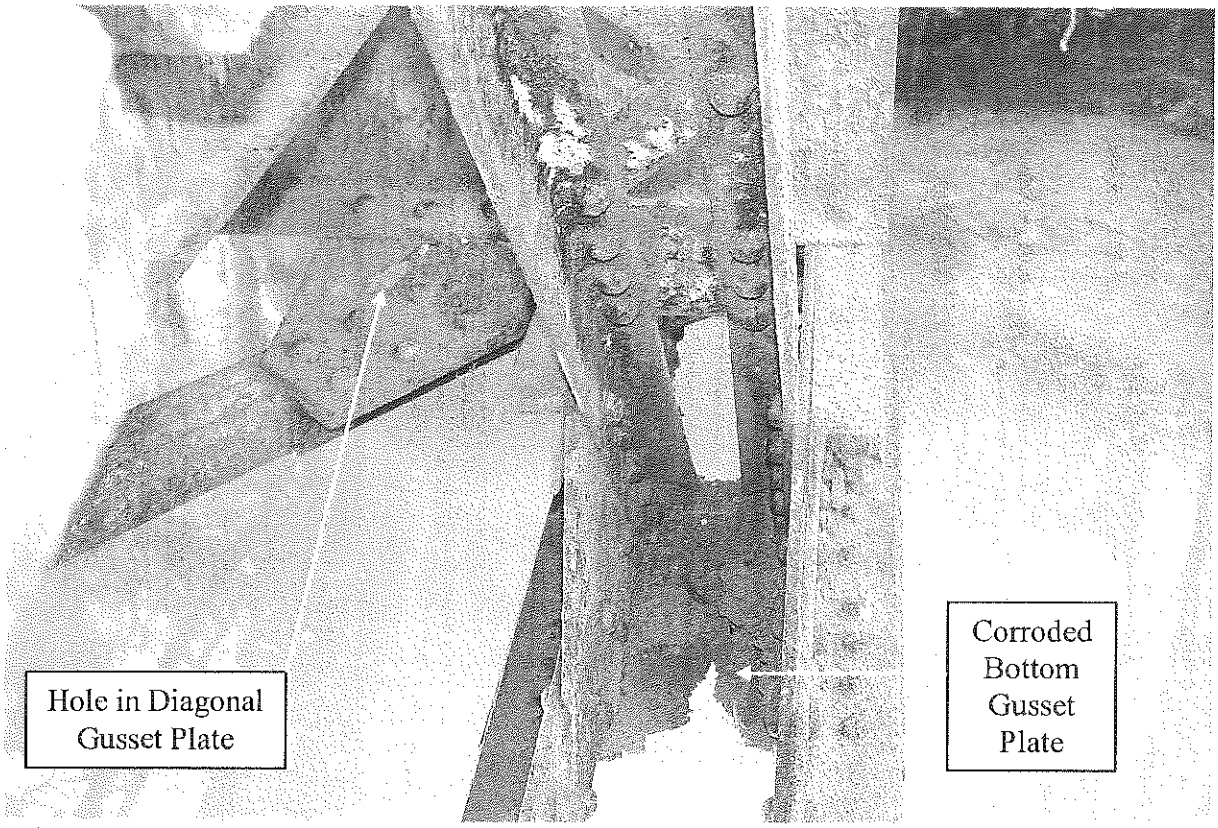

Photo 8 – Heavy Corrosion at Bottom Gusset Plate at Node N3. Note Hole in Diagonal Gusset Plate

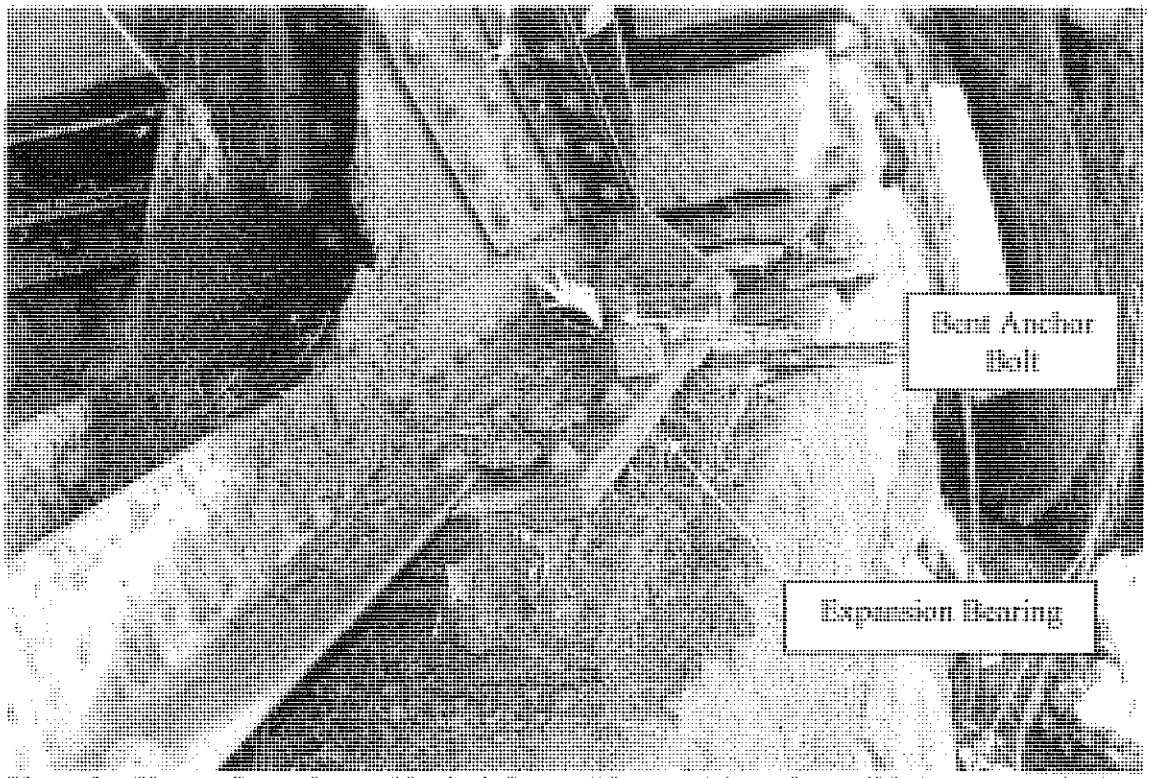

Photo 9 – Heavy Corrosion at Vertical Gusset Plates at N1 and Possibly Non-Functioning Expansion Bearing with Bent Anchor Bolt

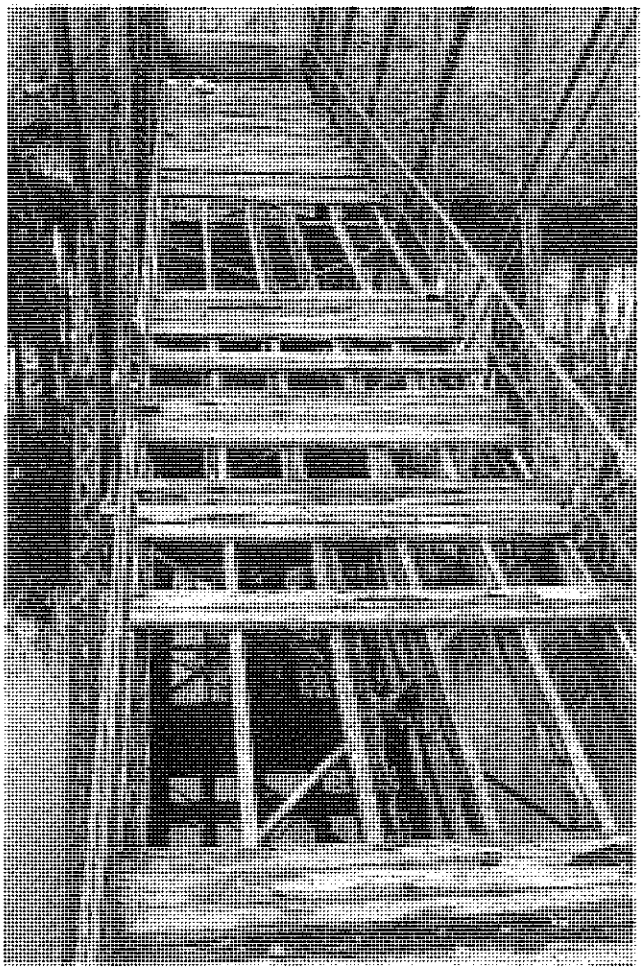

Photo 10 – Deck Looking West

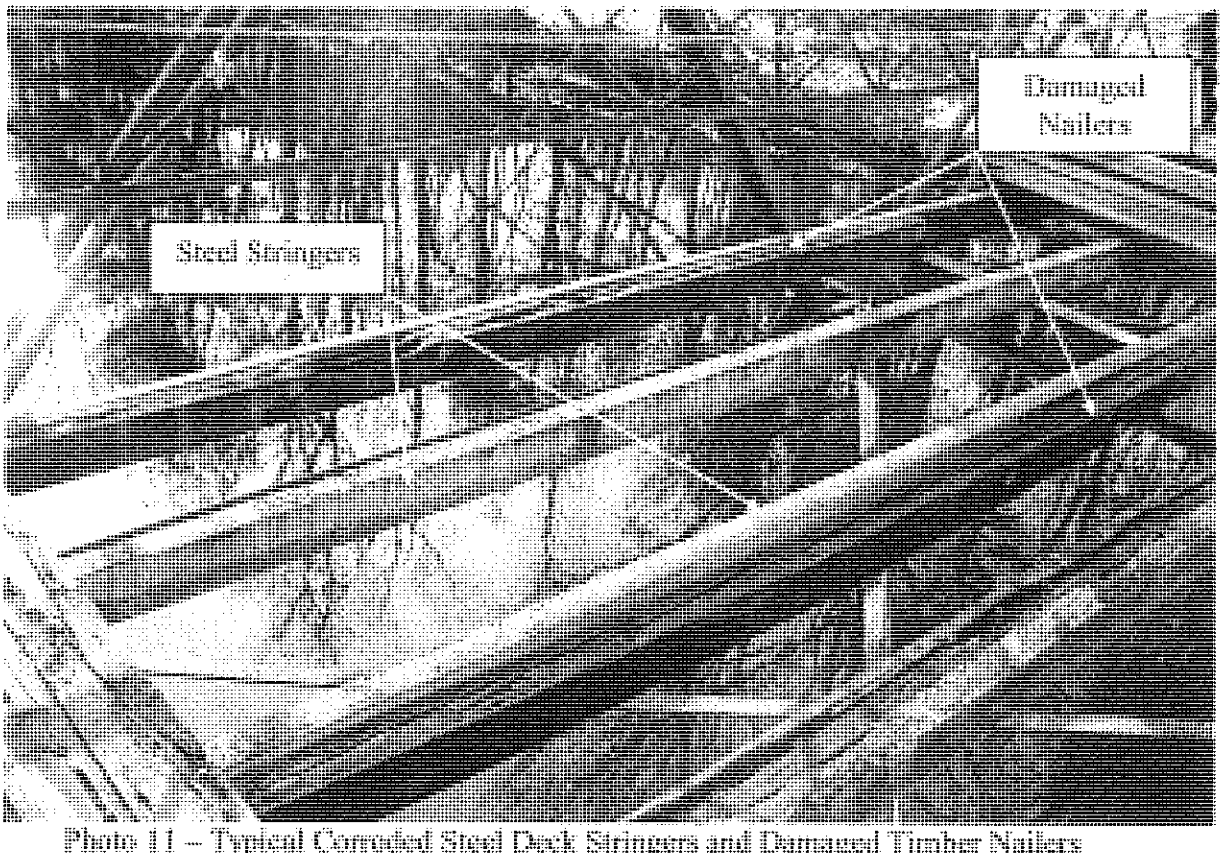

Photo 11 – Typical Corroded Steel Deck Stringers and Damaged Timber Nailers

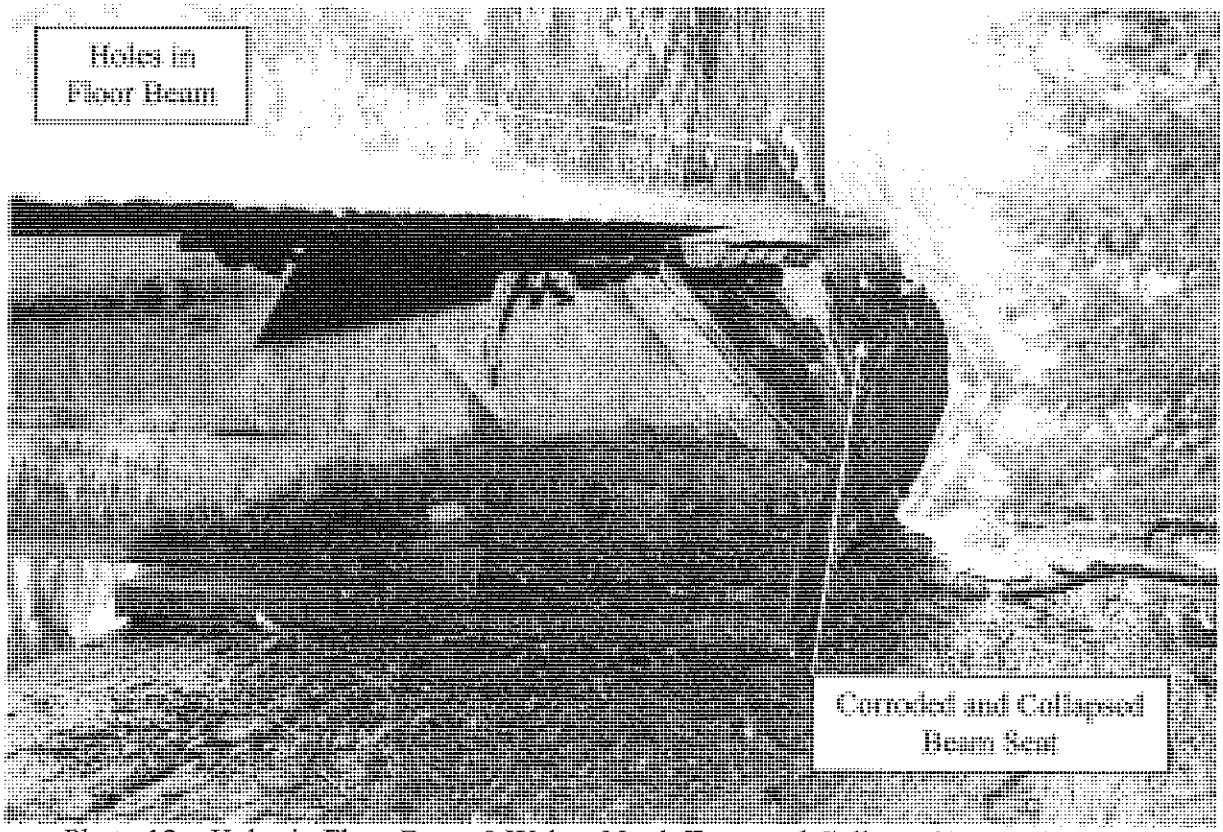

Photo 12 – Holes in Floor Beam 9 Web at North Truss and Collapsed Beam Seat

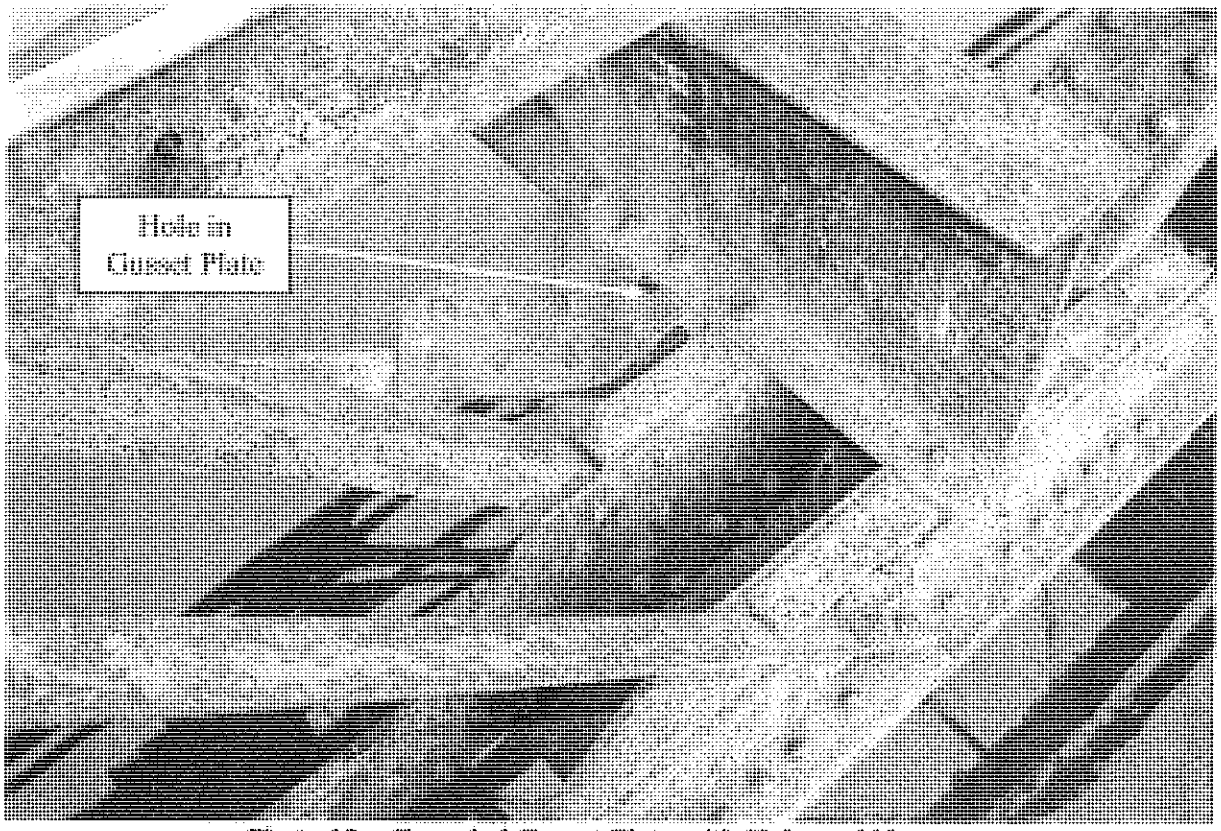

Photo 13 – Corroded Gusset Plate with Holes at N6

Photo 14 – Broken Gusset Plate and Hanging Diagonal Brace at N1

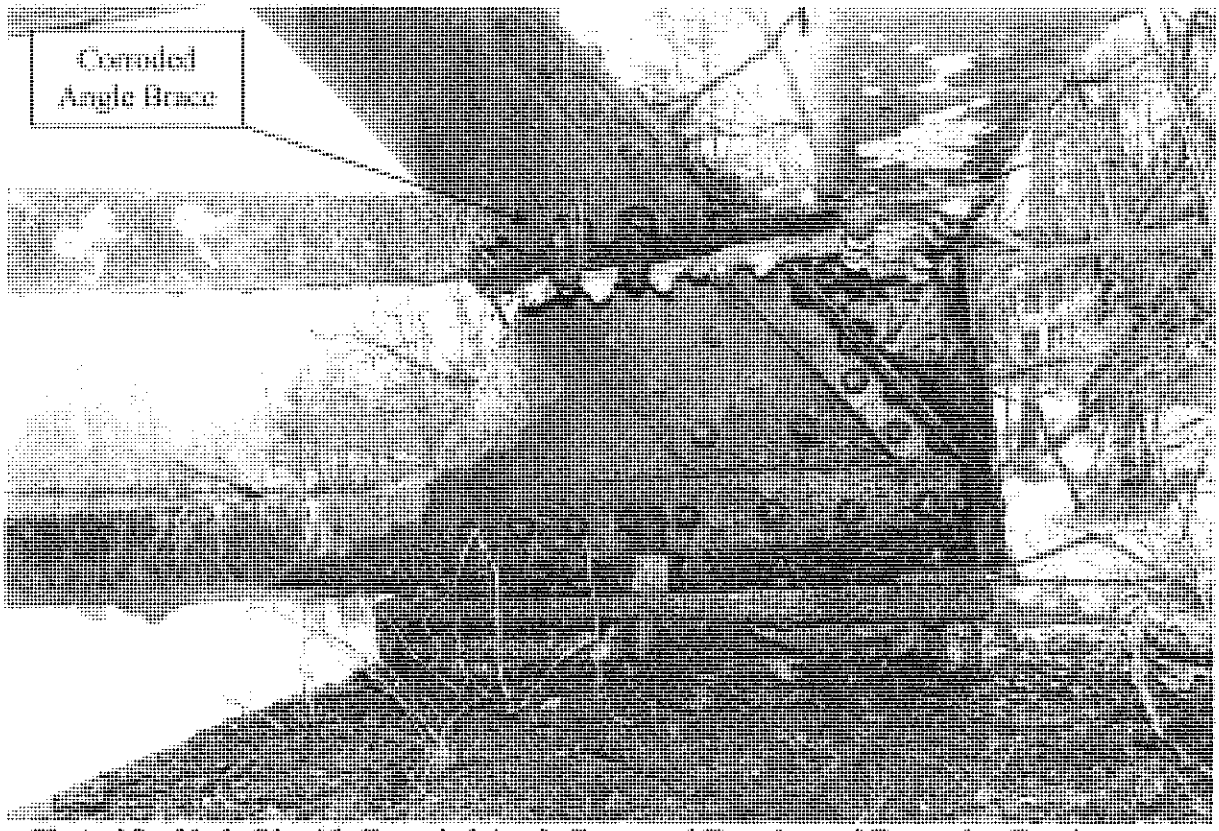

Photo 15 – Node S1 with Corroded Angle Brace and Deteriorated Expansion Bearing

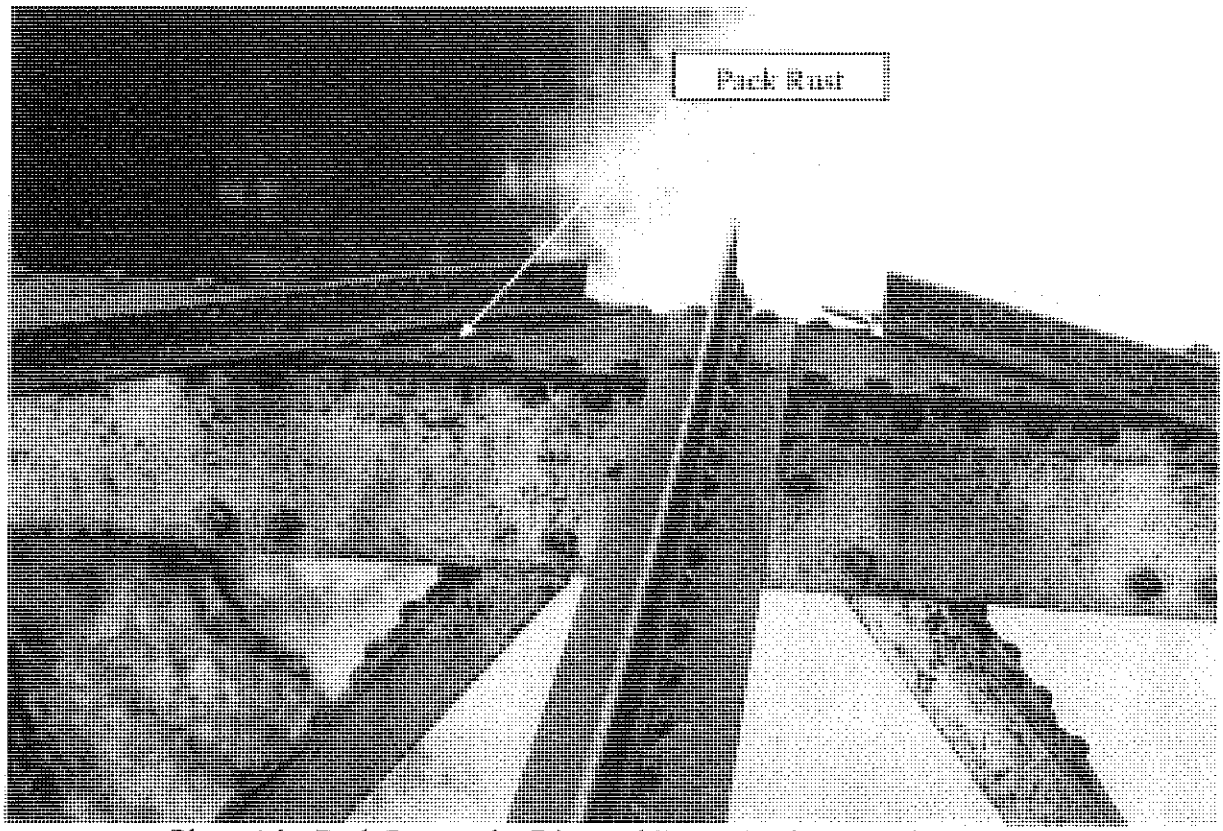

Photo 16 – Pack Rust under Diagonal Brace Angles at Node N5

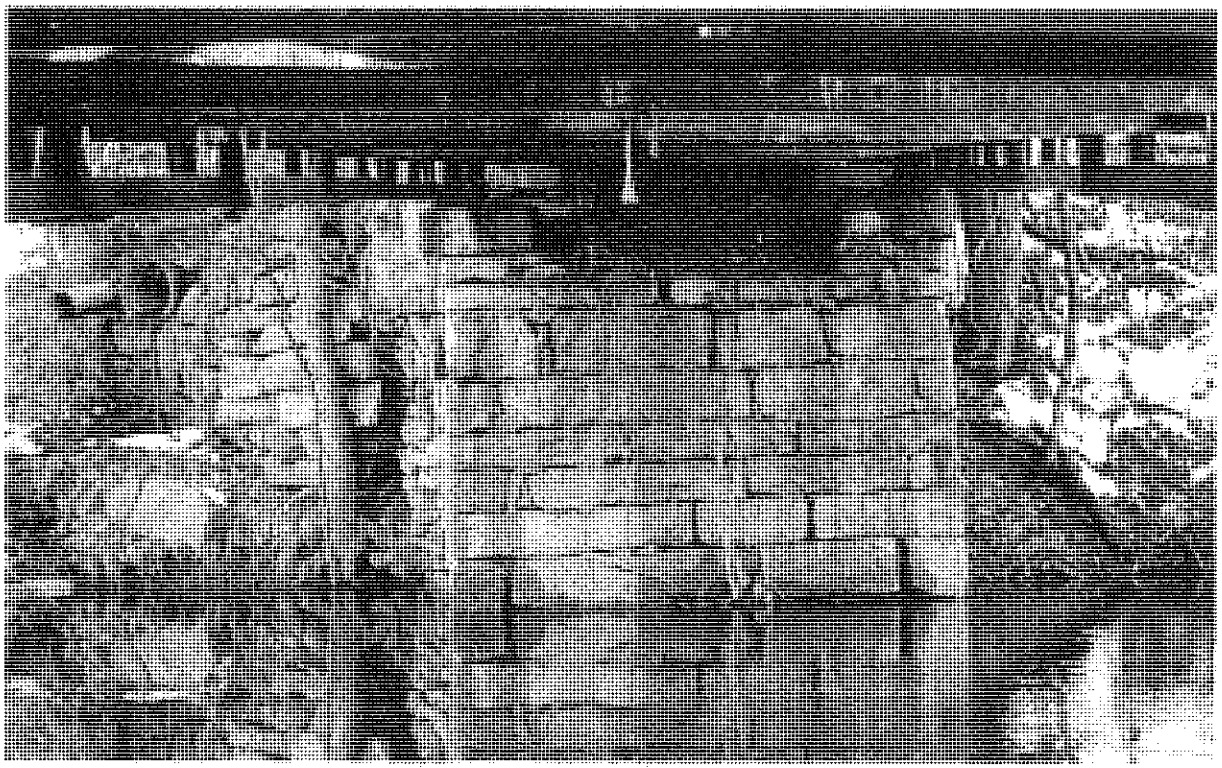

Photo 17 – West Abutment

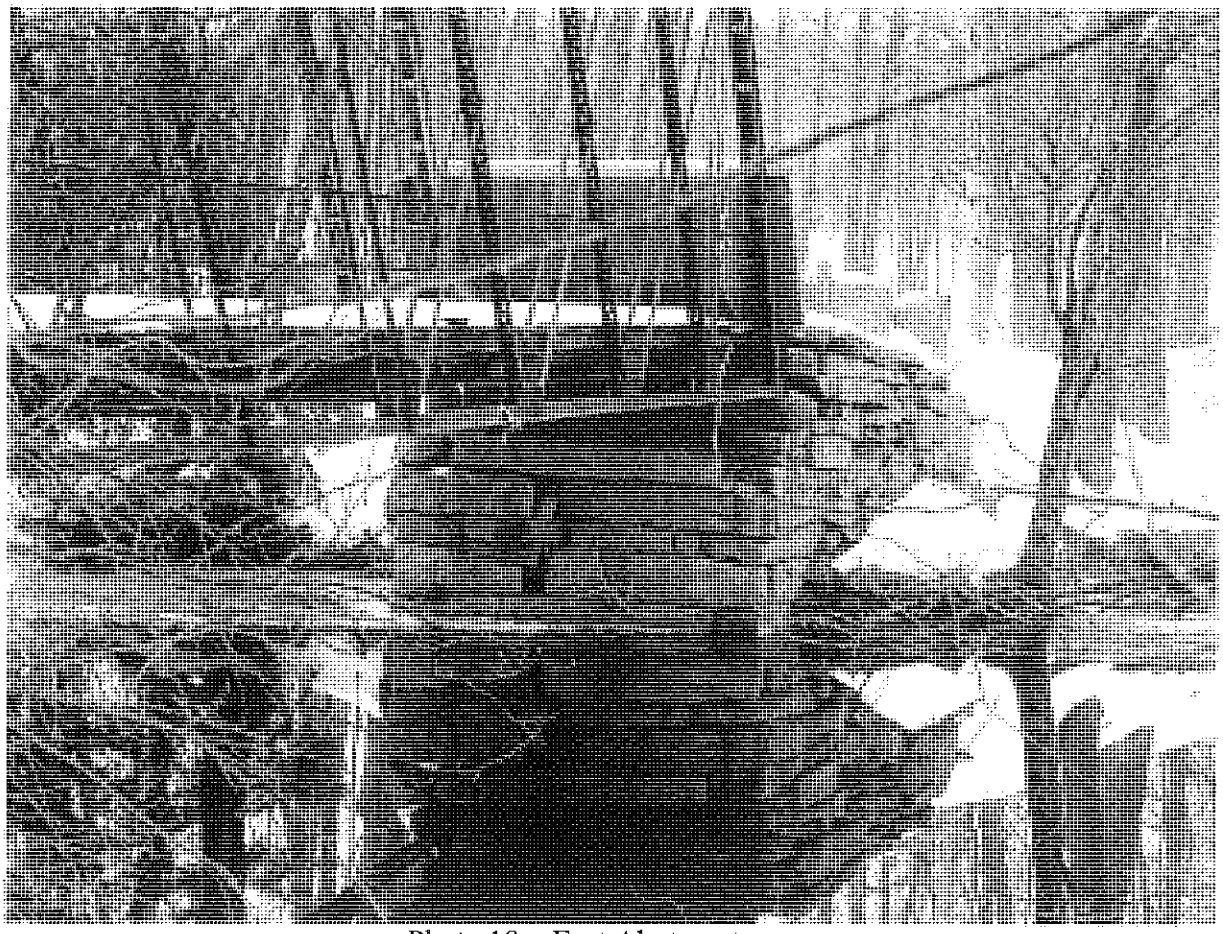

Photo 18 – East Abutment

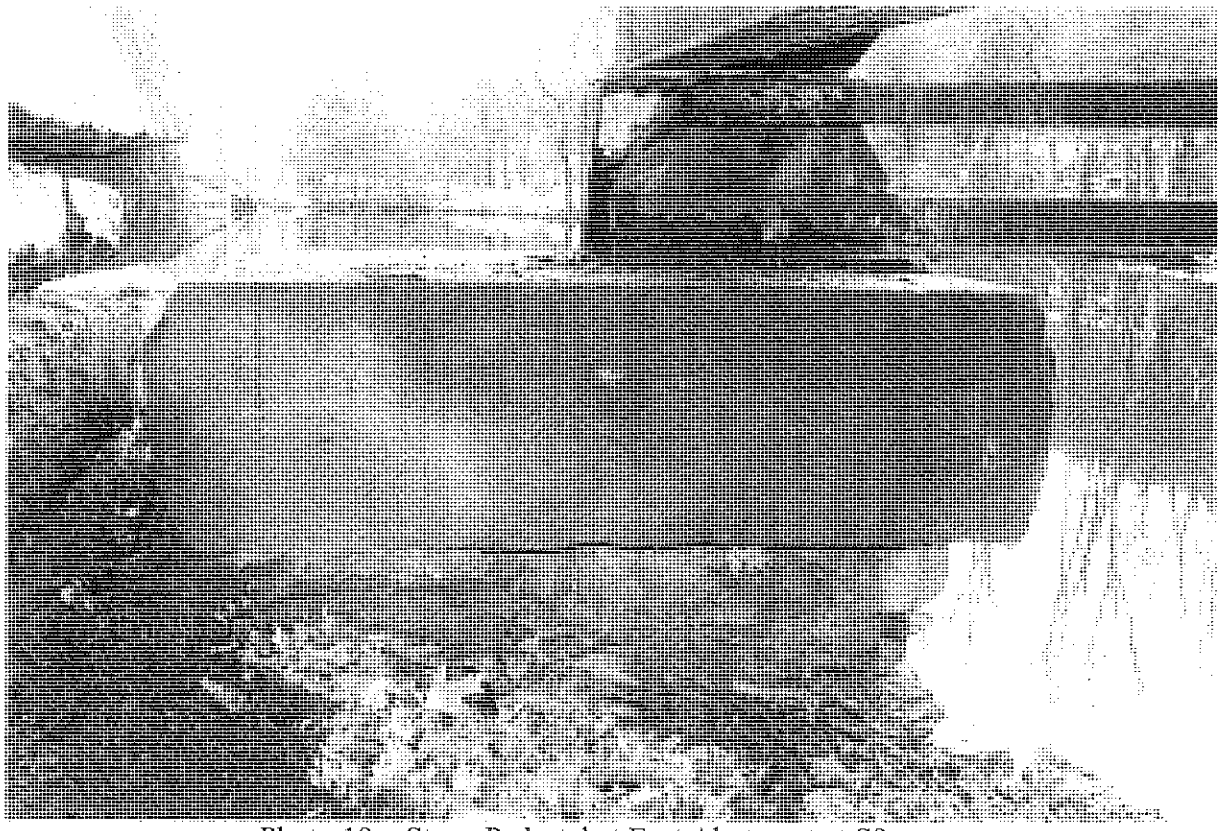

Photo 19 – Stone Pedestal at East Abutment at S9

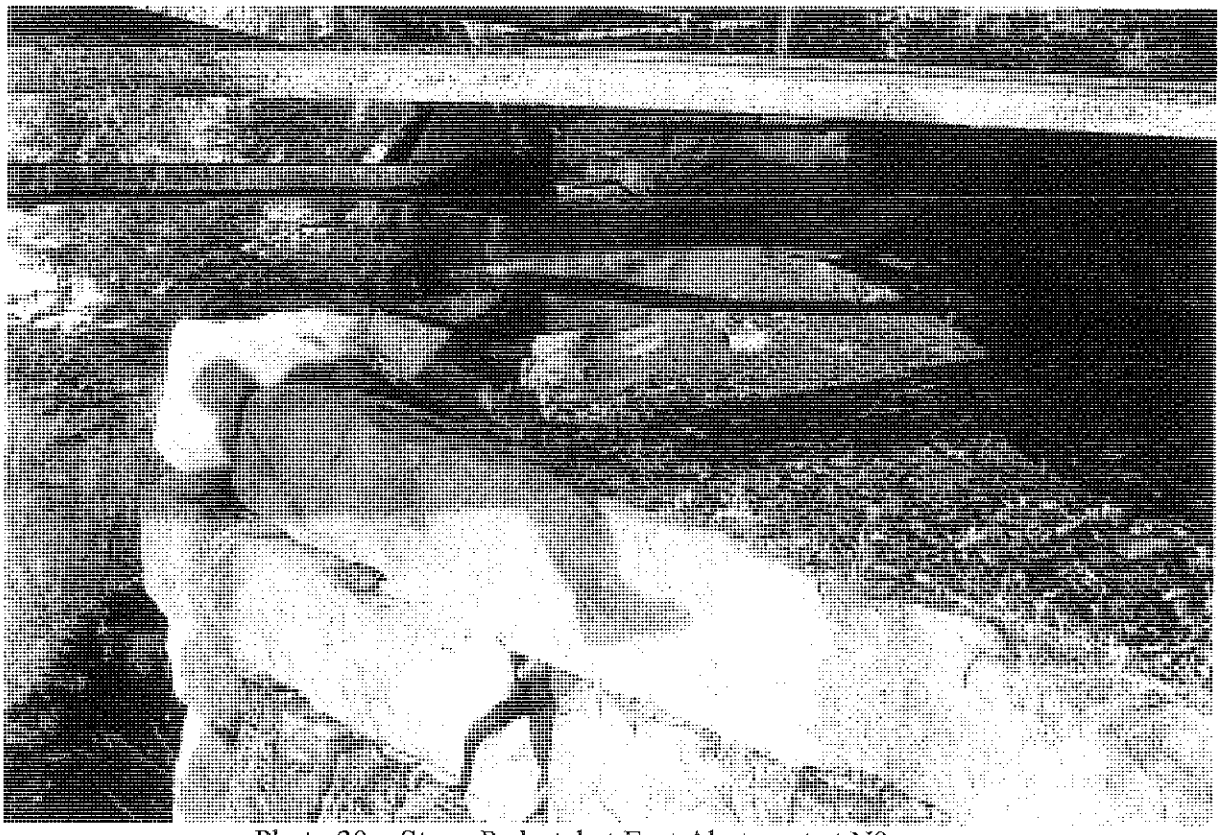

Photo 20 – Stone Pedestal at East Abutment at N9

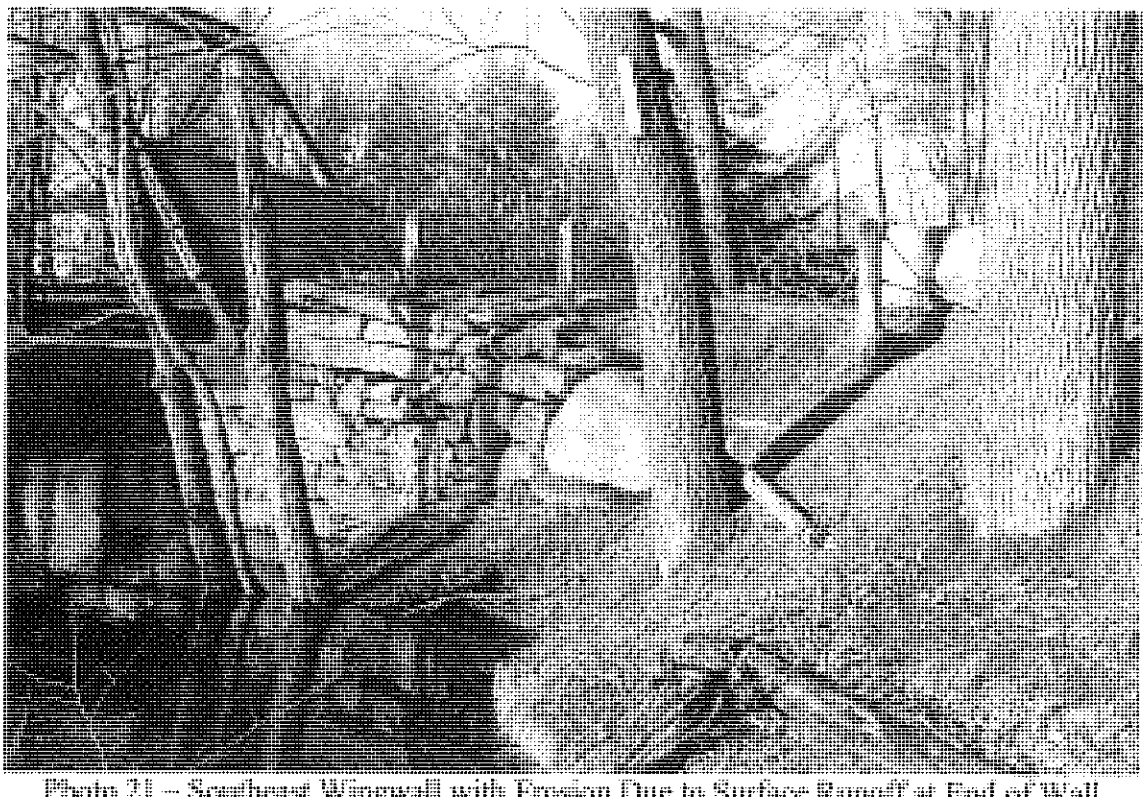

Photo 21 – Southeast Wingwall with Erosion Due to Surface Runoff at End of Wall

APPENDIX B

STRUCTURAL CALCULATIONS

APPENDIX B

STRUCTURAL CALCULATIONS

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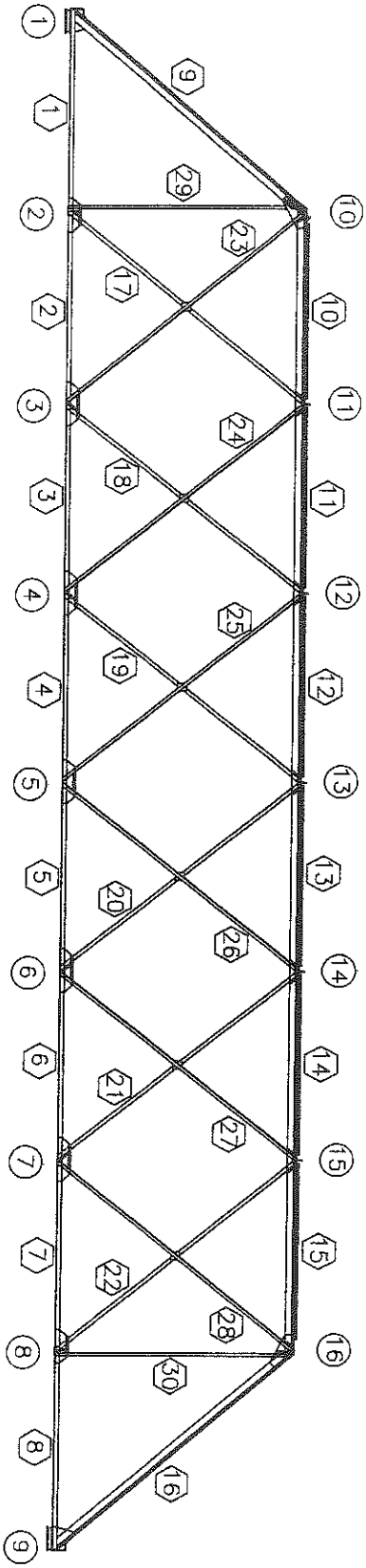

COMPUTER MODEL

(1) –NODE NUMBER

(1) –ELEMENT NUMBER

TRUSS MEMBER SUMMARY

Compression	STAAD Axial Force [k]	Gross Area [in^2]	Applied Stress [ksi]	Allowable Stress [ksi]	
Top Chord	70.56	8.67	8.14	10.8	OK
Bottom Chord (end)	n/a				
Bottom Chord (int)	n/a				
Diagonal Comp	14.44	3.20	4.52	7.83	OK
Diagonal Tens	n/a				
Vertical	n/a				

Allowable stresses for compression are calculated using buckling capacity
The primary (x-x) axis governs for both compression members

Tension	STAAD Axial Force [k]	Gross Area [in^2]	Applied Stress [ksi]	Allowable Stress [ksi]	
Top Chord	n/a				
Bottom Chord (end)	40.77	4.47	9.11	14.30	OK
Bottom Chord (int)	66.98	6.35	10.54	14.30	OK
Diagonal Comp	n/a				
Diagonal Tens	19.99	2.14	9.33	14.30	OK
Vertical	20.73	2.14	9.68	14.30	OK

All allowable stresses for tension are governed by $0.55*F_y$ using Gross Area

AMMANN & WHITNEY (MA) P.C.
12 Marshall Street, 4th Floor
4th Floor
Boston, MA 01970

AW Project #: 2757
Project: Fitch's Bridge Rehabilitation
Design
Subject: Truss Input Loads

By: ES
Date: 01-16-06
Ckd:
Date:

DEAD LOADS-Truss

Constants:

$kip := 1000lbf$ $ksi := \frac{kip}{in^2}$ $pcf := 1\frac{lbf}{ft^3}$ $psf := 1\frac{lbf}{ft^2}$ $TON := 2kip$

Bridge Geometry:

$width_{road} := 13ft$ effective roadway width (CL to CL of truss)

$H_{truss} := 18ft$ height of truss (CL to CL top and bottom chords)

$L_{canti} := 3ft + 5in$ deck cantilever from end panel point

$L_{end\_bay} := 15ft + 3in$ floorbeam spacing of end bays

$L_{int\_bay} := 14ft + 10.75in$ floorbeam spacing of interior bays

Truss Members

Are accounted for as selfweight in STAAD with 2% added for detail weight

Floorbeams: 12" deep 5" flange

Use W12"x35lb

$w_{FB} := 35\frac{lbf}{ft}$

$L_{FB} := 14ft + 0.25in$

Stringers

Interior I-Section Stringers: 6" deep, 3.25" flange

Use W6"x16lb

$w_{STRin} := 16\frac{lbf}{ft}$

Exterior Channel Stringers: 6" deep, 1.88" flange

Use C6x8.2

$w_{STRex} := 8.2\frac{lbf}{ft}$

total weight of all stringers per ft of bridge

$w_{STR} := 2 \cdot w_{STRex} + 4 \cdot w_{STRin}$

$w_{STR} = 80.4\frac{lbf}{ft}$

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By: ES
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Ckd:
Date:

Timber Deck

$width_{deck} := 13.25ft$ (deck width is approximate and accounts for overhanging planks, for dead load use only)

$depth_{deck} := 3in$

$w_{wood} := 45 \cdot pcf$

$w_{deck} := width_{deck} \cdot depth_{deck} \cdot w_{wood}$

$w_{deck} = 149.062 \frac{lbf}{ft}$

Timber Nailers (one per stringer)

$depth_{nailer} := 6in$

$width_{nailer} := \overline{4.25}\,in$ actual nailer widths vary

$w_{nlr} := 6 \cdot (depth_{nailer} \cdot width_{nailer} \cdot w_{wood})$

$w_{nlr} = 47.812 \frac{lbf}{ft}$

Timber Curb

$A_{curb} := 22.21in^2$ (calculated area per linear foot)

$w_{curb} := 2(w_{wood} \cdot A_{curb})$ $w_{curb} = 13.881 \frac{lbf}{ft}$

Railing

$w_{rail} := 2 \cdot \left(11.5 \cdot \frac{lbf}{ft}\right)$

Portal Bracing

$W_{port} := 232lbf$

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Date:

Bracing

$w_{steel} := 490pcf$

Roof Bracing BR1 (Parallel to FB)

$A_{BR1} := 3.38in^2$

$w_{BR1} := A_{BR1} \cdot w_{steel}$ $\quad w_{BR1} = 11.501 \frac{lbf}{ft}$

$L_{BR1} := width_{road}$

$W_{BR1} := w_{BR1} \cdot L_{BR1}$ $\quad W_{BR1} = 149.518\,lbf$

Roof Bracing BR2 (Diagonal X in FB Plane)

$A_{BR2} := 0.94in^2$

$w_{BR2} := A_{BR2} \cdot w_{steel}$ $\quad w_{BR2} = 3.199 \frac{lbf}{ft}$

$L_{BR2} := \sqrt{(14ft + 10.75in)^2 + width_{road}^2}$ $\quad L_{BR2} = 19.771\,ft$

$W_{BR2} := w_{BR2} \cdot L_{BR2}$ $\quad W_{BR2} = 63.239\,lbf$

Floor Bracing BR3 (Diagonal X in FB Plane)

$A_{BR3} := 1.15in^2$

$w_{BR3} := A_{BR3} \cdot w_{steel}$ $\quad w_{BR3} = 3.913 \frac{lbf}{ft}$

$L_{BR3\_end} := \sqrt{(15ft + 3in)^2 + width_{road}^2}$ $\quad L_{BR3\_end} = 20.039\,ft$

$L_{BR3\_int} := L_{BR2}$ $\quad L_{BR3\_int} = 19.771\,ft$

$W_{BR3\_int} := w_{BR3} \cdot L_{BR3\_int}$ $\quad W_{BR3\_int} = 77.367\,lbf$

$W_{BR3\_end} := w_{BR3} \cdot L_{BR3\_end}$ $\quad W_{BR3\_end} = 78.417\,lbf$

Lacing: Bottom Chord and Compression Diagonals (on one truss)

$w_{lacing} := 2.59 \frac{lbf}{ft}$

$L_{diag} := \sqrt{L_{int\_bay}^2 + H_{truss}^2}$ $\quad L_{diag} = 23.364\,ft$

$W_{lac\_diag} := w_{lacing} \cdot L_{diag}$ $\quad W_{lac\_diag} = 60.513\,lbf$

$W_{lac\_bc\_int} := w_{lacing} \cdot L_{int\_bay}$ $\quad W_{lac\_bc\_int} = 38.58\,lbf$

$W_{lac\_bc\_end} := w_{lacing} \cdot L_{end\_bay}$ $\quad W_{lac\_bc\_end} = 39.497\,lbf$

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Applying Dead Loads at panel points of One Truss

Panel Point 1

$$L_{trib\_pt1} := \frac{L_{end\_bay}}{2} + L_{canti} \qquad L_{trib\_pt1} = 11.042\,ft$$

$$DL_{Pt1} := \frac{L_{trib\_pt1}\cdot\left(w_{STR} + w_{deck} + w_{nlr} + w_{curb} + w_{rail}\right) + L_{FB}\cdot w_{FB} + W_{BR3\_end}}{2} + \frac{W_{lac\_bc\_end}}{2}$$

$$DL_{Pt1} = 2.039\,kip$$

Panel Point 2

$$L_{trib\_pt2} := \frac{L_{int\_bay} + L_{end\_bay}}{2} \qquad L_{trib\_pt2} = 15.073\,ft$$

$$DL_{Pt2} := \frac{L_{trib\_pt2}\cdot\left(w_{STR} + w_{deck} + w_{nlr} + w_{curb} + w_{rail}\right) + L_{FB}\cdot w_{FB} + W_{BR3\_int} + W_{BR3\_end}}{2} \ldots + \frac{W_{lac\_bc\_int} + W_{lac\_bc\_end}}{2} + W_{lac\_diag}$$

$$DL_{Pt2} = 2.79\,kip$$

Panel Point 3 (Typical Interior Panel Point)

$$L_{trib\_pt3} := L_{int\_bay} \qquad L_{trib\_pt3} = 14.896\,ft$$

$$DL_{Pt3} := \frac{L_{trib\_pt3}\cdot\left(w_{STR} + w_{deck} + w_{nlr} + w_{curb} + w_{rail}\right) + L_{FB}\cdot w_{FB} + 2\cdot W_{BR3\_int}}{2} + W_{lac\_bc\_int} + W_{lac\_diag}$$

$$DL_{Pt3} = 2.762\,kip$$

Panel Point 10 (Above point 2)

$$DL_{Pt10} := \frac{W_{BR1} + W_{BR2}}{2} + W_{port} \qquad DL_{Pt10} = 0.338\,kip$$

Panel Point 11 (Above point 3 - Typical Interior roof panel point)

$$DL_{Pt11} := \frac{W_{BR1} + 2\cdot W_{BR2}}{2} \qquad DL_{Pt11} = 0.138\,kip$$

DEAD LOAD SUMMARY

$DL_{Pt1} = 2.039\,kip$

$DL_{Pt2} = 2.79\,kip$

$DL_{Pt3} = 2.762\,kip$

$DL_{Pt10} = 0.338\,kip$

$DL_{Pt11} = 0.138\,kip$

AMMANN & WHITNEY (MA) P.C.
12 Marshall Street, 4th Floor
4th Floor
Boston, MA 01970

AW Project #: 2757
Project: Fitch's Bridge Rehabilitation
Design
Subject: Truss Input Loads

By: ES
Date: 01-16-06
Ckd:
Date:

LIVE LOADS-Truss

Pedestrian Live Load

$Pr_{PLL} := 65psf$

$w_{PLL} := Pr_{PLL} \cdot width_{road}$ $\quad w_{PLL} = 0.845 \frac{kip}{ft}$

Panel Point 1

$L_{trib\_pt1} = 11.042\,ft$

$LL_{ped\_pt1} := \frac{w_{PLL} \cdot L_{trib\_pt1}}{2}$ $\quad LL_{ped\_pt1} = 4.665\,kip$

Panel Point 2

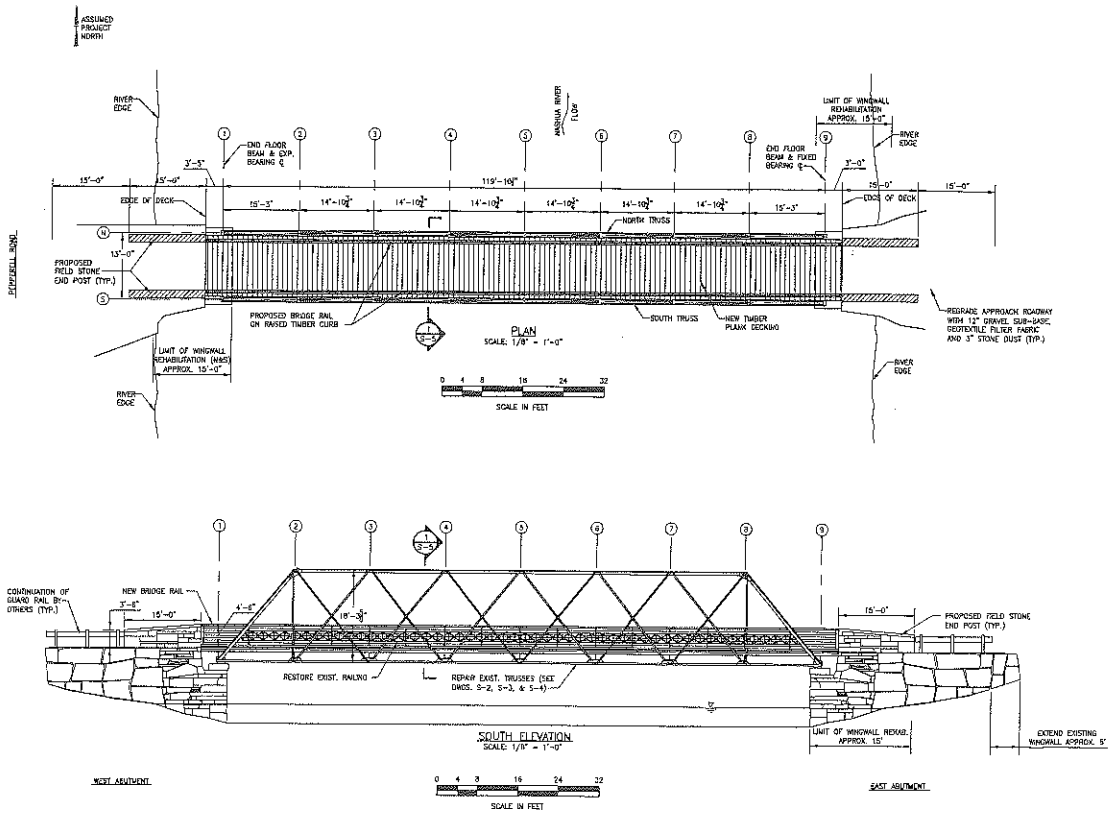
$L_{trib\_pt2} = 15.073\,ft$

$LL_{ped\_pt2} := \frac{w_{PLL} \cdot L_{trib\_pt2}}{2}$ $\quad LL_{ped\_pt2} = 6.368\,kip$

Panel Point 3

$L_{trib\_pt3} = 14.896\,ft$

$LL_{ped\_pt3} := \frac{w_{PLL} \cdot L_{trib\_pt3}}{2}$ $\quad LL_{ped\_pt3} = 6.293\,kip$



NOTES

1. CLEAN AND PAINT ALL EXIST. STRUCTURAL STEEL TO REMAIN.
2. ALL NEW STEEL SHALL CONFORM TO AASHTO M270, GRADE 36

TOWN OF GROTON
MASSACHUSETTS

REHABILITATION
OF
FITCH'S BRIDGE

CAMMANN & WHITNEY
Cammann & Whitney (MA), P.C.
52 Merrimack Street
Newton, MA 02158

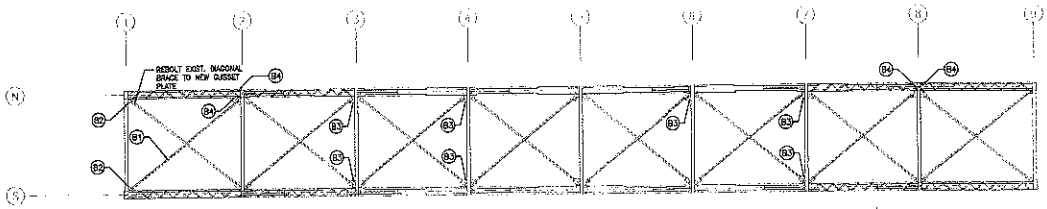
Project No:	2757
Drawn By:	RSH
Checked By:	APM
Issue Date:	FEBRUARY 01, 2005

Revisions

No	Date	Description

Drawing Title:
GENERAL PLAN AND ELEVATION

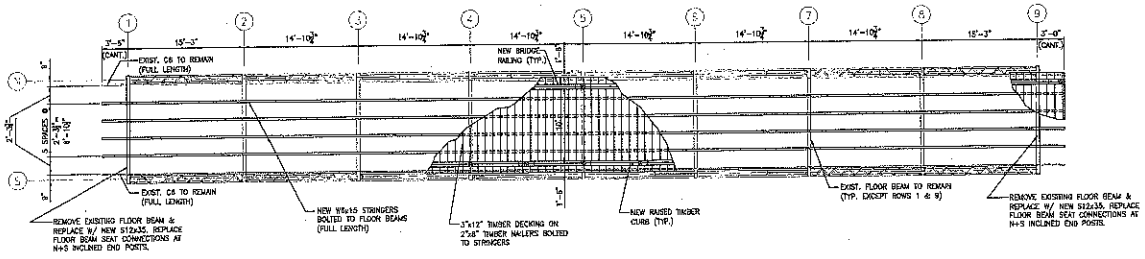
Drawing Number:
S-1



BOTTOM CHORD FRAMING
SCALE: 3/16" = 1'-0"

0 5 10 15 20
SCALE IN FEET

REPAIR TYPE	DESCRIPTION OF REPAIR	QUANTITY
B1	REPLACE L3½x3½x5/16" DIAGONAL BRACE	1
B2	REPLACE GUSSET CONNECTION PLATE WITH NEW PLATE BOLTED TO FLOOR BEAM FLANGE	2
B3	REPLACE GUSSET CONNECTION PLATE WITH NEW PLATE BOLTED TO FLOOR BEAM FLANGE	7
B4	BOLT ON SUPPLEMENTARY PLATE TO COVER HOLES IN BOTTOM FLANGE OF BOTTOM CHORD ANGLE	4



DECK FRAMING
SCALE: 3/16" = 1'-0"

0 5 10 15 20
SCALE IN FEET

TOWN OF GROTON
MASSACHUSETTS

REHABILITATION
OF
FITCH'S BRIDGE

CAMMANN & WHITNEY
Structural & Highway Design, P.C.
10 Marshall Street
Boston, MA 02108

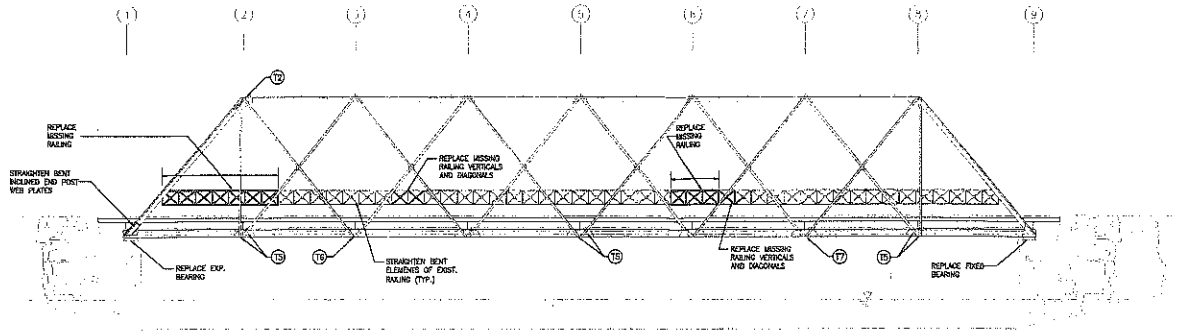
Project No:	2757
Drawn By:	RSH
Checked By:	APM
Issue Date:	FEBRUARY 01, 2006

Revisions

No.	Date	Description

Drawing Title:
REHABILITATION OF BOTTOM CHORD FRAMING & DECK

Drawing Number:
S-2

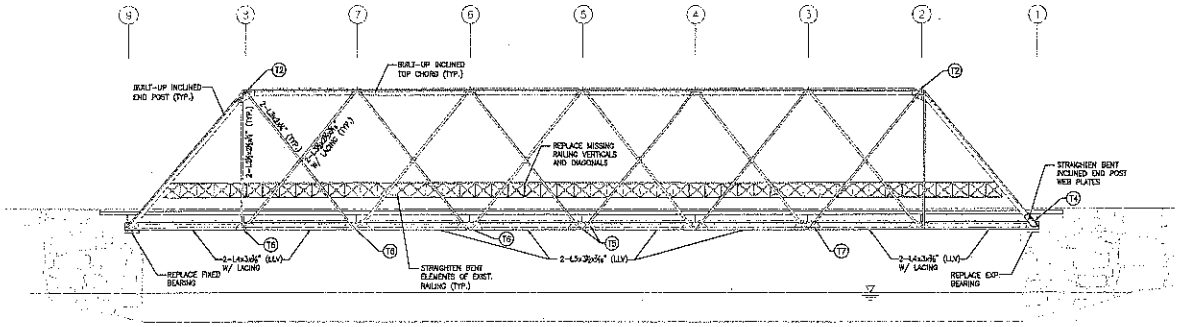


SOUTH TRUSS ELEVATION

SCALE: 3/16" = 1'-0"

0 5 10 15 20

SCALE IN FEET



NORTH TRUSS ELEVATION

SCALE: 3/16" = 1'-0"

0 5 10 15 20

SCALE IN FEET

REPAIR TYPE	DESCRIPTION OF REPAIR	QUANTITY
T2	REMOVE PORTAL BENT PLATE CONNECTION TO TOP CHORD; CUT & CLEAN EXPOSED CORRODED TOP CHORD PLATE; INSTALL SUPPLEMENTARY TOP CHORD PLATE; INSTALL NEW PORTAL CONNECTION PLATE.	3
T4	REMOVE FLOOR BEAM SEAT CONNECTION PLATE; CLEAN PACK RUST FROM TOP FLANGE OF INCLINED END POST AND GIRDER HOLE; INSTALL SUPPLEMENTARY PLATE; INSTALL NEW FLOOR BEAM SEAT	1

REPAIR TYPE	DESCRIPTION OF REPAIR	QUANTITY
T5	BOLT ON SUPPLEMENTARY PLATE TO VERTICAL GUSSET PLATE WITH HOLES; REPLACE CORRODED BOTTOM GUSSET PLATE WITH NEW PLATE BOLTED TO BOTTOM CHORD ANGLES.	4
T6	REPLACE CORRODED BOTTOM GUSSET PLATE WITH NEW PLATE BOLTED TO BOTTOM CHORD ANGLES	4
T7	BOLT ON SUPPLEMENTARY PLATE TO VERTICAL GUSSET PLATE WITH HOLES; REPLACE CORRODED BOTTOM GUSSET PLATE WITH NEW PLATE BOLTED TO BOTTOM CHORD ANGLES.	2

NOTES:

1. NEW BRIDGE RAILING AND END POSTS OMITTED FOR CLARITY. SEE DRAWING S-5 FOR DETAILS
2. SEE DRAWING S-6 FOR SUBSTRUCTURE REHABILITATION

TOWN OF GROTON
MASSACHUSETTS

REHABILITATION
OF
FITCH'S BRIDGE

AMMANN & WHITNEY
Ammann & Whitney (MA) P.C.
13 Hartwell Street
Boston, MA 02116

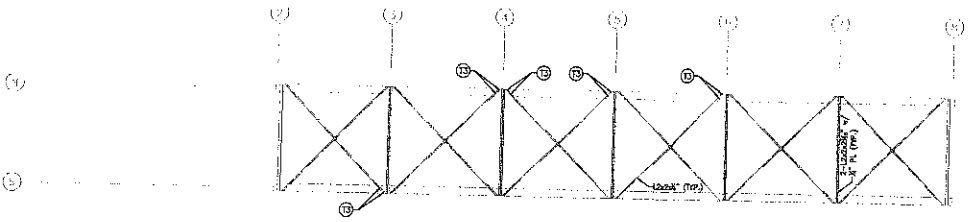
Project No: 7757
Drawn By: RSH
Checked By: JPS
Issue Date: FEBRUARY 01, 2008

Revisions

No	Date	Description

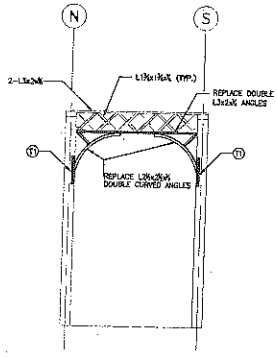
Drawing Title:
REHABILITATION OF NORTH & SOUTH TRUSSES

Drawing Number:
S-3



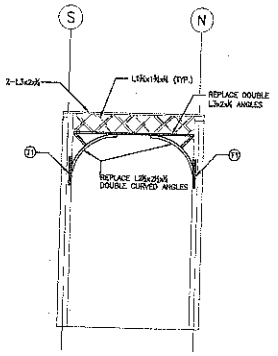
TOP CHORD BRACING--PLAN
SCALE 3/16" = 1'-0"

0 5 10 15 20
SCALE IN FEET



WEST PORTAL
SCALE: 1/4" = 1'-0"

0 2 4 8 12 16
SCALE IN FEET



EAST PORTAL
SCALE: 1/4" = 1'-0"

0 2 4 8 12 16
SCALE IN FEET

REPAIR TYPE	DESCRIPTION OF REPAIR	QUANTITY
T1	REMOVE PORTION OF DAMAGED INSIDE WEB PLATE; INSTALL NEW REPLACEMENT PLATE & BACKING PLATES AND BOLT INTO PLACE	4
T3	REMOVE RIVETS AT TOP CHORD DIAGONAL BRACING; CLEAN PACK RUST UNDER DIAGONAL; INSTALL SUPPLEMENTARY TOP CHORD PLATE; REINSTALL DIAGONAL BRACE.	5

TOWN OF GROTON
MASSACHUSETTS

REHABILITATION
OF
FITCH'S BRIDGE

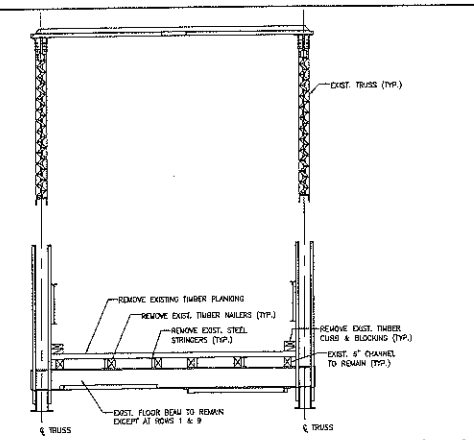
LAMMAN WHITNEY

Project No: 2757
Drawn By: RSH
Checked By: APW
Issue Date: FEBRUARY 01, 2008

Revisions
No. Date Description

Drawing Title:
REHABILITATION OF TOP CHORD BRACING & PORTALS

Drawing Number:
S-4

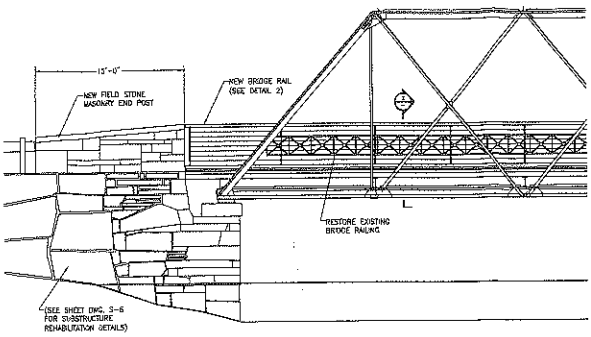


1 / S-1 EXISTING TYPICAL CROSS SECTION

SCALE: 1/2" = 1'-0"

0 1 2 4 6 8

SCALE IN FEET

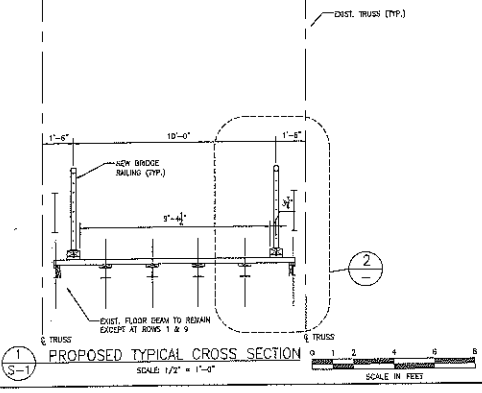


RAILING ELEVATION

SCALE: 1/4" = 1'-0"

0 2 4 8 12 16

SCALE IN FEET

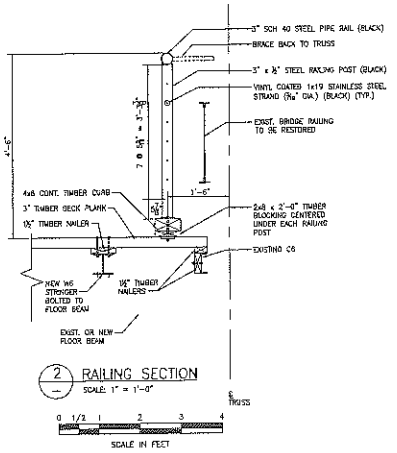


1 / S-1 PROPOSED TYPICAL CROSS SECTION

SCALE: 1/2" = 1'-0"

0 1 2 4 6 8

SCALE IN FEET



2 / — RAILING SECTION

SCALE: 1" = 1'-0"

0 1/2 1 2 3 4

SCALE IN FEET

TOWN OF GROTON
MASSACHUSETTS

REHABILITATION
OF
FITCH'S BRIDGE

ARMANN WHITNEY

Armann & Whitney Civil P.C.
18 Marshall Street
Boston, MA 02108

Project No:	2757
Drawn By:	RSH
Checked By:	APW
Issue Date:	FEBRUARY 01, 2006

Revisions

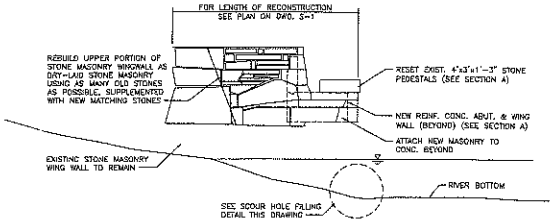
No	Date	Description

Drawing Title:

TYPICAL SECTION
&
BRIDGE RAILINGS

Drawing Number:

S-5

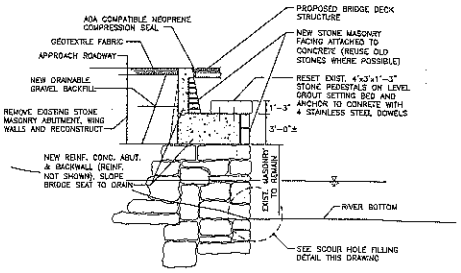


TYPICAL ABUTMENT/WINGWALL ELEVATION

SCALE: 1/4" = 1'-0"

0 2 4 8 12 16

SCALE IN FEET



SECTION A – TYPICAL FOR EAST AND WEST ABUTMENTS

SCALE: 1/4" = 1'-0"

0 2 4 8 12 16

SCALE IN FEET

TOWN OF GROTON
MASSACHUSETTS

REHABILITATION
OF
FITCH'S BRIDGE

HAMMANN & WHITNEY
Hammann & Whitney (MA), P.C.
100 Boylston Street
Boston, MA 02116

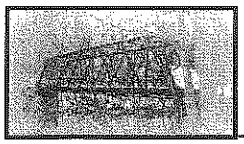
Project No:	2757
Drawn By:	RSH
Checked By:	APW
Issue Date:	FEBRUARY 01, 2008

Revisions

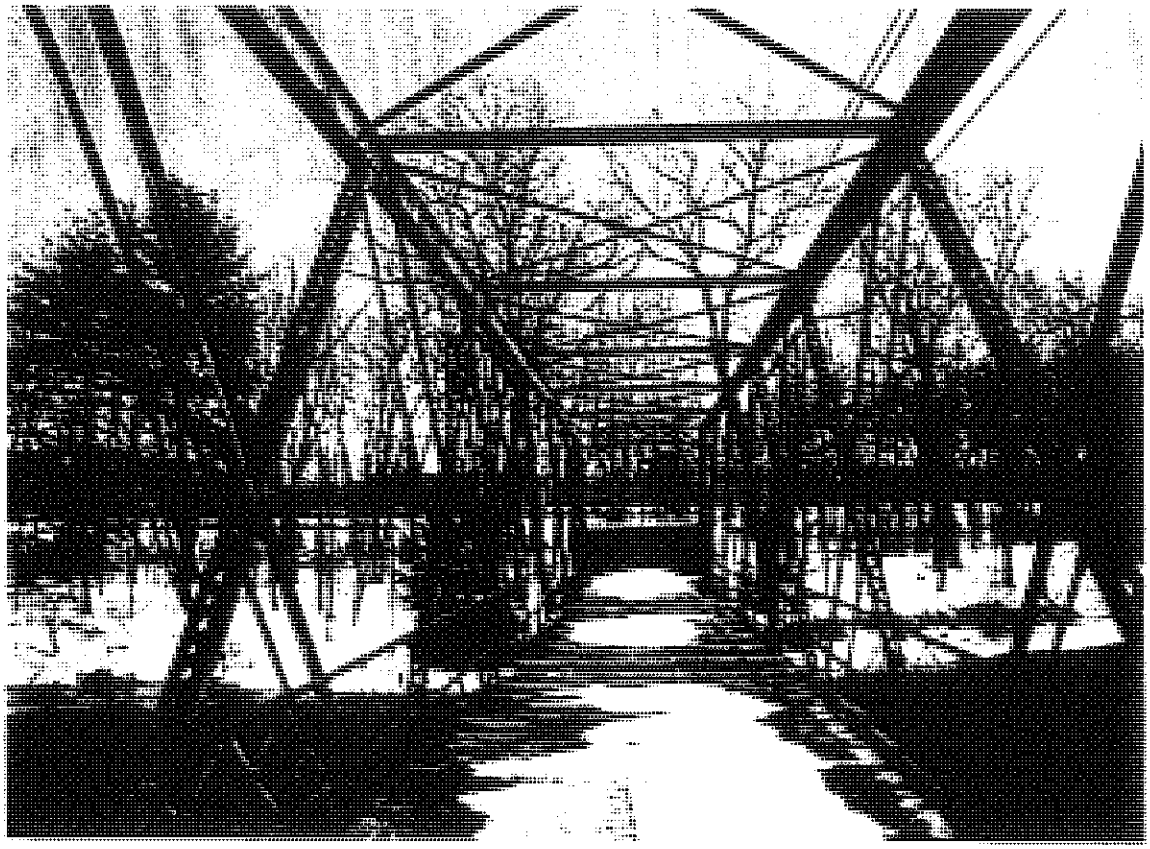
No.	Date	Description

Drawing Title:
REHABILITATION OF SUBSTRUCTURE

Drawing Number:
S-6



Appendix D



Fitch's Bridge

Over

Nashua River

In

Town of Groton, MA

Submitted by

GPI Greenman-Pedersen, Inc.

June, 2001

Background

The rehabilitation of Fitch's Bridge will be a key component in establishing a pedestrian, bicycle, and equestrian linkage from the J. Harry Rich State Forest and Town conservation lands to Throne Hill and Hayes Woods. Fitch's Bridge, built in 1898 by the Berlin Iron Bridge Company, has been determined by the Massachusetts Historic Commission to be potentially eligible for the National Register of Historic Places. The Town of Groton wishes to repair and use the bridge for pedestrian traffic. The Town requested Greenman-Pedersen, Inc. (GPI) to perform a structural investigation of the structure, evaluate its condition, and prepare a report discussing repair recommendations to rehabilitate the bridge to carry pedestrian loads in accordance with the American Association of State Highway and Transportation Officials (AASHTO) Guide Specifications for Pedestrian Bridges.

Description of Structure

Fitch's Bridge is a 126-foot single span steel riveted Warren truss bridge. The steel truss is anchored into four large granite boulders that are seated on field stone gravity abutments. The decking on the steel truss consists of wood planking placed side-by-side spanning the width of the bridge. There is wood curbing on the bridge with ornamental bridge rail. The bridge is closed to vehicle and pedestrian traffic. Two large concrete slabs were placed at both ends of the bridge in order to prevent traffic and pedestrians from using the bridge. There are no existing plans available for the bridge.

Investigation

GPI performed a structural investigation of the bridge in February 2001. Snow was still present on the day of the investigation, however, the temperature was 65° and sunny. During the investigation, GPI measured all bridge members in order to develop plans of the steel truss and to perform a structural analysis. An investigation of the abutment for scour and settlement was performed. Pictures were taken during the investigation and several are included in this report.

Condition of Structure

The structure is in overall stable condition. The abutments and anchor bolts are in fair condition and will need minor repairs. The main trusses will require significant repairs. The steel stringers, floorbeams, and wood decking will need to be replaced.

Abutments

The abutments are laid up fieldstone that are in fair condition. The width, height, and underlying material of the abutment are unknown. There is no signs of settlement or movement of the abutments. Small voids are visible throughout the entire abutment where small stones or grout has fallen out. There is vegetative growth in some locations along the front face of the abutments. No signs of scour or signs of potential signs were observed. The Nashua River on the day of our investigation was moving at a relatively slow velocity. The stream meets the bridge perpendicular to the centerline of the steel truss. The banks upstream and downstream are anchored with vegetation and show no signs of erosion.

Anchor Bolts

The anchor bolts for the steel truss are inserted into large granite blocks at each corner of the truss and sit on the abutment bridge seat. The four granite blocks that serve as the anchoring system for the steel truss to the abutments appear to have moved. One of the granite blocks has a large void underneath the front edge. (See photo 1 below).

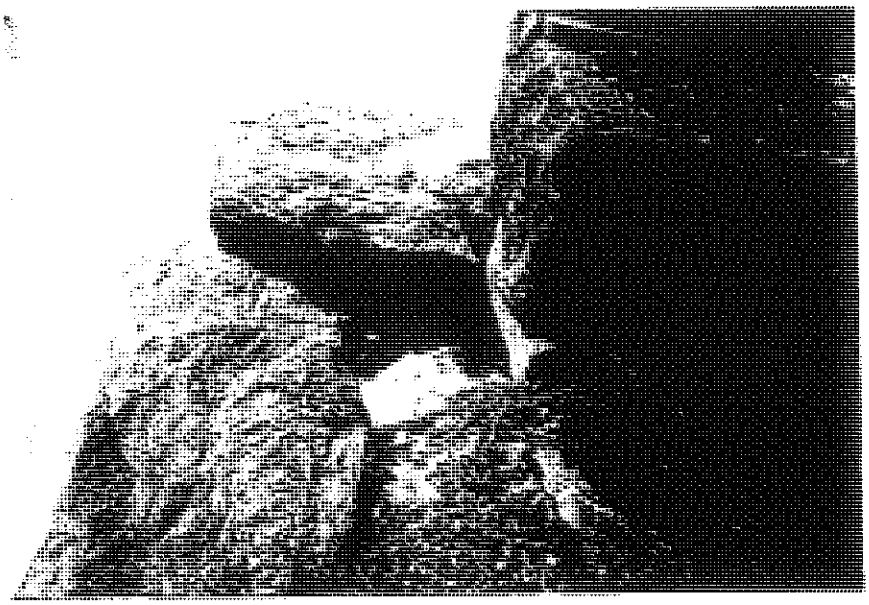


Photo 1

The anchor bolts are attached to the truss through a steel bearing plate. On one end of the bridge, the bearing plates have slotted holes to allow for thermal movement. At this expansion end of the bridge, the anchor bolts are at the edge of the slot and are bent. (See photo 2 below).

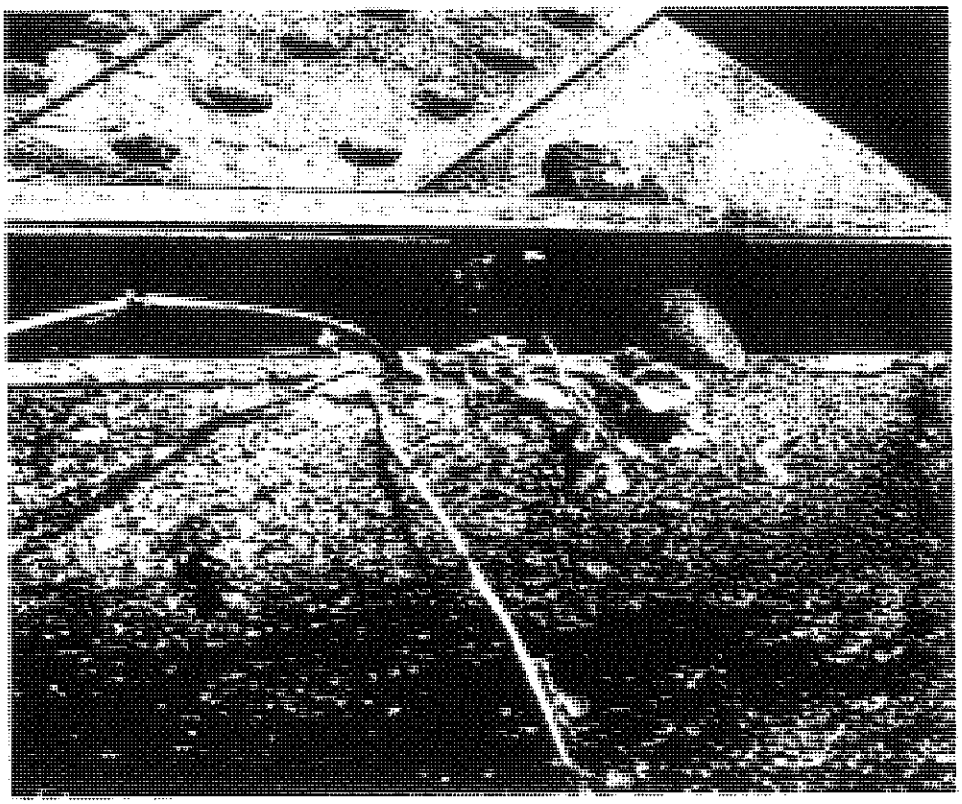


Photo 2

Superstructure

The end floorbeams and the supporting steel members are severely corroded, have areas of full section loss, and show signs of buckling. The steel stringers and wood planking extend beyond the end floorbeams to the backwall of the abutments. At one end of the bridge, the steel stringers and wood planking are in contact with the backwall. See photo 3 for a view of the connection of the end floorbeam and the abutment.

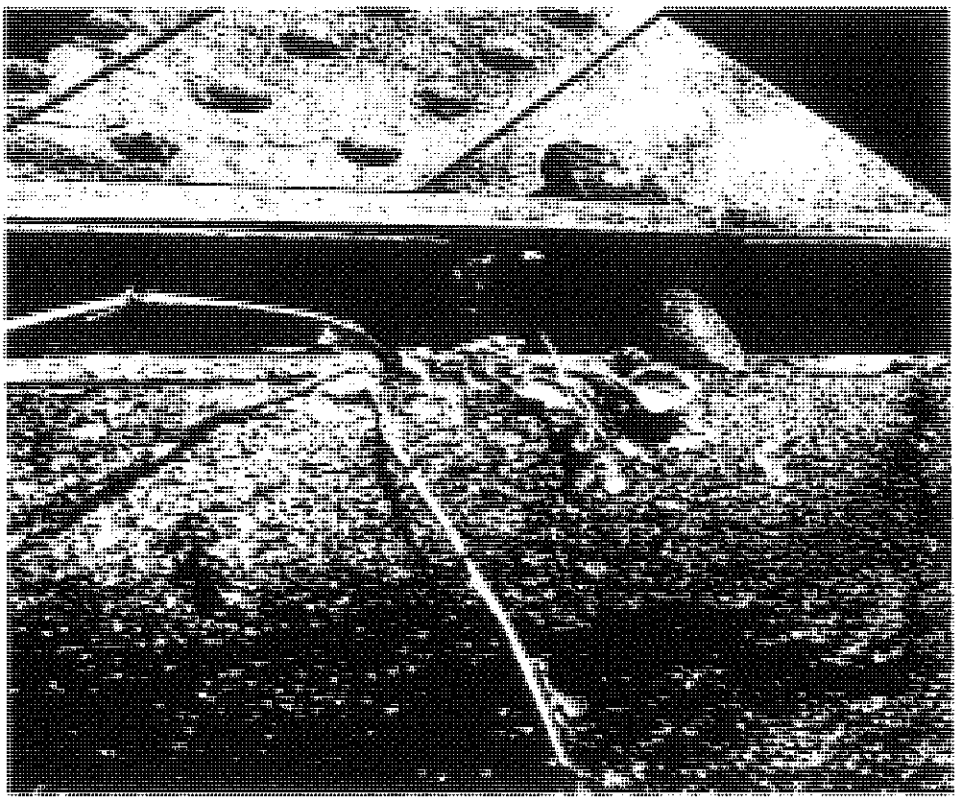


Photo 2

Superstructure

The end floorbeams and the supporting steel members are severely corroded, have areas of full section loss, and show signs of buckling. The steel stringers and wood planking extend beyond the end floorbeams to the backwall of the abutments. At one end of the bridge, the steel stringers and wood planking are in contact with the backwall. See photo 3 for a view of the connection of the end floorbeam and the abutment.

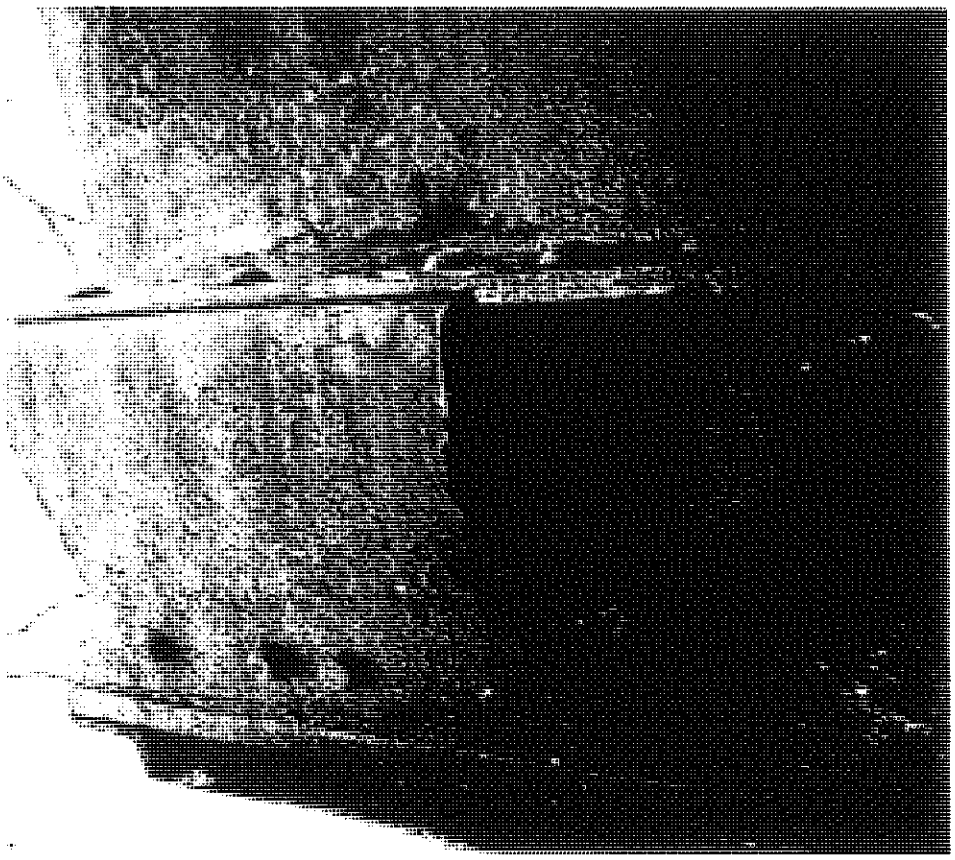


Photo 3

The floor system consists of wood planking placed perpendicular to the steel stringers. Most of the wood planking and the wood curbing are missing. The wood planking that is still present is in poor condition. Wood beams are bolted to the steel stringers to allow for the nailing of the wood planking. The steel stringers are perpendicular to the steel floorbeams. The steel stringers are connected to the top flange of the steel floorbeams. The steel floorbeams transfer the floor system loads into the truss through the bottom chord at the panel points. The wood beams attached to the steel stringers are in poor to fair condition. The steel floorbeams are in good shape with very little sign of section loss. See photo 4 for a view of the flooring system.

Photo 4

Truss

The steel Warren truss is, overall, in relatively good condition. There are some areas of severe section loss in the portal bracing at both ends of the structure. One of the connections between the top bracing and top chord needs repairing. Most of the truss members have minor to no section loss. The steel truss above the bearing plates has localized buckling at all four locations. Some of the gusset plates at the connection between the bottom chord, the verticals, and the diagonals of the truss have full to severe section loss. See photo 5.

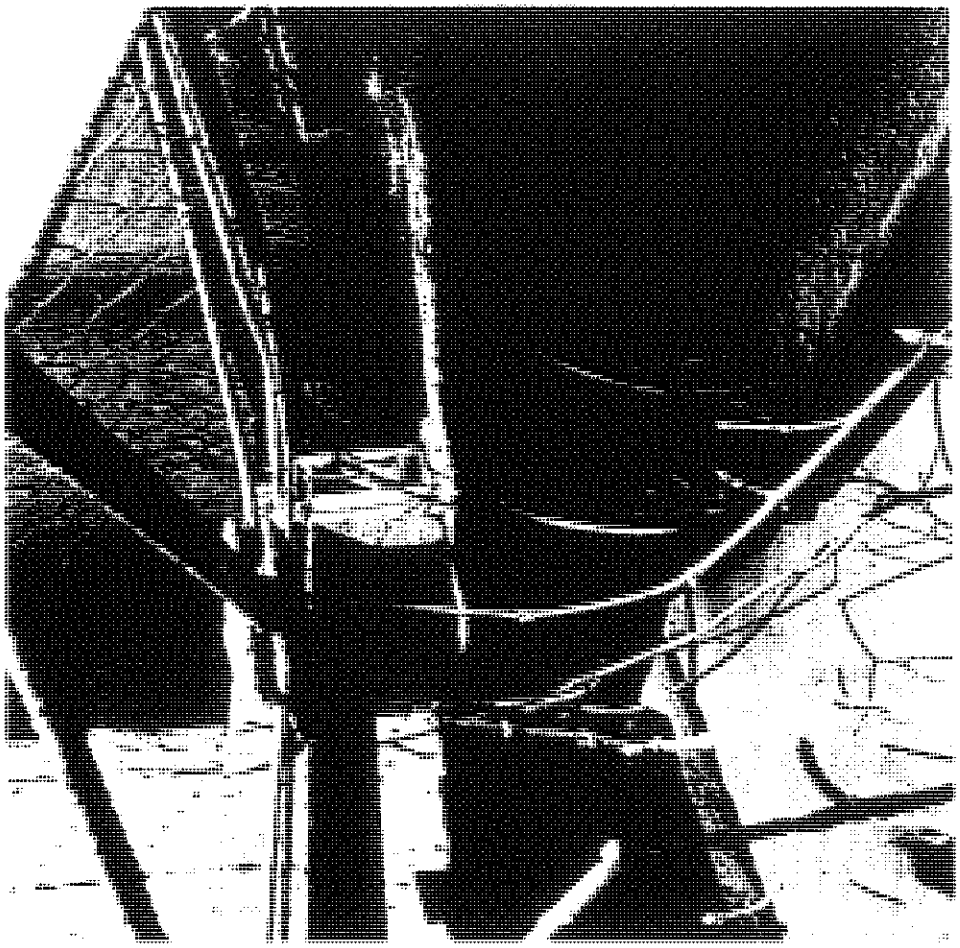


Photo 5

Railing

The ornamental railing is in poor condition and will not meet AASHTO requirements for rail design standards. The rail will need to be removed and replaced with AASHTO approved pedestrian railing. The new rail could be designed so as to maintain the historical appearance.

Coating System

The existing paint system has failed and is non-adherent; therefore, the system is no longer providing corrosion protection for the steel truss. The steel truss above the decking has generalized rusting over the entire structure, but is mostly free of corrosion pits. The steel stringers in the floor system have some areas of full section loss, corrosion

pits, and widespread rusting. The steel floorbeams have generalized rusting, but no signs of corrosion pitting.

Structural Analysis

Using field-measured dimensions of the bridge members, GPI performed a structural analysis of the bridge. According to the current AASHTO Guide Specifications for Pedestrian Bridges, design loads on the bridge would include a wind loading of 75 lb/sq. ft on the bridge members and either a live load of 65 lb./sq.ft or a single emergency vehicle (H-5 truck). The dead load was calculated assuming a new 3" thick timber deck and new steel stringers. The assumed steel yield strength for the steel truss members is 26 ksi.

Conclusion

The analysis indicated that the existing bridge can be rehabilitated and be used as a pedestrian bridge provided the following repairs are made:

1. Repair all localized areas of full section loss.
2. Repair all connections that are fully corroded.
3. Replace all steel stringers.
4. Replace the wood planking and wood beams.
5. Install a pedestrian rail.
6. Replace the anchor bolts.
7. Remove vegetation in abutment.
8. Repair the voids in the abutments.
9. Repair the buckled members.
10. Paint the structure.

After performing the structural investigation and structural analysis on Fitch's bridge, GPI concludes that the structure is adequate for the loads associated with a pedestrian bridge with the above mentioned repairs. The total reconstruction cost for this structure is approximately $385,000.00. The approximate cost for each of the repairs is included in Appendix A.

Appendix A

Estimate

TOWN Groton
STATION _____ ROAD Fitch's Bridge
TYPE Steel Truss ROADWAY 15'-0"
SPAN 126'-0" TOTAL LENGTH _____

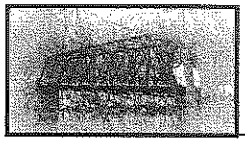
CLASS Pedestrian
OVER Nashua River
WALKS _____
CL. UNDER BR. _____

< PRELIMINARY ESTIMATE OF QUANTITIES AND COST OF CONSTRUCTION >

ITEM	QUANTITY	UNITS	ITEM	UNIT PR.	AMOUNT
	4	EA	Repair Type 1- Localized areas of full section loss	$2,000.00	$8,000.00
	8	EA	Repair Type 2 - Fully corroded connections	$2,500.00	$20,000.00
	18876	LB	Replace all steel stringers	$1.00	$18,876.00
	1890	SF	Replace the wood decking & wood beams	$10.00	$18,900.00
	275	LF	Install a pedestrian rail	$150.00	$41,250.00
	4	EA	Replace the anchor bolts	$5,000.00	$20,000.00
	1	LS	Remove vegetation in abutments	$5,000.00	$5,000.00
	1	LS	Repair the voids in the abutment	$5,000.00	$5,000.00
	4	EA	Repair the buckled members	$10,000.00	$40,000.00
	1	LS	Paint the structure	$130,000.00	$130,000.00

CONSTRUCTION TOTAL	$307,026.00
Contingency 15%	$46,053.90
Mobilization 10%	$30,702.60
	$383,782.50
SAY	$385,000.00
Cost of Design	$40,000.00

ESTIMATED BY: CHECKED BY: APPROVED BY:



Appendix E

TOWN OF GROTON
173 Main Street
Groton, Massachusetts 01450-1237
Tel: (978) 448-1111
Fax: (978) 448-1115

Jean E. Kitchen
Administrative Officer

Board of Selectmen

George F. Dillon, Jr., *Chair*
John L. Sabali, *Vice Chair*
Robert W. Nordblom, *Clerk*
Peter S. Cunningham
Mihran Keosian

February 13, 2006

Mr. Brad Harris
Montachusett Regional Planning Commission
R1427 Water Street
Fitchburg, MA 01420

Dear Mr. Harris:

The Town of Groton is willing to maintain Fitch's Bridge if the Town is successful in obtaining the Transportation Enhancement Grant to restore the bridge.

We look forward to hearing from you.

Sincerely,
THE BOARD OF SELECTMEN

George F. Dillon, Chair

John L. Sabali, Vice Chair

Robert W. Nordblom, Clerk

Peter S. Cunningham, Member

Mihran Keosian, Member

CC: Highway Surveyor Tom Delaney; Greenway Committee; Fitch's Bridge Committee