

CPC PROJECT APPLICATION FORM – FY24

Applicant:

Submission Date: September 30, 2022

Applicant's Address, Phone Number and Email

Purpose: (Please select all that apply)

Ms. Nicole Verronneau, School Business Manager, (508) 979-4000 ext. 140
Fairhaven Public School District, 128 Washington Street
Fairhaven, MA 02719; email: npotter@fairhavenps.net

- ☐ Open Space
- ☐ Community Housing
- ☒ Historic Preservation
- ☐ Recreation

Fairhaven Public School District: Fairhaven High School - Phase I Work Scope for Southeast Gable Repairs

Project Name: Restoration of Roof Surfaces & Related Roof Elements adjacent to Southeast Gable Work

Project Location/Address: 12 Huttleston Avenue, Fairhaven MA 02719

Amount Requested: \$ 200,000

Project Summary: In the space below, or attached sheets if necessary, provide a detailed summary of the project citing the elements of the Review and Recommendation Criteria found in the Application Guidelines and checklists below (p. 4-8)

The proposed work scope is intended to be used as a supplement to the previously authorized Phase I work scope to deconstruct and restore the existing southeast gable at the south side of Fairhaven High School. This is the front side of the building that faces Huttleston Avenue (*please see Attachments for more specific information for that work scope*).

The cost estimate prepared by Spencer Preservation Group to restore the entire southeast gable describes a work scope costing \$1.75M, plus soft costs for the architectural and engineering services (*see Attachments for a more detailed Cost Estimate for the Phase I work*).

Once work has begun on the disassembly and restoration of the southeast gable, it will become apparent which adjoining roof surfaces and adjoining architectural elements could be incorporated into the primary work as supplemental work with a value of \$200,000. Staging, scaffolding and other vertical access equipment will already be in place for the primary work and could possibly be used for the supplemental work.

The very large, southeast gable intersects the main roof of the building. The restoration of the southeast gable will require a blending of slate roofing surfaces, flashing, and underlayment materials. A supplemental CDC grant of \$200,000 may allow a portion of the main roof to receive new slate roofing and new copper flashing. Or, it may allow for the replacement of copper roofing pans on one or more of the small roof dormers that are part of the south-facing main roof. Another possibility would be to use the CDC grant for flashing and repair of the stone balustrade at the base of the main roof, just to the west of the southeast gable.

Our application for CDC funding would allow the primary \$1.75M project to be expanded to include selected adjacent roof surfaces, or architectural elements, to be added to the final work scope. We cannot specify exactly where the grant money would be used until the southeast gable is partly deconstructed during its initial evaluation phase. Once the work scope at the southeast gable is more clearly defined, it should become apparent where supplemental funding could be used to replace/repair/restore adjoining roof elements or surfaces.

The FY24 CPC grant would be used in the most cost-effective manner to increase the work scope of the previously funded Phase I work scope, that will focus on the southeast gable. Thank you for considering our Application.

Estimated Date for Commencement of Project: September 1, 2023

Estimated Date for Completion of Project: August 30, 2028, maximum; but Summer of 2025 could be possible

General Criteria for All Projects – Check off and address each criterion as it applies:

- ☒ Is the project consistent with the goals of the Town of Fairhaven *Community Preservation Plan*?
Yes, the project is consistent with the goals of the Town's Community Preservation Plan.
- ☒ Does the project have other sources of funding? If so, indicate percentage.
No, the proposed project will not have other sources of funding. However, the work scope will be undertaken in conjunction with the southeast gable work that is being funded by a substantial grant of \$1.75M from the Town of Fairhaven.
- ☒ Does the project leverage additional or multiple sources of public and/or private funding?
Yes, past projects at the building have utilized funds from the Massachusetts Historical Commission, the Town of Fairhaven, the High School Endowment Fund, and local Community Preservation Act grants.
- ☒ Does the project preserve a threatened resource?
Yes, as a building on the National Register of Historic Places, the Fairhaven High School will always require regular inspections and periodic repairs to maintain its historic integrity for future generations.
- ☒ Is the project consistent with existing Planning Documents such as the Master Plan and Open Space Plan?
Yes, the project is consistent with both documents. The proposed work is considered to be building maintenance and repair work on an historic building listed on the National Register of Historic Places.
- ☒ Does the project comply with the zoning regulations?
Yes, the building complies with all local zoning regulations
- ☒ Does the project have a budget for maintenance and upkeep?
Yes, the school has a small endowment fund that can be used for occasional maintenance projects. An updated 5-Year Master Plan Report from 2021 is included as part of this FY24 submission to show future repair programs.
- ☒ Does the project involve currently owned municipal assets?
Yes, the Fairhaven High School is a primary municipal asset of significant value to the community.
- ☒ Does the project serve underserved populations or address more than one focus area of the CPA?
Yes, the Fairhaven High School serves all of the students residing in all Fairhaven neighborhoods. It also provides major outdoor recreation spaces for community sports programs.
- Does the project reclaim abandoned or previously developed lands?
No.
- ☒ Does the project require a Special Permit, NOI, Building Permit or other permitting? Please list all local and State permits you are aware of that the project will need.
Yes, a Building Permit will be required from the Town of Fairhaven to undertake the proposed work.
- ☒ Does the project have community support? Does the project provide a positive impact to the community? *Yes, it is the primary High School for all of Fairhaven and has tremendous support from the community to fulfill its responsibility to educate the future citizens of Fairhaven.*
- ☒ Does the project have sufficient supporting documentation?
Yes, the project was the subject of a recent aerial lift examination by the A/E team that has been involved with the building since 2011. The original 2011 Master Plan was recently reviewed and updated in 2021 by the same A/E team.
- ☒ Has the applicant/ team demonstrated the ability and competency to implement the project as proposed?
Yes, the Spencer Preservation Group, assisted by Coastal Engineering (structural engineer), and Ivan Myjer (stone masonry consultant), are professional architects, engineers and consultants who specialize in the preservation and restoration of historic buildings of this size and scale.
- ☒ Does the applicant have site control, or the written consent by the property owner to submit an application?
Yes, the A/E team has the written consent from Nicole Verranneux of the School Department to submit an application for CPA FY24 funding.

Historic Preservation Selection Criteria - Check off and address each criterion as it applies:

- ☒ Is the building on the National or State Register of Historic Places?
Yes, the building is individually listed on the National Register of Historic Places.
- ☐ Is the property eligible for listing on the National or State Register of Historic Places?
- ☒ Has the property been included in the local Survey of Historic Properties (MACRIS)?
Yes, the building is listed as MACRIS page inventory number FAI.133.
- ☒ Is the property in danger of being demolished?
No, the building is not in danger of being demolished.
- ☐ Are there potential archeological artifacts at the site?
- ☒ Did the property ever play a documented role in the history or is it noted in published histories of the Town?
The school is one of the many significant public buildings that Henry Huttleston Rogers donated to the Town of Fairhaven. Rogers was born in Fairhaven and rose to prominence as one of the senior executives of the Standard Oil Trust. It has been referred to locally as the "Castle on the Hill" and is one of the Town's most significant landmarks.
- ☒ Are there any particularly important historic aspects about the property?
The school is considered one of the most significant buildings designed by Boston architect Charles Brigham. Only the best stone masonry was chosen for the exterior; interior stairs are embellished with stained glass windows; ornamental plaster ceilings also exist.
- ☒ Are there other potential uses for the property, which could benefit the Town?
No, the current use of the building as a high school represents its greatest benefit to the Town.
- ☒ Could the building be converted for affordable housing use while still retaining its historic character?
No, it could not be converted into affordable housing without losing its historic character.
- ☒ Is the owner interested in preserving the historic integrity of the property?
The School Department is most definitely interested in preserving the historic integrity of the building for future students and residents of Fairhaven.
- ☒ Does the proposal conform to the Secretary of the Interior's Standards for the Treatment of Historic Properties? Has previous work on the building conformed to the Standards?
Yes, all previous work, and all proposed work, will be undertaken to conform to the requirements of the Secretary of the Interior's "Standards for the Treatment of Historic Properties."
- ☒ Was the structure built before 1921? Has it otherwise been identified as being historic or have cultural value?
Yes, the structure was completed in 1906 and is designated as a National Register Individual Property (06.26.1995) by the Massachusetts Historical Commission (MHC).



MASTER PLAN: 2021 WORK SCOPE UPDATE

FAIRHAVEN HIGH SCHOOL

12 HUTTLESTON AVENUE | FAIRHAVEN, MA

OCTOBER 2021



Spencer Preservation Group
PRESERVATION ARCHITECTS

INTRODUCTION AND EXECUTIVE SUMMARY

■ INTRODUCTION

In 2010-2011, Menders, Torrey & Spencer prepared a Building Conditions Survey for the Fairhaven High School, truly an extraordinary building in a town known for its architectural heritage. The assessment and recommendations then guided preservation repairs in succeeding years, ranging from roofing and gutters, windows -- leaded, stained glass and classroom windows, restoration of the Guastavino tile ceilings and repointing of the front porticos, and fire escapes -- as funding permitted.

Funding sources included a Fairhaven Community Preservation and Massachusetts Preservation Projects Fund grants, and the trust fund established with the gift of the building by the estate of Henry Huddleston Rogers. In November of 2016, Spencer & Vogt Group prepared an update in the form of a 5-Year Exterior Major Improvements Plan. This current report, October 15, 2021, can be seen as a 'report card' -- summarizing the progress on preservation repairs and reinforcing recommendations for major preservation repairs.

In April of 2021, Lynne Spencer and Doug Manley of Spencer Preservation Group, accompanied by Ivan Myjer of Building and Monument Conservation and John Bologna of Coastal Engineering, performed a lift survey of the major exterior wall surfaces and accessible roof areas. The observations from that lift survey have been incorporated into the individual partial exterior elevation drawings that were originally created in the 2010-2011 Building Conditions Survey and updated for the 2016 5-Year Exterior Major Improvements Plan.

These updated partial exterior elevation drawings have been included in this report. Please note that these drawing sheets are from the 2016 5-Year Exterior Major Improvements Plan, and these drawings use a color-coded phasing plan that dates from the original 2010-2011 Master Plan. These sheets should be used for referencing proposed repair work to existing stone and brick masonry only. All completed and future window work is shown on drawings A-200 through A-204.

In this report, we have identified three major work scopes:

▪ **1 - EXISTING WINDOW REPAIR/RESTORATION**

Existing window repairs and restoration are ongoing and will continue. As part of this report, window work that has been completed as well as future work to be done has been identified. This includes future window work to be done at the north Library wing of the building. The future window work is indicated by a purple color on individual window openings on the elevation sheets: A-200 through A-204.

The good news is that over \$823,000 has been spent on restoration of the leaded and stained-glass windows, and the refurbishment of the classroom windows. The latter are critical to the comfort of the occupants for fresh air and energy conservation.

We are projecting two more rounds of window refurbishment for \$125,000 and \$116,000 respectively.

▪ **2 - SOUTHEAST AND SOUTHWEST GABLE REPAIRS**

In the original 2011 Master Plan, it was noted that the southeast and southwest gables were deteriorating due to the rusting and expansion of embedded steel.

We propose disassembling and rebuilding these two gables. The southeast gable should be disassembled and explored first, prior to any work done on the southwest gable.

An excerpt from Ivan Myjer's 2010-2011 report has been reproduced below, which summarizes the overall issues here. Photographs of these areas follow this introduction with repair recommendations by Spencer Preservation Group.

What follows below is excerpted from Ivan Myjer's 2010-2011 report, with underlining by SPG for emphasis:

"In summary, the exterior of Fairhaven High School was constructed from materials carefully selected for their aesthetic appeal and durability. At the time of construction however there did not yet exist standardized time tested details for incorporating steel elements into masonry construction.

The designers and builders underestimated the degree that the steel would be adversely affected by water infiltration. The steel is set too far forward within the masonry, and it is only protected by a coat of shop paint. There are no flashings or waterproofing agents applied over the steel and there are no gaps between the steel and the masonry that would have minimized the impact of expansion due to the corrosion of the steel.

These problems are typical for large masonry buildings constructed in the first decades of the 20th century. In the locations where the steel jacking is the most advanced, the required repairs will entail removing the masonry to gain access to

the steel and then rebuilding it with new flashing detailing to protect the steel in the future.

In locations where the steel jacking is not advanced, preventative steps are required to halt, or at least slow down, the rate of deterioration. These preventative measures will at the minimum entail repointing open mortar joints and repairing defective flashing, roof tiles, bricks and window frames. Additional preventative measures such as cathodic protection of the steel and the selective application of water repellents should be evaluated.

The displacement of the masonry due to the expansion of corroded steel is a localized problem that has resulted not only in the cracking of the bricks, limestone and mortar joints located directly above and below the steel elements, but also in the deterioration of the same materials in the walls that run perpendicular to the gables. The cracking in the perpendicular walls appears to be related to the pressure exerted on those walls by the displacement of the masonry at the upper portion of the gable."

The southeast gable is the most noticeably impacted by the steel oxidation, or 'rust jacking,' and is the first candidate for the disassembly, steel repairs, and reconstruction for an estimated cost of \$727,000. Next priority is the small gable on the east side of the auditorium block at \$210,000.

Given the significant investment in reconstruction, we recommend an experimental treatment of the southwest gable with cathodic protection – basically arresting further deterioration by setting up electric current in the steel beam creating galvanic reaction for an estimated cost of \$90,000.

The total cost of what we included in Phase I priorities is \$2.274 m.

Being practical, we fully understand that financing capabilities may necessarily divide these recommendations into several parts but we continue to emphasize the seriousness of the masonry and embedded steel framing problems. Cracked limestone and brickwork are the visible signs; the extent of corrosion of the steel itself is the primary concern.

■ **3 - SLATE ROOF AND RELATED FLASHING, AND FLAT ROOF REPLACEMENT**

The roof consists of green slate with red copper flashing. With its configuration of nicely sloping gables on the east and west wings, and the impressive hipped roof of the main block, the roof pitches are well shaped to drain well to the copper gutters.

The roof slates vary in width and size. The history of repairs over the past thirty years can be seen in the variegated colors of the slate. Newly quarried green slate has a bluish-green cast, in contrast to the yellowy-green of aged slate. Those recent repairs have been largely at the roof edges on the east and west elevations where the gutters were replaced, and in certain valleys to address leaking problem.

Typically, a slate roof – one of the most durable materials available for roofing – fails for three reasons: deteriorated flashings – valleys, ridges, at vertical intersection – and gutters; deteriorated fastenings – notably iron or steel nails or wires; and the stone itself – exfoliating in thin layers like the sedimentary stone it is.

The durability of slate is often related to its color: red slate of American origin and purple slate of Welsh origin being considered of superior longevity; next, black or variegated purple from Vermont or the famed black Munson, Maine – no longer quarried; and then green, usually Vermont, which is characterized as having a life expectancy of 80 – 100 years depending on exposure and roof configuration.

The High School, built in 1906, has a roof that has performed well but has exceeded its expected life and should be scheduled for full replacement in the near future.

Recent work has addressed several of the flat – or low pitched – roofs but several remain on the list for replacement, such as the large roof over the mechanical room or the flat roofs at the very top of the High School running east – west.

Vigilant monitoring for leaks is a fire-watch approach and the High School is fortunate to have the sharp eyes of Manny Ribeiro, who takes such care and has great pride in this building. That said, the better approach is to undertake replacement in a scheduled plan. The recommendation is a full slate and flat roof replacement on the Main Building and the Library wing in the next 5 years. As we look back at the 2011 recommendations, this roof had been in the ‘weathered’ category, scheduled for replacement in 10 years, or 2021. The 2016 update reinforced this recommendation.

We are now stretching this out another five years to 2027, recognizing the need to seek the necessary funding for this \$3.7M project. For practical reasons, it can be divided into two separate projects, the Main Building at \$2.6M and the Library wing at \$1.2M, with the hope that most of the work can be accomplished during the summer months. Please note that there is a bit of a premium for ‘summer slammers.’

■ **CONCLUSION**

Reviewing the assessment, treatment recommendations, and preservation activities over the past ten years, and looking forward to the next 5 – 10 years, we see that it is hard to catch up with major projects such as the façade gables or roof replacement without significant investment. Yes, steady progress has been accomplished – notably the windows, fire escapes and portico ceilings: all good work. But the big catch is this: continuing to defer the gables and roof work results in higher costs and possibly significantly more work and associated costs for structural repairs. For example, the slate roof replacement estimate prepared by Consigli Construction under our direction in 2011 was \$2.4 m; today is it \$3.7 m. Escalation is based on inflation; it is also likely that increases in materials, shipping and labor will stretch this even further. The same metrics apply to the façade gable project.

The High School and the Education Department have made a serious commitment to seeking sources of support with relatively small grants. The next challenge is significant: a major investment in masonry restoration and roof replacement.

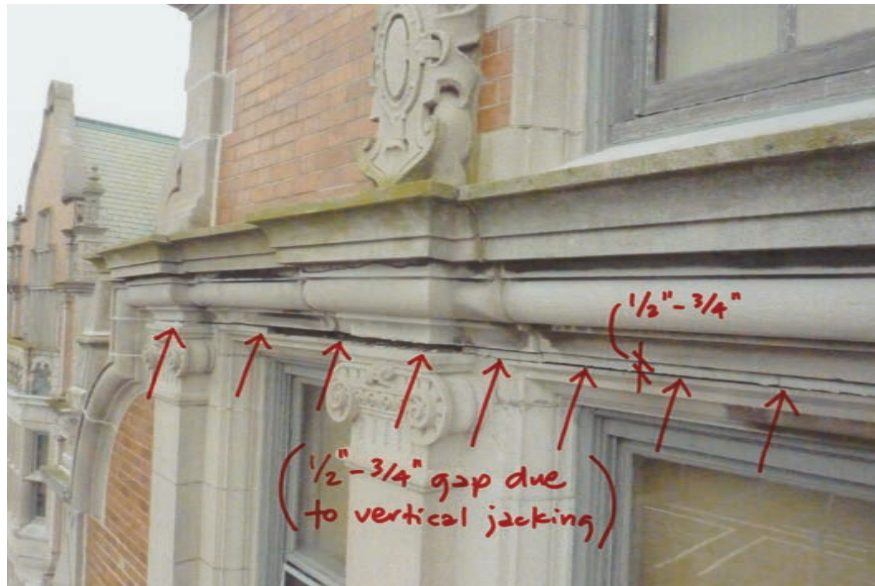
PART 1 - GABLE CONDITIONS



OBSERVATIONS



Photograph 1: Existing condition at gable, showing widening cap above pilasters.



Photograph 2: Same photo as above, indicated location of widening horizontal gap due to vertical jacking of steel (extent indicated by arrows). Gap is approximately 1/2" to 3/4" wide.



Photograph 3: Existing condition showing inward-leaning masonry.



Photograph 4: Same photos as above, showing inward-leaning masonry wall. *Note angle of level positioned against masonry wall.*



Photograph 5: Existing steel framing at gable windows.



Photograph 6: Closeup of existing steel at gable windows.

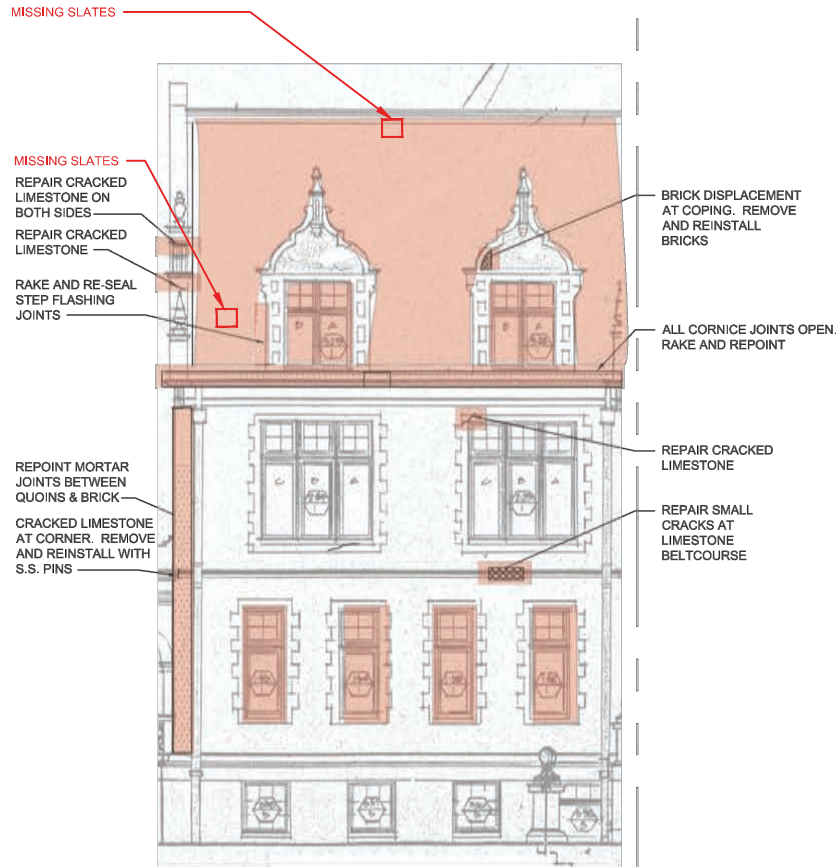
RECOMMENDATIONS

We propose the following scope of work for the southeast gable:

1. Remove and salvage all brick and stone masonry from upper gable area.
2. All removed materials to be identified and numbered for reinstallation.
3. Some back-up masonry materials may need to be removed to expose all affected steel surfaces.
4. Remove rust from iron and steel to remain, by sandblasting exposed surfaces to bare metal.
5. Apply zinc-rich primer immediately to exposed existing iron and steel.
6. Replace severely damaged steel with new hot-dip galvanized sections.
7. Follow with two coats of marine epoxy paint system on steel to remain.
8. Install new rain-screen and cavity wall system to allow water to drain from base of rebuilt wall.
9. Provide new horizontal relieving angles to carry weight of reinstalled masonry.
10. Reinstall brick and stone masonry with integrated copper flashing at heads, jambs and sills of all masonry openings.
11. Pin broken stone elements; provide new brick masonry where necessary.
12. Provide weep holes at edge of relieving angles to drain rain-screen cavity.

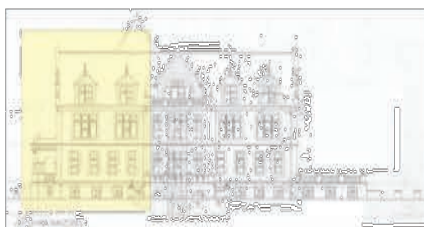
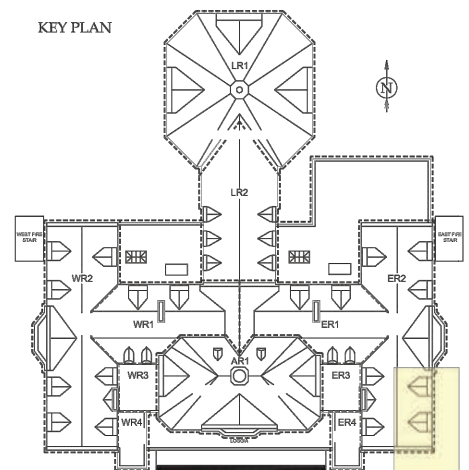
PART 4 - LIFT SURVEY UPDATES





E1

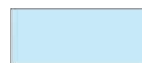
KEY PLAN



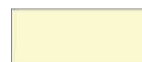
PHASE 1



PHASE 2



PHASE 3

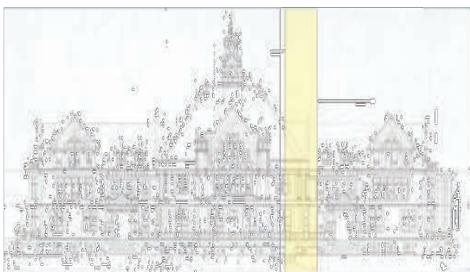
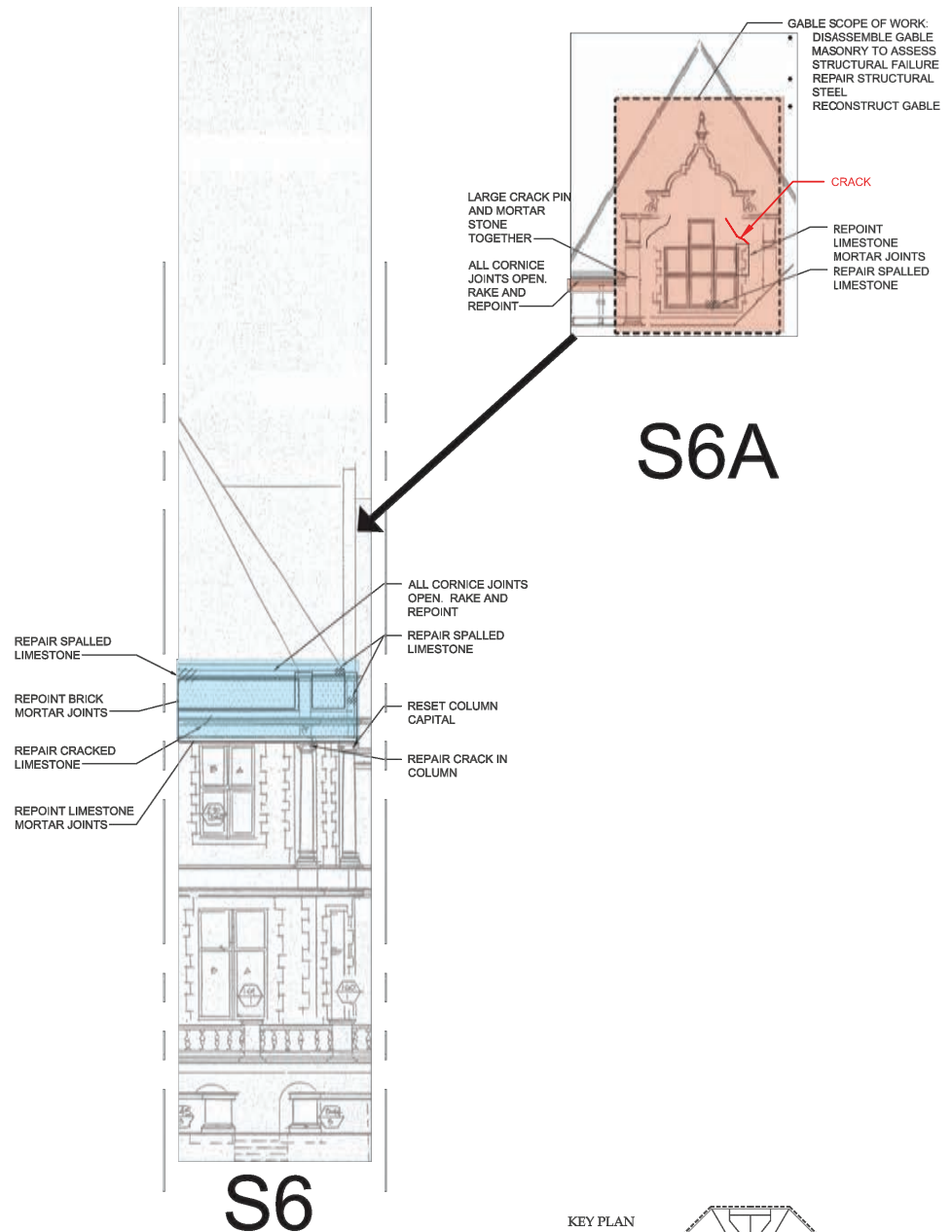


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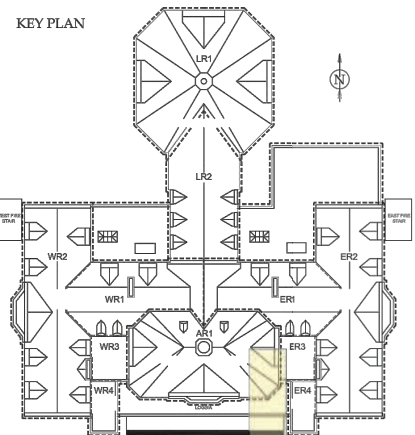


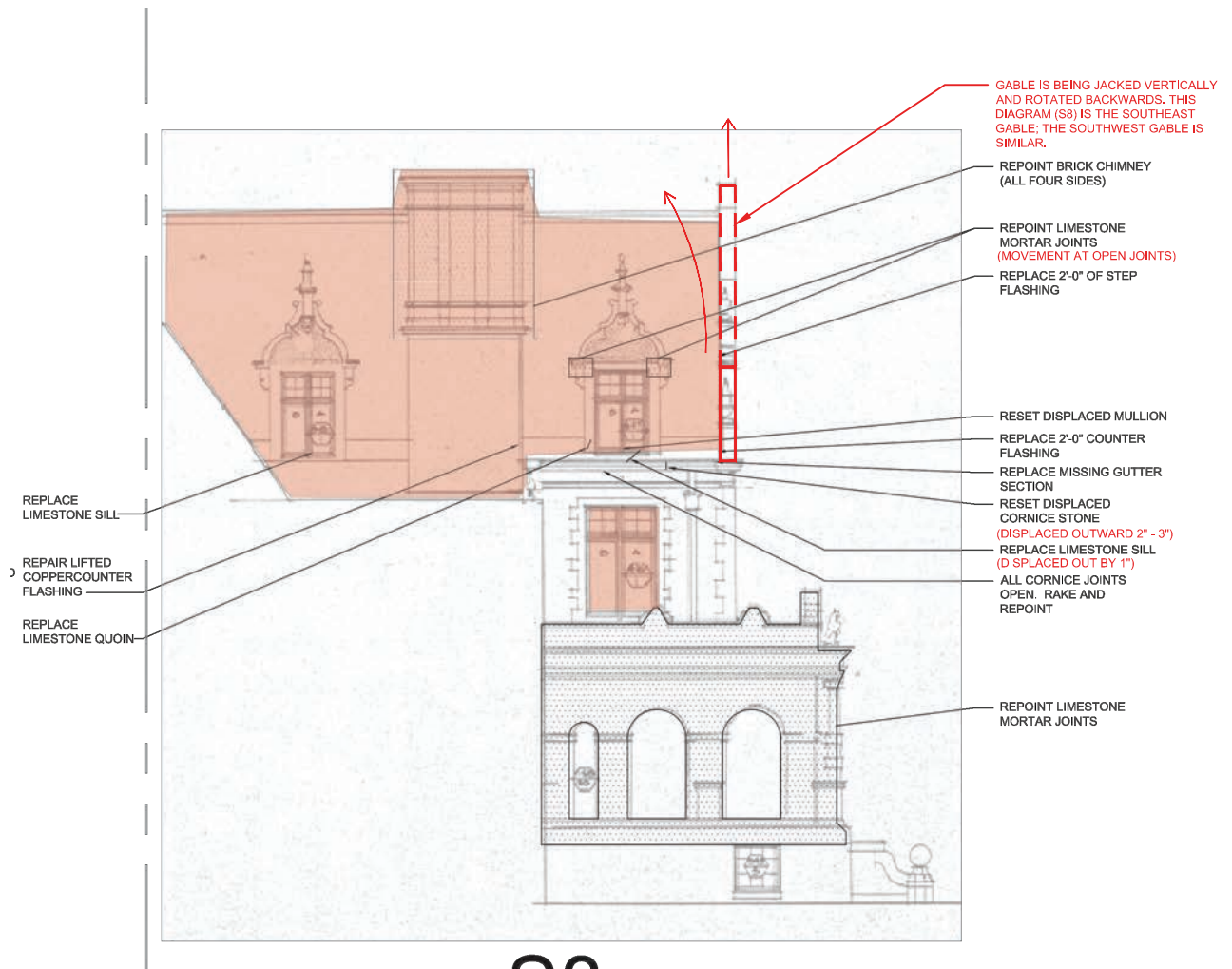
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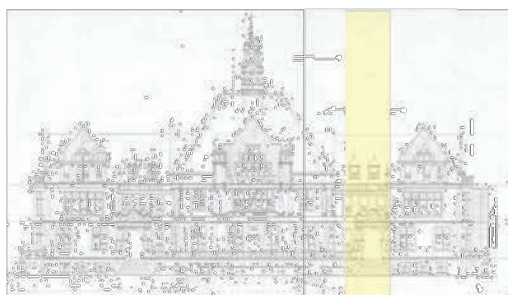
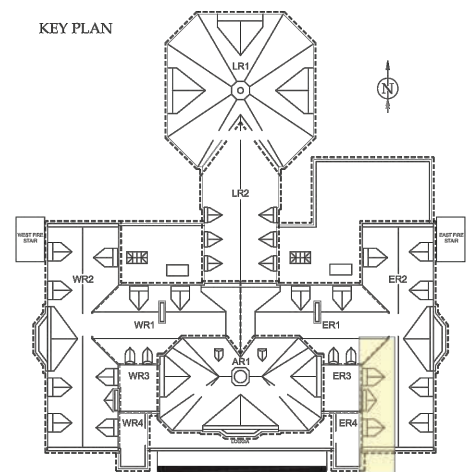
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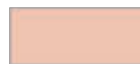


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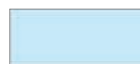
KEY PLAN



PHASE 1



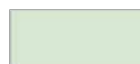
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PHASE 3

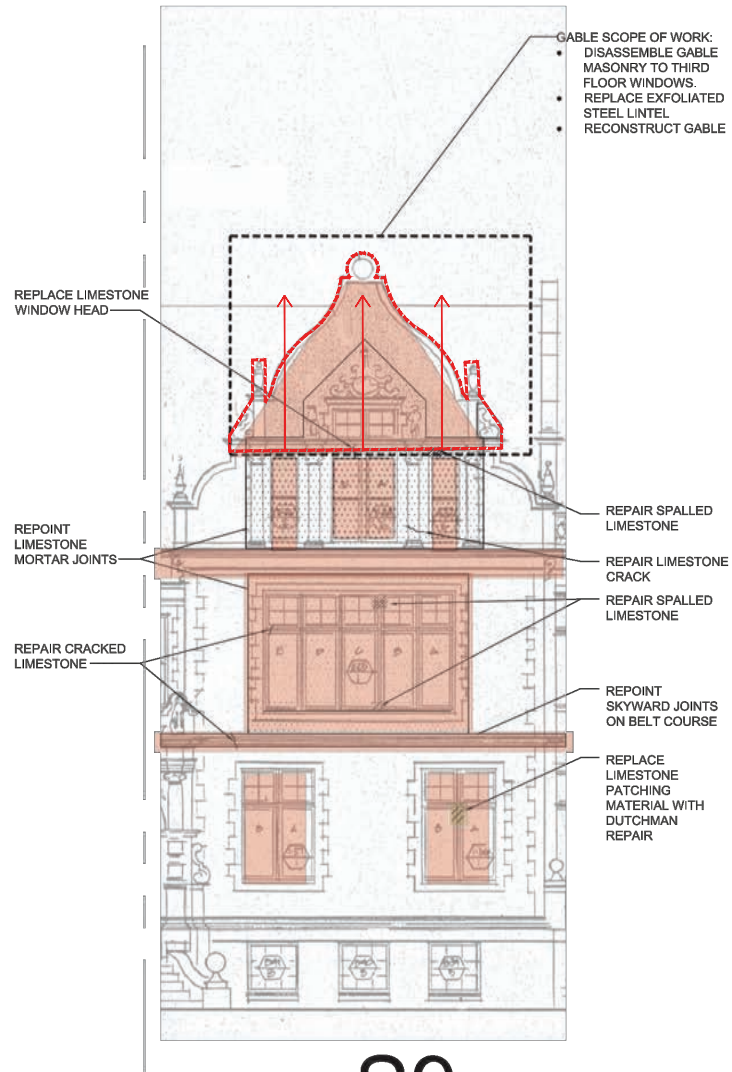


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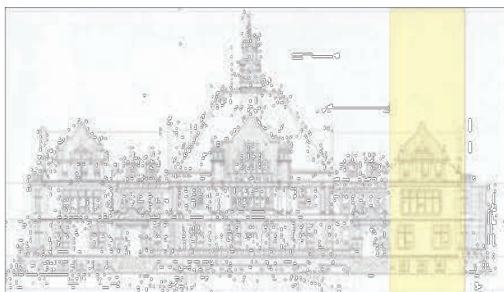
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S9

KEY PLAN



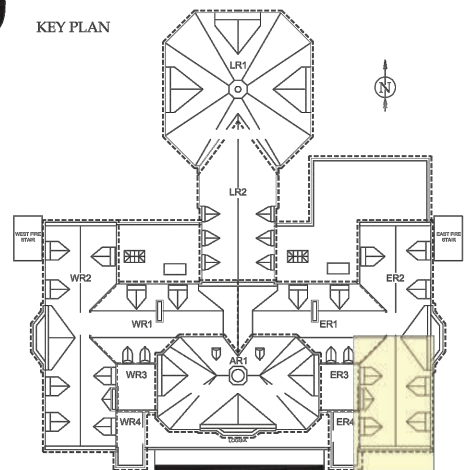
PHASE 1

PHASE 2

PHASE 3

PHASE 4

PHASE 5



PART 5 - ESTIMATES AND PRIOR WORK



PHASED COST ESTIMATE - 5-YEAR MAJOR IMPROVEMENTS

Work Category	PHASE I SOUTHEAST GABLE WING ELEVATIONS	PHASE II LIBRARY WINDOWS & EAST ELEVATION	PHASE III NORTH, WEST ELEVATIONS	PHASE IV MAIN ROOF	PHASE V LIBRARY ROOF
Window Restoration:					
Main Building	\$ 125,000				
Library Wing		\$ 116,000			
Masonry Restoration:					
- Repointing & Stone Repairs	\$ 137,960	\$ 54,110	\$ 156,200		\$ 48,200
- Reconstruction, Southeast Gable, S9	\$ 727,500				
- Reconstruction, small gable, S4	\$ 225,000				
- Cathodic Protection, Southwest Gable	\$ 90,000				
If Cathodic Protection not feasible, reconstruct Southwest Gable, S1			\$ 727,500		
Roof Replacement:					
- Flat Roofs				\$ 283,876	
- Slate Roofs	\$ 30,000			\$ 1,242,990	\$ 641,460
Subtotal	\$ 1,335,460	\$ 170,110	\$ 883,700	\$ 1,526,866	\$ 689,660
General Requirements, 15% (staging, dumpster, equipment, etc.)	\$ 200,319	\$ 25,517	\$ 132,555	\$ 229,030	\$ 103,449
General conditions, 10%	\$ 133,546	\$ 17,011	\$ 88,370	\$ 152,687	\$ 68,966
Overhead and Profit, 5%	\$ 66,773	\$ 8,506	\$ 44,185	\$ 76,343	\$ 34,483
Bonds, 1%	\$ 13,355	\$ 1,701	\$ 8,837	\$ 15,269	\$ 6,897
CONSTRUCTION COST	\$ 1,749,453	\$ 222,844	\$ 1,157,647	\$ 2,000,194	\$ 903,455
Inflation of 4%/year is factored into the construction costs					
Construction Contingency, 15%	\$ 262,418	\$ 33,427	\$ 173,647	\$ 300,029	\$ 135,518
Soft costs: architectural & engineering fees, regulatory reviews - HDC, Zoning, 15%	\$ 262,418	\$ 33,427	\$ 173,647	\$ 300,029	\$ 135,518
TOTAL	\$ 2,274,288	\$ 289,697	\$ 1,504,941	\$ 2,600,253	\$ 1,174,491
Grand Total of all Phases					
\$ 7,843,671					

2010-2021 MAJOR IMPROVEMENT CHRONOLOGY

Work Category	CONSTRUCTION	OTHER	ARCHITECTURAL FEES Spencer & Vogt group
2010-11			
Conditions Assessment			\$ 60,000
Menders, Torrey & Spencer (now Spencer & Vogt Group)			
2011-12			
Roof: South & West Loggias, east gutter and related flashings			
Crocker Architectural	\$ 168,000		\$ 20,000
Direct purchase of limestone balusters		\$ 15,000	
2012-14			
Stained and leaded glass window restoration; wood window prototype to improve operability			
Serpentino Stained Glass with Westmill Preservation	\$ 300,000		\$ 20,000
2012			
Guastavino Vault restoration and repointing of the south porticos	\$ 95,000		\$ 20,000
Dupre Masonry			
Direct purchase of tile from Boston Valley		\$ 30,000	
2013-14			
Fire Escape replacements and related gutter and flashing work	\$ 314,000		\$ 51,500
Campbell Construction			

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2016			
Windows -- Exterior painting	\$ 150,000		\$ 17,000
Dandis Painting, Inc.			
2017			
Windows -- Window Sash Restoration Phase I	\$ 119,400		\$ 22,000
Westmill Preservation Services			
2018			
Windows -- Window Sash Restoration Phase II	\$ 120,800		\$ 14,960
Westmill Preservation Services			
2020			
Windows -- Window Sash Restoration Phase III	\$ 58,800		\$ 11,310
Westmill Preservation Services			
2021			
Windows -- Window Sash Restoration Phase IV	\$ 85,800		\$ 7,000
Westmill Preservation Services			
SUBTOTAL	\$ 1,411,800	\$ 45,000	\$ 188,500
COMBINED TOTAL	\$ 1,645,300		

PART 6 - 2021 UPDATED STRUCTURAL REPORT





June 17, 2021

Project No. C17412.02

Spencer, Sullivan & Vogt
Attn: Lynne Spenser
1 Thompson Square, Suite 504
Charlestown, MA 02129
VIA EMAIL: lspencer@ssvarchitects.com

**RE: Structural evaluation/investigation of the exterior building envelope at Fairhaven High School
12 Huttleston Ave, Fairhaven, MA**

Dear Lynne:

Pursuant to your request and subsequent authorization, Coastal Engineering Company, Inc. (CEC) has performed a structural evaluation/investigation of the exterior building envelope at the Fairhaven High School structure. This evaluation is as a follow up to the previous report prepared by CEC, dated May 10, 2011, and intended to be incorporated into an overall conditional assessment and evaluation report by SVS Architects as part of the ongoing study of the exterior façade stabilization of the existing historic structure. Accordingly, the following is a brief summary of observations and conditions noted on the day of inspection along with recommendations for further investigation.

OBSERVATIONS & COMMENTS

As noted in our previous report, the primary issues of structural concern were related to the infiltration of water at masonry and window frame joints causing corrosion of embedded structural steel elements. The following issues in particular were identified at the building gable ends, floor transitions zones and roof dormers:

1. Jacking of steel lintels at top of windows resulting in displacement of masonry, water infiltration at open joints and cracks, cracking of limestone and bricks.
2. Cracking of masonry from thrust or expansion of steel members at the auditorium corner buttress pilasters located at each end return of the south elevation center bay.
3. Cracking and displacement of limestone as a result of the jacking of steel located behind limestone window heads and mullions
4. Cracking and displacement of brick due to water infiltration.
5. Infiltration and efflorescence along the second and third floor spandrel beam on the north wall, behind the auditorium.

Center Bay Gable/End Wall Dormers

As previously reported, the decorative architectural cladding features and ornate limestone window surrounds at all the gable end walls need complete reworking to repair deteriorated materials and corroded steel embedment items. These decorative features will need to be removed to expose the underlying structure. Once exposed, the corroded steel elements can be repaired by chipping away rusted parts and treated with rust inhibitive primer and paint. Badly damaged steel embedded items may need to be replaced with new hot dipped galvanized steel. Exterior building envelope repairs and replacement of flashing and sealants as well as proper repointing of the masonry wall construction is necessary to mitigate future water infiltration problems. Replacement of deteriorated embedded wood window trim materials is also likely needed. Overall recommendations for exterior building envelope repairs as part of the comprehensive exterior building treatment are described by other investigators on the project team, but to better understand the details of the original construction and the nature of the problem, exploratory demolition of a typical gable end wall dormer assembly is recommended.

North Auditorium Wall Spandrel

There is evidence of moisture entrapment at the auditorium floor spandrel beam, as evidenced by the presence of efflorescence observed on the exterior masonry wall and the peeling paint noted in the backstage corridor walls and ceiling area. Efflorescence is a crystalline precipitate of salts that can form when water is present in or on brick, concrete, stone, stucco or other building surfaces. It has a white or greyish tint and consists of salt deposits left behind when water evaporates. Its presence is an indication of water migration through the building envelope, and the concentration along the spandrel beam line is an indicator of where the entrapped moisture is most pronounced. It is surmised that water that penetrates the building through the failed masonry and window frame joints gets trapped in the exterior wall cavity and soaks into the exterior wall construction, including the exterior masonry veneer, the hollow clay blocks used to infill between the structural steel frame and the plaster wall finish coating inside the building. Any moisture finding its way into the wall cavity is drawn downward by gravity and is likely being blocked by the steel framing at the floor level. Without a clear path out, trapped moisture would have a tendency to soak into the masonry and clay tile construction, saturating the surrounding area, leaving telltale signs of water damage both inside and outside of the building. To better understand the mechanism of water infiltration and the extent of any damage to the structure, exploratory demolition is recommended along the rear (north wall) building facade along the floor beam line.

Auditorium Roof Support Pilasters

Several theories based primarily on speculation were presented in the previous report as to the cause of the mid-height cracks in the two limestone pilasters at each front exterior corner of the auditorium roof. Because of the concealed nature of the construction, none can be validated without further exploratory removal of the exterior façade elements. The two pilasters do show a similar pattern of cracking and each have similar conditions in placement and location indicating consistency of material behavior. Oddly enough, the opposing corner pilasters located at the rear of the auditorium roof show no such evidence of duress, but these pilasters are restrained at the roof eave line by the opposing gable roof. It is suspected that the horizontal thrust exerted by the steel sloping rafters on the embedded steel structure are applying a horizontal load to the pilasters. The resulting displacement caused by the unrestrained force has caused stress cracks in the limestone pilaster enclosure. To fully understand the cause and nature of these cracks, it is recommended that the masonry and limestone pilasters be removed to provide access to the structural steel framing so that proper remedial repairs details may be developed for implementation.

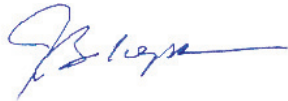
RECOMMENDATIONS

As previously discussed, further exploration of the above priority areas of concern is recommended to properly identify the nature and extent of the water intrusion issues identified. With limited availability to the original plans, it is difficult to fully understand the details of the original construction, much less develop details to mitigate the ongoing water infiltration problems that have perennially plagued this building. Once understood, the extent of the damage can be quantified and details of construction for the remedial repairs can be prepared for implementation.

We trust that this report suits your needs at this time and look forward to meeting with you to discuss the next steps for implementation of the recommendation provided herein. Please let us know if you have any questions or require any additional information.

Regards,

COASTAL ENGINEERING CO., INC

A handwritten signature in blue ink, appearing to read 'J. Bologna', with a long horizontal flourish extending to the right.

John A Bologna, PE
President/CEO

JAB/kvp

PART 7 - 2021 UPDATED MASONRY REPORT



**Fairhaven High School
Fairhaven, Ma
Exterior Envelope 2021 Reassessment**

Executive Summary

In April 21 of 2021, Ivan Myjer of Building and Monument Conservation, working as a member of a team assembled by Spencer, Sullivan & Vogt inspected the exterior of Fairhaven High School. Inc. The inspection was conducted from a high reach personnel lift and from the ground. In the summer of 2010, Ivan Myjer participated in a more extensive inspection and survey which resulted in a comprehensive assessment report with prioritized recommendations completed in 2011.

The purpose of the single day inspection in April of this year completed by Ivan Myjer was to update the exterior masonry conditions assessment from 2010 and, if necessary, reset the priorities and recommendations for the exterior masonry of the high school. While not a stated goal of the inspection, the inspection team did observe some loose profiled limestone units on the front of the building that were cracked and fragmented as a result of the expansive force of the “hit” anchors used to attach the lightening protection system to the masonry. These units were identified as potentially problematic in the 2010 assessment, and damage had indeed seriously progressed since then. These loose and fragmented pieces of stone were removed by the inspection team out of safety concerns. Additional safety inspections will be required in the coming years to check for additional sections of profiled limestone that have cracked as a result of water entering and freezing inside the small cracks and openings created by the lightning protection anchors.

Findings:

1. In the eleven years since our initial inspection, most of the masonry conditions that we identified in our 2011 report have become more advanced. The primary reason for this is that almost all of the cracking and displacement of bricks and limestone units on the exterior is related to the corrosion and expansion of steel elements incorporated into the masonry when the High School was constructed. Water freezing and expanding inside the gaps created by the displaced stone and brick units is compounding the damage resulting from the expansion of the corroding steel elements.
2. The wider and longer the cracks in the masonry become, the greater the amount of water that is able to infiltrate the wall. Left unchecked, the corrosion and expansion of the steel inside the masonry will create masonry conditions where repair and rebuilding are no longer an option, and the only recourse will be 100% replacement of the affected gables and wall sections. In this scenario, cracked and broken limestone and brick units could become detached from the building and entire sections of wall could be undermined by the loss or advanced deterioration of key units. Water infiltration into the interior would be extensive.
3. As documented in our earlier report, some of the gables and wall sections were in an advanced state of deterioration ten years ago and others were exhibiting only moderate levels of deterioration. The advance in deterioration in the smaller gables on the south

elevation is an example of moderate deterioration progressing to more advanced deterioration.

4. At this point in time, fairly radical intervention is required at a great many gables. This intervention would consist of taking apart a complete gable to gain access to the buried steel. The sound units of stone and brick would be salvaged for reuse and the broken units with only a single fracture would be repaired. Bricks and stones with multiple fractures would have to be replaced.
5. Preventative masonry preservation steps are required to ensure that sound areas of masonry do not deteriorate to the same extent as the gables. Preventative steps include repointing the mortar joints, replacing defective sealants and wood window components. Replacing or securing loose flashing in the locations where the masonry interfaces with the roofs is also very important.
6. The exterior masonry is very ornate and very beautiful. It is also part of the exterior envelop defense against water infiltration into the interior of the building. The costs associated with repairing the masonry will be compounded by additional costs relating to damage to the interior walls and finishes, if the most advanced masonry conditions are not addressed in the relatively near future.
7. The work required on the Fairhaven High School masonry is not typical of the types of masonry repairs frequently completed on historic masonry buildings in small towns and cities in New England. It is more typical of the type of interventions that are performed on large urban structures constructed in the first decades of the 20th Century with steel incorporated into the masonry. For this reason, we recommend a series of pilot projects involving different configurations of gables and wall sections in order to better define the scope of the repairs and establish accurate budgets.