CBI CONSULTING INC.

30 YEARS

CBI

PRINCIPALS
CRAIG E. BARNES
MICHAEL S. TELLER
WAYNE R. LAWSON

SENIOR ASSOCIATE
ROBERT G. WILKIN

ASSOCIATE
STEVEN A. WATCHORN

Town of Boxborough
Levi Wetherbee Farmhouse Stabilization
484 Middle Road
Boxborough, Massachusetts 01719

Schematic Design Submission
CBI Project No. 17159
December 1, 2017

OWNER:
Town of Boxborough
29 Middle Road
Boxborough, MA 01719

ARCHITECT:
CBI Consulting Inc.
250 Dorchester Avenue
Boston Ma, 02127

T 617 • 268.8977
F 617 • 464.2971
cbiconsultinginc.com

Table of Contents

PRINCIPALS
CRAIG E. BARNES
MICHAEL S. TELLER
WAYNE R. LAWSON

SENIOR ASSOCIATE
ROBERT G. WILKIN

ASSOCIATE
STEVEN A. WATCHORN

Levi Wetherbee Farmhouse
Boxborough, Massachusetts

Schematic Design Submission

T 617 • 268.8977
F 617 • 464.2971
cbiconsultinginc.com

30 YEARS

CBI

Project Directory

PRINCIPALS
CRAIG E. BARNES
MICHAEL S. TELLER
WAYNE R. LAWSON

SENIOR ASSOCIATE
ROBERT G. WILKIN

ASSOCIATE
STEVEN A. WATCHORN

OWNER Selina S. Shaw Town of Boxborough Town Administrator Tel: (978) 264-1712 Fax: (978) 264-3127 sshaw@boxborough-ma.gov	**OWNER** Edward Whitcomb Town of Boxborough Chair of the Steele Farm Advisory Committee Department Tel: (978) 264-1712 Mobile: (978) 844-1159 Fax: (978) 264-3127 ewhitcomb1@comcast.net
DESIGNER Wayne Lawson Principal Structural Engineer CBI Consulting Inc. Tel: (617)-268-8977 Cell: (617)-823-2553 Fax: (617)-464-2971 wlawson@cbiconsultinginc.com	**DESIGNER** Michael Squires Project Manager CBI Consulting Inc. Tel: (617)-268-8977 Cell: (617)-775-3866 Fax: (617)-464-2971 msquires@cbiconsultinginc.com
	DESIGNER Jonathan Ellowitz Structural Designer CBI Consulting Inc. Tel: (617)-268-8977 Fax: (617)-464-2971 jellowitz@cbiconsultinginc.com

MPS/
17159 NQHS Project Directory.docx

T 617 • 268.8977
F 617 • 464.2971
cbiconsultinginc.com

CBI CONSULTING INC.

30 YEARS

CBI

PRINCIPALS
CRAIG E. BARNES
MICHAEL S. TELLER
WAYNE R. LAWSON

SENIOR ASSOCIATE
ROBERT G. WILKIN

ASSOCIATE
STEVEN A. WATCHORN

December 1, 2017

Ms. Selina Shaw
Town Administrator
29 Middle Road
Boxborough, MA 01719-1430

Tel.: (978) 264-1712
Fax: (978) 264-3127
Email: sshaw@boxborough-ma.gov

Proj.: Town of Boxborough – Levi Wetherbee Farmhouse
Re: Schematic Design Submission

CBI Job No.: 17146

Dear Ms. Shaw:

In accordance with our Contract, dated September 29, 2017, CBI Consulting Inc. (CBI) has prepared the following schematic design submission for building envelope repairs at the Levi Wetherbee Farmhouse on the Steele Farm in Boxborough, MA. The project was commissioned to repair and preserve the damaged structure and the building envelope, which has deteriorated over time.

CBI performed a site visit to observe the extent of deterioration of the first-floor structural framing, exposed foundation, clapboard siding, exposed wall substrate, roofing, and chimney. Destructive exploratory test cuts were not performed, since the first-floor and attic framing wall composition was exposed within to view. One asphalt shingle was removed to sample the roofing underlayment for hazardous containing material.

This submission includes schematic drawings of the farmhouse, observations of the existing conditions, hazmat report, options and recommendations, with preliminary cost estimates to address structural framing failures, and building envelope systems and component improvements, in order to stabilize the structure and increase protection against water infiltration.

Very Truly Yours,
CBI Consulting Inc.

T 617 • 268.8977
F 617 • 464.2971
cbiconsultinginc.com

Michael Squires
Project Manager
msquires@cbiconsultinginc.com

1. Introduction

CBI visited the site Friday, October 13, 2017, to survey and observe the existing conditions and structure with contractor assistance from Jim Bell (Caledonian Corporation) who provided vertical access and test cut. Michael Squires (CBI) met with Edward Whitcomb (Town) who granted access to the interior. The intent of the project is to stabilize the first-floor framing and to improve weather tightness of the building envelope, while maintaining the visual characteristics of this historic building.

The Levi Wetherbee Farmhouse was constructed around the same time Boxborough was incorporated in 1783 and holds significant historical value to the Town. The farmhouse is listed on the National Register of Historic Places. The basement foundation is comprised of dry laid fieldstone with a heavy timber sill plate around the perimeter. The exterior walls consist of wood clapboard siding with 1-inch thick wood board substrate. The roofing assembly is made up of asphalt shingles, self-adhered ice and water barrier along the eaves, plywood sheathing, all over 1-inch thick wood board substrate.

2. Existing Conditions / Observations

Portions of the loose laid fieldstone foundation have collapsed, likely due to soil movement from years of freeze thaw cycles and soil erosion. There is no basement slab. The full depth of the foundation walls below grade are unknown, the basement height however, is approximately 6'-4". CBI observed a loose laid plastic barrier sheeting on the basement ground floor that was weighted down by sand. A double door bulkhead at grade is the only means of egress to access the basement from the exterior.

The painted wood clapboard siding varies in condition from satisfactory to poor. In general, the siding is cracked, split, warped, and cupped. The painted surface is worn and weathered, and is flaking and peeling. Where exposed the bare wood includes splits and cracks, and is decayed and rotted. The species if the wood is unknown, at this time, but is likely cedar or pine or combination of both. It is so severe in some areas, that the original iron nails could be pulled out by hand.

Along the west and east elevations, the upper portion of the gable end wall sheathing was able to be pushed in a considerable amount. It was also discovered that the wood boards in the attic directly behind the gable end area were damp. This indicates water infiltration into the building envelope, near the rake, saturating the wood board substrate. The gable end wood molding returns have deteriorated with multiple soft spots. The west elevation has formed sheet metal holding the profile together. However, the clapboards, on the north side are in much better condition, most likely due to indirect UV-ray exposure. The exterior paint, which tested positive for lead, is severely cracked and flaking. In some areas the paint coating has completely fallen off, exposing the underlying bare wood.

CBI observed no indication of any insulation nor an air/moisture or vapor barrier. However, the interior spaces are not conditioned. There appeared to be no flashings at the sill or jamb

of the windows and doors, however, there are flashings at the window and door head conditions. The flashing is painted and was easily bent by hand; indicating that it maybe be lead. The flashing is punctured and torn in areas, and has exposed fasteners that were used to secure it to the wood head trim behind it.

There are two (2) entry doors located on the south and east side of the building. Both doors are in poor condition. The leafs appear to be made of wood boards with recessed shadow box details, and glass panes with muntins. The wood door trim has begun to split at the base and deep cracks are working their way up the board. The sill face board is severely deteriorated and has detached from the substrate. The glass glazing compound, which tested positive for asbestos, is dry, brittle, cracked with portions missing. The glass on the south door is imperfect, as it is distorted, and contains air bubbles. This glass appears appropriate for the building time period and could be original.

The fenestrations along the building are predominantly double hung wood windows with an upper (outer) sash and lower (inner) sash, each with six (6) glass panes with muntins. The foundation wall contains one opening along the west elevation; a single pane wood fixed framed window. The kitchen includes a combination double hung window unit. All double hung windows are nailed shut with modern fasteners and lumber. CBI observed missing interior and exterior window trim with exposed unpainted bare wood underneath. All trim, frames, and muntins contain flaking and delaminating paint on both the exterior and interior sides, which tested positive for lead.

Some windows appear to be replicas of the original window as the material was not as aged as other windows and the muntin profiles are different. The glass is clear with no distortion. The glazing compound, which tested positive for asbestos, is brittle and cracked; some areas have fallen off and the edge of the glass is exposed at the muntin seam; a potential point of water entry. Most of the muntins are severely deteriorated and rotten throughout, with significant amounts of paint has delaminated leaving portions of wood exposed to the elements. It appears the windows have been caulked over many times in the past, building up onto the glass panes. As a result, many window panes sit crooked in the sash causing gaps at the edges.

The asphalt roof shingles, where no asbestos was detected, were found to be in fair condition. The south side roof shingles appear newer with noticeably less wear than the north side. They seem to have been replaced, most likely due to deterioration through direct exposure to UV rays. The north side shingles appear worn and weathered with visible algae growth, which could accelerate deterioration of the shingles. CBI observed vents located in the middle of the south side roof likely installed to ventilate the attic, which may or may not help with overheating of the shingles.

CBI observed aluminum k-style gutters and straps along the eaves of the roofs with downspouts. An aluminum drip edge runs along the eave and rake along the asphalt shingle roof perimeter. All of which are not original to the building nor are historic. A cast iron pipe penetration is located in the northwest area of the roof. The pipe is in fair condition. The base flashing, which appears to be copper, is in very poor condition with holes due to

corrosion. The asphaltic black mastic, which tested positive for asbestos, is dry, brittle, cracked, and contains voids.

The central chimney is currently blocked with a compressible filler covered with a rubber membrane, that is tightly secured with stainless steel hose clamps. The chimney flutes were concealed and not viewed and their condition is unknown. The existing brick is molded red clay. The brick is imperfect, as it is irregularly shaped and contains manufacturing defects such as fissures, cracks, and holes. Although the brick is old and comes from an earlier time period, it is not likely original to the building. The step flashing at the base has a short upturn height and there are exposed fasteners along the perimeter. The flashing appears to turn into the brick and held in place by mortar.

The portion of the brick chimney below the roof line within the attic space is in poor condition. CBI observed that the brick masonry along the corners, has begun to disintegrate and turn to dust. There appears to be a cementitious parge coating covering the brick. It would appear that the coating is non-permeable and therefore is trapping water. It is likely water enters through the exposed brick above and wicks into the lower portion of chimney where the parge coating prevents water from drying out. The trapped water then freezes during the winter and expands within the brick, causing it to deteriorate.

Finally, suspect materials were tested for asbestos and lead during the site investigation and the hazardous materials report is included with this submission. Asbestos-containing materials were identified in various parts of the roof assemblies, flashings, and caulking. Also, painted areas including concentrations of lead. Please refer to the attached Hazmat Report prepared by Universal Environmental Consultants.

3. Recommendations / Options

Based on the observations conducted to this date, CBI recommends two approaches for the building envelope:

Option No. 1 is a holistic long-term approach that includes the installation of continuous modern day protective barriers directly to the buildings substrate. This option's intent is to repair and improve the performance of all envelope elements. To achieve this, the following exterior components will need to be carefully removed:

- Clapboard siding & trim boards
- Windows & trim
- Doors & trim
- Eave trim & moldings
- Rake trim & moldings
- Asphalt shingles & underlayments
- Associated Sealants & caulking
- Associated Flashings

Once removed the wood board substrate will be reviewed to identify deteriorated areas. CBI recommends that the project scope includes the replacement of approximately 10 percent of the wood board substrate. The elements removed will be stripped of paint to determine what can be salvaged for refurbishing and repair. Wood filler and epoxy can be used to infill holes, seal cracks, and rebuild parts of moldings. CBI recommends assuming that 50 percent of all clapboard need to be replaced as well as sections of eave and rake moldings. All

openings are to be wrapped with self-adhered membrane flashing, the wall cavity will be insulated, and a continuous air/moisture barrier, such as Tyvek, can be installed over the exterior side wall and roof substrate.

Self-adhered ice and water barrier will be installed along the eaves, rakes, and ridge edge of the roof. New flashings will then be installed at the chimney base, vents, pipe penetration, and along the eaves and rakes. Consideration to install a gutter with downspouts and splash blocks at the base and an asphalt shingles roof, although these are not historical elements, they offer additional protection and reduce maintenance. The brick masonry mortar joints will be sawcut out to be replaced with new mortar and damaged bricks can be replaced. The parge coating on the lower section of the chimney will be removed and the first wythe of brick is to be replaced.

CBI recommends to replicate the existing windows with custom historic wood windows to match the original as closely as possible. However, consideration to install wood-composite windows with an implied muntin, such as Marvin Ultrex or similar, although not of historical material, they are rot resistant, is low maintenance, and will provide the same look as painted wood. Once all elements are reinstalled; a permeable coating will be applied to all exterior wood elements to achieve a cohesive look and to add protection to the wood elements.

Lastly, a trench drain will be added around the perimeter of the structure to mitigate any rising water table, during rain, saturating the basement.

Option No. 2 is an immediate approach to address the failing components and does not include the use of any modern systems. The intent of this option is to repair the failing envelope elements to increase the current weather tightness.

To achieve this, the following exterior components will be removed:

- Deteriorated clapboard & trims
- Deteriorated moldings
- Asphalt shingles & underlayments
- Roof flashings
- Exterior paint
- Window Sashes, glazing caulking, & panes

Once removed the deteriorated clapboards, trim, and moldings will be replaced with the same wood species. The remaining wood elements can be repaired in place with wood filler and epoxy. The window sashes and glazing panes will be carefully removed to strip the muntins, stiles, and rails for repainting and to remove excess caulking from the glass. The panes will then be reset neat in the muntins to be caulked in place. All joints around the building envelope will be caulked and sealed.

Self-adhered ice and water barrier will be installed along the eaves, rakes, and ridge edge of the roof. New flashings will then be installed at the chimney base, vents, pipe penetration, and along the eaves and rakes. Consideration to install a gutter with downspouts and splash blocks at the base and an asphalt shingles roof, although these are not historical elements, they offer additional protection and reduce maintenance. The brick masonry mortar joints

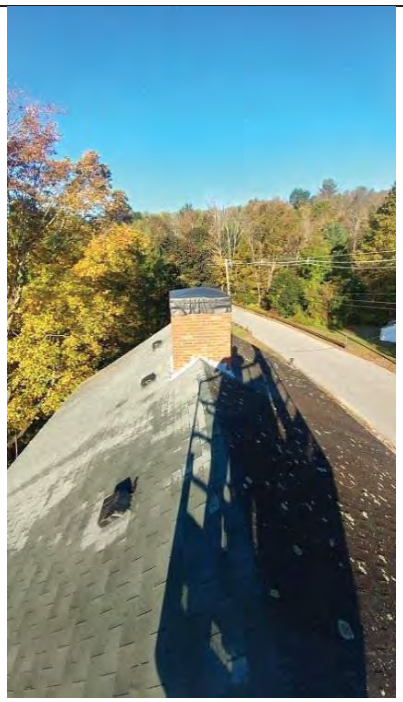
will be sawcut out to be replaced with new mortar and damaged bricks can be replaced. The existing chimney covering will remain.

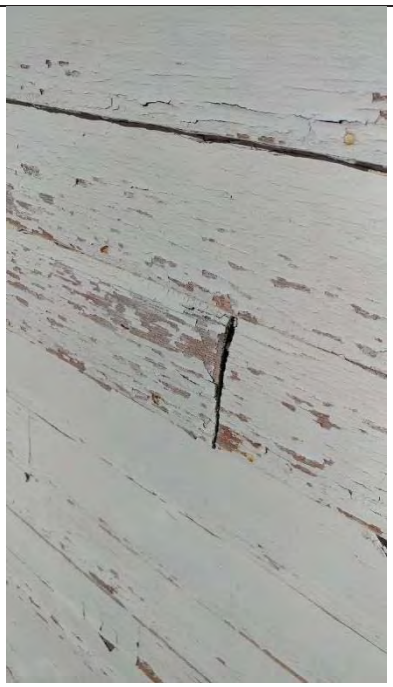
Once the wood elements are repaired; a permeable coating will be applied to all exterior wood elements to achieve a cohesive look and to add protection to the wood elements.

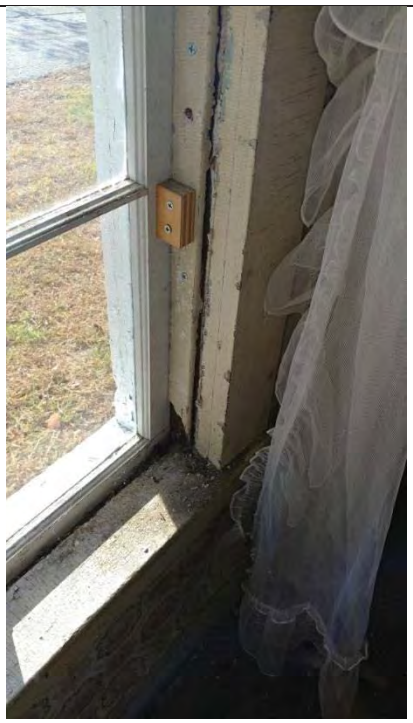
Photo Index

1		North elevation which faces Middle Road.
2		West elevation, the electrical lines will need to be temporarily disconnected.
3		East elevation.

4		South elevation.
5		Close up of the window sill and pane. Note the missing glazing compound leaving the muntin seam exposed. The wood trim has deteriorated in areas causing gaps.

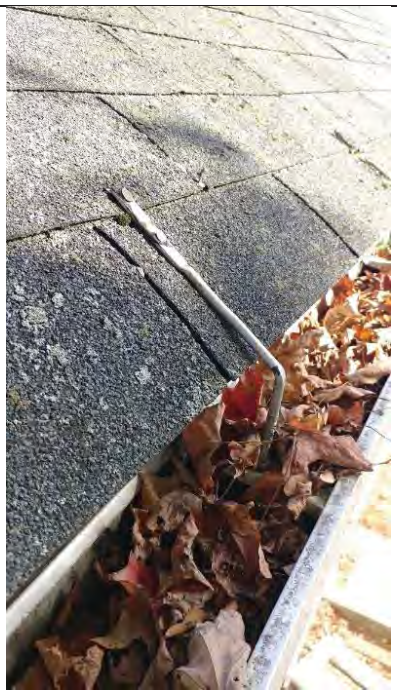
6		View of the brick masonry chimney and shingle roofing. Note the visible algae growth on the north side.
7		Close up of the cracked butt end of the wood clapboard siding

8		Close up of the warped butt end of the wood clapboard siding beginning to pull away from the sheathing.
9		Close up of missing sealant where the clapboard butts against the corner trim.

10		Interior window sill, the lower sash is fastened shut with screws and wood blocks.
11		Formed metal repair with exposed fasteners at west elevation gable end return.

12		Close up view of the deteriorated wood gable end return molding on the east gable end return.
13		Close-up side view of the deteriorated wood eave molding on the east gable end return.

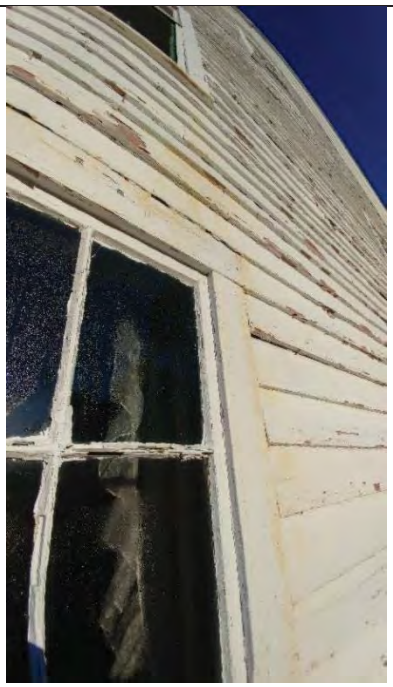
14		Close up of the peeling and delaminated paint.
15		Cast iron pipe penetration deteriorated copper flashing and asphaltic roof mastic.

16		Aluminum gutter with hanger rods fastened directly through the shingle roofing.
17		West elevation electrical hook up to be disconnected during work.

18		Close up view of one of the many holes within the wood board corner trim.
19		Another close-up view of one of the holes in the wood board corner trim.

20		Views of cracked and split clapboard siding with a high concentration of fasteners.
21		Areas of cracked, split, cupped, and bowed clapboard siding. Attempts have been made to fasten it back in place.

22		Loose and detached aluminum rake edge.
23		Overall exterior window view of missing glazing compound and paint coating, exposing the bare wood.

24		Exterior close up view of muntins with deteriorated wood and missing glazing compound.
25		Interior close up view of muntins with deteriorated wood and weathered paint; note the glass appears newer as it does not include any distortions.

26		Close up view of a window replica, the material appears not as aged and the muntin profiles are different than the other windows.
27		Overall view of a window replica. Note missing jamb trim and the exposed underlying bare wood.

28		Exterior close up of the entry head trim along the south elevation. Notice the trim in bowing and pulling away from the sheathing.
29		View of the vision panels on the south door leaf. Notice the glass is distorted.

30		Underside view of the roof vent along the south side roof.
31		Close up of the cracked brick on the chimney above the roof.

32		Low upturn base flashing along the chimney that is fastened directly through the shingles.
33		View of the deteriorated cementitious parging on the chimney within the attic.

MPS/hld
17146 Levi Wetherbee Arch SD Letter.docx

PRINCIPALS
CRAIG E. BARNES
MICHAEL S. TELLER
WAYNE R. LAWSON

SENIOR ASSOCIATE
ROBERT G. WILKIN

ASSOCIATE
STEVEN A. WATCHORN

Existing Structural Conditions

CBI performed an existing conditions survey of structural conditions at the Levi Wetherbee house in Boxborough, with particular emphasis on the foundation, first-floor framing, and roof framing.

The building appears to be a post-and-beam wood-framed structure supported on a rough stone foundation in which field stones and some large boulders are assembled together without mortar. The roof framing is rafters with transverse girts, supported at the top on a multi-sided ridge beam. Wood members are all rough-hewn timbers, some square in profile, others round; some of the round timbers are still covered with original bark. Joints are mortis and tenon joints without nails – common for late eighteenth-century wood frame construction.

First-floor joists vary in size and are on average 7" x 7" rectangular or round; first-floor beams are on average 8" x 7" square (note: timber sizes are as-measured width x depth). Wood sill plates on the top of the foundation are approximately 6-1/2" deep. Joists are spaced at about 28" on center. Joists span east-west in the southern 60% of the first floor, and north-south in the upper 40% of the first floor. There are two (2) beam lines running north-south at the first-floor framing – approximately 9'-0" from the inside of the western foundation wall, and approximately 11'-5" from the inside of the eastern foundation wall. These two (2) beam lines are spaced approximately 12'-4" apart on center. The beams are supported on the foundation wall and on the central stone chimney wall located in the central northern portion of the house. Two (2) joists serve as beams at the northwest (7" x 6-1/2" rectangular) and northeast (8" x 6" rectangular) portions of the first floor where the span direction of joists changes by ninety degrees (90°). Wide-plank floor boards approximately 1" thick span between the wood joists. Floor-to-underside of plank height is approximately 6'-4".

As noted above, the foundation consists of loose field stones assembled without mortar, and includes large boulders that may have been present before original construction of the house.

In general, the first-floor framing is in poor condition. Powder post beetles and termite damage, and moisture damage are visible at approximately eighty percent (80%) of the joists and beams. This determination was made visually by observing the conditions of members, and by investigating the susceptibility of wood members to incision by a knife. At the northwest bay of horizontal framing, wood joists have been sistered with 3-1/2" x 5-1/2" wood members at an unknown prior date. These joists had failed and are separated from the bottom of the floor decking. Portions of these and other joists are so damaged that their wood fibers scatter like dust when disturbed.

Temporary shoring has been installed at the 7" x 6-1/2" beam in the northwest portion of the first-floor framing, and there is also a supplementary 3-3/4" x 3-3/4" wood post at the 8" x 6" beam in the northeast portion of the first-floor framing.

With the exception of localized damage from insect infestation, the wood sill appeared to be in fair condition.

T 617 • 268.8977
F 617 • 464.2971
cbiconsultinginc.com

The central stone wall that supports the chimney mass above and that partially supports the north-south beams has failed in part along its western side. At an unknown prior date, the loose stones of the wall appear to have fallen out, and are piled in a heap in the western side of the cellar. At this same location, CBI observed an inward bulge in the foundation wall, indicating that the foundation has insufficient strength against earth pressure from retained soils. CBI noted a similar bulge in the eastern portion of the interior stone chimney foundation. This may indicate that the retained soil backfill exerts horizontal pressure that exceeds the retaining capacity of this wall.

There is another pile of loose field stones adjacent to the base of the cellar stairs at the eastern portion of the cellar. CBI assumes these stones are also from the aforementioned failed stone wall at the western portion of the cellar.

CBI observed deflection of the central northern portion of the first floor. This section of first-floor framing spans over what appears to be rubble infill north of the chimney foundation. In the cellar, CBI observed that north-south joists in the central northern portion of the floor framing had failed, most likely due to insect-related damage.

Based on field measurements, the north-south dimension of the eastern half of the cellar is shorter than the western portion by approximately two feet (2'). This suggests that the northeast foundation wall parallel to Middle Street is thicker than the northwest foundation wall.

The brick chimney in the attic has a cement parge coat that appears to be trapping moisture inside the brick. CBI observed erosion of the brick at this location.

Roof framing appears to be in fair to good condition, and new roof sheathing is visible through openings in the original roof decking. At some locations, it appears that a fire is responsible for holes in the roof. It is unknown how long or through how many seasons of rain and snow such openings were left unrepaired before supplementary sheathing was installed.

Preliminary Report –Structural Recommendations

CBI proposes the following structural remediation measures that, if implemented, are intended at a minimum to return the structure to its original condition and capacity.

Foundation Repairs

Short term:

- Wrap existing foundation wall stones in wire mesh at cellar interior.
- Install intermittent reinforced concrete footings within cellar floor *below* sand floor cover.
- Install steel frames at each of the new footings to brace the existing stone foundation at intervals. This provides a temporary safety measure structurally that is not particularly intrusive or permanent to the architecture of the cellar.

- Excavation of damaged (western) portion of central stone wall in order to access first-floor framing for repairs and in order to access central chimney bearing wall for repairs.
- Partial repair of central stone/brick chimney foundation with reinforced CMU or brick backup, or with typical steel bracing frames installed at interior of perimeter foundation.

Long term:

- Wrap existing foundation wall stones in wire mesh at cellar interior.
- Underpin foundation with new reinforced concrete strip footing.
- Install vertical steel members designed to brace the foundation against horizontal loads from soil and surcharge. The steel members will be anchored to the new footings and connected to the floor decking either directly or via the existing wood sill.
- Install new slab-on-grade throughout the cellar.
- Excavate central northern section of loose stone foundation at chimney in order to access first-floor framing. Repair chimney foundation with installation of reinforced concrete or reinforced CMU foundation wall, repointing of brick, or installation of reinforced brick foundation. At eastern portion of central-north wall (intact), install backup foundation to reinforce the unreinforced existing wall.
- Alternate 1: Install new reinforced concrete or reinforced CMU backup retaining wall at inside perimeter of foundation wall.
- Alternate 2: Wrap existing foundation wall stones in wire mesh at cellar interior. Excavate exterior perimeter of foundation wall and install new reinforced concrete or reinforced CMU retaining wall (the purpose of which is to retain the historical aesthetic quality of the loose field stone foundation while reinforcing it against earth pressures).
- Alternate 3: Shore and raise entire building at first-floor framing level. Demolish existing stone foundation walls and retain all stones. Install new reinforced concrete or CMU foundation wall on reinforced concrete strip footing with pins to support reinstallation of foundation stones. Reinstall foundation stones with limited mortar, supported partially by horizontal pins installed in new foundation wall.

First-Floor Framing Repairs

The following program of immediate repairs is necessary for structural adequacy.

- Splice in new sill sections where moisture-related and/or insect-related damage is prevalent.
- Temporarily shore and remove all wood joists (having excavated and accessed central northern portion of framing beyond damaged central stone wall).

- Replace all wood joists with rectangular timbers. At the central northern section, the floor boards will need to be jacked up from their deflected condition to be re-supported on new joists. Provide positive connection between new joists and existing floor boards to remain. North-South beams can be replaced with new timbers that support the new joists via mortis-and-tenon notches to best match the existing historical condition. The beams can be designed to span between pockets at the existing foundation wall and pockets at the repaired interior chimney foundation. (CBI assumes that the building owner wishes to mimic as much as possible the original construction aesthetics.)
- Replacement of existing cellar stair stringers with new wood stringers (assuming the existing risers and treads are in acceptable condition and can be reused).

Attic and Roof Framing Repairs

- Removal of parging coat from the chimney, and repair of bricks. Brick repairs will include both repointing of joint mortar and significant brick replacement. *Refer to the architectural portion of this report for more details.*
- CBI understands that the roofing will be replaced. *All former layers of roofing shall be removed in their entirety down to the existing roof sheathing.* As the full capacity of the existing roof framing is unknown but appears to have functioned adequately throughout the building's history, additional dead load from additional layers of roofing *shall not* be added; only a single layer of roofing shingles shall be installed. *Refer to the architectural portion of this report for more details.*

Schematic Structural

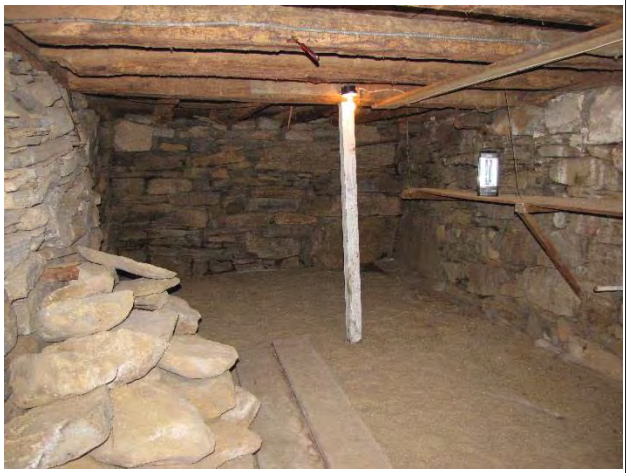
Architectural & Structural Design Services for Stabilization of Levi-Wetherbee Farmhouse Town of Boxborough, Massachusetts CBI Proposal No. 17146

Photo No.		Description
01		Photo showing sill damage at bulkhead.
02		Photo showing effects of insect damage at first-floor framing.

03		Photo of damaged joist tenon at longitudinal beam – first-floor framing. The damage is likely due to insect infestation.
04		Photo similar to Photo 02. Note presence of supplementary wood member below damaged beam.

05		Photo similar to Photo 02.
06		Photo similar to Photo 05, at northwest portion of first-floor framing. Note sistered wood member adjacent to damaged joist.
07		Photo of severely damaged first-floor joist. Note effects of insect damage, and note gap between floor boards and wood joist (red arrow).

08		Photo of typical tenon joint at wood sill (red arrow).
09		Photo of temporary shoring at first-floor beam. Note rubble pile to the left – remnants of collapsed central stone foundation wall.
10		Photo of first-floor framing at damaged central stone wall.

11		Photo of wall damage noted in Photo 09.
12		Photo of east portion of cellar. Note supplementary wood post installed at unknown prior date.

13		Photo of moisture-damaged sill at southeast portion of cellar.
14		Photo of wood joists on stone foundation wall – northeast portion of foundation.
15		Photo of insect damage at first-floor framing (red arrow).

16		Photo of failed first-floor framing at central northern portion at central stone foundation wall.
16-A		Close-up view of conditions in Photo 16. Note failed chimney bricks and collapsed floor joist (red arrows).
17		Photo of cellar stairs.

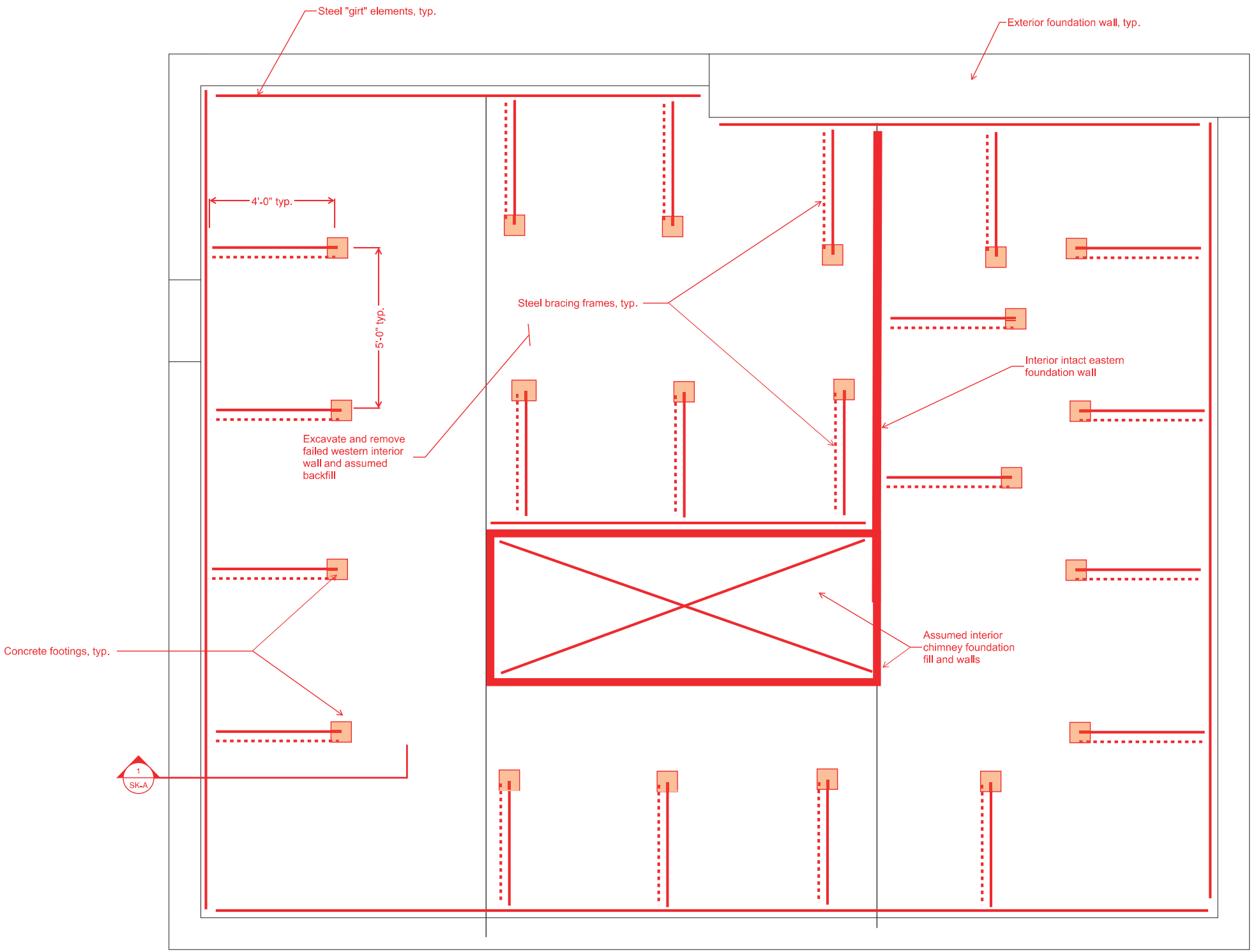
18		Photo of corner post support at foundation corner. Note skew of foundation corner stone.
19		Photo of deflected first floor portion at north central framing over stone foundation below (red arrow).

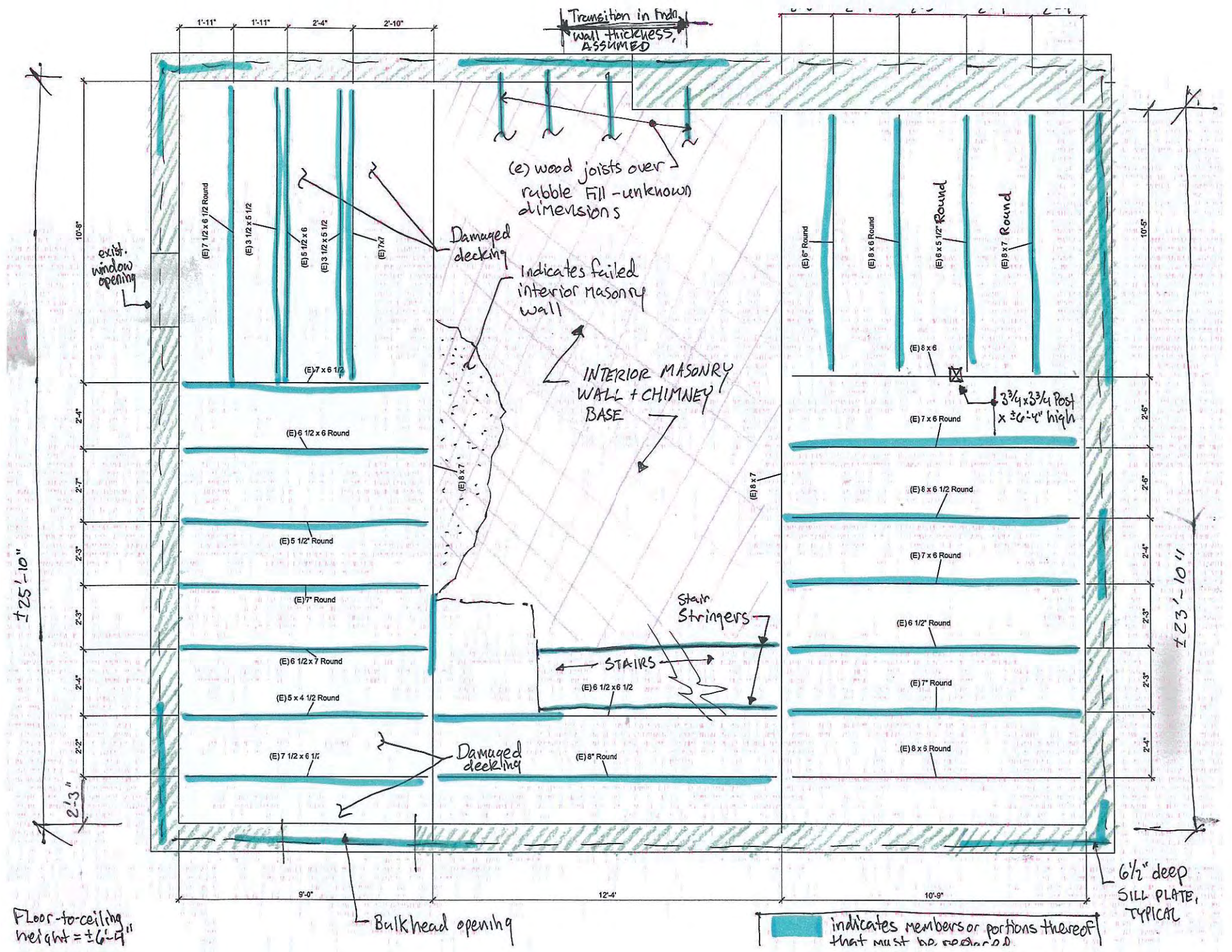
20		Photo of roof framing – note roof rafters and wind girts.
21		Photo of roof framing.
22		Photo of roof framing at former openings in original roof sheathing, now covered by new sheathing installed at an unknown prior date (red arrow).

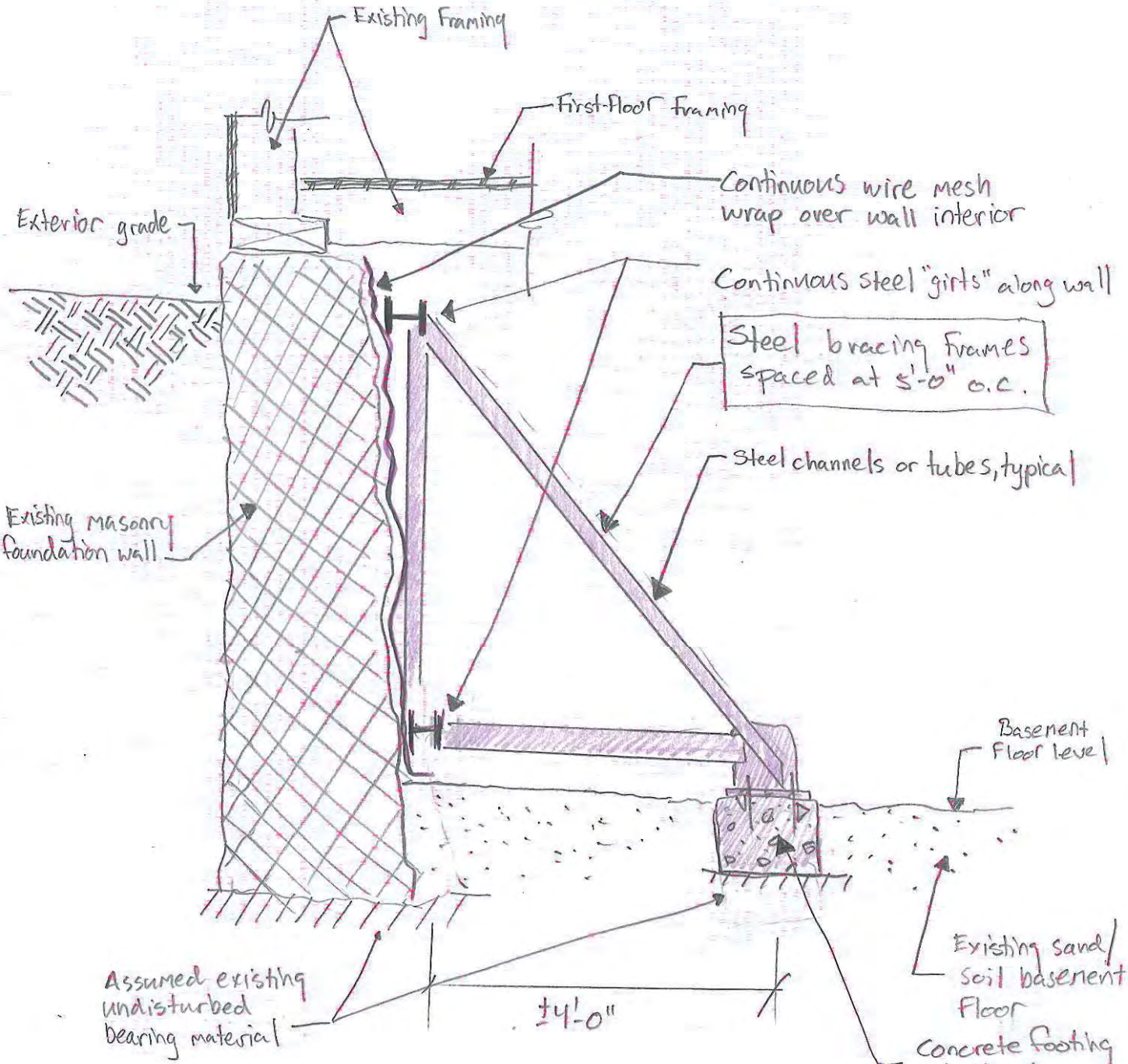
23		Photo of original construction mistake at wind girt (red arrow).
24		Photo of eroding bricks (red arrow) and parge coat at central chimney.

25		Photo of damaged roof framing south of brick chimney.

MPS/hld
17146 Levi Wetherbee Struc SD letter.docx


Steel "girt" elements, typ.
Exterior foundation wall, typ.
4'-0" typ.
5'-0" typ.
Steel bracing frames, typ.
Interior intact eastern foundation wall
Excavate and remove failed western interior wall and assumed backfill
Concrete footings, typ.
Assumed interior chimney foundation fill and walls
1
SK-A


1'-11"
1'-11"
2'-4"
2'-10"
Transition in Fndn. wall thickness, ASSUMED
(e) wood joists over rubble Fill - unknown dimensions
Damaged decking
Indicates failed interior masonry wall
INTERIOR MASONRY WALL + CHIMNEY BASE
exist. window opening
(E) 7 1/2 x 6 1/2 Round
(E) 3 1/2 x 5 1/2
(E) 5 1/2 x 6
(E) 3 1/2 x 5 1/2
(E) 7x7
(E) 7 x 6 1/2
(E) 6" Round
(E) 8 x 6 Round
(E) 6 x 5 1/2" Round
(E) 8x7 Round
(E) 8 x 6
3 3/4 x 3 3/4 Post x ±6'-4" high
(E) 6 1/2 x 6 Round
(E) 8 x 7
(E) 5 1/2" Round
(E) 7" Round
(E) 6 1/2 x 7 Round
(E) 5 x 4 1/2 Round
(E) 7 1/2 x 6 1/2
(E) 7 x 6 Round
(E) 8 x 6 1/2 Round
(E) 6 1/2" Round
Stair Stringers
STAIRS
(E) 6 1/2 x 6 1/2
(E) 8" Round
Damaged decking
±25'-10"
±23'-10"
2'-3"
10'-8"
10'-5"
2'-4"
2'-7"
2'-3"
2'-3"
2'-4"
2'-2"
2'-6"
2'-6"
2'-4"
2'-3"
2'-3"
2'-4"
9'-0"
12'-4"
10'-9"
Bulkhead opening
6½" deep SILL PLATE, TYPICAL
indicates members or portions thereof that must be replaced
Floor-to-ceiling height = ±6'-4"



1 Steel bracing frame elevation
N.T.S.

C/BI CONSULTING INC. 250 Dorchester Avenue Boston, MA 02127 Phone: 1-617-268-8977 Fax: 1-617-464-2971	LEVI WETHERBEE - REPAIRS		SHEET NO.
	TEMPORARY FOUNDATION SHORING FRAMES		SK-A
	REVISION	DESCRIPTION	
11/22/17 JCE			

Schematic Design Estimate

Levi Wetherbee Farmhouse

Envelope Repairs

Boxborough, MA

PM&C LLC

20 Downer Avenue; Suite 1c
Hingham, MA 02043
(T) 781-740-8007
(F) 781-740-1012

Prepared for:

CBI Consulting Inc.

December 1, 2017

Levi Wetherbee Farmhouse
Envelope Repairs
Boxborough, MA

01-Dec-17

Schematic Design Estimate

MAIN CONSTRUCTION COST SUMMARY

	Construction Start	Estimated Construction Cost
Envelope Repairs		
OPTION 1	July-18	$244,928
HAZ MAT		$15,000
SUB-TOTAL		$259,928
GENERAL CONDITIONS		$60,000
BONDS	1.00%	$2,599
INSURANCE	2.00%	$5,199
PERMIT		NIC
OVERHEAD AND FEE	15%	$38,989
ESCALATION	2%	$5,199
DESIGN AND PRICING CONTINGENCY	15%	$55,007
TOTAL - OPTION 1 (not including structural repairs)		**$426,921**
OPTION 2	July-18	$140,415
HAZ MAT		$15,000
SUB-TOTAL		$155,415
GENERAL CONDITIONS		$60,000
BONDS	1.00%	$1,554
INSURANCE	2.00%	$3,108
PERMIT		NIC
OVERHEAD AND FEE	15%	$23,312
ESCALATION	2%	$3,108
DESIGN AND PRICING CONTINGENCY	15%	$36,508
TOTAL - OPTION 2 (not including structural repairs)		**$283,005**

Levi Wetherbee Farmhouse
Envelope Repairs
Boxborough, MA

01-Dec-17

Schematic Design Estimate

Note the costs below are in addition to costs presented above

SHORT TERM FOUNDATION REPAIRS	**$113,865**
LONG TERM FOUNDATION REPAIRS	**$167,547**

The alternates below are in addition to the Long Term repair options above

Alternate 1	**$89,429**
Alternate 2	**$132,837**
Alternate 3	**$269,485**
FRAMING REPAIRS	**$69,962**

This schematic design cost estimate was produced from a drawing prepared by CBI Consulting Inc., and their design team dated November 22, 2017. Design and engineering changes occurring subsequent to the issue of these documents have not been incorporated in this estimate.

This estimate includes all direct construction costs, contractor's overhead and profit and design contingency. Cost escalation assumes start dates indicated.

Bidding conditions are expected to be public bidding under Chapter 149 of the Massachusetts General Laws to pre-qualified general contractors, and pre-qualified sub-contractors, open specifications for materials and manufacturers.

The estimate is based on prevailing wage rates for construction in this market and represents a reasonable opinion of cost. It is not a prediction of the successful bid from a contractor as bids will vary due to fluctuating market conditions, errors and omissions, proprietary specifications, lack or surplus of bidders, perception of risk, etc. Consequently the estimate is expected to fall within the range of bids from a number of competitive contractors or subcontractors, however we do not warrant that bids or negotiated prices will not vary from the final construction cost estimate.

ITEMS NOT CONSIDERED IN THIS ESTIMATE

Items not included in this estimate are:

- All professional fees and insurance
- Land acquisition, feasibility, and financing costs
- All Furnishings, Fixtures and Equipment
- Items identified in the design as Not In Contract (NIC)
- Items identified in the design as by others
- Owner supplied and/or installed items (e.g. draperies, furniture and equipment)
- Construction or occupancy phasing or off hours' work, (except as noted in this estimate)

Levi Wetherbee Farmhouse
Envelope Repairs
Boxborough, MA

Schematic Design Estimate

CONSTRUCTION COST SUMMARY IN CSI FORMAT

	Subtotal	*Total*
Envelope Repairs Option 1		
The costs below do not include structural repairs		
DIV. 2 EXISTING CONDITIONS		**$36,702**
021500 Selective Demolition	$36,702	
025000 Hazardous Material	See Summary	
DIV. 4 MASONRY		**$18,500**
040001 Masonry	$18,500	
DIV. 6 WOODS & PLASTICS		**$3,320**
061000 Rough Carpentry	$3,320	
DIV. 7 THERMAL & MOISTURE PROTECTION		**$125,294**
070002 Roofing and Flashing	$24,270	
072100 Thermal Insulation	$10,500	
074000 Wood Siding	$90,524	
DIV. 8 DOORS & WINDOWS		**$56,112**
080001 Windows + Doors	$56,112	
DIV. 15 MECHANICAL		**$5,000**
220000 PLUMBING	$5,000	
SUBTOTAL DIRECT (TRADE) COST		**$244,928**

PM&C

Levi Wetherbee Farmhouse
Envelope Repairs
Boxborough, MA

01-Dec-17

Schematic Design Estimate

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
	Envelope Repairs Option 1						
	02 EXISTING CONDITIONS						
021500	**Demolition**						
	Carefully remove, store and inspect existing cedar siding and trim	**2,100**	sf	13.30	27,930		
	Carefully remove, store and inspect existing windows; includes protection of openings	**186**	sf	10.00	1,860		
	Carefully remove, store and inspect existing window trim	**244**	lf	5.00	1,220		
	Carefully remove, store and inspect existing corner trim	**135**	lf	8.00	1,080		
	Carefully remove, store and inspect existing entrance doors	**2**	loc	400.00	800		
	Carefully remove, store and inspect existing eave trim and molding	**67**	lf	12.00	804		
	Carefully remove, store and inspect existing rake trim and molding	**70**	lf	8.00	560		
	Remove asphalt shingles, underlayment and flashings	**1,224**	sf	2.00	2,448		
	SUBTOTAL					36,702	
	TOTAL, DIVISION 2 - EXISTING CONDITIONS						**$36,702**
	04 MASONRY						
041000	**Masonry**						
	Repoint existing masonry 100%	**100**	sf	65.00	6,500		
	Allowance to repair existing brickwork	**1**	ls	2,000.00	2,000		
	Allowance to repair/clean chimney; including shoring	**1**	ls	10,000.00	10,000		
	SUBTOTAL					18,500	
	TOTAL, DIVISION 6 - WOOD & PLASTICS						**$18,500**
	06 WOOD & PLASTICS						
061000	**Rough Carpentry**						
	Replace 10% of wood substrate sheathing at exterior	**210**	sf	10.00	2,100		
	Allowance for removal and replacement of deteriorated deck, 5% of total area	**122**	sf	10.00	1,220		
	SUBTOTAL					3,320	
	TOTAL, DIVISION 6 - WOOD & PLASTICS						**$3,320**
	07 THERMAL & MOISTURE PROTECTION						
070002	**Roofing and Flashing**						
	Architectural asphalt shingles; includes all flashing	**1,224**	sf	10.00	12,240		
	Fiberglass reinforced building felt	**1,224**	sf	1.00	1,224		
	Ice and water barrier	**685**	sf	3.00	2,055		
	New aluminum gutters with gutter guard and gutter straps	**67**	lf	38.00	2,546		
	New aluminum downspouts	**135**	lf	28.00	3,780		
	Splash blocks	**4**	ea	250.00	1,000		
	Exterior masonry flashing						
	Zinc coated copper step flashing at chimney including brick reglet	**19**	lf	75.00	1,425		
	SUBTOTAL					24,270	
072100	**Thermal Insulation**						
	Blown in insulation to cavity	**2,100**	sf	5.00	10,500		
	SUBTOTAL					10,500	

PM&C

Levi Wetherbee Farmhouse
Envelope Repairs
Boxborough, MA

01-Dec-17

Schematic Design Estimate

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
Envelope Repairs Option 1							
074000	**Wood Siding and trim**						
	Strip paint from all siding and inspect for repair	**2,100**	sf	9.00	18,900		
	Strip paint from all trim and inspect for repair	**379**	lf	12.00	4,548		
	Strip paint from all eave and trim and inspect for repair	**67**	lf	25.00	1,675		
	Strip paint from all rake and trim and inspect for repair	**70**	lf	15.00	1,050		
	Replace 50% of wood siding to match existing; historic profiles	**1,050**	sf	22.00	23,100		
	Repair 50% of wood siding	**1,050**	sf	12.00	12,600		
	Replace 50% of all trim	**190**	lf	12.00	2,280		
	Replace 50% of all eaves and trim	**34**	lf	25.00	850		
	Replace 50% of all rake and trim	**35**	lf	15.00	525		
	Repair 50% of all trim	**190**	lf	6.00	1,140		
	Repair 50% of all eaves and trim	**34**	lf	14.00	476		
	Repair 50% of all rake and trim	**35**	lf	8.00	280		
	Paint all siding and trim with permeable barrier	**2,100**	sf	9.00	18,900		
	Air/Moisture barrier	**2,100**	sf	2.00	4,200		
	SUBTOTAL					90,524	
TOTAL, DIVISION 7 - THERMAL AND MOISTURE PROTECTION							**$125,294**
08	***DOORS & WINDOWS***						
080001	**Windows and doors**						
	Membrane flashing at windows	**244**	lf	9.00	2,196		
	Replace windows with custom historic windows	**186**	sf	250.00	46,500		
	New sealants	**244**	lf	14.00	3,416		
	Restore exterior doors	**2**	loc	2,000.00	4,000		
	SUBTOTAL					56,112	
TOTAL, DIVISION 8 - DOORS AND WINDOWS							**$56,112**
15	***MECHANICAL***						
220000	**Plumbing**						
	New trench drain	**1**	ls	5,000.00	5,000		
	SUBTOTAL					5,000	
TOTAL, DIVISION 8 - DOORS AND WINDOWS							**$5,000**

Levi Wetherbee Farmhouse
Envelope Repairs
Boxborough, MA

Schematic Design Estimate

CONSTRUCTION COST SUMMARY IN CSI FORMAT

	Subtotal	*Total*
Envelope Repairs Option 2		
The costs below do not include structural repairs		
DIV. 2 EXISTING CONDITIONS		**$3,936**
021500 Selective Demolition	$3,936	
025000 Hazardous Material	See Summary	
DIV. 4 MASONRY		**$6,500**
040001 Masonry	$6,500	
DIV. 6 WOODS & PLASTICS		**$1,220**
061000 Rough Carpentry	$1,220	
DIV. 7 THERMAL & MOISTURE PROTECTION		**$99,023**
070002 Roofing and Flashing	$24,270	
074000 Wood Siding	$74,753	
DIV. 8 DOORS & WINDOWS		**$29,736.00**
080001 Windows + Doors	$29,736	
SUBTOTAL DIRECT (TRADE) COST		**$140,415**

PM&C

Levi Wetherbee Farmhouse
Envelope Repairs
Boxborough, MA

01-Dec-17

Schematic Design Estimate

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
	Envelope Repairs Option 2						
	02 EXISTING CONDITIONS						
	021500 Demolition						
	Carefully remove, store and inspect existing window sashes; includes protection of openings	**186**	sf	8.00	1,488		
	Remove asphalt shingles, underlayment and flashings	**1,224**	sf	2.00	2,448		
	SUBTOTAL					3,936	
	TOTAL, DIVISION 2 - EXISTING CONDITIONS						**$3,936**
	04 MASONRY						
	041000 Masonry						
	Repoint existing masonry 100%	**100**	sf	65.00	6,500		
	SUBTOTAL					6,500	
	TOTAL, DIVISION 6 - WOOD & PLASTICS						**$6,500**
	06 WOOD & PLASTICS						
	061000 Rough Carpentry						
	Allowance for removal and replacement of deteriorated deck, 5% of total area	**122**	sf	10.00	1,220		
	SUBTOTAL					1,220	
	TOTAL, DIVISION 6 - WOOD & PLASTICS						**$1,220**
	07 THERMAL & MOISTURE PROTECTION						
	070002 Roofing and Flashing						
	Architectural asphalt shingles; includes all flashing	**1,224**	sf	10.00	12,240		
	Fiberglass reinforced building felt	**1,224**	sf	1.00	1,224		
	Ice and water barrier	**685**	sf	3.00	2,055		
	New aluminum gutters with gutter guard and gutter straps	**67**	lf	38.00	2,546		
	New aluminum downspouts	**135**	lf	28.00	3,780		
	Splash blocks	**4**	ea	250.00	1,000		
	Exterior masonry flashing						
	Zinc coated copper step flashing at chimney including brick reglet	**19**	lf	75.00	1,425		
	SUBTOTAL					24,270	
	074000 Wood Siding and trim						
	Strip paint from all siding and inspect for repair	**2,100**	sf	9.00	18,900		
	Strip paint from all trim and inspect for repair	**379**	lf	12.00	4,548		
	Strip paint from all eave and trim and inspect for repair	**67**	lf	25.00	1,675		
	Strip paint from all rake and trim and inspect for repair	**70**	lf	15.00	1,050		
	Repair/replace select individual locations of wood siding to match existing; historic profiles	**1,050**	sf	18.00	18,900		
	Repair/replace select locations of wood siding	**1,050**	sf	8.00	8,400		
	Repair/replace select locations of all trim	**190**	lf	8.00	1,520		
	Repair/replace select locations of eaves and trim	**34**	lf	15.00	510		
	Repair/replace select locations of rake and trim	**35**	lf	10.00	350		
	Paint all siding and trim with permeable barrier	**2,100**	sf	9.00	18,900		
	SUBTOTAL					74,753	
	TOTAL, DIVISION 7 - THERMAL AND MOISTURE PROTECTION						**$99,023**

PM&C

Levi Wetherbee Farmhouse
Envelope Repairs
Boxborough, MA

01-Dec-17

Schematic Design Estimate

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
	Envelope Repairs Option 2						
	08 DOORS & WINDOWS						
	070001 Windows and doors						
	Restore upper and lower sashes of existing windows	**186**	sf	120.00	22,320		
	New sealants	**244**	lf	14.00	3,416		
	Restore exterior doors	**2**	loc	2,000.00	4,000		
	SUBTOTAL					29,736	
	TOTAL, DIVISION 8 - DOORS AND WINDOWS						**$29,736**

PM&C

Levi Wetherbee Farmhouse
Envelope Repairs
Boxborough, MA

01-Dec-17

Schematic Design Estimate

CSI CODE	*DESCRIPTION*	*QTY*	*UNIT*	*UNIT COST*	*EST'D COST*	*SUB TOTAL*	TOTAL COST
SHORT TERM FOUNDATION REPAIRS							
	Wrap existing foundation wall with mesh	**779**	sf	3.00	2,337		
	E + B for new footings for braced frames	**21**	loc	100.00	2,100		
	New footings for braced frames	**21**	loc	222.22	4,667		
	Continuous steel girts	**246**	lf	45.00	11,070		
	Steel braced frames	**21**	loc	1,200.00	25,200		
	Excavate central stone wall for repairs	**1**	ls	5,000.00	5,000		
	Allowance for repair to chimney foundation	**1**	ls	10,000.00	10,000		
	Premium for confined space work	**1**	ls	9,056.10	9,056		
	SUBTOTAL					69,430	
TOTAL SHORT TERM FOUNDATION REPAIRS							**$69,430**

TOTAL WITH MARKUPS **$113,865**

PM&C

Levi Wetherbee Farmhouse
Envelope Repairs
Boxborough, MA

01-Dec-17

Schematic Design Estimate

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
LONG TERM FOUNDATION REPAIRS							
	Wrap existing foundation wall with mesh	**779**	sf	3.00	2,337		
	Underpin foundation	**18**	cy	2,000.00	36,000		
	Steel braced frames; connected to new footing and to wood framing	**21**	loc	900.00	18,900		
	New slab on grade	**830**	sf	20.00	16,600		
	Allowance for repair to chimney foundation	**1**	ls	15,000.00	15,000		
	Premium for confined space work	**1**	ls	13,325.55	13,326		
	SUBTOTAL					102,163	
TOTAL LONG TERM FOUNDATION REPAIRS							**$102,163**
TOTAL WITH MARKUPS							**$167,547**
Alternate 1							
	New concrete retaining wall to inside face of foundation wall	**779**	sf	70.00	54,530		
	Total with Markups				**$89,429**		
Alternate 2							
	Wrap existing foundation wall with mesh	**779**	sf	3.00	2,337		
	Excavate and backfill at perimeter of foundation wall	**202**	cy	60.00	12,120		
	New concrete retaining wall to outside face of foundation wall	**779**	sf	70.00	54,530		
	Allowance for waterproofing	**779**	sf	9.00	7,011		
	Allowance to reinstate/repair landscaping	**1**	ls	5,000.00	5,000		
	Total with Markups				**$132,837**		
Alternate 3							
	Shore and raise existing building	**1**	ls	20,000.00	20,000		
	Temporary sheeting and shoring	**984**	sf	50.00	49,200		
	Dismantle and store existing stone foundation wall	**779**	sf	15.00	11,685		
	Excavate and backfill for new foundation wall	**41**	cy	60.00	2,460		
	New concrete footing at foundation wall	**123**	lf	120.00	14,760		
	New concrete foundation wall	**779**	sf	40.00	31,160		
	Allowance rebuild stone wall to face of new foundation wall	**779**	sf	45.00	35,055		
	Total with Markups				**$269,485**		

PM&C

Levi Wetherbee Farmhouse
Envelope Repairs
Boxborough, MA

01-Dec-17

Schematic Design Estimate

CSI CODE	*DESCRIPTION*	*QTY*	*UNIT*	*UNIT COST*	*EST'D COST*	*SUB TOTAL*	TOTAL COST
FRAMING REPAIRS							
	Replace sills in sections	**50**	lf	120.00	6,000		
	Replace joists; includes shoring	**830**	sf	25.00	20,750		
	Jack up floor boards at central section	**1**	ls	1,000.00	1,000		
	Reattach flooring to new joists	**830**	sf	5.00	4,150		
	New support beams	**53**	lf	90.00	4,770		
	Replace damaged floor decking	**150**	sf	10.00	1,500		
	Repair cellar stair	**1**	ls	2,000.00	2,000		
	Repair with epoxy and pain existing floor boards	**166**	sf	15.00	2,490		
	SUBTOTAL					42,660	
TOTAL FRAMING REPAIRS							**$42,660**

TOTAL WITH MARKUPS **$69,962**

TOWN OF BOXBOROUGH

LEVI WETHERBEE FARMHOUSE STABILIZATION

LOCATOR MAP

NOTE:
CONTRACTOR TO FIELD VERIFY ALL DIMENSIONS AND CONDITIONS.

DRAWING SHEETS

General
G0-01 COVER SHEET

Architectural
A1-01 FLOOR PLANS
A1-02 ROOF PLAN

Structural
S1-01 FIRST FLOOR FRAMING PLAN

GENERAL NOTES

G0 A CERTIFICATE OF INSURANCE SHALL BE PROVIDED BY THE CONTRACTOR AND MADE PART OF THIS CONTRACT. THE CONTRACTOR'S POLICY COVERING THE INSURANCE SPECIFIED FOR THIS PROJECT SHALL NAME ORGANIZATION'S NAME AND CBI CONSULTING INC. ALL AS ADDITIONAL INSURED'S WITH A WAIVER OF SUBROGATION.

G1 CONTRACTOR SHALL BE RESPONSIBLE FOR CHECKING AND COORDINATING ALL DIMENSIONS WITH ARCHITECTURAL DRAWINGS. IN CASE OF CONFLICT, THE ARCHITECT SHALL BE NOTIFIED AND SHALL RESOLVE THE CONFLICT. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS AND CONDITIONS.

G2 IN ANY CASE OF CONFLICT BETWEEN OR WITHIN THE DRAWINGS AND THE PROJECT SPECIFICATIONS OR WITHIN THE DRAWINGS OR SPECIFICATIONS, THE MORE STRINGENT REQUIREMENTS SHALL GOVERN AT THE SOLE DISCRETION OF THE ARCHITECT.

G3 THE CONTRACTOR SHALL MAKE NO DEVIATION FROM DESIGN DRAWINGS WITHOUT PRIOR REVIEW BY THE ARCHITECT.

G4 WORK NOT INDICATED ON A PART OF THE DRAWINGS BUT REASONABLY IMPLIED TO BE SIMILAR TO THAT SHOWN AT CORRESPONDING PLACES SHALL BE REPEATED. ANY CONDITION FOUND NOT DETAILED SHALL BE CONSTRUCTED IN A MANNER SIMILAR TO THAT OF THE TYPICAL DETAILS.

G5 ALL WORK SHALL COMPLY WITH APPLICABLE CODES AND LOCAL LAWS AND REGULATIONS.

G6 GENERAL CONTRACTOR SHALL COORDINATE LOCATIONS OF OPENINGS, PITS, BOXES, SUMPS, TRENCHES, SLEEVES, DEPRESSIONS, GROOVES, AND CHAMFERS, WITH MECHANICAL, ELECTRICAL AND PLUMBING TRADES.

G7 THE STRUCTURAL DESIGN OF THE BUILDING IS BASED ON THE FULL INTERACTION OF ALL ITS COMPONENT PARTS. NO PROVISIONS HAVE BEEN MADE FOR CONDITIONS OCCURRING DURING CONSTRUCTION. IT IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO MAKE PROPER AND ADEQUATE PROVISIONS FOR STABILITY OF, AND ALL STRESSES TO, THE STRUCTURE DUE TO ANY CAUSE DURING CONSTRUCTION.

G8 CONTRACTOR SHALL NOT SCALE DRAWINGS. CONTRACTOR SHALL REQUEST ALL DIMENSIONS OR INFORMATION REQUIRED TO PERFORM THE WORK FROM THE ARCHITECT. WORK COMPLETED BY THE CONTRACTOR WITHOUT DIMENSIONS OR INFORMATION SHALL BE DONE AT HIS OWN RISK AND SHALL BE REMOVED AND REINSTALLED TO THE SPECIFICATIONS OF THE ARCHITECT AT NO ADDITIONAL COST TO THE OWNER.

G9 MEANS AND METHODS OF CONSTRUCTION AS WELL AS COMPLIANCE WITH OSHA AND OTHER SAFETY LAWS AND REGULATIONS IS EXCLUSIVE RESPONSIBILITY OF THE CONTRACTOR, HIS SUBCONTRACTOR(S), SUPPLIERS, CONSULTANTS AND SERVANTS.

G10 FOR ALL ITEMS THAT ARE TO BE REUSED AND/OR REINSTALLED AS PART OF THE WORK:

ALL ITEMS THAT ARE TO REMAIN ARE TO BE PROTECTED FROM DAMAGE. IF ANY DAMAGE OCCURS THE CONTRACTOR SHALL REPAIR THE ITEM SO IT IS IN A LIKE NEW CONDITION OR REPLACE IT WITH A NEW ITEM THAT FUNCTIONS THE SAME OR BETTER THAN THE ORIGINAL ITEM.

ALL ITEMS THAT ARE TO BE TEMPORARILY REMOVED & REINSTALLED ARE TO BE CAREFULLY REMOVED AND MOVED TO A PROTECTED AREA ON SITE OR TO AN OFF SITE FACILITY. THE ITEM IS TO BE CLEANED AND PREPARED FOR REINSTALLATION. ALL FITTINGS AND CONNECTION POINTS ARE TO BE INSPECTED AND REPAIRED. PROVIDE NEW FASTENERS AND CAREFULLY TRANSPORT THE ITEM BACK TO ITS ORIGINAL LOCATION AND CAREFULLY REINSTALL. IF ANY DAMAGE OCCURS THE CONTRACTOR SHALL REPAIR THE ITEM SO IT IS IN A LIKE NEW CONDITION OR REPLACE IT WITH A NEW ITEM THAT FUNCTIONS THE SAME OR BETTER THAN THE ORIGINAL ITEM.

LIST OF ABBREVIATIONS	
+/-	PLUS OR MINUS
AFF	ABOVE FINISH FLOOR
APPROX.	APPROXIMATE
BIT.	BITUMINOUS
BUR	BUILT UP ROOF
CB	CATCH BASIN
CMU	CONCRETE MASONARY UNIT
CONC.	CONCRETE
CONT.	CONTINUOUS
D.S.	DOWNSPOUT
E.W.	EACH WAY
EQ	EQUAL
FD	FLOOR DRAIN
HC	HANDICAP
HT	HEIGHT
I IN	INVERT IN
I OUT	INVERT OUT
ID	INTERIOR DIAMETER
L.C.C.	LEAD COATED COPPER
M.O.	MASONARY OPENING
MAX.	MAXIMUM
MIN.	MINIMUM
N.I.C	NOT IN CONTRACT
N.T.S.	NOT TO SCALE
N/A	NOT APPLICABLE
O.C.	ON CENTER
O.H.	OPPOSITE HAND
OD	OVERHEAD DOOR
P.T.	PRESSURE TREATED
PAV.	PAVERS
S.S	STAINLESS STEEL
SIM.	SIMILAR TO
T.	TREAD
TYP.	TYPICAL
U.O.N	UNLESS OTHERWISE NOTED
V.I.F.	VERIFY IN FIELD
VCB	VINYL COVE BASE
W/	WITH
Z.C.C.	ZINC COATED COPPER
Ø	DIAMETER

88 / AX-XX	SEE DETAIL 88 ON SHEET AX-XX
	BREAK LINE
---	DIMENSION LINE
---	EXTENT
##	DOOR TAG
XX	WINDOW TAG

CONTACT INFORMATION:

Architect

CBI CONSULTING INC
www.cbiconsultinginc.com

250 DORCHESTER AVENUE
BOSTON, MA 02127

P: (617) 268-8977
F: (617) 464-2971

cbi@cbiconsultinginc.com
www.cbiconsultinginc.com

Owner

Town of Boxborough
29 Middle Road
Boxborough, MA 01719
Contact: Selina S. Shaw
P: 978-264-1712
F: 978-264-3127

30 YEARS
CBI CONSULTING INC.
250 DORCHESTER AVENUE
BOSTON, MA 02127
P: (617) 268-8977
F: (617) 464-2971
cbi@cbiconsultinginc.com
www.cbiconsultinginc.com

LEVI WETHERBEE FARMHOUSE STABILIZATION

TOWN OF BOXBOROUGH

29 MIDDLE ROAD
BOXBOROUGH, MA 01719

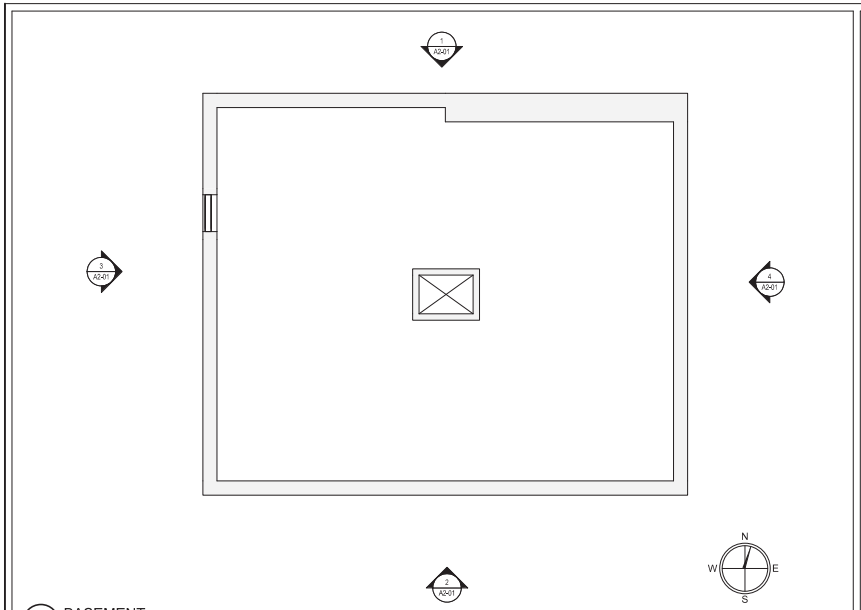
Drawing Title:
COVER SHEET

Revisions:

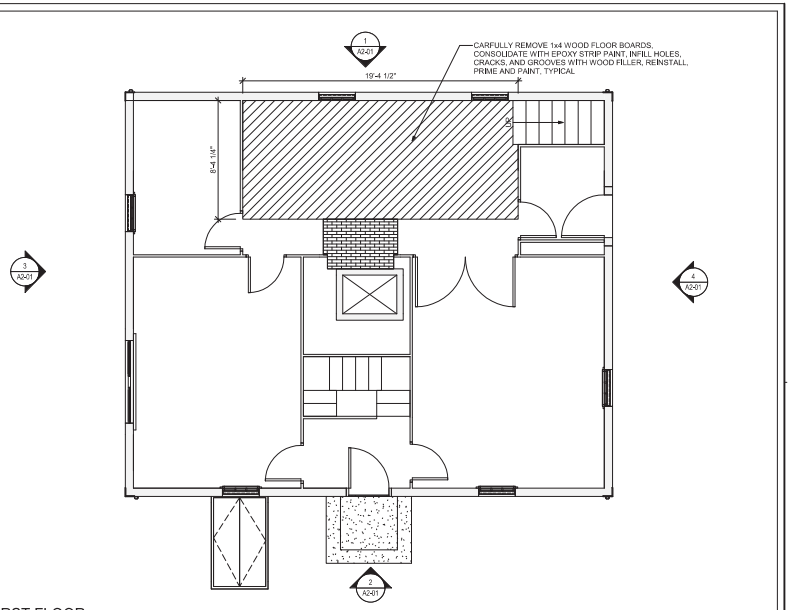
Submission:
SCHEMATIC DESIGN

Date:	November 21, 2017
Project Number:	17146
Project Manager:	MPS
Drawn By:	MVM
Scale:	NOT TO SCALE

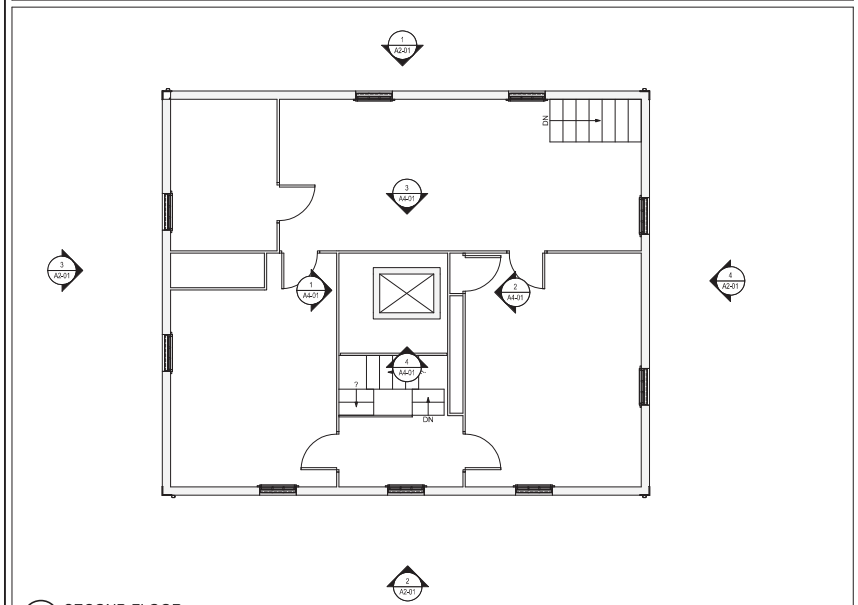
G0-01



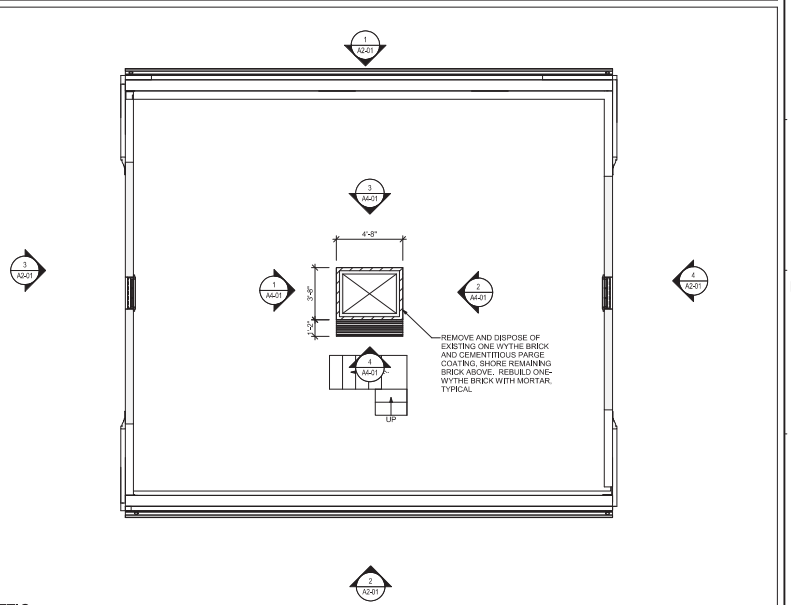
1 BASEMENT
1/4" = 1'-0"



2 FIRST FLOOR
1/4" = 1'-0"



3 SECOND FLOOR
1/4" = 1'-0"



4 ATTIC
1/4" = 1'-0"

30 YEARS
CBI CONSULTING INC.
250 DORCHESTER AVENUE
BOSTON, MA 02127
P: (617) 268-8977
F: (617) 464-2971
cbi@cbiconsultinginc.com
www.cbiconsultinginc.com

LEVI WETHERBEE FARMHOUSE STABILIZATION

BOXBOROUGH, MASS. INCORPORATED FEB. 23 1783

TOWN OF BOXBOROUGH

29 MIDDLE ROAD
BOXBOROUGH, MA 01719

Drawing Title:
FLOOR PLANS

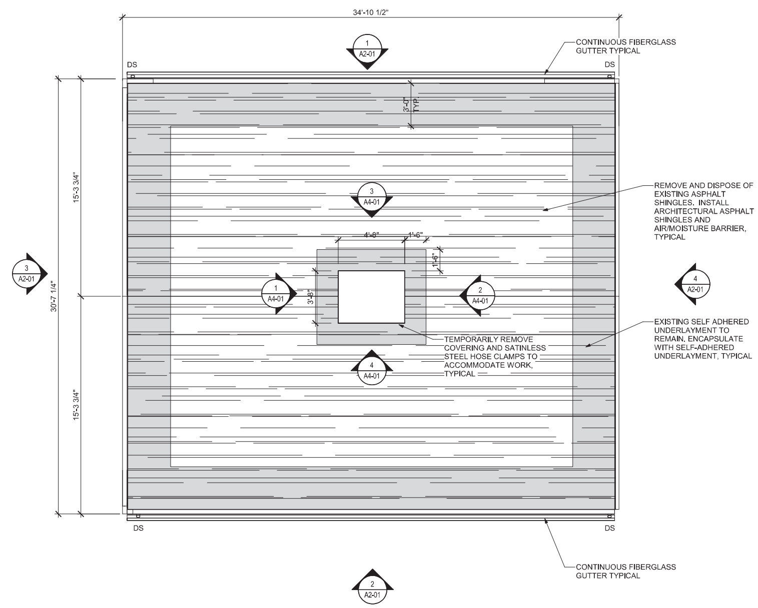
Revisions:

Rev. No	Date	Description

Submission:
SCHEMATIC DESIGN

Date: November 21, 2017
Project Number: 17146
Project Manager: Checker
Drawn By: Author
Scale: 1/4" = 1'-0"

A1-01



1 ROOF PLAN
1/4" = 1'-0"

CBI 30 YEARS
CONSULTING INC.
250 DORCHESTER AVENUE
BOSTON, MA 02127
P: (617) 268-8977
F: (617) 464-2971
cbi@cbiconsultinginc.com
www.cbiconsultinginc.com

LEVI WETHERBEE FARMHOUSE STABILIZATION

TOWN OF BOXBOROUGH

29 MIDDLE ROAD
BOXBOROUGH, MA 01719

Drawing Title:
ROOF PLAN

Revisions:

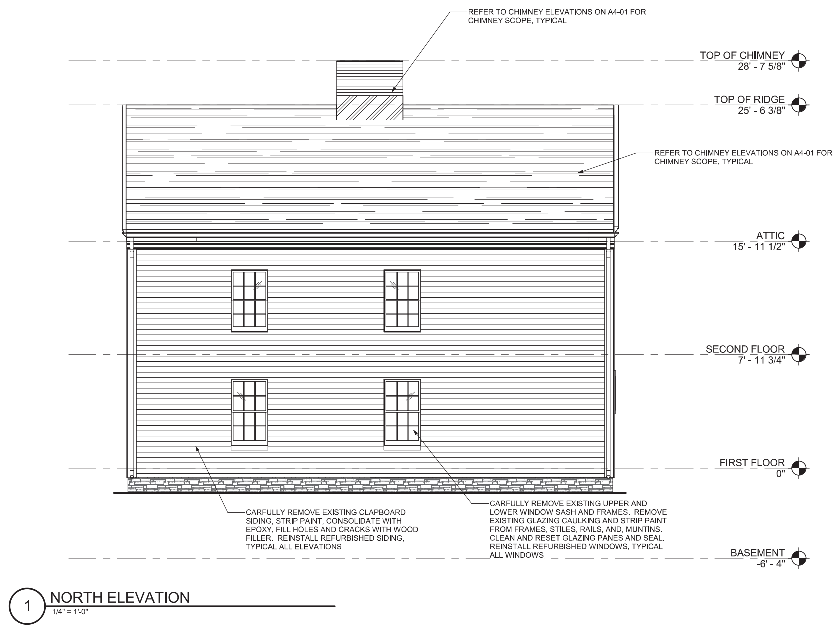
Rev. No	Date	Description

Submission:
SCHEMATIC DESIGN

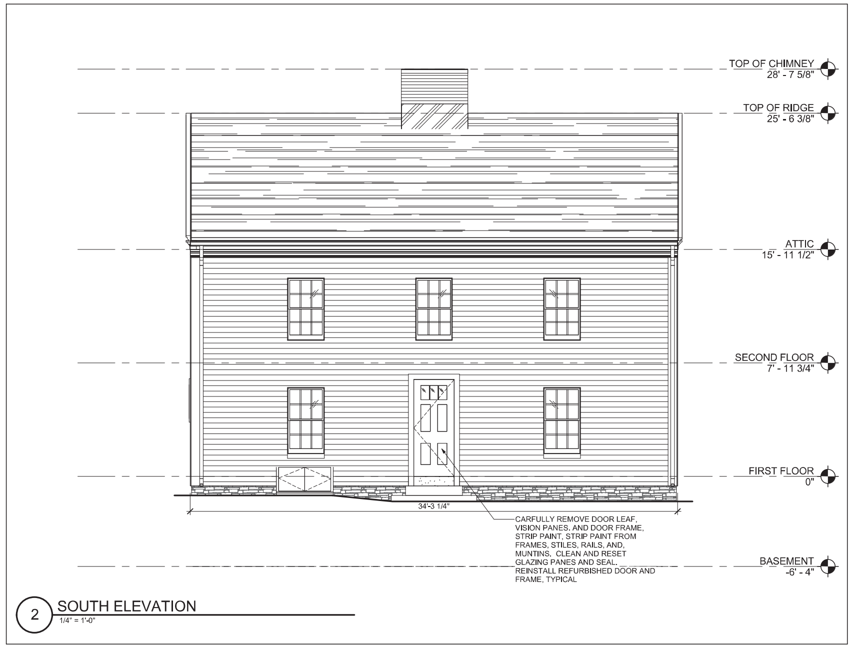
Date: November 21, 2017
Project Number: 17146
Project Manager: Checker
Drawn By: Author
Scale: 1/4" = 1'-0"

A1-02

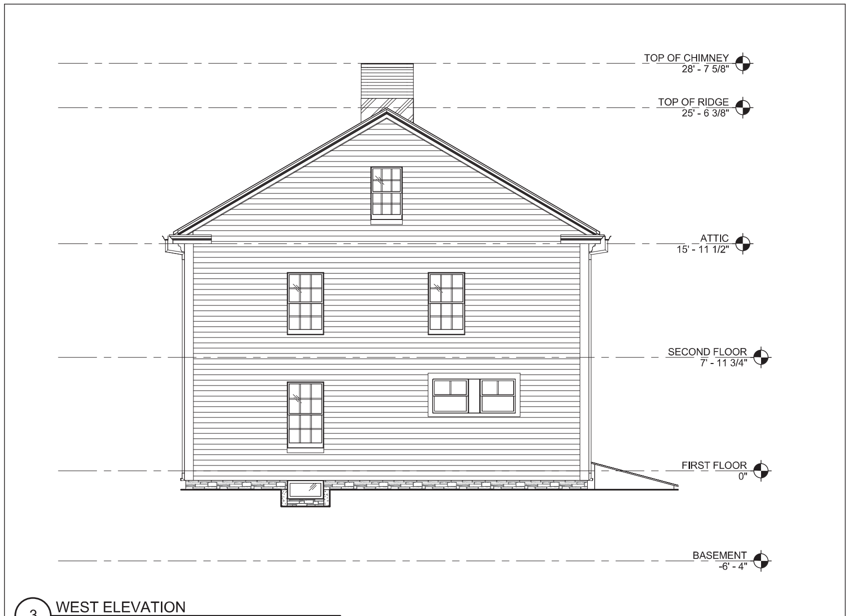
12/1/2017 11:48:11 AM C:\Revit 2017 Local Files\17146 Levi Wetherbee Farmhouse v2017_msquiresCBI.rvt



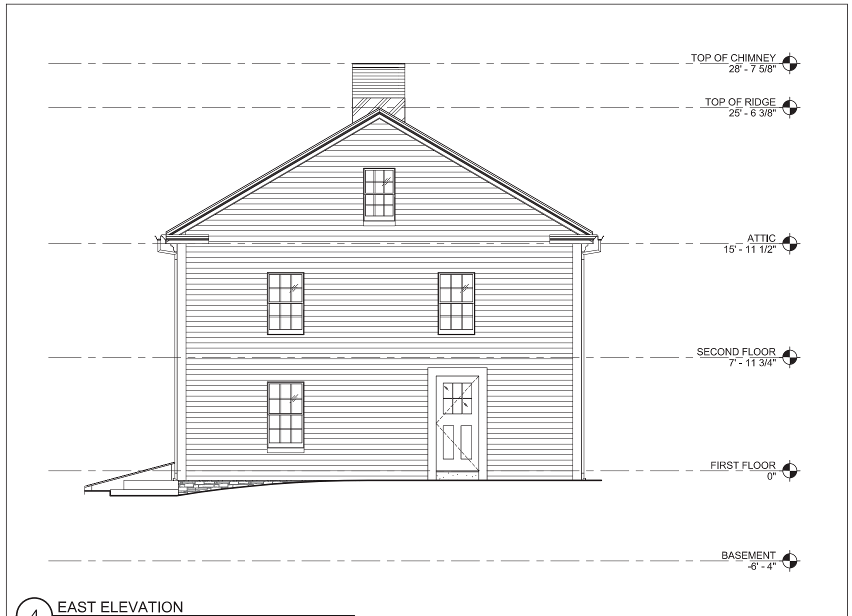
1 NORTH ELEVATION
1/4" = 1'-0"



2 SOUTH ELEVATION
1/4" = 1'-0"



3 WEST ELEVATION
1/4" = 1'-0"



4 EAST ELEVATION
1/4" = 1'-0"

30 YEARS
CBI CONSULTING INC.
250 DORCHESTER AVENUE
BOSTON, MA 02127
P: (617) 268-8977
F: (617) 464-2971
cbi@cbiconsultinginc.com
www.cbiconsultinginc.com

LEVI WETHERBEE FARMHOUSE STABILIZATION

BOXBOROUGH, MASS. · LUTHER BLANCHARD · 1775 · INCORPORATED FEB. 25, 1783

TOWN OF BOXBOROUGH

29 MIDDLE ROAD
BOXBOROUGH, MA 01719

Drawing Title:
BUILDING ELEVATIONS

Revisions:

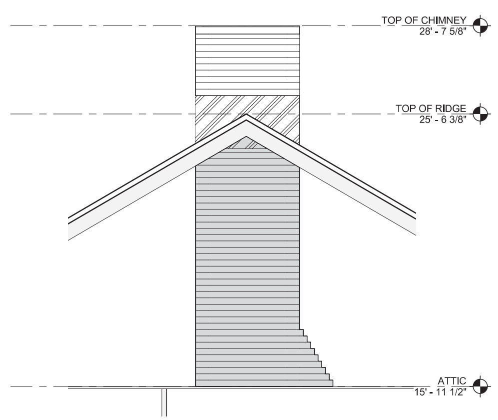
Rev. No	Date	Description

Submission:
SCHEMATIC DESIGN

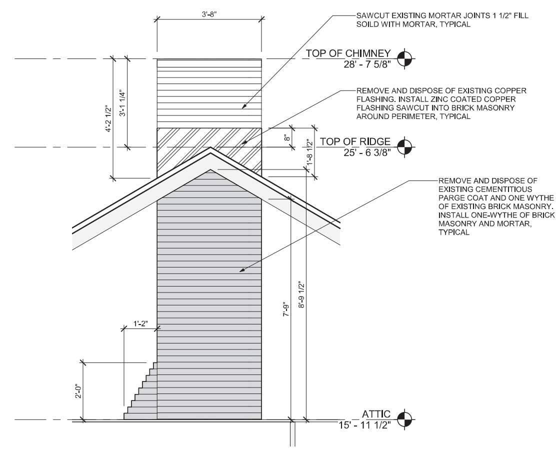
Date: November 21, 2017
Project Number: 17146
Project Manager: MPS
Drawn By: Author
Scale: 1/4" = 1'-0"

A2-01

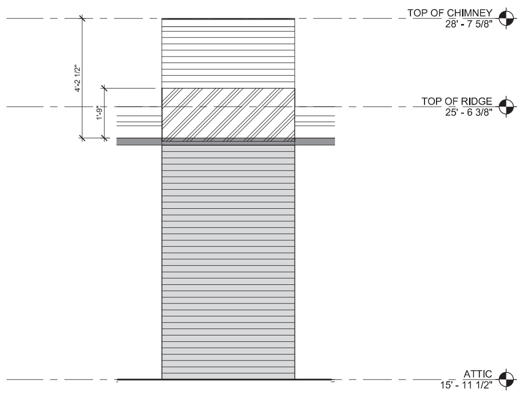
12/1/2017 11:48:12 AM C:\Revit 2017 Local Files\17146 Levi Wetherbee Farmhouse v2017_msquiresCBI.rvt



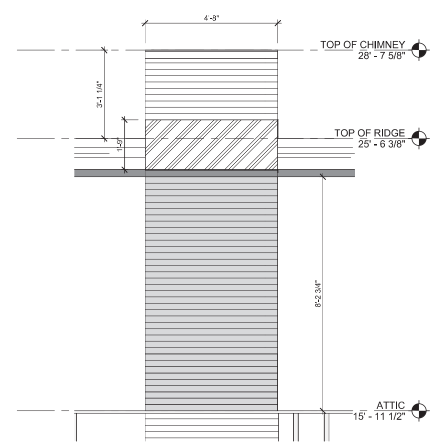
1 Chimney West
1/2" = 1'-0"



2 Chimney East
1/2" = 1'-0"



3 Chimney North
1/2" = 1'-0"



4 Chimney South
1/2" = 1'-0"

12/1/2017 11:48:13 AM C:\Revit 2017 Local Files\17146 Levi Wetherbee Farmhouse v2017_msquiresCBI.rvt

30 YEARS
CBI CONSULTING INC.
250 DORCHESTER AVENUE
BOSTON, MA 02127
P: (617) 268-8977
F: (617) 464-2971
cbi@cbiconsultinginc.com
www.cbiconsultinginc.com

LEVI WETHERBEE FARMHOUSE STABILIZATION

TOWN OF BOXBOROUGH

29 MIDDLE ROAD
BOXBOROUGH, MA 01719

Drawing Title:
CHIMNEY ELEVATIONS

Revisions:

Rev. No	Date	Description

Submission:
SCHEMATIC DESIGN

Date: November 21, 2017
Project Number: 17146
Project Manager: Checker
Drawn By: Author
Scale: 1/2" = 1'-0"

A4-01

ENVIRONMENTAL • GEOTECHNICAL
BUILDING SCIENCES • MATERIALS TESTING

500 W. Cummings Park, Suite 3750
Woburn, MA 01801
Telephone 781-932-9400
Fax 781-932-6211
www.atcgroupservices.com

October 26, 2017

Mr. Michael Squires
Assistant Project Manager
CBI Consulting Inc.
250 Dorchester Avenue
Boston, MA 02127

Subject: Limited Asbestos and Lead Inspection
484 Middle Road- Levi Wetherbee Farmhouse
Boxborough, Massachusetts 01719
ATC Job Number: 6000003266

Dear Mr. Squires:

ATC Group Services, LLC (ATC) was requested to perform representative lead paint testing and perform bulk sampling of suspect asbestos-containing materials on October 13th, 2017 of areas designated by CBI Consulting at the Levi Wetherbee Farmhouse located at 484 Middle Road, Boxborough, MA. These areas included the roofing system, windows, and mortar located in the basement. The lead determination was performed by Mr. Logan Fitzgerald. The asbestos inspection and bulk sampling was performed by Commonwealth of Massachusetts Department of Labor Standards (DLS) certified Asbestos Inspector Mr. Logan Fitzgerald (License No.: AI900711).

Asbestos-Containing Materials Survey

ATC performed bulk sampling of suspect asbestos-containing materials in areas designated by CBI Consulting. These areas included the roofing system, windows, and mortar located in the basement. A total of Twenty-three (23) samples were collected and a total of Eighteen (18) samples were analyzed for asbestos content. Representative bulk samples of each type of homogenous materials were collected. Sampling was performed to ensure compliance with the Asbestos Hazard Emergency Response Act (AHERA) criteria, as required by OSHA regulations, as well as the National Emission Standards for Hazardous Air Pollutants (NESHAP), and Commonwealth of Massachusetts Department of Environmental Protection (MADEP) standards (310 CMR 7.00: Air Pollution Control and 7.15: Asbestos) and DLS standards (453 CMR 6.00)

The samples were placed in labeled containers, which were sealed and submitted to the laboratory for analysis. Asbestos Identification Laboratory located in Woburn, Massachusetts, analyzed the asbestos bulk samples using Polarized Light Microscopy with dispersion staining (PLM/DS) in general accordance with EPA Method 600/R-93/116. The visual estimation technique was used to quantify asbestos concentrations. Asbestos Identification Laboratory is fully accredited for bulk sample analysis under the National Voluntary Laboratory Accreditation Program (NVLAP) administered by the National Institute of Standards and Technology and is also licensed by the Massachusetts Department of Labor Standards (DLS) (License No.: AA000208).

PLM bulk sample analysis indicated that the following materials were found to contain asbestos;

- Black Caulking Associated with the Chimney- Approximately 25 sq ft
- Black Caulking Associated with Roof Penetrations- Approximately 15 sq ft
- Exterior and Interior Window Glazing Compound- Approximately 19 Window Units (Includes all sashes and frames)

Please refer to the attached *Bulk Sample Results of Polarized Light Microscopy Analysis Table* and *AIL Analytical Results Forms* for sample information and analytical results.

ATC recommends that if a suspect material has not been positively identified, but is similar in mode of occurrence or physical properties as other ACM, it should be considered asbestos-containing. Any suspect materials uncovered during future renovation/demolition activities that are not readily identified as non-asbestos-containing should be assumed to be asbestos-containing, unless future bulk sampling and analysis reveals otherwise.

Representative Lead-Based Paint Survey

ATC performed a limited lead-containing paint determination on representative interior and exterior painted surfaces that may be impacted by the renovation project. Paint chip samples were submitted to EMSL Analytical Inc. for analysis in accordance with EPA method SW846—3050B/7000B. EMSL is an AIHA-LAP Certified Laboratory with lab ID number: 100194.

The table below provides the results of the lead paint testing. The Flame AAS readings are in parts per million (PPM), and in percent weight (%/weight).

As noted in the table, paint on the building exterior, interior and exterior windows, and the door frame contained detectable lead above the reporting limit

TABLE 1
LEAD PAINT TESTING RESULTS BY SOP BASED ON SW846-7420/3051
LEVI WETHERBEE FARMHOUSE
484 MIDDLE ROAD
BOXBOROUGH, MA

Location	Component	Substrate	Color	Flame AAS Results (PPM/% Weight)	Reporting Limit
Paint Chip Survey					
Building Exterior	Exterior – White Paint Chips	Wood	White	**31**	0.019
Building Exterior	Exterior – White Paint Chips	Wood	White	**37**	0.013
Door Frame	Interior – Red Paint Chips	Wood	Red	**38**	0.0089
Exterior Window Frame	Exterior – Red Paint Chips	Wood	Red	**37**	0.017
Interior Window	Interior – White Paint	Wood	White	**13**	0.019
Interior Kitchen Window	Interior- Yellow and Teal Paint Chips	Wood	Yellow and Teal	**0.21**	0.020

Regulatory Implications

The implications of LCP existing in a non-residential building are related to the future use of the facility and the need to impact these painted surfaces during the renovation and demolition process.

The Occupational Safety and Health Administration (OSHA) does not acknowledge any quantitative threshold for a lead-based paint. Paint with a detectable amount of lead, regardless of the level, is recognized as a lead-containing paint. The possible exposure hazard to workers impacting these coasted surfaces should be assessed and contractors and their employees must adhere to OSHA Lead in Construction standard found at 29 CFR 1926.62. Although OSHA does not recognize negative XRF results as proof that paint does not contain lead, the use of XRF is an efficient real time screening technique for identifying lead-containing paints. To comply with OSHA requirements, a negative XRF result would have to be confirmed by other approved methods. Positive XRF results do not need to be confirmed.

Regardless of analytical results, OSHA still requires that personal exposure monitoring be conducted when appropriate to determine lead exposure, even for zero results as determined by any method. To fully comply with EPA regulations, sampling of demolition debris waste streams may be required, depending on the requirements of the receiving facility.

OSHA recognizes that construction type work on surfaces coated with lead-containing paint has a potential to expose workers to hazardous levels of lead and requires that appropriate safety and health measures be followed as stated in 29 CFR 1926.62. OSHA states that until the employer performs an exposure assessment and documents that employees are not exposed above the permissible exposure limit (PEL) of greater than 50 micrograms per cubic meter ($\mu g/m^3$) of air, the employer must treat employees as if they were exposed above the PEL for the following operations:

- Manual renovation and demolition of structures, manual scraping, manual sanding and use of heat gun where lead-containing coatings or paints are present;
- Abrasive blasting;
- Power tool cleaning;
- Lead burning;
- Using lead-containing mortar or spray painting with lead-containing paint;
- Abrasive blasting, rivet blasting or welding, cutting or burning on any structure where lead-containing coatings or paint are present;
- Cleanup activities where dry expendable abrasives are used; and
- Any other task the employer believes may cause an excess of the PEL.

Work precautions include providing respiratory protection, protective work clothing and equipment, change areas, hand washing facilities, biological monitoring and training until an exposure assessment has determined that the work activity will result in an exposure below the PEL. Additional requirements under this standard include a written compliance program as well as record keeping.

Waste Disposal

Waste disposal is governed by the Federal Resource Conservation and Recovery Act (RCRA) regulations, which distinguish between solid wastes and hazardous wastes. Solid wastes include general construction debris and are subject to minimum handling, transportation, and landfill disposal requirements under RCRA regulations. Hazardous wastes, including certain lead-containing materials, are subject to restrictions designed to prevent the hazardous materials from entering the environment. Lead waste is classified as hazardous or non-hazardous based on the results of the Toxic Characteristic Leaching Procedure (TCLP) testing. The leachability test measures whether or not lead leaches from the waste in excess of the regulated level of 5.0 mg/L. If the results of the TCLP analysis exceed this level, the waste must be handled, transported and disposed as a hazardous waste in an approved waste site, reclamation facility or incinerator site.

If you have any questions regarding the contents of this report, please call us at your convenience at 781-932-9400. Thank you for the opportunity to be of service and we look forward to working with you on future projects.

Sincerely,

Logan Fitzgerald
Asbestos Inspector
For ATC Group Services, LLC
Direct Line: 774-273-0571
Email: logan.fitzgerald@atcassociates.com

Bryan Thompson
Division Manager- Building Sciences
For ATC Group Services, LLC
Direct Line: 781-404-1375
Email: bryan.thompson@atcassociates.com

Attachments: Bulk Sample Results Table
Appendix A- AIL Analytical Results
Appendix B- Lead Paint Analysis Results

APPENDIX I
BULK SAMPLE RESULTS
POLARIZED LIGHT MICROSCOPY ANALYSIS
LEVI WETHERBEE FARMHOUSE
484 MIDDLE ROAD
BOXBOROUGH, MA

Sample ID	Material	Sampling Locations	Analytical Results
01A-C	Asphalt Shingle (Top Layer)	Roof	No Asbestos Detected
02A-C	Vapor Barrier (Bottom Layer)	Roof	No Asbestos Detected
03A-C	Black Caulking Around Chimney	Roof	5% Chrysotile
04A-C	Gray Caulking Around Chimney	Roof	No Asbestos Detected
05A-C	Black Caulking Around Roof Penetrations	Roof	10% Chrysotile
06A-C	Exterior Window Glazing	Exterior Windows	2% Chrysotile
07A-C	Exterior Window Glazing on Door	Front Door	No Asbestos Detected
08A-B	Interior Window Glazing	Interior Windows	2% Chrysotile
09A-B	Mortar	Basement	No Asbestos Detected

Appendix A

AIL Analytical Results

Asbestos Identification Laboratory

165 New Boston St., Ste 227
Woburn, MA 01801
781-932-9600

Web: www.asbestosidentificationlab.com
Email: mikemanning@asbestosidentificationlab.com

Batch: 26726

NVLAP®
Lab Code: 200919-0

October 17, 2017

Bryan Thompson
ATC Group Services, Woburn
500 West Cummings Park
Suite 3750
Woburn, MA 01801

Project Number:
Project Name: Levi Wetherbee Farmhouse

Date Sampled: 2017-10-13
Work Received: 2017-10-16
Work Analyzed: 2017-10-16

Analysis Method: BULK PLM ANALYSIS EPA/600/R-93/116

Dear Bryan Thompson,

Asbestos Identification Laboratory has completed the analysis of the samples from your office for the above referenced project .

The information and analysis contained in this report have been generated using the EPA /600/R-93/116 Method for the Determination of Asbestos in Bulk Building Materials. Materials or products that contain more than 1% of any kind or combination of asbestos are considered an asbestos containing building material as determined by the EPA. This Polarized Light Microscope (PLM) technique may be performed either by visual estimation or point counting. Point counting provides a determination of the area percentage of asbestos in a sample. If the asbestos is estimated to be less than 10% by visual estimation of friable material, the determination may be repeated using the point counting technique. The results of the point counting supersede visual PLM results. Results in this report only relate to the items tested. This report may not be used by the customer to claim product endorsement by NVLAP or any other U.S. Government Agency.

Laboratory results represent the analysis of samples as submitted by the customer. Information regarding sample location, description, area, volume, etc., was provided by the customer. Asbestos Identification Laboratory is not responsible for sample collection activities or analytical method limitations. Unless notified in writing to return samples, Asbestos Identification Laboratory discards customer samples after 30 days. Samples containing subsamples or layers will be analyzed separately when applicable. Reports are kept at Asbestos Identification Laboratory for three years. This report shall not be reproduced, except in full, without the written consent of Asbestos Identification Laboratory.

- NVLAP Lab Code: 200919-0
- Massachusetts Certification License: AA000208
- State of Connecticut, Department of Public Health Approved Environmental Laboratory Registration Number: PH-0142
- State of Maine, Department of Environmental Protection Asbestos Analytical Laboratory License Number: LB-0078(Bulk) LA-0087(Air)
- State of Rhode Island and Providence Plantations. Department of Health Certification: AAL-121
- State of Vermont, Department of Health Environmental Health License AL934461

Thank you Bryan Thompson for your business.

Michael Manning
Owner/Director

October 17, 2017

Bryan Thompson
ATC Group Services, Woburn
500 West Cummings Park
Suite 3750
Woburn, MA 01801

Project Number:
Project Name: Levi Wetherbee Farmhouse

Date Sampled: 2017-10-13
Work Received: 2017-10-16
Work Analyzed: 2017-10-16

Analysis Method: BULK PLM ANALYSIS EPA/600/R-93/116

FieldID / LabID	Material	Location	Color	Non-Asbestos %	Asbestos %
01A 300669	Asphalt Shingle (Top Layer)	Roof	black	Fiberglass 20 Non-Fibrous 80	None Detected
01B 300670	Asphalt Shingle (Top Layer)	Roof	black	Fiberglass 25 Non-Fibrous 75	None Detected
01C 300671	Asphalt Shingle (Top Layer)	Roof	black	Fiberglass 20 Non-Fibrous 80	None Detected
02A 300672	Vapor Barrier (Bottom Layer)	Roof	black	Cellulose 70 Non-Fibrous 30	None Detected
02B 300673	Vapor Barrier (Bottom Layer)	Roof	black	Cellulose 80 Non-Fibrous 20	None Detected
02C 300674	Vapor Barrier (Bottom Layer)	Roof	black	Cellulose 80 Non-Fibrous 20	None Detected
03A 300675	Black Caulking Around Chimney	Roof	black	Cellulose 15 Non-Fibrous 85	None Detected
03B 300676	Black Caulking Around Chimney	Roof	black	Non-Fibrous 95	**Detected** **Chrysotile 5**
03C 300677	Black Caulking Around Chimney	Roof			Not Analyzed
04A 300678	Gray Caulking Around Chimney	Roof	white	Non-Fibrous 100	None Detected
04B 300679	Gray Caulking Around Chimney	Roof	white	Non-Fibrous 100	None Detected
04C 300680	Gray Caulking Around Chimney	Roof	white	Non-Fibrous 100	None Detected
05A 300681	Black Caulking Around Roof Penetrations	Roof	black	Non-Fibrous 90	**Detected** **Chrysotile 10**
05B 300682	Black Caulking Around Roof Penetrations	Roof			Not Analyzed

FieldID / LabID	Material	Location	Color	Non-Asbestos %	Asbestos %
05C 300683	Black Caulking Around Roof Penetrations	Roof			Not Analyzed
06A 300684	Exterior Window Glazing	Exterior Windows	gray	Non-Fibrous 98	**Detected** Chrysotile 2
06B 300685	Exterior Window Glazing	Exterior Windows			Not Analyzed
07A 300686	Exterior Window Glazing on Door	Front Door	gray	Non-Fibrous 100	None Detected
07B 300687	Exterior Window Glazing on Door	Front Door	gray	Non-Fibrous 100	None Detected
08A 300688	Interior Window Glazing	Interior Windows	gray	Non-Fibrous 98	**Detected** Chrysotile 2
08B 300689	Interior Window Glazing	Interior Windows			Not Analyzed
09A 300690	Mortar	Basement	gray	Non-Fibrous 100	None Detected
09B 300691	Mortar	Basement	gray	Non-Fibrous 100	None Detected

Tuesday 17 October

Analyzed by: Michael Thomas

End of Report

Batch: 26726

CHAIN OF CUSTODY

EPA/600/R-93/116

Asbestos Identification Lab
165 New Boston St.
Suite 227
Woburn, MA 01801
(781)932-9600
www.asbestosidentificationlab.com

Client: ATC
Address: Woburn, MA
Project Site & #: Levi Wetherbee farmhouse
Phone / email address: logan.fitzgerald@atcassociates.com
Contact: Bryan Thompson and Logan Fitzgerald
Relinquish by/date: logan fitzgerald 10/15/17 @ 900 hrs
Received by/date: [illegible signature] 10/16/17
# of Samples Received: 23

Date Sampled: 10/13/17
BATCH# 26726
Rev 12/15

Page 1 of 5

Turnaround Time	Sample Method
☐ Less 3 Hrs	☒ Bulk
☐ Same Day	☐ Soil
☒ Next Day	☐ Wipe
☐ Two Day	☐ Point Count

Stop on 1st Positive? (Yes) / No
Notify Method: Mail / (E-Mail) / Verbal
Anayzed By: [signature]
Date: 10/16/17

Temp in Celcius = ____

Lab ID# (Lab Use Only)	Field ID/ (Client Reference)	Material / Location	% of Asbestos	Color	Homogeneity	Texture	Friable	Asbestos Minerals	Asbestos %	Morphology	Extinction	Sign of Elongation	Birefringence	Pleochroism	RI ‖	RI ⊥	Fiberglass	Mineral Wool	Cellulose	Hair	Synthetic	Other	Non-Fibrous
70300669	01A	Material: Asphalt shingle (top layer) Location: roof	0	BK	N	GN/FN		Chrysotile									I						
								Amosite															
								Crocidolite															
								Tremolite															
								Anthophyllite															
								Actinolite									20						80
70	01B	Material: (same) Location: (same)	0	BK	N	GN/FN		Chrysotile									I						
								Amosite															
								Crocidolite															
								Tremolite															
								Anthophyllite															
								Actinolite									25						75
71	01C	Material: (same) Location: (same)	0	BK	N	GN/FN		Chrysotile									I						
								Amosite															
								Crocidolite															
								Tremolite															
								Anthophyllite															
								Actinolite									20						80

Temp in Celcius = ____

Lab ID# (Lab Use Only)	Field ID/ (Client Reference)	Material / Location	Stereo Scope: % of Asbestos	Color	Homogeneity	Texture	Friable	Asbestos Minerals	Optical Properties: Asbestos %	Morphology	Extinction	Sign of Elongation	Birefringence	Pleochroism	RI: II	RI: ⊥	Non-Asbestos Percentage (%): Fiberglass	Mineral Wool	Cellulose	Hair	Synthetic	Other	Non-Fibrous
72	02A	Material: vapor barrier (bottom layer) Location: roof	0	BK	N	GN/FN	N	Chrysotile															
								Amosite															
								Crocidolite															
								Tremolite											R				
								Anthophyllite															
								Actinolite											70				30
73	02B	Material Location	0	BK	N	GN/FN	N	Chrysotile															
								Amosite															
								Crocidolite															
								Tremolite											R				
								Anthophyllite															
								Actinolite											80				20
74	02C	Material Location	0	BK	N	GN/FN	N	Chrysotile															
								Amosite															
								Crocidolite															
								Tremolite											R				
								Anthophyllite															
								Actinolite											80				20
75	03A	Material: Black caulking around chimney Location: roof	0	BK	N	GN	N	Chrysotile															
								Amosite															
								Crocidolite															
								Tremolite											R				
								Anthophyllite															
								Actinolite											15				85
76	03B	Material Location	0	BK	N	GN	N	Chrysotile	S	W	P	+	L	N	1550	1560							
								Amosite															
								Crocidolite															
								Tremolite															
								Anthophyllite															
								Actinolite															95

Temp in Celcius = ____

Lab ID# (Lab Use Only)	Field ID/ (Client Reference)	Material / Location	Stereo Scope					Asbestos Minerals	Optical Properties						RI		Non-Asbestos Percentage (%)							
			% of Asbestos	Color	Homogeneity	Texture	Friable		Asbestos %	Morphology	Extinction	Sign of Elongation	Birefringence	Pleochroism	II	⊥	Fiberglass	Mineral Wool	Cellulose	Hair	Synthetic	Other	Non-Fibrous
77	03C	Material: Black caulking around Chimney Location: roof	0	Blk	un	aw		Chrysotile Amosite Crocidolite Tremolite Anthophyllite Actinolite																DM4
78	04A	Material: Gray caulking around chimney Location	0	un	un	aw		Chrysotile Amosite Crocidolite Tremolite Anthophyllite Actinolite															100	
79	04B	Material Location	0	un	un	aw		Chrysotile Amosite Crocidolite Tremolite Anthophyllite Actinolite															100	
80	04C	Material Location	0	un	un	aw		Chrysotile Amosite Crocidolite Tremolite Anthophyllite Actinolite															100	
81	05A	Material: Black caulking around roof Penetrations Location	0	Blk	un	aw		Chrysotile Amosite Crocidolite Tremolite Anthophyllite Actinolite	10	w	p	+	c	N	1556	1551							90

Temp in Celcius = ____

Lab ID# (Lab Use Only)	Field ID/ (Client Reference)	Material / Location	Stereo Scope: % of Asbestos	Color	Homogeneity	Texture	Friable	Asbestos Minerals	Optical Properties: Asbestos %	Morphology	Extinction	Sign of Elongation	Birefringence	Pleochroism	RI: II	RI: ⊥	Non-Asbestos Percentage (%): Fiberglass	Mineral Wool	Cellulose	Hair	Synthetic	Other	Non-Fibrous	
82	05B	Material: Black caulking around roof penetration Location: roof						Chrysotile																DNA
								Amosite																
								Crocidolite																
								Tremolite																
								Anthophyllite																
								Actinolite																
83	05C	Material Location						Chrysotile																DNA
								Amosite																
								Crocidolite																
								Tremolite																
								Anthophyllite																
								Actinolite																
84	06A	Material: Exterior window glazing Location: Exterior windows	0	6Y	N	any		Chrysotile	2	W	P	+	C	N	1557	1550							95	
								Amosite																
								Crocidolite																
								Tremolite																
								Anthophyllite																
								Actinolite																
85	06B	Material Location						Chrysotile																DNA
								Amosite																
								Crocidolite																
								Tremolite																
								Anthophyllite																
								Actinolite																
86	07A	Material: Exterior window glazing on door Location: Front door	0	6Y	N	any		Chrysotile																
								Amosite																
								Crocidolite																
								Tremolite																
								Anthophyllite																
								Actinolite															100	

Temp in Celcius = ___

Lab ID# (Lab Use Only)	Field ID/ (Client Reference)	Material / Location	Stereo Scope: % of Asbestos	Color	Homogeneity	Texture	Friable	Asbestos Minerals	Optical Properties: Asbestos %	Morphology	Extinction	Sign of Elongation	Birefringence	Pleochroism	RI: ∥	RI: ⊥	Non-Asbestos Percentage (%): Fiberglass	Mineral Wool	Cellulose	Hair	Synthetic	Other	Non-Fibrous
87	07B	Material: Extrior window Glazin on door; Location: Front door	0	GY	N	AN	/	Chrysotile															100
								Amosite															
								Crocidolite															
								Tremolite															
								Anthophyllite															
								Actinolite															
88	08A	Material: Interior window glazin; Location: Interior window	0	GY	N	AN	/	Chrysotile	2	W	P	+	L	N	1556	1550							98
								Amosite															
								Crocidolite															
								Tremolite															
								Anthophyllite															
								Actinolite															
89	08B	Material: (same as above); Location: (same as above)						Chrysotile															
								Amosite															
								Crocidolite															
								Tremolite															
								Anthophyllite															
								Actinolite															
90	09A	Material: Mortar; Location: Basement	0	GY	N	AN		Chrysotile															100
								Amosite															
								Crocidolite															
								Tremolite															
								Anthophyllite															
								Actinolite															
91	09B	Material: (same as above); Location: (same as above)	0	GY	N	AN		Chrysotile															100
								Amosite															
								Crocidolite															
								Tremolite															
								Anthophyllite															
								Actinolite															

Dust

Appendix B

Lead Paint Analysis Results

ProScience Analytical Services, Inc.
22 Cummings Park, Woburn, MA 01801

Telephone: 781-935-3212
Facsimile: 781-932-4857
Email: chemistry@proscience.net

Laboratory Report

Contact: Bryan Thompson
Client: ATC Group Services, LLC
Address: 500 W. Cummings Pk , 3750
Woburn, MA 01801

Batch #: C 293540
Date received: 10/18/2017
Date analyzed: 10/16/2017
Date of report: 10/16/2017

Project # N/A
P.O.# N/A
Project Site: Levi Wetherbee Farmhouse
484 Middle Rd., Boxborough, MA

AIHA-LAP, LLC Lab ID 102754

Lead Analysis In Paint Using SOP Based on SW846-7420/3051
Results in weight percent on an "as received" weight basis

Lab ID	Client ID	Sample date	Description	Result	Reporting Limit	Comments
C 585964	1	10/13/17	White Paint / Building Exterior	31	0.019	
C 585965	2	10/13/17	White Paint / Building Exterior	37	0.013	
C 585966	3	10/13/17	Red Paint / Door Frame	38	0.0089	paint+plaster
C 585967	4	10/13/17	Red Paint / Exterior Window Frame	37	0.017	
C 585968	5	10/13/17	White Paint / Interior Windows	13	0.019	
C 585969	6	10/13/17	Yellow / Teal Paint / Interior Kitchen Window	0.21	0.020	

Simona Peavey, Tech. Manager Chemistry
Aimee Cormier, Lab Director

Unless otherwise indicated, all samples were received in acceptable condition.
All result apply only to the samples as received and are accurate to no more than two significant figures.
Unless otherwise indicated, all the quality control criteria for the method above have been met.
RL-Reporting Limit(%by weight) Note on units: mg/Kg is the same as ppm by weight.

ProScience Analytical Services, Inc.

Chemistry Chain of Custody Record

LABORATORY/HEADQUARTERS
22 Cummings Park, Woburn, MA 01801
T:781-935-3212 F:781-932-4857

www.proscience.net
general@proscience.net

Rush/<6 Hours — Turn Around Time Requested

Same Day	Next Day	2 Day	3 Day	5 Days
		X		

Client: ATC Group Services

Address — Street: 500 W. Cummings Park Suite 3750
Town: Woburn — State/Zip: MA 01801

Project Site — Line 1: Levi Wetherbee Farmhouse — Project Number:
Line 2: 484 Middle Road, Boxborough, MA — PO:

Contact: Logan.Fitzgerald@atcassociates.com — Phone: 774-273-0371 — FAX: — Alt/Pager:

☐ NELAC analysis

TYPE OF ANALYSIS (circle)

DUST WIPES	PAINT (0.1 g)	SOIL (1 g)
AIR	TSP	TCLP (100g)
(min)	PM10	Other

Please use a separate form for each matrix.

Element: gravimetric
(Pb) Cd Cr As Hg
Se Ag Ba Fe

Other (please specify under Comments)

☐ QC

For Laboratory Use
BATCH NUMBER: C 293540

☐ ASTM E1792

FOR LABORATORY USE ONLY

Date and Time Sampled	Field I.D.	Sample Description/Location	Air Sampling Information: Start Time	End Time	Start Flowrate	End Flowrate	Volume (liters)	Wiped area: length (inch)	width (inch)	Area (sq in)	ANALYSIS: Weight (grams)	Dil'n	AA/ ICP Reading	RESULT	Lab I.D.
10/13/17 - 11am	01	White paint / Building Exterior													585964
	02	White Paint / Building Exterior													65
	03	red Paint / Door frame													66
	04	red Paint / exterior window frame													67
	05	white paint / Interior windows													68
	06	yellow/teal paint / Interior kitchen window													69

Relinquished By: Logan Fitzgerald — Date: 10/15/17 — Time: 11:30 am
Received By: — Date: 10/16/17 — Time: 7:00a

Comments:

ver 5.3

Field blanks are required for airs and wipes per the sampling method.
Proscience Analytical Services reserves the right to subcontract samples to an appropriately accredited laboratory when we are unable to perform the analysis in house.