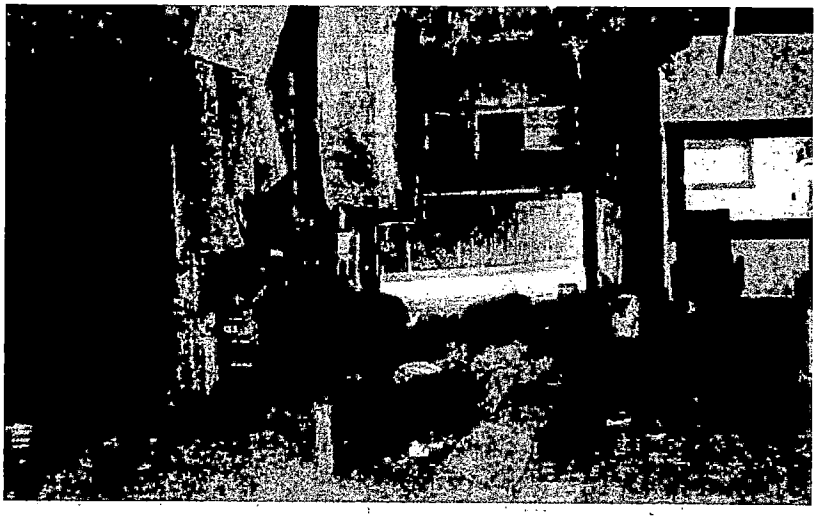
Jim Barnes

Historic Structures Report

Benson's Property
Town of Hudson, New Hampshire
May 22, 2003 – 100% Submittal

Haselton Barn
Feature Inventory and Condition Assessment

Building Envelope



Feature Description:

Although rehabilitation has been identified as the ultimate treatment for the Haselton Barn, interim measures are required to maintain the building without additional loss of historic integrity until long term uses have been identified, and funding is available for rehabilitation. Stabilization consists of measures to slow or stop the process of deterioration by reestablishing a weather resistant enclosure, and providing temporary, reversible means of structural shoring or support where necessary.

Quantity:	Measurement unit:	Condition Rating:
1	Ea	Poor

Feature Condition:

The Haselton Barn has been largely abandoned for over ten years. Although some stabilization work was done in the early 1990's, deterioration of the building continues and accelerates. Immediate stabilization efforts are needed to slow the existing deterioration of the barn. By executing these recommendations, the barn can be made safer and less exposed to the elements. These recommendations are provided as a beginning point for the complete restoration of the building. The work is necessary to ensure the structural integrity of the building, and to provide opportunity for careful planning and fund-raising for the eventual restoration of the barn.

Treatment Type: **Stabilization**

Priority: **Critical**

Building Envelope

Treatment Description: Site work and grading

Debris, shrubbery, trees, and other organic matter should be removed from the perimeter of the building up to a distance of about twenty feet. Surface grading where water passes directly to the building as a result of built up earth should be graded away from the structure. Large piles of branches etc., should be removed a safe distance from the building and burned or carted away.

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
1 LS	$5,000.00 LS	$5,000.00

Treatment Reference:

Treatment Description: Weatherization of structure

Remaining areas around the perimeter of the barn where clapboards and or sheathing is missing, should be closed in. This can be done by installing 30 pound felt paper in such a way that water sheds onto the paper from above and sheds water out and away from the building. Wood shingles and strapping can be installed over the paper to secure it to the building.

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
1 LS	$1,500.00 LS	$1,500.00

Treatment Reference:

Treatment Description: Stabilize cupola

The cupola on top of the original barn is in significant structural failure. It should be stabilized and removed to the ground in order to reduce the risk of continued damage to its architectural and structural elements. The extent of damage here also poses a significant safety risk should strong wind and heavy snow aid in its imminent collapse. The cupola is the one element of the barn that is highly decorated. Upon placing the structure on the ground, it should be sheltered inside the cellar bay at the rear of the barn or covered by a temporary structure that will protect and secure it. The remaining roof opening atop the barn must be covered with a temporary roof designed to prevent continued water penetration into the structure. (The Benson's Committee has suggested that the cupola be removed to the Hudson Highway Maintenance Facility pending restoration and re-erection).

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
1 LS	$6,000.00 LS	$6,000.00

Treatment Reference:

Building Envelope

Treatment Description: **Secure window and door openings**

The barn must be made secure by closing in all window and door openings. This should include the removal of windows and doors that have been extensively damaged by vandalism and the elements. Window openings should be temporarily covered by clear lexan or plexiglass panels set in wood frames to protect the security of the building while still allowing light into the structure for continued investigation and preservation. Hinged 3/4 inch thick plywood temporary doors with proper hasp and padlock security should secure door openings. Keys should be procured by Police and Fire departments via an on site locked box designed for said purpose. Additional keys should be obtainable through the town office and a log of their use established.

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
1 LS	$6,000.00 LS	$6,000.00

Treatment Reference:

Park, Sharon C. Preservation Brief 31 – Mothballing Historic Buildings. U.S. Department of the Interior, Nationa Park Service, Preservation Assistance Division. Washington, DC. 1993.

Treatment Description: **Structure clean-up and debris removal**

The barn is in need of an extensive clean up effort to remove debris from every level of the structure. Existing paper products as well as tires, engine parts and other debris must be removed to reduce the present fire hazard facing the building. A minimum of two 30 yard dumpsters will be necessary for the clean up effort. Labor must be equipped with respirators and protective clothing.

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
1 LS	$8,000.00 LS	$8,000.00

Treatment Reference:

Stabilization Treatment Cost Total: **$26,500.00**

Foundation: Main Barn

Feature Description:

The foundation of the Haselton barn is made up of rubble stone and brick. Some areas of the stone have been parged with mortar but for the most part the stone is dry laid. The brick is largely utilized to fill in portions of the foundation that once were deliberate openings into the lower level of the barn. Brick walls are also found at the base of the drive posts in the lowest level of the barn. The brick here is also an added element to the original construction.

Quantity:	Measurement unit:	Condition Rating:
440	LF	Fair

Feature Condition:

The foundation needs considerable repair along the south eave perimeter wall. The retaining walls perpendicular to the foundation also need to be realigned. Drainage along the south eave of the building is poor, allowing water to enter the foundation and push it apart during the freeze/thaw cycle.

Treatment Type: Preservation

Priority: High

Treatment Description: Catalog, remove and rebuild with original stone.

The stone foundation along the south eave will need to be cataloged and dismantled down to where the foundation is solid. The estimate includes removal to a depth of six feet if necessary. The foundation should be dry laid and reset with the original stones to provide a solid foundation. The installation of proper drainage along this wall will ensure the longevity of the wall.

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
900 SF	$45.00 SF	$40,500.00

Treatment Reference:

Cost estimates are based on similar stone wall repair work performed by Early American Masonry, Rick Irons of Limerick, Maine. Actual costs may vary.

Preservation Treatment Cost Total: **$40,500.00**

Foundation of Attached Silo Ell

Feature Description:

The foundation of the attached silo ell is made up of small rubble stone and appears minimal at best. It is currently almost entirely covered by the existing grade surrounding the ell. It is made up of native stone and dry laid.

Quantity:	Measurement unit:	Condition Rating:
56	LF	Poor

Feature Condition:

The rubble stone foundation has failed along each wall of the ell. The grade around the ell has built up over the years directly exposing the foundation to the freeze and thaw of the soil. This has pushed the stone out of alignment and caused many to settle into the earth, leaving the building unsupported.

Treatment Type: Preservation

Priority: High

Treatment Description: **Reconstruct stone foundation on new footing.**

The silo ell foundation will need to be cataloged and carefully removed so that a proper footing can be placed below the frost line. This footing should be placed at least four feet below the finished grade around the structure. The footing can be of poured concrete or it can be constructed of packed earth and a foot of packed crushed stone. The original stones may not be sufficient for the new foundation depth. In this case similar stone should be acquired for the below grade work. This will allow the use of the original stone for above grade work.

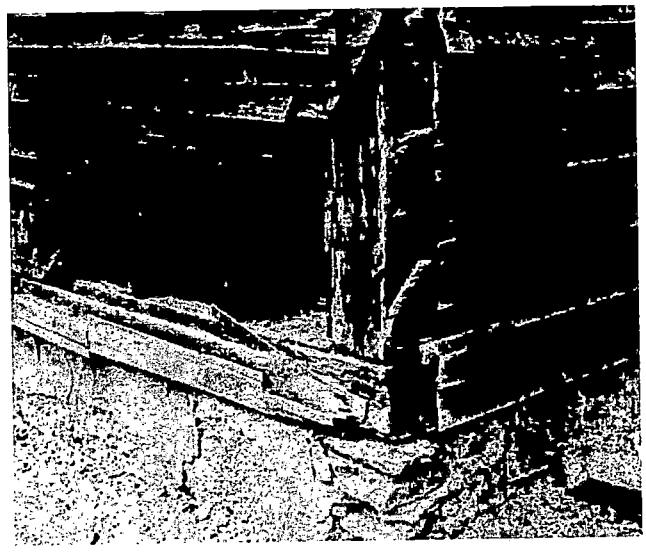
Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
336 SF	$45.00 SF	$15,120.00

Treatment Reference:

Cost estimates are based on similar stone wall repair work performed by Early American Masonry, Rick Irons of Limerick, Maine. Actual costs may vary.

Preservation Treatment Cost Total: **$15,120.00**

Sills: Silo Ell



Feature Description:

Perimeter sills of the silo ell are created from 8"x 8" softwood beams. The sills accept vertical studs and posts at four corners. They are half lapped at the corners and pegged with wooden pegs. The sills are continuous along the length of each ell wall,

Quantity:	Measurement unit:	Condition Rating:
84	LF	Poor

Feature Condition:

The perimeter sills on the ell are very deteriorated due to high grade and exposure to the elements. Much of the sill along the east wall is missing and unsalvageable. The rest of the perimeter while existing is very rotten and is not structurally sound.

Treatment Type: Restoration

Priority: High

Treatment Description: In-kind replacement of sills, stud and post repair.

Perimeter sills of the ell will need to be replaced in kind using native hemlock beams. The ell will need to be supported on jacks and cribbing for this process and the building can be straightened at that time. The bottoms of the studs and posts will require repair. In the posts, a new foot will be spliced using new timber into the original fabric via the use of the scarf joint prevalent in the main building. The studs will be repaired by cutting away the rotten base and introducing a compression block to the sill and a tenoned sister stud about four feet long which engages a sill mortise and pegged into the original fabric of the stud with wooden pegs.

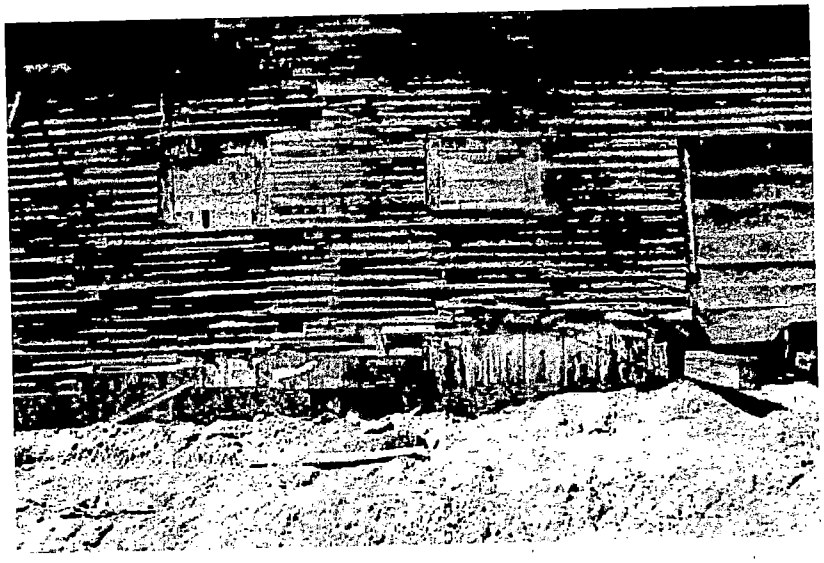
Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
84 LF	$175.00 LF	$14,700.00

Treatment Reference:

This repair method is evident in the post extensions seen in the main barn. This repair method is seen in many properly repaired timber framed buildings across the Northeast.

Restoration Treatment Cost Total: **$14,700.00**

Sills: Main Barn



Feature Description:

The sills of the main barn are made up of 8"x 8" timbers of considerable length. The east gable end is one piece and the two eave walls are comprised of two sections of timber with a bladed scarf joint joining the two elements. They are native softwood and appear to be good quality pine. Sills are lapped at the corners of the building with both lap joints and scarf joints pinned with wooden pegs. Structural posts and studs engage the sills with a short tenon into a shallow mortise. Floor joists are pocketed into the sill. The sills are present around the entire perimeter of the main barn and along each side of the center drive.

Quantity:	Measurement unit:	Condition Rating:
464	LF	Good

Feature Condition:

Sills along the north eave wall of the barn appear in very good shape as they are well above grade. Sills along the West gable end also appear in good shape albeit they are part of the two added bays of the barn. They too are well above grade. Sills along the south eave wall have been damaged by water and will need repair. The sill along the east gable end is damaged due to high grade and water penetration. Temporary supports have been added to the drive sills and adjacent drive joists where the joinery has rotted as they engage the rotten gable end sill.

Treatment Type: Restoration

Priority: High

Sills: Main Barn

Treatment Description: **In-kind repair and/or of exisitng sills**

As much of the original sills should be retained as is possible to assure the structural integrity of the frame. Where replacement is necessary, new hemlock beams of equal size and conversion method should be utilized. This means that if part of an original sill is rotted at one end, then the new wood used to repair the end should be of the same size and similar species. Although most of the sills appear to be pine, replacement wood should be native hemlock as it is more rot resistant. All new wood spliced to old should utilize the bladed scarf joint that appears throughout the building. Wooden pegs should be installed to secure any joinery. All joist pockets, post and stud mortises should be installed to match the layout of the original sills.

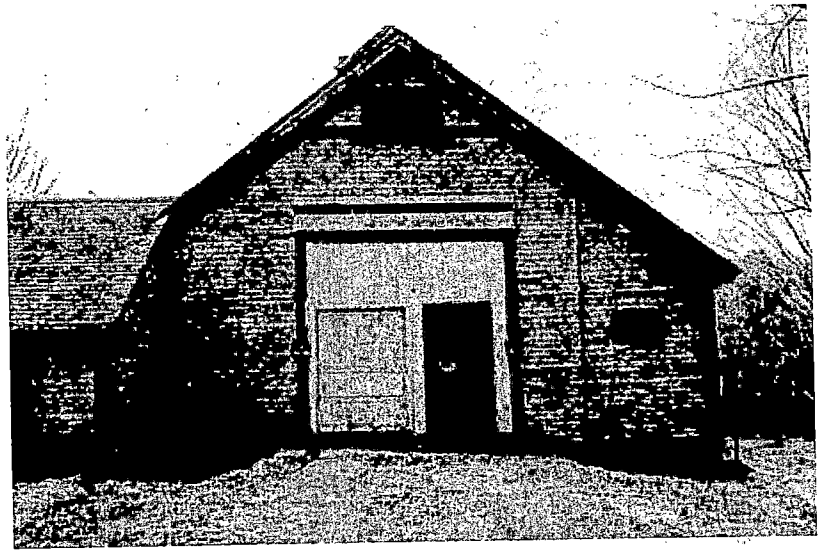
Repair/Replacement Amount:	**Unit Cost:**	**Repair/Replacement Cost:**
162 LF	$175.00 LF	$28,350.00

Treatment Reference:

Native hemlock and pine timbers can be sawn to exact dimension by almost any custom saw mill in the area. Cost Estimates are based on similar work completed by Preservation Timber Framing Inc., Eliot, Maine. Cost estimates are based on the support of the building on jacks and cribbing while sill replacement and repair is performed. It includes the repair of post feet and studs along the perimeter of repaired or replaced sill beams.

Restoration Treatment Cost Total: **$28,350.00**

Main Barn: Bent One - East Gable End



Feature Description:

The east gable end of the barn can be considered the front of the barn as viewed from the Bush Hill Road. It measures 36 feet in length and 9'- 1" to the eave line. The nine pitch roof creates a peak height of 24 feet. This bent sits at grade with an earthen ramp leading up to the center drive doors. Existing exterior doors are created from modern overhead garage doors on tracks. Plywood has been placed in the original door opening with a person door access to the right of the garage door. Evidence of a transom light over the original opening is clearly visible above the doors. The original pocket door and its hardware are still intact just behind the later added garage door. Window fenestration evidence clearly remains in this façade albeit the sash and portions of the frames are damaged or missing. Exterior trim elements appear original to the barn and remain intact. The exterior of the façade is clad with clapboards.

Quantity:	Measurement unit:	Condition Rating:
1	LS	Poor

Feature Condition:

The east gable end has experienced major alterations with the addition of the garage doors. Fortunately the original evidence of both window placement, transom light and the original pocket door remain.

Treatment Type: Preservation

Priority: Medium

Main Barn: Bent One - East Gable End

Treatment Description: Repair existing clapboard

The existing pine clapboards are in pretty good shape but some repair and replacement is necessary. New clapboards should be radially sawn pine clapboards primed on all sides with a high quality oil base primer. 5d stainless steel ring shank nails shoud be used for fastening the clapboards.

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
1000 LF	$1.95 LF	$1,950.00

Treatment Reference:

Pine clapboards can be obtained from the following sources: Stephen Jeffery, Barrington New Hampshire: 603-664-9002. Granville Manufacturing. Granville Vermont. Additional clapboard mills are also available in Massachusetts and Maine.

Treatment Description: Pocket door: repair and make operational

The original pocket door and hardware remain intact behind the current modern doors and plywood. The modern materials should be removed and the pocket door repaired using in-kind materials and methods. The hardware can be refurbished to allow for ease of operation. Any missing hardware can be reproduced in kind.

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
1 LS	$2,000.00 LS	$2,000.00

Treatment Reference:

Preservation Treatment Cost Total: $3,950.00

Treatment Type: Rehabilitation

Priority: Medium

Treatment Description: Replacement of gable end window

The original window opening in the peak of the gable end remains. A new sash could be acquired and the frame repaired or a new window unit could be installed. The window should match the evidence found in photographs and other physical evidence that provide the basis for its reproduction.

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
1 LS	$800.00 LS	$800.00

Treatment Reference:

Brosco Window Company <http://www.brosco.com/> makes historically sufficient replacement sash and window units. Units may cost near $300.00

Rehabilitation Treatment Cost Total: $800.00

Treatment Type: Restoration

Priority: Low

Main Barn: Bent One - East Gable End

Treatment Description: **Exterior paint scraping and coating**

The exterior of the front façade will eventually need to be scraped and painted. The old paint should be scraped with carbide bladed scrapers and then the wood should be washed and sanded lightly before applying two coats of oil base primer. California brand "trouble shooter" primer or equivalent is a good choice.

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
1644 SF	$1.22 SF	$2,005.68

Treatment Reference:

California Brand paints have been used with great success on numerous museum properties owned by the Society for the Preservation of New England Antiquities (S.P.N.E.A.), and by Preservation Timber Framing Inc. on a number of church steeple projects. It is readily available at various paint supply stores.

Restoration Treatment Cost Total: **$2,005.68**

Priority: **Medium**

Treatment Description: **Repair reproduce transom light over door**

The original transom light opening over the original door opening is partially intact. Carefull investigation of the opening can determine the size and construction of the original transom light and frame for its repair and reproduction.

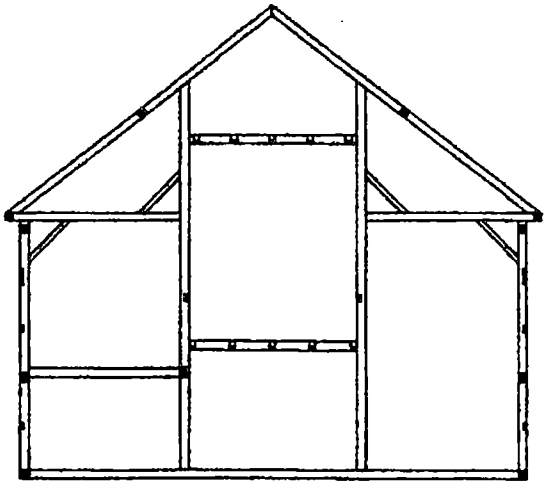
Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
1 LS	$1,000.00 LS	$1,000.00

Treatment Reference:

It may be possible to have the transom sash made by a window manufacturer such as Brosco. If not, the entire unit can be custom made. This estimate is based on the utilization of a manufactured sash in a custom rebuilt frame.

Restoration Treatment Cost Total: **$1,000.00**

Main Barn: Bent Two



Feature Description:

Bent two is located one bay west of bent one at the east gable end of the barn. It is comprised of two perimeter posts, and two drive posts. Discontinuous tie beams connect the interior drive posts with the exterior posts. The drive posts extend from the sill level through two floors and end where they join into the principle rafter pair near mid-span. The horizontal girts accept the various floor levels along the right, left and center drive bays. The timber components are all mortise and tenon and joined using the square rule method of layout. Exterior posts have post extensions added to their base via a bladed scarf joint pegged with wooden pegs. The center drive posts have post top extensions utilizing a centered mortise and tenon connection. Both of these extensions appear to be original elements in the frame as evidenced by the additional joinery layout present for what appear to be original girt locations.

Quantity:	Measurement unit:	Condition Rating:
1	LS	Good

Feature Condition:

Bent two is in good shape overall. Joinery systems are intact at all critical locations. Bent two is well supported by the building's rubble stone foundation on the north Wall. The south wall is also supported by the foundation with some damage but it is bolstered by the added silo ell.

Main Barn: Bent Two

Treatment Type: Preservation

Priority: High

Treatment Description: Bent two: control for repairs

Bent two is perhaps the most intact of all the major barn bents. It does not reveal any failure in tension nor does it sag across its length. Treatment here should be kept to a minimum and focus on this bent as a control for height and width of remaining bents is appropriate.

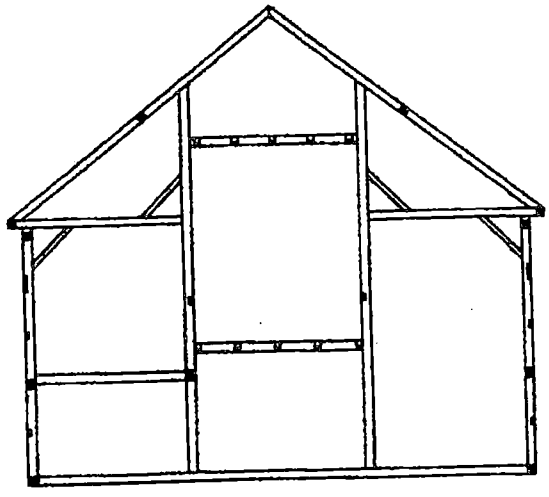
Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
0 LS	$0.00 LS	$0.00

Treatment Reference:

See drawing sheet #4 of 18; Bents 2, 3, 4,& 5 (Typical) Elevation.

Preservation Treatment Cost Total: $0.00

Main Barn: Bent Three



Feature Description:

Bent Three is two bays west of the east gable end or front of the barn. It is designed and matches bents two, four and five. It is comprised of softwood beam elements with the posts, girts and rafters all hand hewn with a broad axe. Circular sawn elements are found in the braces and adjacent common rafters. Most of the frame elements are pine with some spruce and hemlock mixed in. Like bents two through five, it too has perimeter post foot extension and drive post top extensions.

Quantity:	Measurement unit:	Condition Rating:
1	LS	Fair

Feature Condition:

Bent three shows signs of tension failure across its tie beam/post connections. Some work has been done to minimize the spreading of the joinery in the form of a steel cable that is through bolted through the perimeter posts. The cable is placed just below the discontinuous tie beams in the loft level of the frame. The through bolts are close to the discontinuous plate mortises thus reducing the strength of the tops of the perimeter posts.

Treatment Type: Preservation

Priority: High

Main Barn: Bent Three

Treatment Description: **Bolstering the tension connections in bents 2 - 5.**

The design of the barn with the discontinuous tie beams connecting the perimeter walls with the drive posts leaves a minor structural challenge. When the building settled this joinery connection was placed under considerable stress. It is here that the frame design is at its weakest. The tenon on the end of the tie beam is not strong enough to withstand the roof load outward thrust following foundation settlement and or failure. This pulls the joinery apart and reduces the strength of the frame. One method of correcting this is to add a wrought iron strap no more than two to three inches wide around the post and the tie beam connection and fasten the U-shaped strap to the tie beam with through bolts. The strap should extend into the field of the tie about two feet to allow for three bolt connections. The use of such straps is common in larger buildings and many barns of similar age. The through bolts would have square heads and nuts to match the period of construction.

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
8 Ea	$300.00 Ea	$2,400.00

Treatment Reference:

Many buildings of this size and period have steel in critical tension connections. A local welder experienced in wrought iron can easily custom make the necessary hardware as described above. Cost approximately $100.00 per hardware unit.

Treatment Description: **Realign and secure bent three.**

The repair of bent three must be done in conjunction with the sill repairs and the alignment of the barn in general along its length. As the barn is supported on cribbing and jacks for the sill repair, the bent framing can be bound with straps and come-a-longs and slowly and carefully brought to its original configuration with the joinery retightened and the shoulders of the discontinuous ties and posts tight once again. It may also be necessary to support the roof system during this portion of the work. This would be done by posting up to the roof system from the cellar level and lifting the roof with the aid of twenty ton screw jacks which allow the movement to be controlled and peaceful. Upon realigning the building, the joinery can be re-pegged and secured.

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
1 LS	$2,000.00 LS	$2,000.00

Treatment Reference:

Rigging companies and preservation professionals including structural engineers and timber framers may have alternate methods for supporting this building. The methods described herein are those used by Preservation Timber Framing Inc. of Eliot, Maine and are expressed here as guidelines for the preservation of the barn.

Preservation Treatment Cost Total: **$4,400.00**

Treatment Type: **Restoration**

Priority: **High**

Main Barn: Bent Three

Treatment Description: **Free tenon repair to tie beams**

Tie beam connections lost in bent three can be recreated if necessary by adding a free tenon at the tie/post connection. To implement this fix, the post mortise would need to be opened up above the tie beam to accept the free tenon being installed into the tie beam. The tie beam would be laid out along the original tie beam tenon location and cut back about 18 inches and to the width of the original tenon. The mortise in the tie beam would stop two inches from the bottom face of the tie so that the repair would not be visible from below save the wooden pegs that would be driven to hold the fix in place. Once the mortises are created a new softwood free tenon of pine or oak would be fashioned to fit snugly into the tie beam mortise and be slid in from above via the post mortise extension. The free tenon is then pegged both to the tie beam and post. While this treatment is the most traditional in nature, it does interrupt both tie and post and it is not as strong in tension as the wrought iron strap described above.

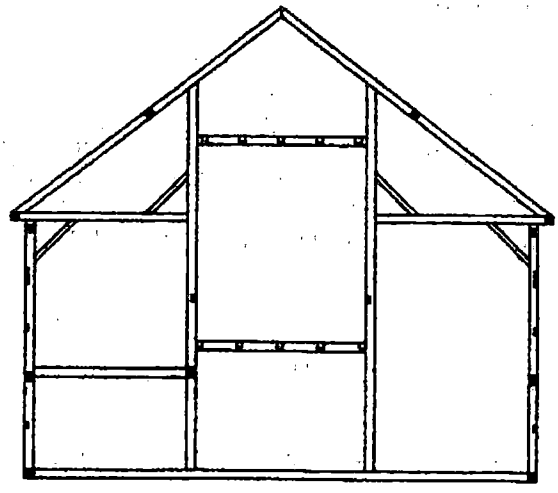
Repair/Replacement Amount:	**Unit Cost:**	**Repair/Replacement Cost:**
2 LS	$400.00 LS	$800.00

Treatment Reference:

Free tenon work is seen in both traditional historic work and in modern timber framing. It is an excellent means by which to join two timber elements but it does have its challenges when the joinery is in tension. Refer to: the Timber Frame Joinery and Design Workbook, A Publication of The Timber Framers Guild of North America, 199

Restoration Treatment Cost Total: **$800.00**

Main Barn: Bent Four



Feature Description:

Bent four is located three bays west of the east gable end of the barn. Like bents two, three and five, it contains the same structural elements. It possesses the post feet extensions in the perimeter posts and it also has the post top extensions in the drive posts supporting the principle rafters. It is made up of softwood elements both hewn and sawn. Like bent three, it shows signs of spreading and it is temporarily being held in tension across the discontinuous ties by a steel cable and turn buckles placed 14 inches below the top shoulder of the perimeter posts.

Quantity:	Measurement unit:	Condition Rating:
1	LS	Fair

Feature Condition:

Both tie beams have pulled out and away from their corresponding drive posts. The ties also appear to be out of level with movement evident in the drive posts. The North drive post has torn away at the tie beam joint leaving the tenon and peg intact. This joint has opened up about two inches. The South drive post is intact leaving the relish of the tenon in the tie beam broken.

Treatment Type: Preservation

Priority: High

Main Barn: Bent Four

Treatment Description: **Post repair and realign bent**

Bent four will need to be straightened and realigned to bring the tie beam/post joinery back together. The North drive post will also need a "Dutchman" repair at the tie beam location to correct for the tear-out of the post. To effect this repair it will be necessary to splice a new piece into the post. The repair piece should be of like material and match the coversion method of the post, which is hand hewn. The Dutchman repair should extend 18 inches above and below the post mortise. It should be cut with two undersquints at each end to allow for the tension applied by the tie beam tenon. The new Dutchman repair is then pegged into the original post. Glue is not necessary or effective in this location. The wrought iron strap described in the treatment of bent three is appropriate here as well.

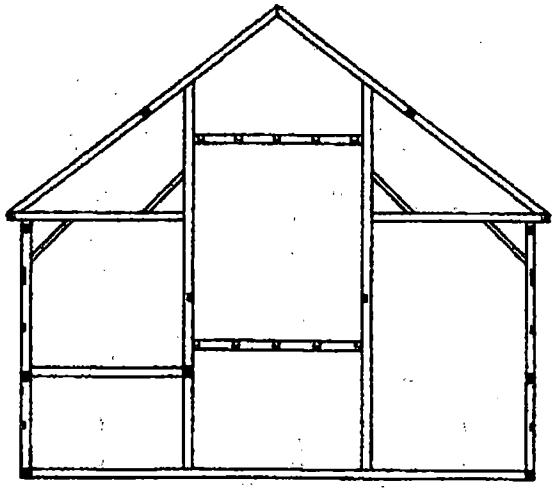
Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
1 LS	$3,000.00 LS	$3,000.00

Treatment Reference:

See treatments for bent three and drawing sheet #4 of 18; Bents 2, 3, 4,& 5 (Typical) Elevation.

Preservation Treatment Cost Total: **$3,000.00**

Main Barn: Bent Five



Feature Description:

Bent five is located four bays west of the east gable end of the barn. This bent has the same framing elements as bents 2, 3, & 4. It is softwood with both sawn and hand hewn elements. Perimeter posts possess post feet extensions and drive posts have post top extensions supporting the principle rafters.

Quantity:	Measurement unit:	Condition Rating:
1	LS	Fair

Feature Condition:

Bent five suffers from the same outward thrust seen in bent three and four. The North side discontinuous tie beam has separated from the drive post about two inches. The South drive post and tie beam connection is intact.

Treatment Type: Preservation

Priority: High

Treatment Description: Realign and repair bent five

Repair methods for bent five are identical to that of bent three. The tie beam connections must be brought back together when the building is straightened and aligned and the sills are repaired. The post/tie connection can be dealt with via a free tenon, wrought iron strap or both.

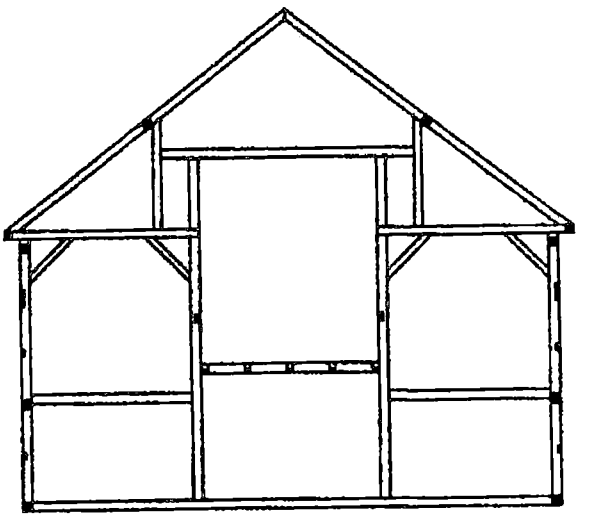
Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
1 LS	$2,000.00 LS	$2,000.00

Treatment Reference:

See treatments for bent three and drawing sheet #4 of 18; Bents 2, 3, 4,& 5 (Typical) Elevation.

Preservation Treatment Cost Total: $2,000.00

Main Barn: Bent Six



Feature Description:

Bent six is the original west gable end of the original barn. Mortise and tenon joinery at the girt levels above the adjacent floor levels are empty. The post feet are extended in both perimeter posts and in the south drive post. Braces in this bent are a mixture of soft and hard woods. It is the only bent with hardwood braces throughout the barn. Drive posts extend to what appears to have once been a continuous tie beam at the eave line of the barn. Atop the severed tie beam directly above the drive posts are two recycled vertical posts that engage a second discontinuous tie beam that is connected to two vertical posts that support the principle rafters. A mortise in the North principle rafter that was once filled with what perhaps was a collar tie when this end of the barn was exposed to the weather. The South principle rafter shows no mortise but does show a shadow of a collar tie with cut nails indicating its original position. The two vertical posts supporting the rafters also accept the tenons of principle purlins that extend into the three bents added later to the end of the original barn. The perimeter posts have also been altered to accept additional discontinuous plates extending into the three added bents.

Quantity:	Measurement unit:	Condition Rating:
1	LS	Good

Feature Condition:

Bent six while significantly altered to accept the three added bents at the rear of the main barn seems in good condition structurally. Five horizontal girts are missing from the original bent configuration: Two from the north side, two from the zouth side and one from the center drive as well. The removal of these girts was apparently to provide better access to the later added portion of the building. The girts were removed peacefully without damaging the adjacent posts.

Main Barn: Bent Six

Treatment Type: Preservation

Priority: High

Treatment Description: Realign bent six

Like Bents 3, 4, & 5, this bent also has settled and is slightly misalinged. When repairs are being made to the previous bents, and the building is supported on cribbing and jacks, it will be important to ensure that all joinery remains intact in this original back gable end.

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
1 LS	$2,000.00 LS	$2,000.00

Treatment Reference:

See drawing sheet #5 of 18; Bent 6 Elevation.

Preservation Treatment Cost Total: $2,000.00

Treatment Type: Restoration

Priority: Low

Treatment Description: Install new girts and tie to original locations.

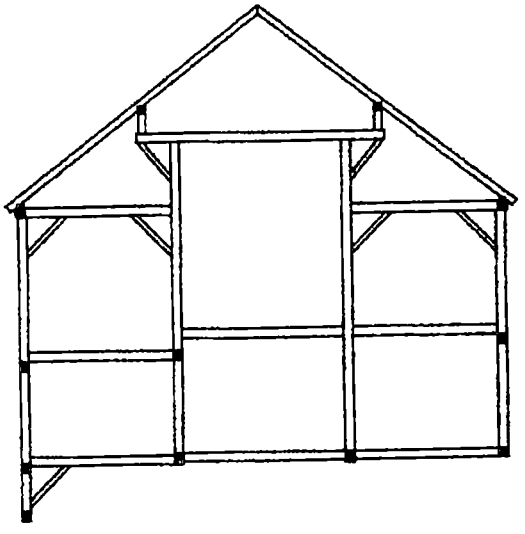
Bent six having been altered when later bents 7, 8 and 9 were added, could be put back to its original configuration. The missing girts could be reproduced and installed in their original locations with the use of free tenons. The center portion of the original continuous tie beam could be reintroduce into the original fabric by cutting bladed scarf joints over the tops of the drive posts and inserting a new element to gain the tension across the bent. While the girts add little to the structural integrity of the frame, the tie beam repair does indeed provide a tension connection for the barn. The tie beam connection is then of higher priority for implementation than that of the girts. It also still provides ample access to the back later bents. The cost of replacing the tie beam alone is approximately $2000.00

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
1 LS	$6,000.00 LS	$6,000.00

Treatment Reference:

Restoration Treatment Cost Total: $6,000.00

Main Barn: Added Bent Seven



Feature Description:

Bent seven is clearly a later added portion of the barn. It is made up of circular sawn timber posts, namely pine, and the layout method for joinery is the mill rule where there are no housed joints accommodating the irregular surface of the hand hewn elements seen in the original barn. The discontinuous tie beam sits atop the perimeter post and engages the drive posts. The drive posts continue to a higher tie beam that crosses over the top of the two posts and extends beyond the drive posts. The extended ends of this tie are supported by a diagonal brace back to the post. Sitting on top of the tie beam extension is a very short post that supports a lateral principle purlin that is employed in supporting the common roof rafters. The roof rafters are full length and meet each other at the peak with no ridge board. At their heels that sit upon a discontinuous plate that engages the sides of the corresponding short tie beams.

Quantity:	Measurement unit:	Condition Rating:
1	LS	Fair

Feature Condition:

While the elements of bent seven are much more dimensional, the joinery is not as well executed as in the original frame. This is not to say that the structure is not sound, only that the craftsmanship is of a lesser quality. The wood used is also much more uniform and of poorer quality than that found in the original barn.

Main Barn: Added Bent Seven

Treatment Type: Preservation

Priority: High

Treatment Description: Realign bent seven.

Bent seven will need to be realigned during the straightening of the previous bents in the original barn. Sills on the North side have rotted and the bent has settled.

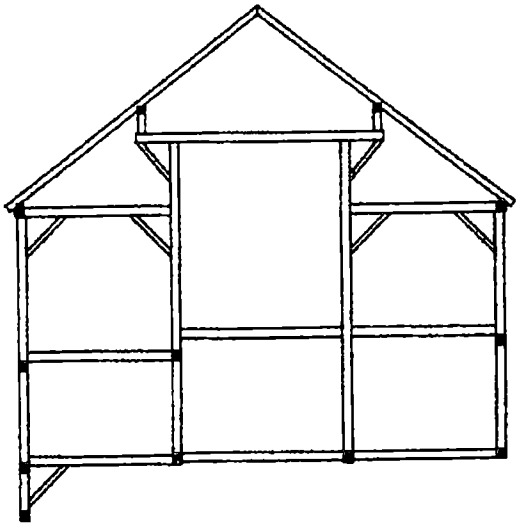
Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
1 LS	$2,000.00 LS	$2,000.00

Treatment Reference:

See treatments for bents two, three, and four, and drawing sheet #6 of 18; Bents 7 & 8 (Typical) Elevation.

Preservation Treatment Cost Total: $2,000.00

Main Barn: Added Bent Eight



Feature Description:

Bent eight is built very similar to bent seven with mill rule layout and dimensional timbers. Every element is circular sawn from softwood species. A significant distinguishing feature of this bent is seen at the roof level. The 6"x 6" principle purlins that cross the short posts in both bents seven and eight extend beyond the plane of bent eight and diagonal braces help support the ends of these extensions. At the very end of the plate is a tie beam upon which the hip rafters, which make up the rear portion of the roof, sit. The two principle purlins are scarfed over the tops of the short posts in bent eight. These scarf joints are heavily loaded by the roof weight associated with the hip roof.

Quantity:	Measurement unit:	Condition Rating:
1	LS	Poor

Feature Condition:

Bent eight is in good shape until it becomes part of the cantilevered roof support system for the hip roof. Here the scarf joints that allow extensions on the end of the principle purlin are severely damaged due to the roof load from the hip rafters. The short tie beam that connects the north and south principle purlins is also overloaded by the roof system and bends considerably downward along its length.

Treatment Type: Rehabilitation

Priority: High

Main Barn: Added Bent Eight

Treatment Description: New supports for hip roof

The exisiting hip roof structure that connects from bent nine to the cantilievered principle purlins in bent eight is structurally overloaded and poorly designed. The crux of the problem is that the purlin extensions are scarfed onto the ends of the principle purlin directly over the short support posts where they hinge and come apart. The short tie crossing the drive is undersized as well and must be supported. The best way to support this area without changing the design of the roof or removing historic fabric is to do the following: First it will be necessary to add a sleeper beam of 8"x 8" dimesion from the discontinuous tie beams in bent 8 to the newer back gable end in bent nine. These sleepers will land just above the diagonal brace supporting the short tie/drive post connection. Once in place, the sleeper beam can support a vertical post that is mortise and tenoned into the sleeper and joins the cantilevered principle purlin at its top. Two diagonal braces, one from each post, will help to support the short tie beam across the drive. The existing roof system should also be lifted and straightened during this process with temporary posts and screw jacks from below.

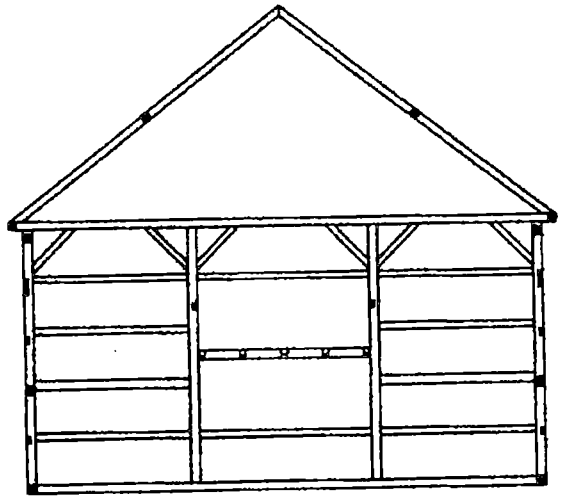
Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
1	$3,800.00	$3,800.00

Treatment Reference:

See drawing sheet #14 of 18; Timber Frame Support for the West Gable - Section and Axonometric Views.

Rehabilitation Treatment Cost Total: $3,800.00

Main Barn: Added Bent Nine



Feature Description:

Bent nine is the current west gable end of the barn. It is created like bents seven and eight from softwood beams all circular sawn and laid out in the mill rule tradition. Instead of tall drive posts and short tie beams however, bent nine is studded between horizontal girts and a top plate that runs the entire length of the bent. Common rafters between the hip rafters extend from the top plate to the support beam cantilevered off bent eight. A small added dimensional heel plate sits atop the wall plate to allow for the common rafters to sit at the same height as the larger principle and common rafters of the original barn. It is sheathed with horizontal rough board sheathing and is clad on the exterior in clapboard. Five windows are placed in this bent. Below the sill level at the base of the posts is another framing system that supports this tall wall and allows direct access to the cellar level at grade. A window opening exists on the north side of this lower framing and a large sliding wooden door which slides toward the south wall is present. Behind the sliding door is a modern overhead garage door.

Quantity:	Measurement unit:	Condition Rating:
1	LS	Poor

Feature Condition:

Although the framing elements of bent nine seem in good order, the exterior clapboards and sheathing are very deteriorated. All of the window openings are smashed and in considerable disrepair. The sliding door and its hardware will need to be repaired and the garage door behind is also damaged. The north side of the bent within the lower framing elements has been sheathed with sheetrock to the interior to provide a small office. The condition of this sheetrock is very poor.

Main Barn: Added Bent Nine

Treatment Type: Rehabilitation

Priority: High

Treatment Description: Create new windows and install in gable end

Existing windows in bent nine are beyond repair as they have been vandalized on numerous occasions. They will need to be re-created. The best way to re-create the windows is to acquire sash from a window manufacturer that fits the original opening. New Frames can be custom built to match the original openings. Framing around the the windows must also be made secure.

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
6 Ea	$800.00 Ea	$4,800.00

Treatment Reference:

The Brosco Window Company, <http://www.brosco.com/> can produce single pane sash for these openings. See drawing sheet #13 of 18; West Gable Wall Elevation, for window layout.

Rehabilitation Treatment Cost Total: $4,800.00

Priority: Medium

Treatment Description: Staging for the back gable end

To effect repairs in the previous treatments in this section it will be necessary to stage the entire back gable end wall throughout the repair processes.

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
1 LS	$3,000.00 LS	$3,000.00

Treatment Reference:

Staging can be rented from a number of outfits including Seacoast Scaffolding of Concord, New Hampshire

Rehabilitation Treatment Cost Total: $3,000.00

Treatment Type: Restoration

Priority: High

Main Barn: Added Bent Nine

Treatment Description: **Install new replacement clapboard siding**

The existing pine clapboards are in pretty good shape but some repair and replacement is necessary. New clapboards should be radially sawn pine clapboards primed on all sides with a high quality oil base primer. A 5d stainless steel ring shank nail shoud be used for fastening the clapboards.

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
3744 LF	$1.95 LF	$7,300.80

Treatment Reference:

Pine clapboards can be obtained from the following sources: Stephen Jeffery, Barrington New Hampshire: 603-664-9002. Granville Manufacturing: Granville Vermont. Additional clapboard mills are also available in Massachusetts and Maine.

Treatment Description: **Sheathing replacement (approximately 50%)**

The exterior rough board sheathing on the back gable end is deteriorated significantly and some will need to be replaced in-kind. Rotten sheathing should be removed only where necessary and nailed with 10d galvanized common nails.

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
500 SF	$2.00 SF	$1,000.00

Treatment Reference:

Treatment Description: **Realign bent nine**

While the entire building is being realigned and straightened the back gable end will also need to be done as well. This involves the use of cribbing and jacks applied to the point loads of the structure. The ledger beams used to pick up the length of the building should extend beyond bent nine so that jacks can be placed outboard of the barn for ease of lifting.

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
1 LS	$2,000.00 LS	$2,000.00

Treatment Reference:

See drawing sheet #7 of 18; Bent 9 Elevation.

Restoration Treatment Cost Total: **$10,300.80**

West Gable End

Feature Description:

The west gable end of the barn begins at grade at the back of the barn. It shows the cellar level, first and second floor levels and then a hip roof is visible back two thirds of the way into bay eight where the gable peak becomes visible with an arched transom light in the peak of the barn. There are two windows at the second floor, four windows at the first floor level and one window and a large sliding door at the cellar level. The sliding door slides towards the south eave wall when opened and behind it is an overhead garage door allowing access to the cellar. The sliding door and hardware appear to be original to the added bays of the barn. All other window openings have smashed window sash and damaged frames. The arched window in the west roof peak is missing as well. Only the frame of this window remains. Siding is clapboard like the other three sides, with many clapboards missing and horizontal sheathing deteriorated. The foundation stones come well above grade to protect the sills of the wall.

Quantity:	Measurement unit:	Condition Rating:
1,008	SF	Fair

Feature Condition:

The back west gable end of the barn shows considerable damage due to neglect and time. The foundation is in good shape save some realignment to the south of the sliding door. The sheathing has been exposed to the weather and this has heavily damaged the exposed areas. The sliding door works only part way with the hardware also being exposed to the elements. The overhead garage door behind is operable. All window sash are missing or completely smashed. Remaining paint is minimal as most of the exterior coating has weathered away.

West Gable End

Treatment Type: Restoration

Priority: High

Treatment Description: Repair fan window frame and replace sash

The original window opening in the peak of the gable end remains. A new sash could be acquired and the frame repaired or a new window unit could be installed. The window should match the evidence found in photographs and other physical evidence that provide the basis for its reproduction.

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
1 Ea	$1,500.00 Ea	$1,500.00

Treatment Reference:

A custom window manufacturer can reproduce the fan window to original specification. See drawing sheet #13 of 18; West Gable Wall Elevation.

Restoration Treatment Cost Total: $1,500.00

Priority: Low

Treatment Description: Scraping and painting west gable end

The exterior of the back west façade will eventually need to be scraped and painted. The old paint should be scraped with carbide bladed scrapers and then the wood should be washed and sanded lightly before applying two coats of oil base primer. California brand "trouble shooter" primer or equivalent is a good choice.

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
1008 SF	$1.22 SF	$1,229.76

Treatment Reference:

California Brand paints have been used with great success on numerous museum properties owned by the Society for the Preservation of New England Antiquities (S.P.N.E.A.), and by Preservation Timber Framing Inc. on a number of church steeple projects. It is readily available at various paint supply stores.

Restoration Treatment Cost Total: $1,229.76

Silo Exterior

Feature Description:

The silo has three sides exposed to the exterior and the north gable wall is integrated into the south eave wall of the main barn. Originally the silo was clapboarded on its exposed three sides and it shared a closed access shed from the east gable end wall to its east eave wall. The roof is currently in asphalt shingles. The framing on the north gable end of the silo is exposed to the interior of the main barn and here one sees that the frame is bolted together at its corners to bolster the joinery, as it held considerable materials within it that would exert outward force on the silo walls. Where exterior siding and sheathing is missing, one can see that the walls are studded and posted in the corners. The building can be considered a modified balloon frame in design with the inclusion of heavy sills, plate and corner posts. Exterior trim includes rake boards, corner boards and delicate returns at the eaves. While vernacular in style, it fits with the trim elements seen in the main barn.

Quantity:	Measurement unit:	Condition Rating:
1,568	SF	Poor

Feature Condition:

All three sides of the exterior of the silo are in considerable disrepair. Damaged sills have led to damaged wall planes which has resulted in the loss of exterior sheathing, clapboards and trim elements. Enough of the exterior remains however, to determine the reproduction of the three facades.

Silo Exterior

Treatment Type: Restoration

Priority: High

Treatment Description: Sheathing repair and replacement

Existing sheathing is deteriorated especially down low along the sill level of the building and over the entire east eave wall façade. New sheathing should be rough pine boards to match the original in size and species. The existing and new horizontal sheathing should be nailed with 10d galvanized common nails. All original board to be re-nailed where exposed to the elements.

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
800 SF	$1.50 SF	$1,200.00

Treatment Reference:

Any local custom saw mill can provide rough sawn boards to match the thickness of the original. Air drying the boards for at least one month is recommended before installation.

Restoration Treatment Cost Total: $1,200.00

Priority: Low

Treatment Description: Scraping and painting exterior of silo

The exterior of the back west façade needs to be scraped and painted. The old paint should be scraped with carbide bladed scrapers and then the wood should be washed and sanded lightly before applying two coats of oil base primer. California brand "trouble shooter" primer or equivalent is a good choice.

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
1600 SF	$1.22 SF	$1,952.00

Treatment Reference:

California Brand paints have been used with great success on numerous museum properties owned by the Society for the Preservation of New England Antiquities (S.P.N.E.A.), and by Preservation Timber Framing Inc. on a number of church steeple projects. It is readily available at various paint supply stores.

Restoration Treatment Cost Total: $1,952.00

Priority: Medium

Treatment Description: Repair and reproduction of trim elements

Silo trim elements are very damaged and many need to be rebuilt and replaced. Enough evidence remains pertaining to their original configuration and new work must pattern the existing elements. High quality pine to match original trim should be free of sapwood and black knots.

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
120 LF	$25.00 LF	$3,000.00

Treatment Reference:

Silo Exterior

Treatment Description: Clapboard repair and replacement

The existing pine clapboards are in pretty good shape but some repair and replacement is necessary. New clapboards should be radially sawn pine clapboards primed on all sides with a high quality oil base primer. A 5d stainless steel ring shank nail shoud be used for fastening the clapboards.

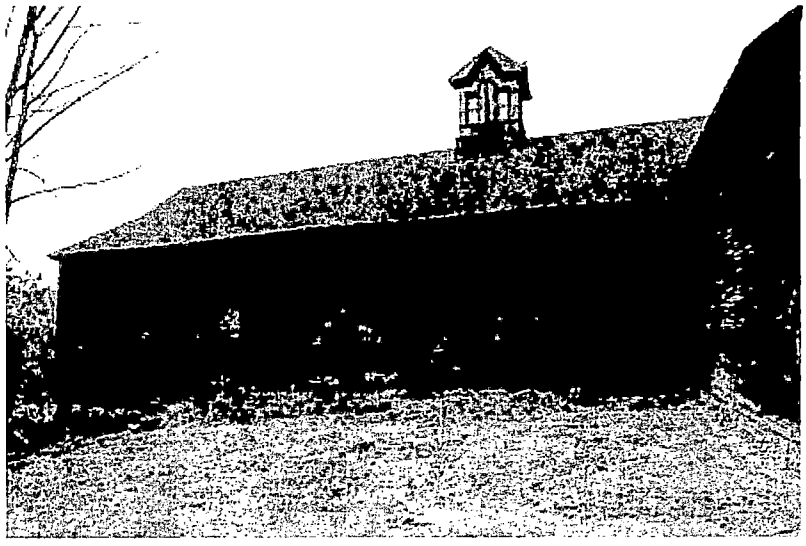
Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
3200 LF	$1.95 LF	$6,240.00

Treatment Reference:

Pine clapboards can be obtained from the following sources: Stephen Jeffery, Barrington New Hampshire: 603-664-9002. Granville Manufacturing, Granville Vermont. Additional clapboard mills are also available in Massachusetts and Maine.

Restoration Treatment Cost Total: $9,240.00

Main Barn: South Eave Wall Exterior



Feature Description:

The south eave wall shows at the grade entrance into the first floor of the barn. Openings denote the exit and entrance of dairy cows along this side of the building. Four window openings are clearly visible in the original barn wall but little sash remains. A cow door opening in bay three is visible but the door is gone and the opening is closed from the inside. There is evidence of a wood ramp at this door location. It is extremely deteriorated and almost entirely gone. The added three bays of the barn have three window openings at the first floor and three window openings at the cellar level. The barn follows the grade and drops down as the land slopes away towards the southwest. Clapboards exist all along the south eave wall and follow onto the connected silo ell which intersects the main barn at bay one. The granite stone foundation is visible along the entire length of the south eave and retaining walls extend perpendicular to the foundation. The grade is high and there is a clear drip line swale along the length of the wall due to roof water run off.

Quantity:	Measurement unit:	Condition Rating:
1,700	SF	Poor

Feature Condition:

All door and window openings are in very poor condition with trim and sash missing in most cases. The entire south wall is clapboarded but many are missing near the base of the wall where water splashing up on the wall from the very high grade has deteriorated the sills, sheathing and clapboards. Retaining walls and the main foundation need to be rebuilt along this wall. The silo ell is in very poor condition as well, largely due to water penetration and splash back.

Main Barn: South Eave Wall Exterior

Treatment Type: Rehabilitation

Priority: High

Treatment Description: Regrade and drain south eave wall

The grade along the south eave wall needs to be taken down and sloped away from the main barn and the silo ell. Drainage design should include the use of schedule 40 perforated drainage pipe on a gravel base. The gravel base is comprised of 1.5 inch stone, six inches below and six inches above the pipe. Gravel and pipe should be wrappec in a filter fabric sock. Sheet drain products will be considered as well. All drainage should include the proper surface grading around the building to ensure water flows away from the building. Drainage designs should accommodate the option for the installation of gutters. Drainage system exits should include a daylight exit if appropriate or dry well placed strategically on the property.

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
130 LF	$25.00 LF	$3,250.00

Treatment Reference:

Drainage recommendations are taken from similar drainage specifications for museum properties such as The Moffatt-Ladd Museum in Portsmouth and The Clark House Museum in Wolfeboro, New Hampshire.

Rehabilitation Treatment Cost Total: $3,250.00

Treatment Type: Restoration

Priority: High

Treatment Description: Sheathing replacement and repair

The bottom six feet or so of the sheathing along the length of the south eave wall may require replacement as the water from the roof has splashed back off from the high grade and rotted the sheathing. New sheathing should be acquired to match the original in size and species.

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
576 SF	$1.50 SF	$864.00

Treatment Reference:

Any local custom saw mill can provide rough sawn boards to match the thickness of the original. Air drying the boards for at least one month is recommended before installation.

Main Barn: South Eave Wall Exterior

Treatment Description: New cow door and hardware

The existing opening for cow access to the first floor of the barn should be recreated. Careful scrutiny of the opening will determine door size and hardware for ease of use. The door should be recreated with materials matching those of remaining exterior original doors existing in the barn such as the east gable end pocket door.

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
1 Ea	$1,000.00 Ea	$1,000.00

Treatment Reference:

See drawing sheet #12 of 18; South Eaves Wall Elevation, for cow door location.

Treatment Description: Window repair and replacement

All ten of the south wall exterior windows should be re-instated with new replacement sash and reproduction frames to match the original openings in scope and scale. Window jamb materials should be carefully selected to avoid sapwood in their manufacture. Careful measuring of the openings will ensure that the proper window is installed.

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
10 Ea	$800.00 Ea	$8,000.00

Treatment Reference:

The Brosco Window Company, <http://www.brosco.com/> makes historically sufficient replacement sash and window units. Units may cost near $300.00. See drawing sheet #12 of 18; South Eaves Wall Elevation, for window layout.

Restoration Treatment Cost Total: **$9,864.00**

Priority: Low

Treatment Description: Scraping and painting south eave wall

The exterior of the south façade needs to be scraped and painted. The old paint should be scraped with carbide bladed scrapers and then the wood should be washed and sanded lightly before applying two coats of oil base primer. California brand "trouble shooter" primer or equivalent is a good choice.

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
17001 SF	$1.22 SF	$20,741.22

Treatment Reference:

California Brand paints have been used with great success on numerous museum properties owned by the Society for the Preservation of New England Antiquities (S.P.N.E.A.), and by Preservation Timber Framing Inc. on a number of church steeple projects. It is readily available at various paint supply stores.

Restoration Treatment Cost Total: **$20,741.22**

Priority: Medium

Main Barn: South Eave Wall Exterior

Treatment Description: **Repair of clapboards and trim**

About 50 % of clapboards along this eave wall will need to be replaced. The existing pine clapboards are in pretty good shape but some repair and replacement is necessary. New clapboards should be radially sawn pine clapboards primed on all sides with a high quality oil base primer. A 5d stainless steel ring shank nail shoud be used for fastening the clapboards.

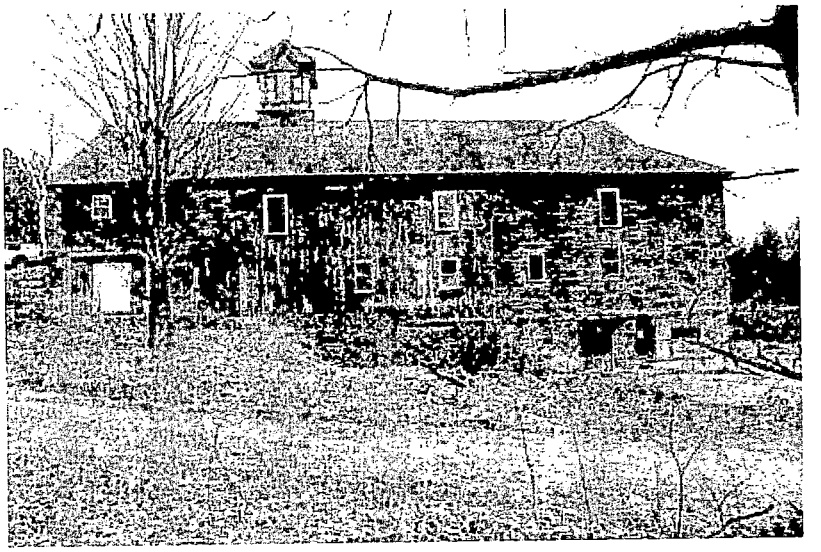
Repair/Replacement Amount:	**Unit Cost:**	**Repair/Replacement Cost:**
4000 LF	$1.95 LF	$7,800.00

Treatment Reference:

Pine clapboards can be obtained from the following sources: Stephen Jeffery, Barrington New Hampshire: 603-664-9002. Granville Manufacturing, Granville Vermont. Additional clapboard mills are also available in Massachusetts and Maine.

Restoration Treatment Cost Total: **$7,800.00**

Main Barn: North Eave Wall Exterior



Feature Description:

The north wall of the barn has seen a number of changes over its lifetime and illustrates very well the evolution of the barn. It is clear to see from the exterior that the original barn extends 60 feet in six bents. Vertical sheathing is attached to horizontal girts at each floor level and near midspan of each floor. Clapboards were installed over the vertical sheathing but many are now missing. Shadows where an original ell came perpendicular to the north eave wall is still evident in the clapboard line. This shadow corresponds to the stone foundation for the ell and the ell is present in early photographs of the barn. As the north wall progresses from east to west it gains height as the grade slopes downward. Below bents three four and five there exists a brick wall foundation. This brick wall is an apparent infill of open bays leading directly to the cellar level of the barn. To the west of the brick wall are two bays of sliding doors that provided access to the cellar level of the barn at the added bays between bents six and seven. Finally a solid wall is present in the most westward bay of the north wall. The granite foundation travels the entire length of the both the original barn and the added two bays. A dividing line in the foundation is present at the junction of original and later barn sections. Nine windows are present along the north eave wall. None appear to be original to the building. An overhead garage door exists in the north wall in bay one which allows access to the first floor of the barn. This opening is present in early photographs of the structure.

Quantity:	Measurement unit:	Condition Rating:
1	LS	Fair

Feature Condition:

Overall the north wall is in good shape. Structurally it is sound albeit some settling of the posts. Exterior façade elements such as the clapboards, windows and doors need considerable repair. Sliding doors below the added barn bays are made of plywood and are very deteriorated.

Main Barn: North Eave Wall Exterior

Treatment Type: Rehabilitation

Priority: Medium

Treatment Description: North wall brick infill foundation

Bricks have been used to close the original opening into the cellar from beneath the original ell. This same technique can be used to close in the two openings in bay six and bay seven in the added bays of the barn. The existing plywood doors would be removed and their associated hardware as well. New bricks on the existing stone foundation would be installed to match the bond of the existing infill in bays five and six. This ensures greater structural stability for the added bays of the barn.

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
200 SF	$45.00 SF	$9,000.00

Treatment Reference:

New bricks should be of similar quality and size to existing. Mortar will need to be matched as well.

Rehabilitation Treatment Cost Total: $9,000.00

Treatment Type: Restoration

Priority: High

Treatment Description: Sheathing repair

Sheathing along the north wall is in need of repair. Rough board sheathing to match the original boards should be placed only where necessary to provide a solid base for trim, windows and clapboards. Areas along the north wall where there is evidence of the removed ell, namely the vertical slots seen in the sheathing where the ell rafters engaged the barn, should be left as is to record the history of the ell. About 20% of this wall needs repair

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
1600 SF	$1.50 SF	$2,400.00

Treatment Reference:

Any local custom saw mill can provide rough sawn boards to match the thickness of the original. Air drying the boards for at least one month is recommended before installation.

Treatment Description: Repair of window openings

Existing window openings along the north wall may not be original to the building, but they have been in place for some time. The exsiting windows are all damaged beyond repair and must be replaced. New sash can be acquired to fit the existing openings and new frames can be created to match the original trim and jamb.

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
10 Ea	$800.00 Ea	$8,000.00

Treatment Reference:

The BROSCO Window Company can provide a good quality divided light window sash to match the original fabric. See drawing sheet #10 of 18; North Eaves Wall Elevation, for window layout.

Restoration Treatment Cost Total: $10,400.00

Main Barn: North Eave Wall Exterior

Priority: Low

Treatment Description: Painting the north wall

The exterior of the front façade will eventually need to be scraped and painted. The old paint should be scraped with carbide bladed scrapers and then the wood should be washed and sanded lightly before applying two coats of oil base primer. California brand "trouble shooter" primer or equivalent is a good choice.

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
8000 SF	$1.22 SF	$9,760.00

Treatment Reference:

California Brand paints have been used with great success on numerous museum properties owned by the Society for the Preservation of New England Antiquities (S.P.N.E.A.), and by Preservation Timber Framing Inc. on a number of church steeple projects. It is readily available at various paint supply stores.

Restoration Treatment Cost Total: $9,760.00

Priority: Medium

Treatment Description: Clapboard and trim repair and replacement

Clapboards remain on the north wall, but they are in considerable disrepair. New pine vertically sawn clapboards primed with oil base primer on all sides should be used for repairs and replacement. Nails should be 5d stainless ring shank and the entire field of clapboards should be re-nailed. There are clear delineations of clapboard lines that illustrate the existence of an ell extending from the north wall and there is a clear vertical line separating the original barn from the added three bays. It is possible to retain these lines to show the evolution of the barn.

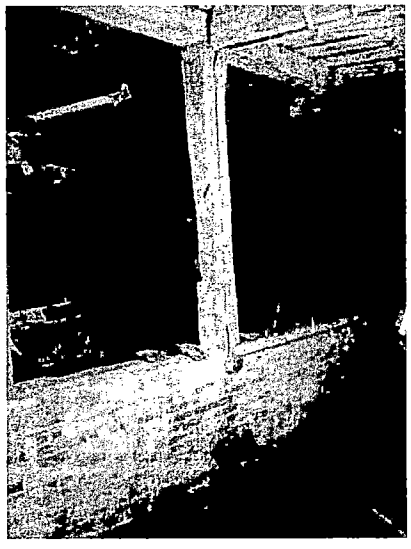
Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
7200 LF	$1.95 LF	$14,040.00

Treatment Reference:

Pine clapboards can be obtained from the following sources: Stephen Jeffery, Barrington New Hampshire: 603-664-9002. Granville Manufacturing, Granville Vermont: Additional clapboard mills are also available in Massachusetts and Maine.

Restoration Treatment Cost Total: $14,040.00

Main Barn Cellar Framing



Feature Description:

The timber framed elements of the cellar level of the main barn are of two periods each corresponding to the earlier and later bents seen above them. In the original 60 feet of the main barn the first floor framing is held up by vertical timber columns that flare to accept the drive girts and summer beams across the drive and north and south side bays. These flared timbers are all hand hewn and engage a timber sill that is elevated on a brick foundation running down both side of the center drive. It appears that perhaps these vertical structural posts may have been recycled from an earlier frame, but this cannot be known for certain. The timber sills are later additions to the original cellar framing and correspond to the brick work seen as infill for the ell entry openings on the north wall. It is clearly visible in the original foundation of the center drive supports that the flared timber posts at one time, came down directly onto stone piers. These piers remain intact and are integrated into the brick drive walls. In the 36 feet of the cellar below the added three bays the support system is comprised of granite piers. The granite piers are integrated into stone foundations along the south center drive line but they are no longer visible on the North side of the drive. Here, the piers have been removed and a myriad of steel columns and horizontal floor supports have been poorly introduced in an attempt to make a larger post-free work bay in the cellar. This cellar framing appears to be twentieth century. Insulation in the cellar ceiling, and an office fully sheet rocked in the ,northwest corner, obscures some of the structural elements at this level.

Quantity:	Measurement unit:	Condition Rating:
0	LS	Fair

Feature Condition:

Despite significant changes to the original cellar framing the vertical supports still perform very well. The framing supporting bays seven and eight should be restored to their original configuration with granite piers on rubble stone as the existing steel work does not perform well as the vertical supports are not directly below their corresponding point loads in the first floor framing.

Main Barn Cellar Framing

Treatment Type: Rehabilitation

Priority: Low

Treatment Description: Create finished space in cellar

The cellar level of the original barn could be modified to accept all of the services required for the year round use of the building. All heating units, air conditioning, plumbing and electrical supply lines and control units should be placed within bays two through six. Direct access to service area could be placed in the brick infill area of the north wall and access would be available from the west gable end as well. Finish space in the cellar could be created in bays seven and eight in the later added barn to provide for a range of year-round uses. This workspace would be ideal for a shop facility for preservation maintenance staff for the building and grounds. The west elevation provides at grade access and allows for windows on three sides of the space for comfortable working conditions.

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
1296 SF	$100.00 SF	$129,600.00

Treatment Reference:

Rehabilitation Treatment Cost Total: $129,600.00

Treatment Type: Restoration

Priority: Medium

Treatment Description: Restore orginal vertical supports in later barn

It will be necessary to temporarily support the existing first floor framing in the three added bays of the barn near their point loads along the drive. Once in place the steel supports added in the twentieth century can be removed. The concrete floor can then be excavated to reveal the original granite pier locations and granite piers can be replaced thereon. All insulation, wiring and the office space will need to be removed to complete the work.

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
1 LS	$8,000.00 LS	$8,000.00

Treatment Reference:

Restoration Treatment Cost Total: $8,000.00

Main Barn First Floor Framing and Deck

Feature Description:

The first floor framing elements of both the original barn and the added three bays are clearly visible from the cellar. The perimeter sills accept half round log joists along the north and south bays and in the center drive the log joists run between summer beams at each bent location parallel to the main drive girts. Most of these elements are hand hewn and the joists are pocketed directly into drive girts, summer beams and perimeter sills. The first floor deck along the north side of the barn is in fair condition. The center drive deck boards are laid in on the diagonal over a layer of underlayment. The south side decking is a conglomeration of layer of decking, each added after the previous layer became structurally unsafe for the dairy herd it supported. Joist spacing varies in each bay oftentimes exceeding 24-inches on center. Summer beams in the original barn possess open mortises which may indicate that the beams were in part, recycled from earlier frames.

Quantity:	Measurement unit:	Condition Rating:
3,456	SF	Fair

Feature Condition:

Center drive girts, summer beams and joists appear in good shape. north bay joists also appear to be structurally sound. The south bay joists however, especially in bays five and four, have suffered from exposure to urine, manure and water. Fungus is apparent on a number of joists and deterioration continues as a result. The deck boards above these areas in bays five, six, seven and eight are very uneven due to the continued overlay of various levels of decking designed to postpone the comprehensive repair of the floor boards.

Main Barn First Floor Framing and Deck

Treatment Type: Preservation

Priority: High

Treatment Description: Fungus and pest control

An antifungal preservative can be applied to the undercarriage to rid the original floor system of any fungal growth remaining after repairs. Bora-Care is a product that is water soluable, non-toxic, and safe to spray on the existing beams.

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
1 LS	$1,000.00 LS	$1,000.00

Treatment Reference:

Bora-Care products are available through the Preservation Resource Group Inc., Rockville, Maryland. 301-309-2222. <http://prginc.com>

Preservation Treatment Cost Total: $1,000.00

Treatment Type: Rehabilitation

Priority: Low

Treatment Description: Add bolsters to joist system to reduce spans

The first floor joist system could be bolstered with added posts and headers to reduce the span of the log joists in an effort to reduce the load requirements for the floor system. This could be done with timber material and timber joinery matching the existing structure and placed on granite pier foundations.

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
1 LS	$7,000.00 LS	$7,000.00

Treatment Reference:

This treatment may be able to replace treatments four and five.

Treatment Description: North side bay deck removal and joist enhancement.

Remove existing north side bay decking and expose joist pockets. Install new joist pockets and half round joists between exisiting joists to meet modern loading requirements.

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
1 LS	$10,000.00 LS	$10,000.00

Treatment Reference:

Existing joist system may not meet BOCA code requirements for public spaces.

Main Barn First Floor Framing and Deck

Treatment Description: **Center drive deck removal and enhace framing.**

The center drive boards could be removed to to allow for the installation of new joists between existing log joists tc ensure modern floor load requirements are met. New log joists to match the original could be pocketed into the exisiting framing to bolster the floor system. Center drive joist ends in bay two also need repair where they engage into the summer beam below bent two. There is a full foundation below bent two as it acts to form a large retaining wall for the front of the barn where the at grade entry is at the second floor level. The stone work matches the perimeter foundation and there is rubble and dirt filling the void between bent one and two. This proximity to earth and moisture has caused the summer beam to deteriorate as well as the log joists. A bladed scarf joint can be utilized here to repair both the damaged portions of the summer beam and the joist ends.

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
1 LS	$14,000.00 LS	$14,000.00

Treatment Reference:

Existing joist system may not meet BOCA code requirements for public spaces.

Rehabilitation Treatment Cost Total: **$31,000.00**

Treatment Type: **Restoration**

Priority: **Medium**

Treatment Description: **Install new floor to match original; south wall.**

the original floor system of barns of this period, usually were comprised of a one inch layer of underlayment followed by a layer two inches thick. The south eave bays will need similar treatment. Like the center drive bays, the second layer could be laid diagonally to match.

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
1200 SF	$5.00 SF	$6,000.00

Treatment Reference:

High quality tongue and groove flooring in both one and two inch thickness can be obtained throuh Fahey Finish Lumber, Brentwood, New Hampshire.

Treatment Description: **Re-create damaged joists, add new joists to code.**

Joists damaged by animal husbandry will be replaced in kind with new round log joists to match the removed feature. As a large portion of the south eave sill will also need replacement, the new sill will accommodate in the same locations, the joist pockets for the new joists. While the deck is up, new joists can be added to reduce the span between the original floor joists to improve load bearing capacity thus meeting modern code requirements. Joists to be added between existing joist bays throughout south side of barn.

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
1 LS	$6,000.00 LS	$6,000.00

Treatment Reference:

Cost estiamates based on similar undercarriage work performed by Preservation Timber Framing Inc.

Main Barn First Floor Framing and Deck

Treatment Description: **Remove deck boards to provide access to joists.**

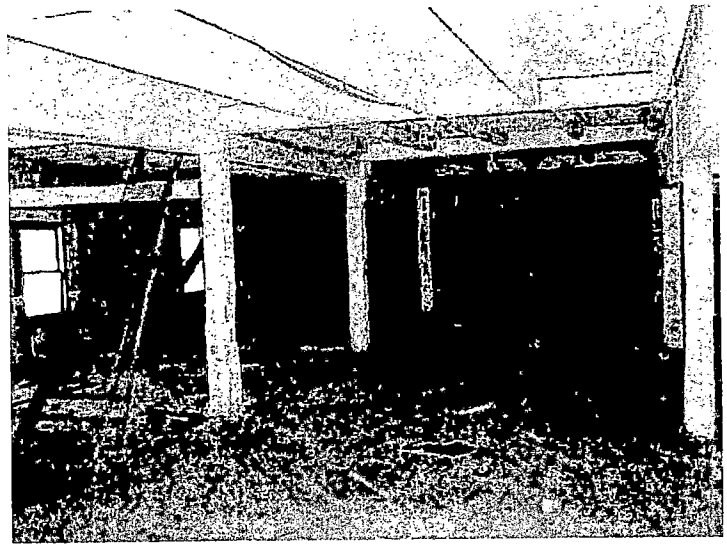
Deck boards along the southern side of the barn will need to be removed to allow access to damaged joists. The decking will be saved and replaced upon completion of the joist repairs except where damaged by urine and manure. Here, in kind replacement of the the original configuration of the deck is appropriate.

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
1 LS	$6,000.00 LS	$6,000.00

Treatment Reference:

Restoration Treatment Cost Total: **$18,000.00**

Main Barn: Second floor framing and Deck



Feature Description:

The entire first floor of the barn is whitewashed. All of the second floor framing is whitewashed as well. This was apparently the main floor for the dairy herd. Entrance to this floor is at grade along the south eave wall. Most openings along the south wall have been boarded over. Along the north side bays, the floor framing is dimensional 2"x 8" joists set near 16-inches on center. They travel from the north wall girt level to the drive bay girts which have been added and raised up from their original location to match the perimeter girt level and drive deck. Girts and joists along the south wall have not been raised and the result is about a 16-inch difference between ceiling heights in the center drive and south eave bays. Bay one has access at grade along the north wall via a garage door opening. Bay one also gains access to the lowest level of the silo on the south eave wall. The floor of bay one is concrete. The remaining bays are wood decks over the first floor framing. Bay one joists in the center drive are bolstered near their junction with the east gable end sill as the sill has rotted away. The joist end are rotten as well. The main barn perimeter posts all have their post extensions via the bladed scarf joint. (See drawing sheet #18 of 18; Typical 1st Phase Barn Post Bottom Bladed Scarf Joint.) Evidence that this is an original feature of the barn is most clearly evident in the north west corner of the original barn where the original girt mortises for the original gable end are laid out across both the upper portion of the post and through the post modification as well. Girts along the north drive do not appear original as they are mortised and tenoned at one end and brought into their corresponding post with an angled let in. This let in was placed at the level of the floor girts along the south eave wall and then raised to be level with the drive deck. The apparent absence of these girts and the inclusion of the dimensional joists in bays three through five indicate that the second floor in this area was not part of the original floor plan. It appears that originally it was intended to be part of an open hay mow that allowed loose hay to be dropped from the second floor and upper loft levels down to the first floor for ease of feeding the animals. Low girts on the drive bay floor also corroborate this hypothesis. Partition walls have been added to divide many of the bays along the first floor level. These appear to have been added in the twentieth century and do not serve any structural purpose.

Quantity:	Measurement unit:	Condition Rating:
1	LS	Good

Feature Condition:

Conditions found within the second floor framing are generally good overall with few alterations, save the added joists in bays three four and five. The added partition walls are largely vandalized and poorly built.

Main Barn: Second floor framing and Deck

Treatment Type: Rehabilitation

Priority: Low

Treatment Description: Remove added partition barriers

Existing partition barriers on the first floor are non bearing and poorly built. Their removal will allow a better use of space on this floor and restore the original floor plan.

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
1 LS	$1,500.00 LS	$1,500.00

Treatment Reference:

Treatment Description: Bolsters for north drive girts

The added and raised girts along the north drive in bays two through five will need bolsters beneath them to meet modern floor load requirements. Bolsters are simply pieces of white oak let into the post directly beneath each girt to pick up the shear load transferred from the floor. The let in should not exceed one inch into the side of the post and can be done at an angle as the added girts have been done. The bolster is then pegged to the post with wooded pegs that pass through both bolsters in bents three, four and five and through each individual bolster in bents two and six. The bolsters can be white washed to match the original features on this floor.

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
8 LS	$250.00 LS	$2,000.00

Treatment Reference:

Adding bolsters to girts and or post tops is a typical way to spread load paths out and pick up compression strength in vertical elements.

Rehabilitation Treatment Cost Total: $3,500.00

Priority: Medium

Treatment Description: Elevator

An elevator is important to provide ADA accessibility to all levels of the barn except the upper loft. The elevator is most easily installed in bay two along the North wall. It should pass from the cellar through the first floor and stop at the second floor. Access at grade already exists at each floor level from the exterior, and the elevator will meet all ADA requirements.

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
1 LS	$30,000.00 LS	$30,000.00

Treatment Reference:

Refer to the American Disabilty Act Accessiblity Guidelines for Buildings and Facilities for size and scope of elevator.

Main Barn: Second floor framing and Deck

Treatment Description: New stairs in bay three

A new set of stairs can be built easily into bent three that will allow access from the second floor to the first floor and on down to the cellar level. These stairs should be confined to bay three along the North wall. This will require that they turn at landings as they descend. Rise and run must meet modern egress requirements. Stairs should be made of wood with three stringers and risers and treads of native hardwood.

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
1 LS	$3,500.00 LS	$3,500.00

Treatment Reference:

Refer to BOCA code requirements for proper egress requirements.

Treatment Description: Add joists to bays six, seven and eight

To meet modern floor load requirements it will be necessary to add joists between existing 3"x 8" joists in the added newer bays of the barn. To do this it is necessary to add joist pockets deep enough to allow the new joist to slide into the summer beams that correspond to each bent in this area. An alternate to adding mortises, is to add a ribbon to the joist system that is bolted to the summer beam.

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
1 LS	$1,500.00 LS	$1,500.00

Treatment Reference:

Treatment Description: Raise deck in south side bays

The ceiling height along the south bays does not meet modern building codes. The step down that currently exists on the second floor drive down to the south side bays is also difficult to design into a current use for the building. To raise the deck requires the removal of fasteners along the drive and perimeter girts along the south side. The deck and corresponding girts can be lifted as a unit with jacks and cribbing to the second floor drive level making the second floor one plane. New girts can be inserted on top of the existing girts to gain the desired floor height.

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
1 LS	$5,500.00 LS	$5,500.00

Treatment Reference:

Rehabilitation Treatment Cost Total: **$40,500.00**

Treatment Type: Restoration

Priority: High

Main Barn: Second floor framing and Deck

Treatment Description: Girt end repair in bay one

The drive girt ends in bay one have rotted where they engage the east gable end sill . The large drive joists of half round logs have also deteriorated. The support system that holds the girts and joists needs to be removed to allow for use of space. A bladed scarf joint like those seen throughout the perimeter posts can be used to repair the ends of the girts and joists. As the sill work in the gable end of building is also getting repaired, these joist and girt ends can engage pockets in the new sill.

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
6 Ea	$700.00 Ea	$4,200.00

Treatment Reference:

Restoration Treatment Cost Total: $4,200.00

Priority: Medium

Treatment Description: Rebuild stairs from second floor to first floor

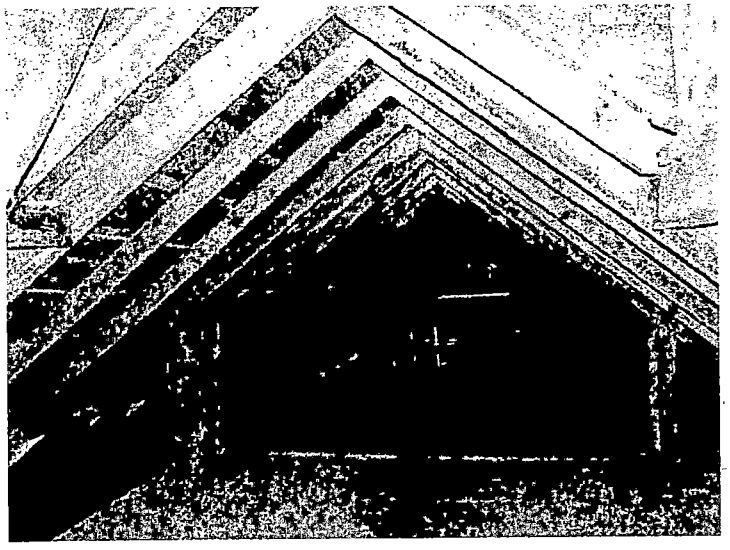
An opening exists in bay one for a descending stair from the second floor to the first. This is the most likely location for a stairway in the original floor plan of the building. Stairs should be made of wood and fit the opening in both run and rise. This stair opening will not allow for stairs meeting modern code requirements for egress.

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
1 LS	$1,000.00 LS	$1,000.00

Treatment Reference:

Restoration Treatment Cost Total: $1,000.00

Center Drive Upper Loft



Feature Description:

The upper loft of the center drive consists of sapling joists pocketed into the high tie beams that cross from drive post to drive post in each bent. A set of stairs ascends to the loft from the south side of bay one. Currently the loft is sheathed in sheets of plywood, Areas of the loft are open to the center drive below and there is no railing. The center drive loft in bay three supports the cupola and there is an added support system of short beams placed on the loft deck to help support the heavily damaged cupola. Along the north side of Bay Seven in the upper loft sits a short king rod truss that passes from the tie beam in bent seven to the tie beam in bent eight. A ventilator shaft also rises to the upper loft in bay six just prior to the truss as it passes up to the roof. There does not appear to be any opening in the roof for the ventilator shaft. A great deal of bat guano exists at this level on the plywood decking.

Quantity:	Measurement unit:	Condition Rating:
1	LS	Fair

Feature Condition:

The upper loft level was probably used for loose hay storage in the original configuration of the barn. It may have never had anything but a small cat walk to the cupola as loose hay could be stored directly on the sapling joists. The upper loft is not designed to carry the weight of the cupola. At present however, it is loaded to some degree by the temporary supports added in the last few decades to the frame.

Center Drive Upper Loft

Treatment Type: Rehabilitation

Priority: Medium

Treatment Description: Build cat walk with rails to cupola

The cupola access is from the upper drive loft and the loft is accessed via the stair way in bay one north. A cat walk with hand rails should be installed from bay one to bay three along the upper loft to allow access for maintenance and inpsection of the cupola. Remaining portions of the loft should remain open for viewing.

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
1 LS	$2,000.00 LS	$2,000.00

Treatment Reference:

Rehabilitation Treatment Cost Total: $2,000.00

Treatment Type: Restoration

Priority: Low

Treatment Description: Remove plywood and bat guano

The plywood on the upper loft framing is not original and should be removed. This will also provide opportunity to clean up the bat guano collecting from the open cupola.

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
1 LS	$1,500.00 LS	$1,500.00

Treatment Reference:

Restoration Treatment Cost Total: $1,500.00

South Eave Wall: Bays 1-8 At Second Floor Level

Feature Description:

The south eave wall bays of the main barn and added bays are in excellent shape and retain almost all of their original features. Horizontal girts connect bent to bent as do the discontinuous plates. Flying purlins are also discontinuous and engage the ends of the tie beams which extend beyond the wall plane to create the overhand. Vertical sheathing with a reverse vertical batten covering the vertical seams of the rough boards is visible in all five bays of the original barn. Horizontal sheathing is present in the added three bays 6, 7, & 8. Sheathing is nailed at each horizontal girt level. Angled braces complete the bays, each engaging the post and plate along the length of the building. Girts are hand hewn and braces are circular sawn. Rough board sheathing is also circular sawn.

Quantity:	Measurement unit:	Condition Rating:
1	LS	Good

Feature Condition:

Elements of the south bays are in good shape overall. Some repair is necessary in bent one where the upper bay elements have suffered damage at the flashing points of the silo ell. There are missing low drive girts in bay one, and three. These girts originally were intended to restrain loose hay stored to each side of the drive bay of the barn. Their mortises and the remnants of the tenons for the girts are clearly visible in the corresponding drive posts.

Treatment Type: **Preservation**

Priority: **High**

South Eave Wall: Bays 1-8 At Second Floor Level

Treatment Description: Repair flying purlin in bent one

The flying purlin in bent one has suffered water damage at the flashing point of the silo ell. While replacement may be necessary, it is possible that enough of the original fabric can be retained with the aid of a Dutchman repair and epoxy.

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
1 LS	$1,000.00 LS	$1,000.00

Treatment Reference:

An epoxy consolidant such as Abatron products can be employed here. Abatron is a trade name for a number of epoxy and filler products available directly from the manufacturer. <http://www.abatron.com>

Preservation Treatment Cost Total: $1,000.00

Priority: Medium

Treatment Description: Replace low drive girts

The low drive girts in bents one and three have been cut away, but the evidence exists for their re-creation. Low drive girts still exist in bays two three and four and the missing girts can be made in kind to match the existing. Free tenons can be used to ease installation of the girts into their existing mortises as the girts are not structural and bear no load.

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
2 LS	$1,000.00 LS	$2,000.00

Treatment Reference:

Preservation Treatment Cost Total: $2,000.00

Treatment Type: Rehabilitation

Priority: Medium

Treatment Description: Floor from bay one to silo

The floor between the silo and bay one is very deteriorated. When the east gable end sills are repaired and the silo sill are repaired then the floor joists can be reconfigured and a new wood floor deck installed to ease access to and from each building.

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
1 LS	$1,000.00 LS	$1,000.00

Treatment Reference:

South Eave Wall: Bays 1-8 At Second Floor Level

Treatment Description: **Reinforce stairway to loft in bay one.**

The existing stairway leading from the second floor to the upper drive loft is minimally built and will need to be reinforced with stringer supports. Existing treads also need to be refastened using 10d galvanized box nails. A gate made from similar material may also be needed at its base as the upper floor loft will not be accessible to the general public.

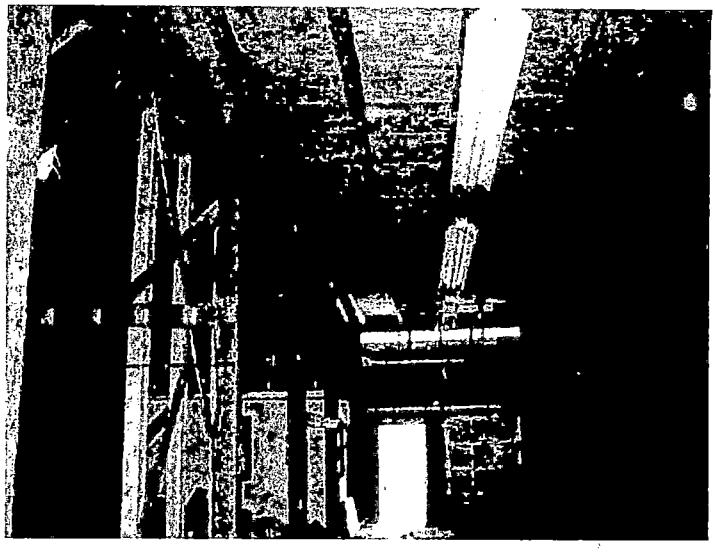
Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
1 LS	$1,000.00 LS	$1,000.00

Treatment Reference:

BOCA Code requirements will not allow the upper drive loft to be open to public use.

Rehabilitation Treatment Cost Total: **$2,000.00**

North Eave Wall Bays 1-8 At Second Floor Level



Feature Description:

Bays along the north wall are in good shape overall, and retain almost all of their original features. Horizontal girts connect bent to bent as do the discontinuous plates. Flying purlins are also discontinuous and engage the ends of the tie beams which extend beyond the wall plane to create the overhand. Vertical sheathing with a reverse vertical batten covering the vertical seams of the rough boards is visible in all five bays of the original barn. Horizontal sheathing is present in the added three bays; six, seven and eight. Sheathing is nailed at each horizontal girt level. Angled braces complete the bays, each engaging the post and plate along the length of the building. Girts are hand hewn and braces are circular sawn. Rough board sheathing is also circular sawn. Bay one has a much later added office with sheetrock and vernacular trim. Bay three currently has a temporary timber support system that passes from the first floor through the second floor and ends supporting the principle purlin in the roof system below the cupola. Bay five posses a ventilator shaft that also rises to the roof level. Windows are scattered among the eight bays along the north wall.

Quantity:	Measurement unit:	Condition Rating:
1	LS	Good

Feature Condition:

Almost all of the elements in the north bays are intact. Low drive girts in bays one, three, four and five are missing although their mortises are clearly visible. The girt in bay two is present but has been raised up and away from its original location. Windows are largely smashed away and very deteriorated.

North Eave Wall Bays 1-8 At Second Floor Level

Treatment Type: Restoration

Priority: Low

Treatment Description: Remove added office space.

The office space in bay one on the north eave wall can be easily removed and discarded to provide access to the pocket door in the east gable and to reveal the framing in bay one.

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
1 LS	$700.00 LS	$700.00

Treatment Reference:

Restoration Treatment Cost Total: $700.00

Priority: Medium

Treatment Description: Re-create and install low drive girts

The existing low drive girt in bay two can serve as the pattern by which the remaining missing girts can be recreated. These girts can utilize free tenons for their insertion into the existing posts as they are non load bearing. The girts originally acted as a railing for the open hay mow down to the first floor below. These girts may have been removed when the modern floor deck was added.

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
5 Ea	$500.00 Ea	$2,500.00

Treatment Reference:

Refer to the north wall exterior for window and sheathing repairs.

Restoration Treatment Cost Total: $2,500.00

South Roof

Feature Description:

The roof system in the original five bays of the barn is made up of principle rafters at each bent which meet at the peak with a simple plumb cut that is pegged together with a one inch trunnel. Common rafters between each principle rafters also meet with a simple plumb cut at their peaks. They are place about 24 inches on center within each bay. The common rafters are supported at midspan by a principle purlin that is mortise and tenoned into each principle rafter. The common rafters travel to the flying purlin and end with a level seat cut on the flying purlin. The common rafters are nailed with cut nails at these three connection points. Eave trim is directly attached to the flying purlin which is mortise and tenoned into each of the short tie beams in each bent that extend beyond the wall plane to allow for a proper overhang. The lower portion of the roof system in bay one also integrates with the silo roof system which runs perpendicular to it. The cupola sits in bay three spanning and interrupting the ridge line at this location. The roof framing is covered with one inch rough board skip sheathing designed for a wood shingle covering. Wood shingles can still be seen in the original frame. Asphalt shingles cover the wood shingles.

Quantity:	Measurement unit:	Condition Rating:
2,208	SF	Good

Feature Condition:

The asphalt roof covering is nearing its life span. Leaking is evident at the flashing points where the silo meets the south roof slope. The cupola lets in great amounts of water due to its deteriorated condition.

South Roof

Treatment Type: Rehabilitation

Priority: High

Treatment Description: Flashing the silo and cupola

Lead flashing should be utilized to ensure a water tight flashing at the junction of the roof and cupola. Copper valley flashing and lead should be used to flash the silo roof junction. A rubberized ice and water shield should be installed six feet up the roof plane along the entire roof of both barn and silo.

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
1 LS	$1,500.00 LS	$1,500.00

Treatment Reference:

Copper flashing should be custom made to fit the roof planes. Rolled lead and ice and water shield are available at most reputable construction supply stores.

Treatment Description: Alt A: New 50 year architectural asphalt shingles

The prepared roof substrate can accept new architectural asphalt roof shingles. The shingles should be installed following the hurricane standards outlined in the manufacturers specifications. Nails must penetrate at least one half inch through the new layer of one inch roof sheathing.

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
22 SQ	$100.00 SQ	$2,200.00

Treatment Reference:

Most reputable asphalt roof shingle manufaturers will stipulate high wind area application processes.

Treatment Description: Remove old roof covering and install sheathing

The asphalt roof covering must be removed. The old wood shingles must be removed as well. The original skip sheathing can be retained but shuould be renailed with 10D galvanized common nails. Another layer of ship lapped rough sheathing boards can then be placed over the skip sheathing to create a substantial base for the new roof covering. New roof sheathing is to be nailed to the common and principle rafters using a 16D galvanized common nail.

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
22 SQ	$400.00 SQ	$8,800.00

Treatment Reference:

The existing roof design is ill prepared for the dead load of two or three layers of asphalt over wood shingles.

South Roof

Treatment Description: **Alt B: Standing seam roof alternative**

A standing seam metal roof is an excellent choice for a building of this size and age. The advantage of standing seam is two fold. First, it will outlast any ashphalt roof by at least twenty five years. Second, it provides very little dead load and disallows any significant live load from snow on the exisiting roof structure. Where the roof structure is repaired this is a very real advantage.

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
22 SQ	$400.00 SQ	$8,800.00

Treatment Reference:

Standing seam roof suppliers can be found throughout New Hampshire.

Rehabilitation Treatment Cost Total: **$21,300.00**

North Roof

Feature Description:

The roof system in the original five bays of the barn is made up of principle rafters at each bent which meet at the peak with a simple plumb cut that is pegged together with a one inch trunnel. Common rafters between each principle rafters also meet with a simple plumb cut at their peaks. They are place about 24-inches on center within each bay. The common rafters are supported at midspan by a principle purlin that is mortise and tenoned into each principle rafter. The common rafters travel to the flying purlin and end with a level seat cut on the flying purlin. The common rafters are nailed with cut nails at these three connection points. Eave trim is directly attached to the flying purlin which is mortise and tenoned into each of the short tie beams in each bent that extend beyond the wall plane to allow for a proper overhang. The lower portion of the roof system in bay one also integrates with the silo roof system which runs perpendicular to it. The cupola sits in bay three spanning and interrupting the ridge line at this location. The roof framing is covered with one inch rough board skip sheathing designed for a wood shingle covering. Wood shingles can still be seen in the original frame. Asphalt shingles cover the wood shingles.

Quantity:	Measurement unit:	Condition Rating:
22	SQ	Good

Feature Condition:

The north roof is in relatively good condition save elements in bay three. Here the principle purlin has been damaged by water penetrating the cupola and the purlin may need to be replaced. A temporary beam support system currently holds this purlin in place.

North Roof

Treatment Type: Rehabilitation

Priority: High

Treatment Description: Alt. B: Standing seam roof alternative

A standing seam metal roof is an excellent choice for a building of this size and age. The advantage of standing seam is two fold. First, it will outlast any ashphalt roof by at least twenty five years. Second, it provides very little dead load and disallows any significant live load from snow on the exisiting roof structure. Where the roof structure is repaired this is a very real advantage.

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
22 SQ	$400.00 SQ	$8,800.00

Treatment Reference:

Standing seam roof suppliers can be found throughout New Hampshire.

Treatment Description: Flashing the cupola

Lead flashing should be utilized to ensure a water tight flashing at the junction of the roof and cupola. A rubberized ice and water shield should be installed six feet up the roof plane along the entire roof of both barn and silo.

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
1 LS	$700.00 LS	$700.00

Treatment Reference:

Rolled lead and ice and water shield are available at most reputable construction supply stores.

Treatment Description: Alt. A: New 50 year architectural asphalt shingles

The prepared roof substrate can accept new architectural asphalt roof shingles. The shingles should be installed following the hurricane standards outlined in the manufacturers specifications. Nails must penetrate at least one half inch through the new layer of one inch roof sheathing.

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
22 SQ	$100.00 SQ	$2,200.00

Treatment Reference:

Most reputable asphalt roof shingle manufaturers will stipulate high wind area application processes.

North Roof

Treatment Description: **Remove old roof covering and install sheathing.**

The asphalt roof covering must be removed. The old wood shingles must be removed as well. The original skip sheathing can be retained but should be renailed with 10d galvanized common nails. Another layer of ship lapped rough sheathing boards can then be placed over the skip sheathing to create a substantial base for the new roof covering. New roof sheathing is to be nailed to the common and principle rafters using a 16d galvanized common nail.

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
22 SQ	$400.00 SQ	$8,800.00

Treatment Reference:

The existing roof design is ill prepared for the dead load of two or three layers of asphalt over wood shingles.

Rehabilitation Treatment Cost Total: **$20,500.00**

Treatment Type: **Restoration**

Priority: **High**

Treatment Description: **Common rafter repair, bay three**

Common rafters in bay three may also need repair. To do this the skip sheathing and the cupola must be removed from the building. New common rafters can be created and placed in their original locations to ensure the structural integrity of the roof system.

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
5 Ea	$250.00 Ea	$1,250.00

Treatment Reference:

Refer to repairs for the cupola for details for removing the cupola.

Treatment Description: **Principle purlin replacement; bay three north.**

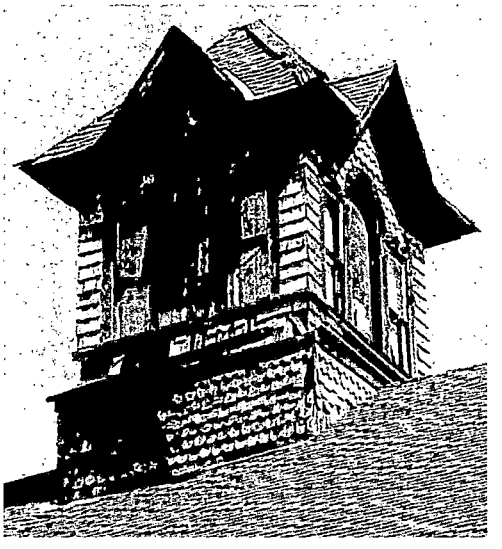
The principle purlin in bay three will need replacement. To do this the roof must be stripped and the skip sheathing removed to expose the purlin. A new purlin created to match the original can then be created. To install the the new purlin it will be necessary to cut away a portion of the principle rafter in bent four to expose the purlin mortise. The new purlin will then engage the exisitng mortise in bent three and fill the void created in bent four with a half lapped dove tailed joint. This lapped joint can be short to interfere minimally with the structural integrity of the principle rafter.

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
1 LS	$2,000.00 LS	$2,000.00

Treatment Reference:

Restoration Treatment Cost Total: **$3,250.00**

The Cupola



Feature Description:

The cupola is by far the most ornate element on the barn. It is built in the shingle style with artfully sculpted wood shingle siding and decorative roof framing and trim elements. It is multi-colored to stand out as a prominent feature and it has two rectangular windows in each side and an arched center window in each side as well. The arched windows have wood panels placed within them and the side sash possess some remaining glass. The cupola is placed at the center of bay three and therefore, was at the original barn's center when first built. The interior of the cupola is framed with dimensional 2"x 4" stud walls and light cross members. The roof framing is also very light. The hip roof with peaked gables is covered with asphalt shingles with lead flashing over the hip rafters. The base of the cupola steps out to form a box that sits directly onto the roof system. Common rafters in bay three have been cut back to accept the cupola framing and they have become part of its structure.

Quantity:	Measurement unit:	Condition Rating:
1	LS	Poor

Feature Condition:

The cupola is in great jeopardy. It is almost in complete structural failure and currently leaks at every corner. A considerable number of lower structural elements have rotted away leaving the lower sheathing hanging from poor fasteners.

The Cupola

Treatment Type: Rehabilitation

Priority: High

Treatment Description: New timber supports for cupola

The original structural support for the cupola is inadequate and must be revised. To accomplish this two sleeper beams will be placed across the high tie beams in bents three and four parallel to the drive. These sleepers will measure 8"x 8" square and cog over the tie beam. The sleeper beams run parallel with the center drive directly below the cupola framing. Once in place, a short post at each corner will be placed and a top plate will be installed to make a box frame on top of the posts. The posts should be braced with mortise and tenoned angle braces both ascending to the plate level and decending to the sleeper beams. Posts will be mortised and tenoned into the sleeper beams and posts. Once in place the cupola can be flown into position and the new cupola framing will be mortise and tenoned into the plate and the exterior sheathing fastened into the plate as well. This provides ample support for the weight of the cupola while providing a sufficient base to which proper flashing can be applied. The cupola stairs and platforms can then be reinstalled to allow access to the cupola for maintenance.

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
1 LS	$2,000.00 LS	$2,000.00

Treatment Reference:

The weight of the cupola is not significant with regard to the joinery at the high tie beam level. It can easily take the load. See drawing sheet #15 of 18; Cupola Support Base.

Rehabilitation Treatment Cost Total: $2,000.00

Treatment Type: Restoration

Priority: High

Treatment Description: Remove cupola and repair/replace in-kind

In order to save the cupola and repair the existing roof framing the cupola must be removed to the ground. Once down it can be carefully cataloged and dismantled with the intention of re-using as many architectural details as possible to recreate it. Sash will need to be reproduced in-kjnd. The structural components will need to be reproduced entirely and strengthened. New wood shingles will need to be installed and a new paint job to match the original will be applied. Once complete, the cupola can be reinstalled as the central feature of the barn.

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
1 LS	$27,000.00 LS	$27,000.00

Treatment Reference:

See drawing sheet #16 of 18; Cupola Framing.

Restoration Treatment Cost Total: $27,000.00

Silo Roof

Feature Description:

The silo roof is created from common rafters nailed to a timber top plate. The roof sheathing is rough pine boards set relatively close together. The roof covering is asphalt shingles.

Quantity:	Measurement unit:	Condition Rating:
1	LS	Poor

Feature Condition:

The silo roof shingles are very damaged and water penetrates to the interior.

Treatment Type: Rehabilitation

Priority: High

Treatment Description: Alt B: Install standing seam roof

A standing seam roof has advantage over the asphalt shingle roof on two fronts. First it is much lighter, and second, it does not hold snow therefore, reducing the overall live loads placed on the roof.

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
6 SQ	$400.00 SQ	$2,400.00

Treatment Reference:

Silo Roof

Treatment Description: **Alt A: Install 50 year architectural shingles.**

The prepared roof substrate can accept new architectural asphalt roof shingles. The shingles should be installed following the hurricane standards outlined in the manufacturers specifications. Nails must penetrate at least one half inch through the new layer of one inch roof sheathing.

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
6 SQ	$100.00 SQ	$600.00

Treatment Reference:

Most reputable asphalt roof shingle manufaturers will stipulate high wind area application processes.

Treatment Description: **Remove old roof covering and install sheathing.**

The asphalt roof covering must be removed. The old wood shingles must be removed as well. The original skip sheathing can be retained but shuould be renailed with 10d galvanized common nails. Another layer of ship lappec rough sheathing boards can then be placed over the skip sheathing to create a substantial base for the new roof covering. New roof sheathing is to be nailed to the common and principle rafters using a 16d galvanized common nail.

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
6 SQ	$400.00 SQ	$2,400.00

Treatment Reference:

The existing roof design is ill prepared for the dead load of two or three layers of asphalt over wood shingles.

Rehabilitation Treatment Cost Total: **$5,400.00**

Silo Interior

Feature Description:

The silo interior is made up of horizontal sheathing nailed directly to the studs creating a two story open shaft for silage.

Quantity:	Measurement unit:	Condition Rating:
1	LS	Fair

Feature Condition:

The interior sheathing is in good order save a few pieces down low near the rotten sills

Treatment Type: Rehabilitation

Priority: Low

Treatment Description: Create usable floor in silo

The silo can become a viable part of the barn comples with the addition of two floors. The base level floor will be created from modern kiln dried joists placed 16 inches on center attached to a ribbon joist lag bolted through the exisitng sheathing and into the stud wall framing. A deck to match the level of the first floor and in kind with the deck boards should be installed. A second deck level can be created at the plane of the second floor of the main barn to allow access here as well.

Repair/Replacement Amount:	Unit Cost:	Repair/Replacement Cost:
784 SF	$27.00 SF	$21,168.00

Treatment Reference:

New elements added to the silo should be clearly delineated from the original fabric.

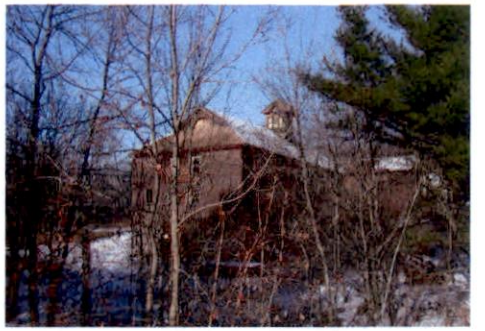
Rehabilitation Treatment Cost Total: $21,168.00

1992

D.O.T
PHOTOS

POSTED





















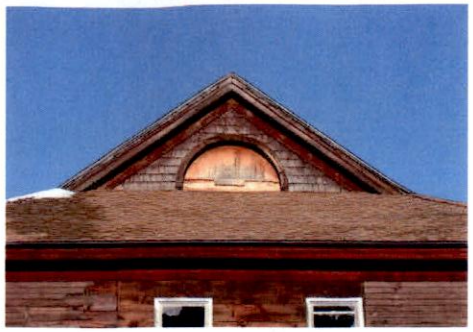




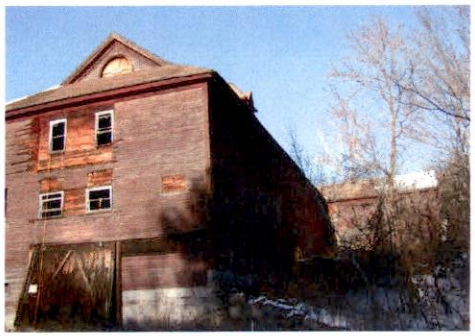








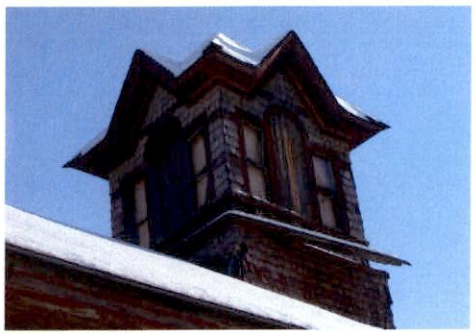


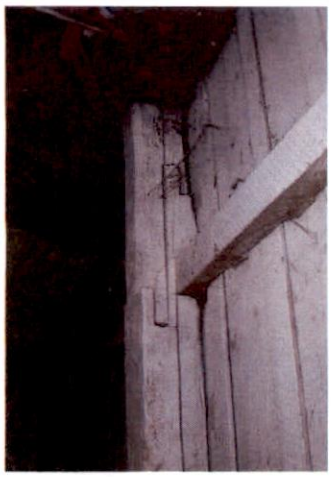











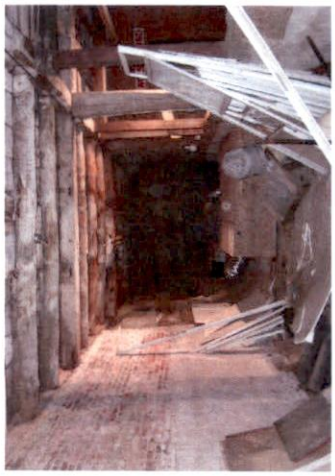








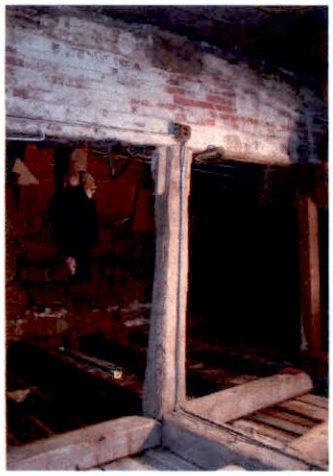












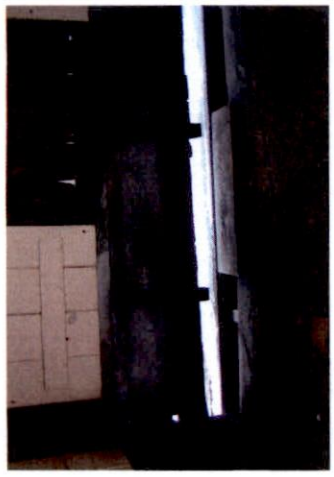










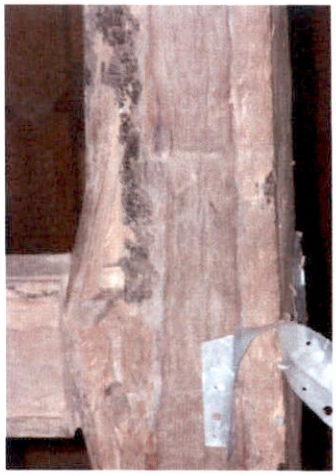












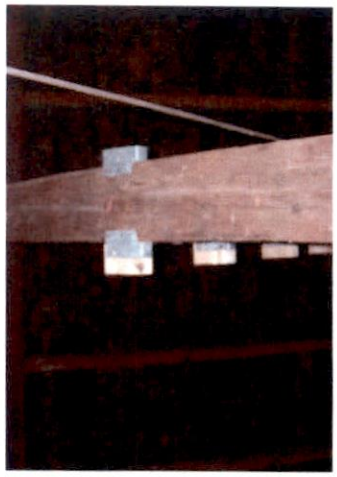










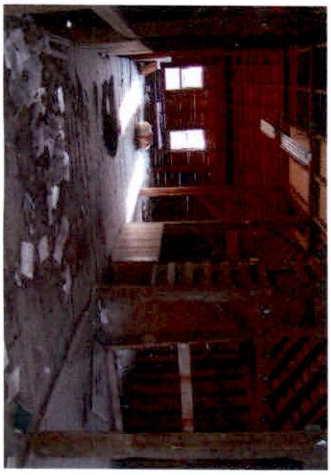


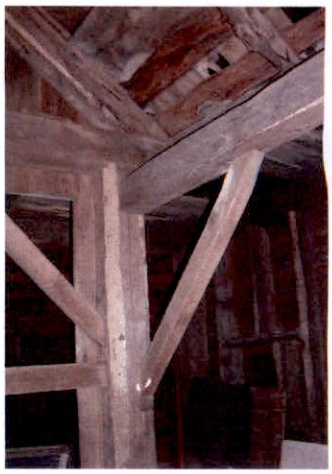




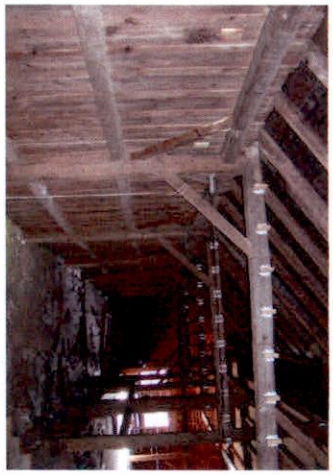


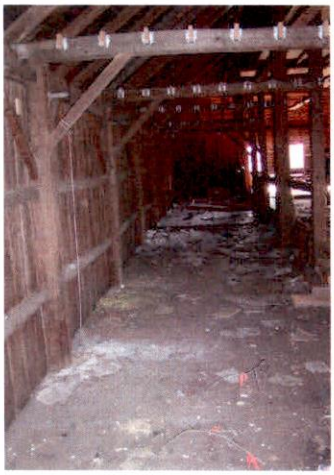


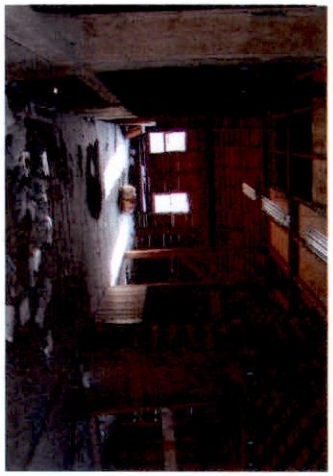



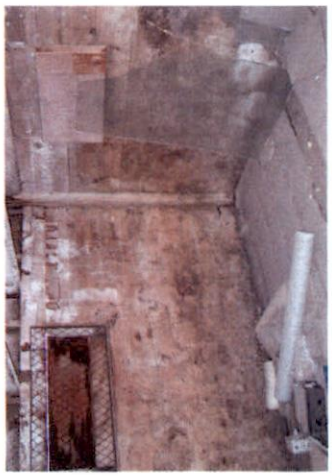




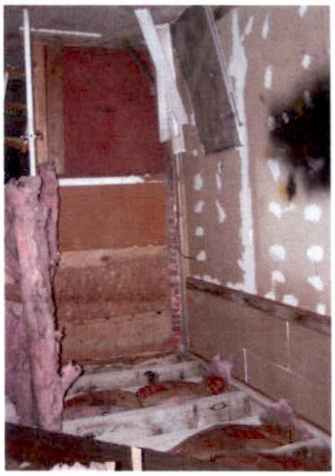




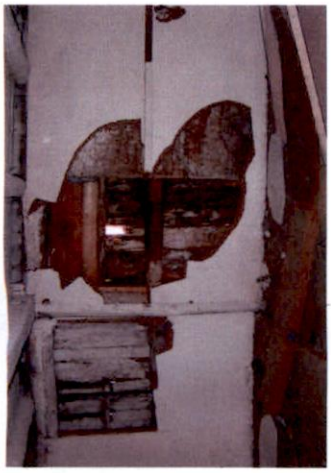




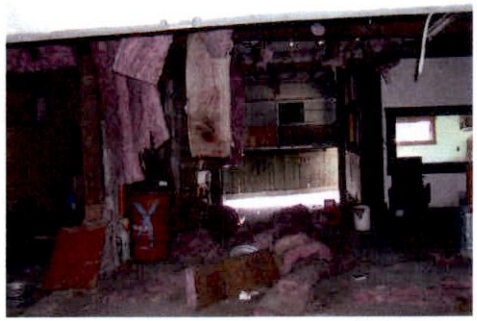


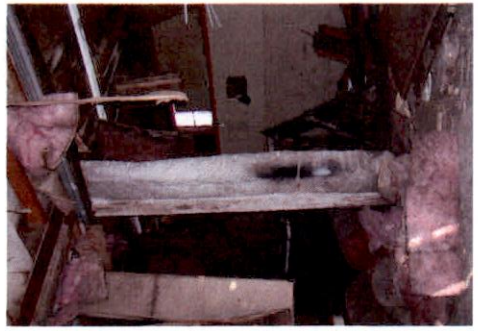
















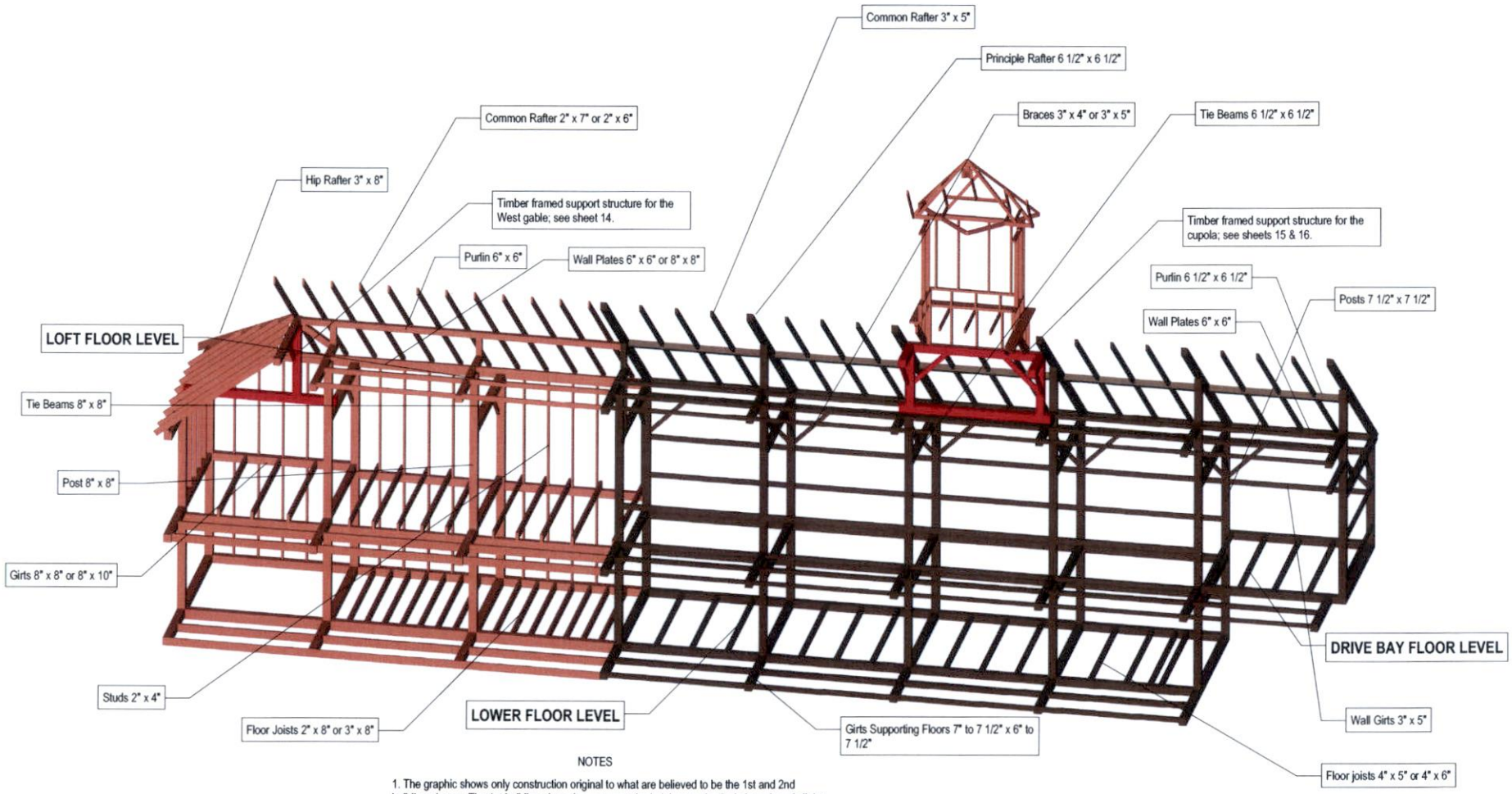



POSTED




POSTED

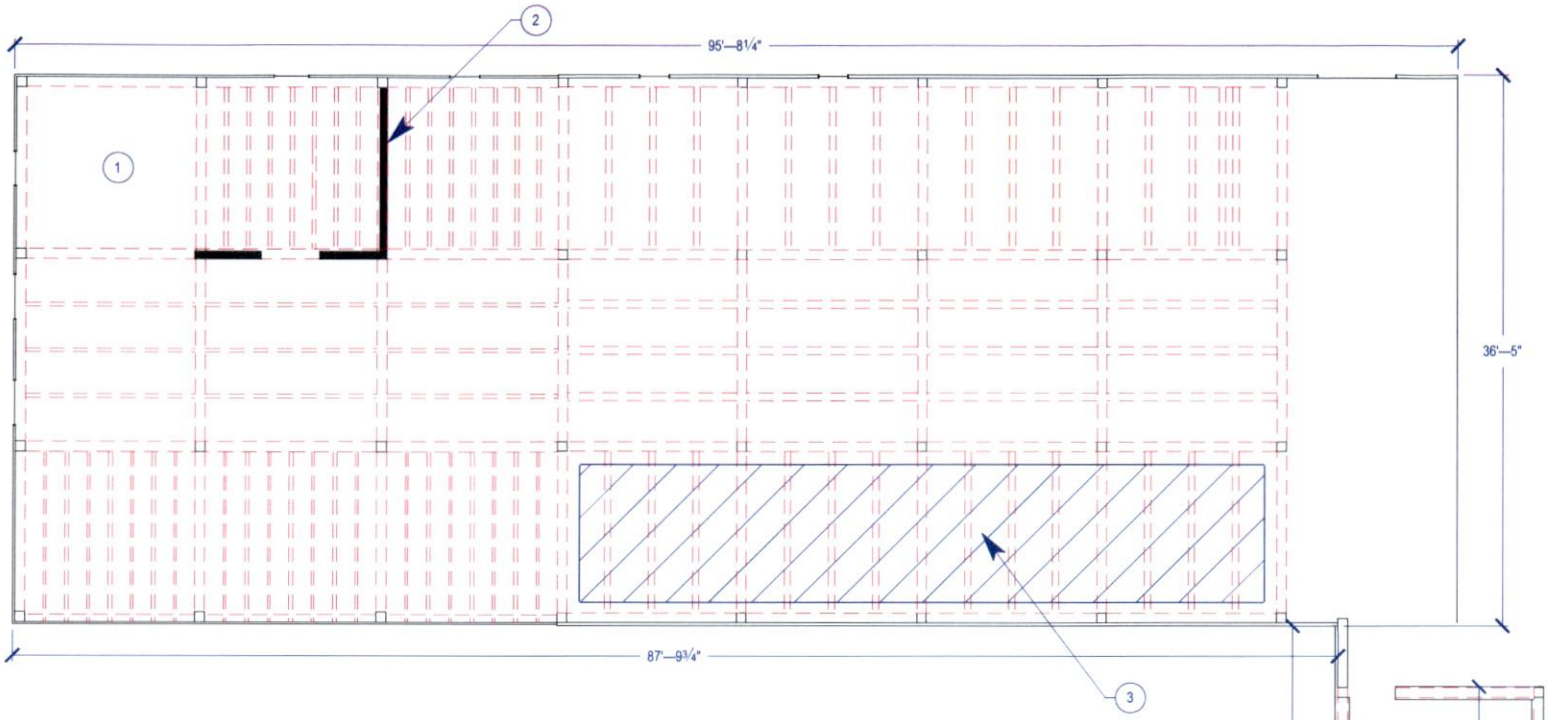
Barn Drawings



NOTES

1. The graphic shows only construction original to what are believed to be the 1st and 2nd building phases. The 1st building phase barn appears in dark brown the 2nd phase barn is light brown.
2.The frame of the 1st building phase barn was constructed using the "Square Rule " timber framing layout method. Dimensions of typical frame members were taken at the Square Rule reductions. The principle frame members in the 1st phase barn are hewn; the secondary frame members as well as sheathing, flooring etc. are circular sawn.
3. The frame of the 2nd phase barn was constructed using the "Mill Rule" timber framing layout method. The principle and secondary frame members are circular sawn.

HASELTON BARN
3-DIMENSIONAL TIMBER FRAME SECTION VIEW



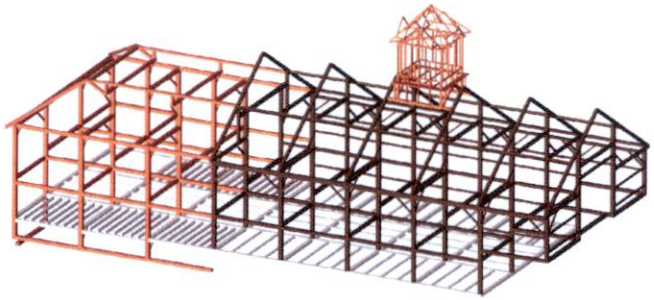
Drawing Object

1st Building Phase

2nd Building Phase

NOTES

1. Floor joists not accessible for measurement.
2. Walled area in the Northwest corner of the lower level may date to the second building phase.
3. Drawing shows original floor joist configuration, most of the original joists in the blue hatched area have been replaced and re-configured.



SCALE OF FEET

HASELTON BARN
HUDSON, NH

Lower Floor Level Plan

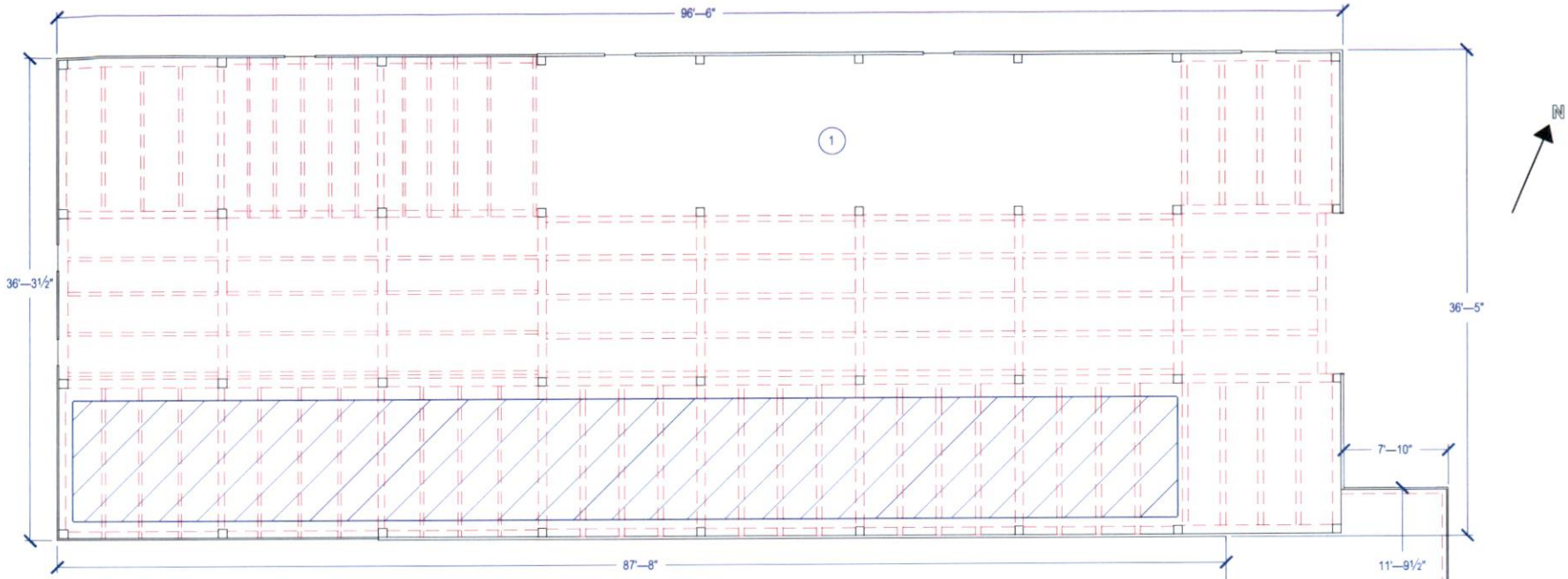
SCALE: 1/8" = 1'

SHEET # 1 of 18

DRAWN BY: J. Butler

DATE 5/18/03

PRESERVATION TIMBER FRAMING INC.
POST OFFICE BOX 29, ELIOT, MAINE 03903
207.361-2091



Drawing Object

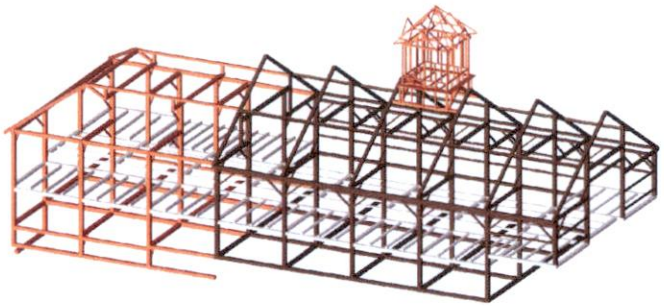
1st Building Phase

2nd Building Phase

NOTES

1.There is no evidence of early floor framing in this section of the North drive bay. It was likely open to the lower level for hay storage. It is presently floored over at the level of the center drive bay.

2. The drive bay level floor within the blue hatched area is dropped approximately 22" below the center drive bay floor.



SCALE OF FEET

HASELTON BARN
HUDSON, NH

Drive Bay Level Floor Plan

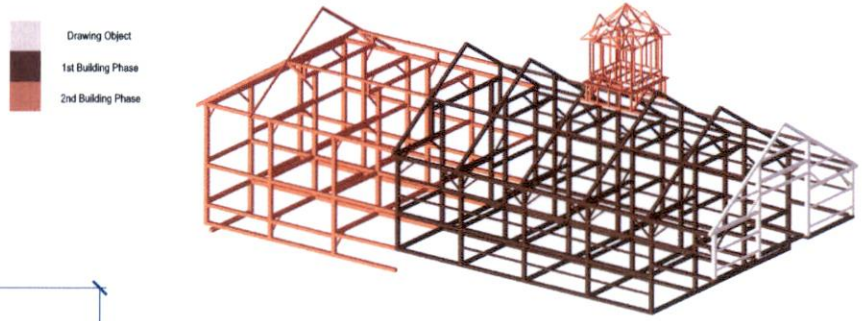
SCALE: 1/8" = 1'

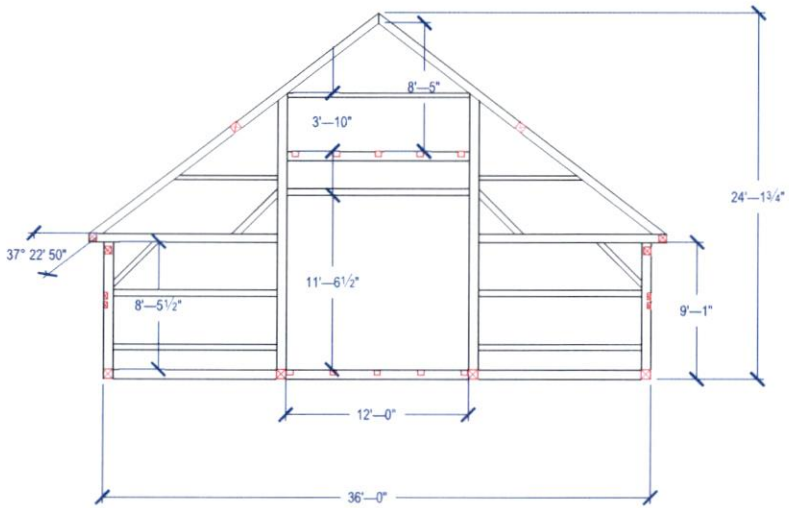
SHEET # 2 of 18

DRAWN BY: J. Butler

DATE 5/18/03

PRESERVATION TIMBER FRAMING INC.
POST OFFICE BOX 29, ELIOT, MAINE 03903
207 361-2091





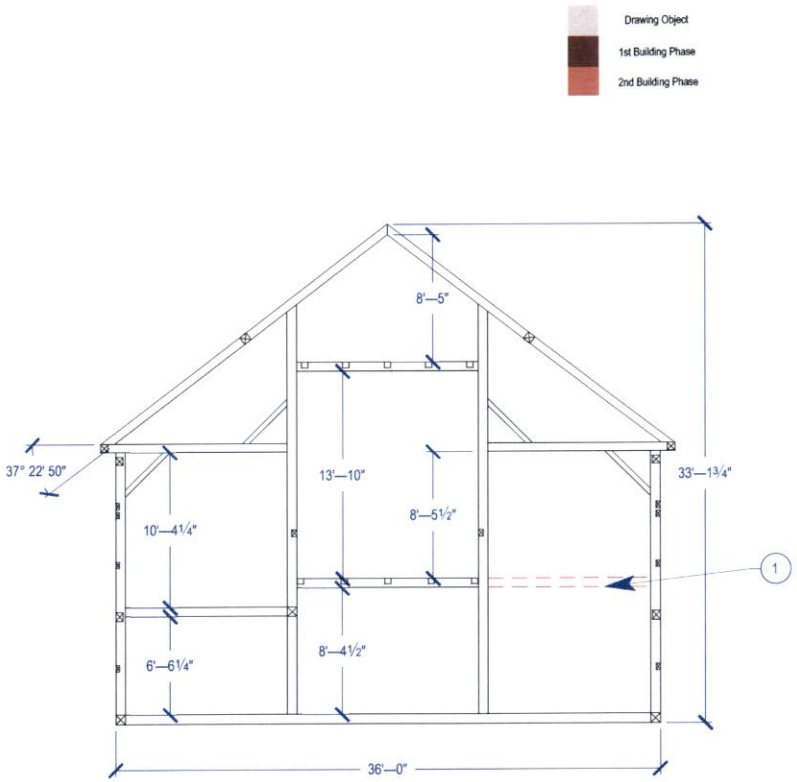
SCALE OF FEET

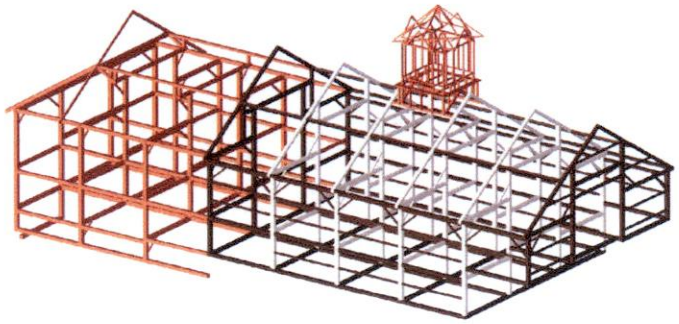
HASELTON BARN
HUDSON, NH

Bent 1 Elevation
Viewpoint from the East (layout/reference face)

SCALE: 1/8" = 1'	SHEET # 3 of 18
DRAWN BY: J. Butler	DATE 5/18/03

PRESERVATION TIMBER FRAMING INC.
POST OFFICE BOX 29, ELIOT, MAINE 03903
207 361-2091





NOTES

1. Dotted lines denote present drive bay floor level on the North side of the barn. Originally this area was open to the lower level floor.

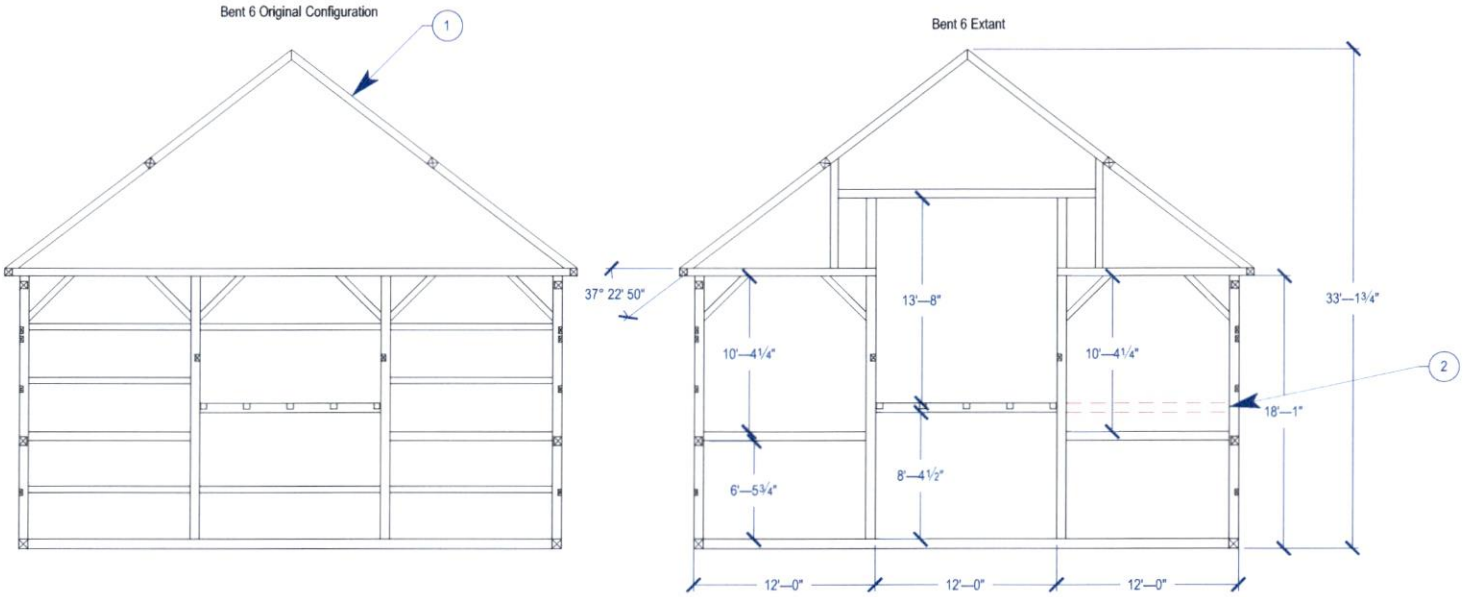
SCALE OF FEET

HASELTON BARN
HUDSON, NH

Bents 2, 3, 4 & 5 (Typical) Elevation
Viewpoint from the East (layout/reference face)

SCALE: 1/8" = 1'	SHEET # 4 of 18
DRAWN BY: J. Butler	DATE 2/4/03

PRESERVATION TIMBER FRAMING INC.
POST OFFICE BOX 29, ELIOT, MAINE 03903
207 361-2091



NOTES

1. Bent 6 underwent significant modification when the phase 2 barn was added to the phase 1 barn. The original configuration of bent 6 appears on the left. Original gable framing is not entirely understood.

2. Present Drive Bay floor level on the North side of the barn.

HASELTON BARN
HUDSON, NH

Bent 6 Elevation
Viewpoint from the East (non-layout/reference face)

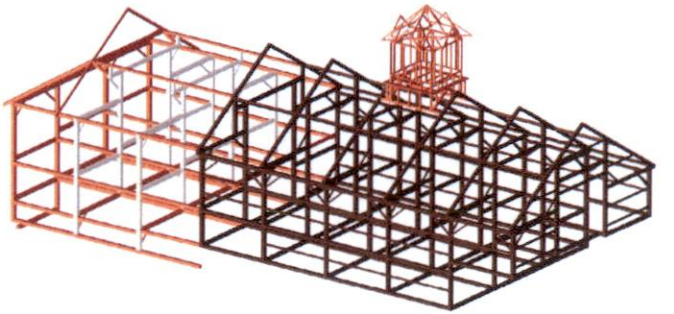
SCALE: 1/8" = 1'	SHEET # 5 of 18
DRAWN BY: J. Butler	DATE 5/18/03

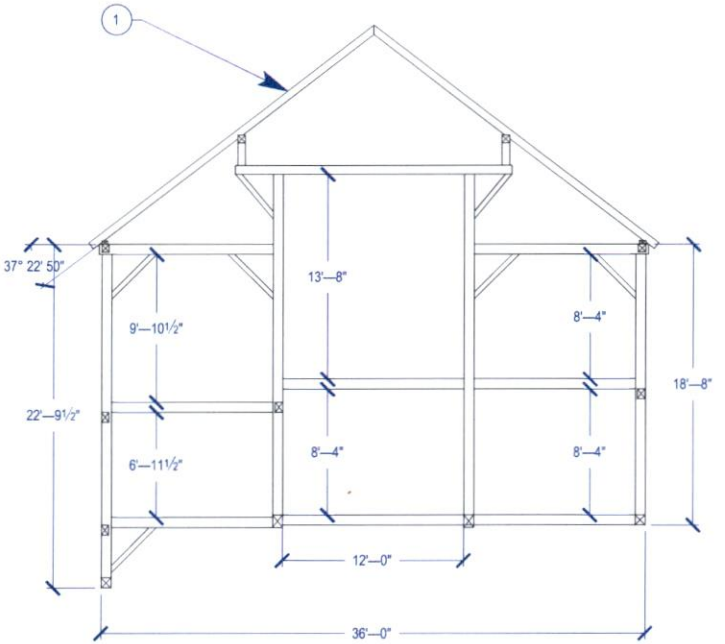
PRESERVATION TIMBER FRAMING INC.
POST OFFICE BOX 29, ELIOT, MAINE 03903
207 361-2091

Drawing Object

1st Building Phase

2nd Building Phase





NOTES

1. Phase 2 Barn roof consists entirely of common rafters. The rafters are not joined to the bents.

SCALE OF FEET

HASELTON BARN
HUDSON, NH

Bents 7& 8 (Typical) Elevation
Viewpoint from the East (non-layout/reference face)

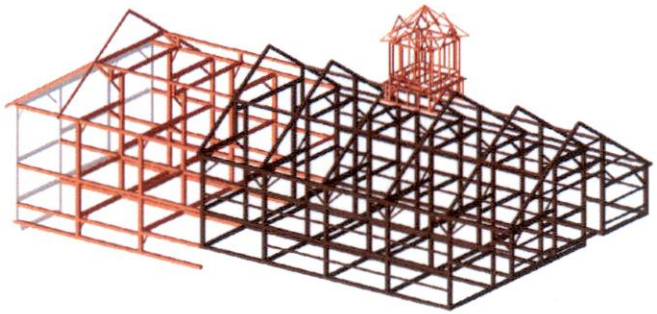
SCALE: 1/8" = 1'	SHEET # 6 of 18
DRAWN BY: J. Butler	DATE 5/18/03

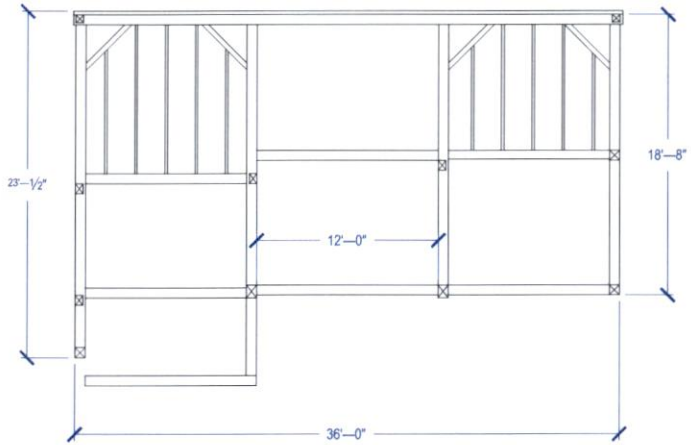
PRESERVATION TIMBER FRAMING INC.
POST OFFICE BOX 29, ELIOT, MAINE 03903
207 361-2091

Drawing Object

1st Building Phase

2nd Building Phase





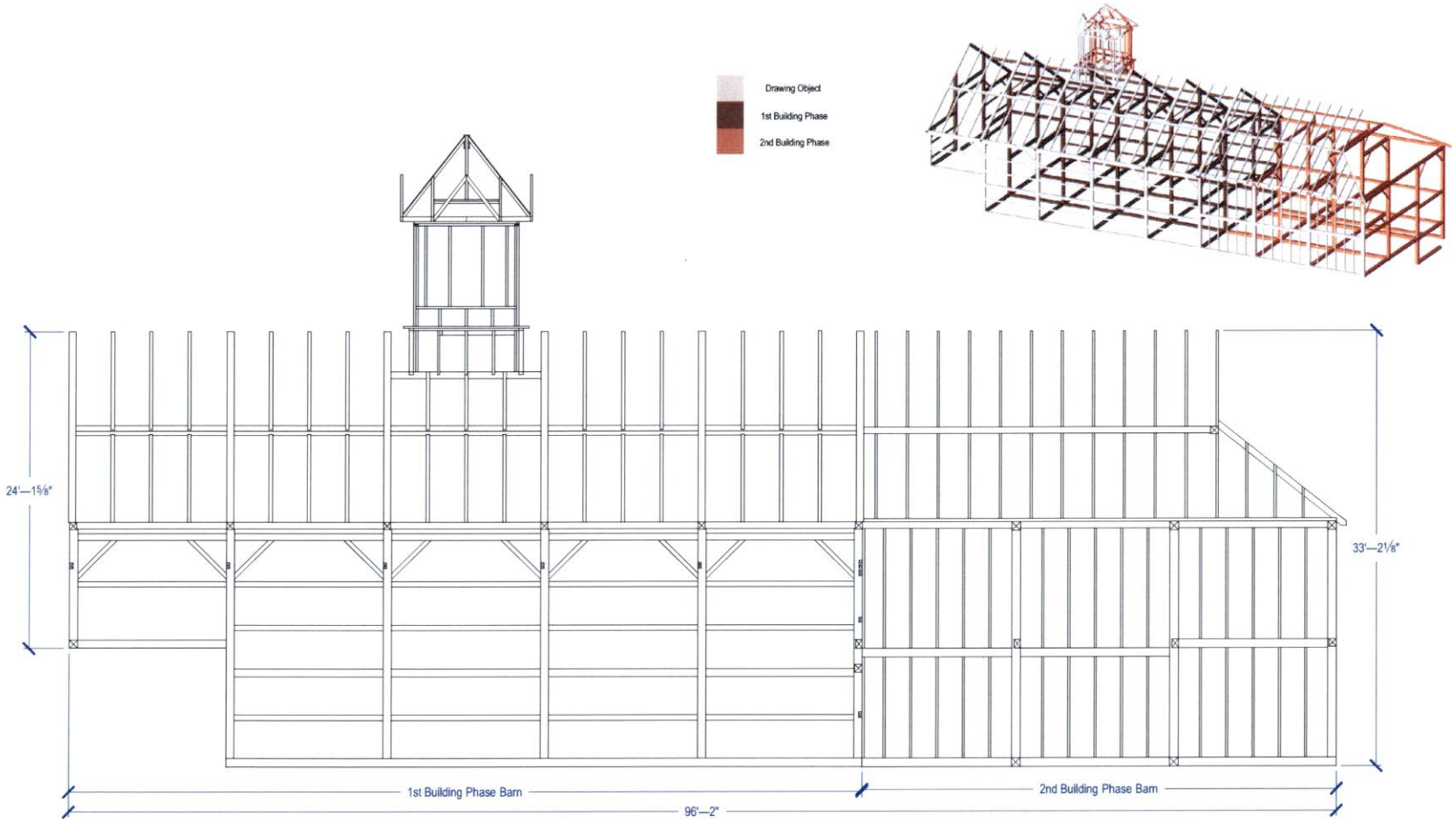
SCALE OF FEET

HASELTON BARN
HUDSON, NH

Bent 9 Elevation
Viewpoint from the East (non-layouo/reference face)

SCALE: 1/8" = 1'	SHEET # 7 of 18
DRAWN BY: J. Butler	DATE 5/18/03

PRESERVATION TIMBER FRAMING INC.
POST OFFICE BOX 29, ELIOT, MAINE 03903
207 361-2091

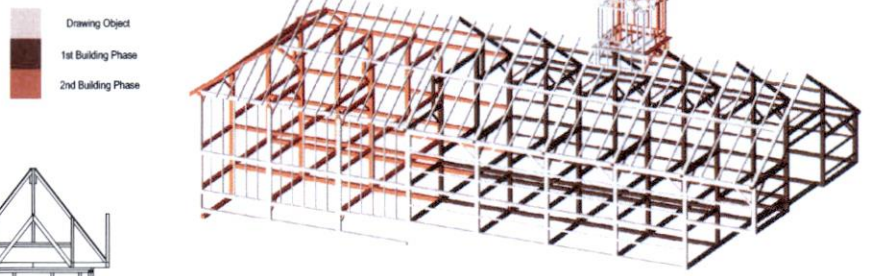


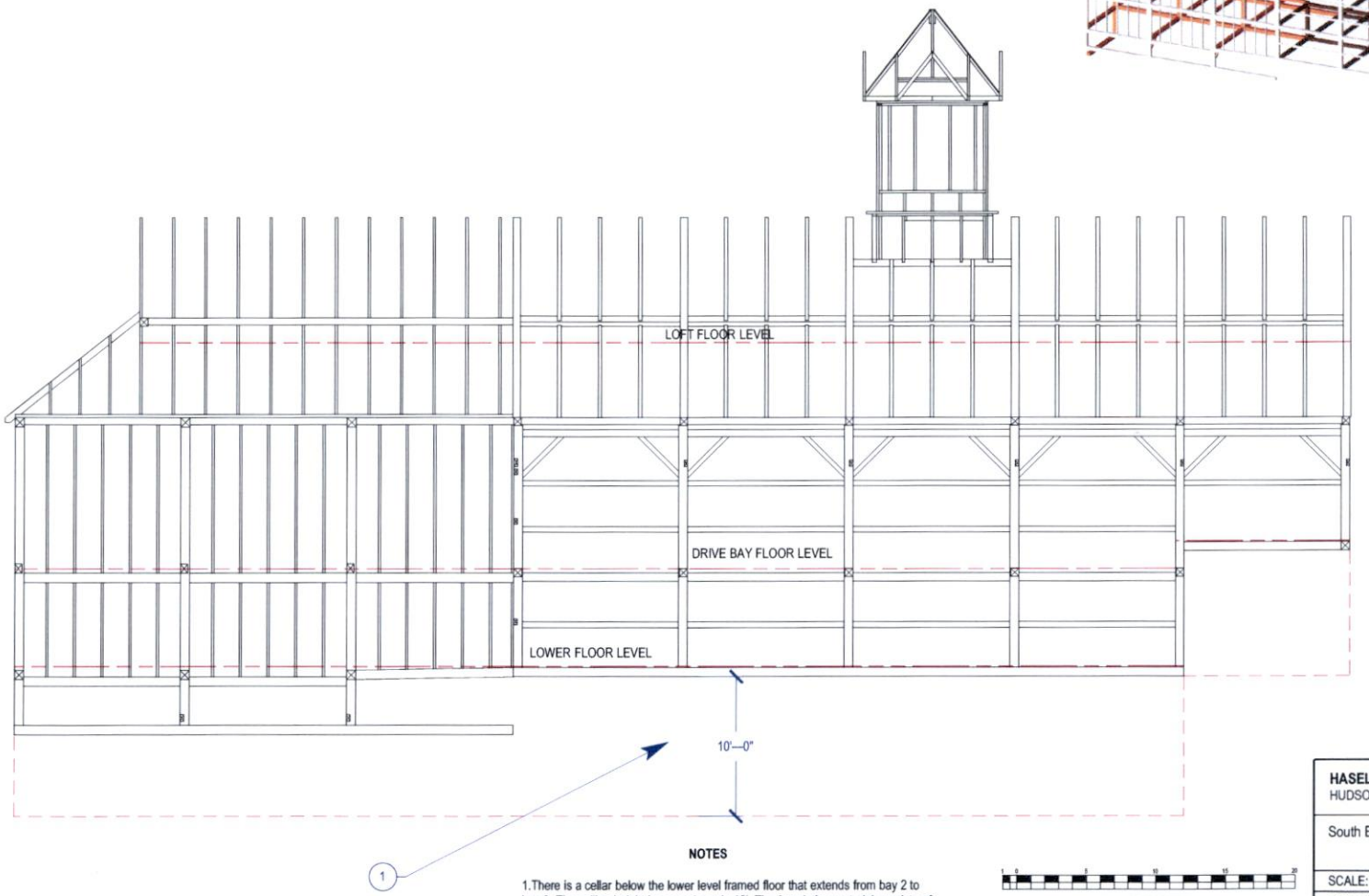
HASELTON BARN
HUDSON, NH

North Eaves Wall Frame Elevation

SCALE 1/8" = 1':	SHEET # 8 of 18
DRAWN BY: J. Butler	DATE 5/18/03

PRESERVATION TIMBER FRAMING INC.
POST OFFICE BOX 29, ELIOT, MAINE 03903
207 361-2091





NOTES

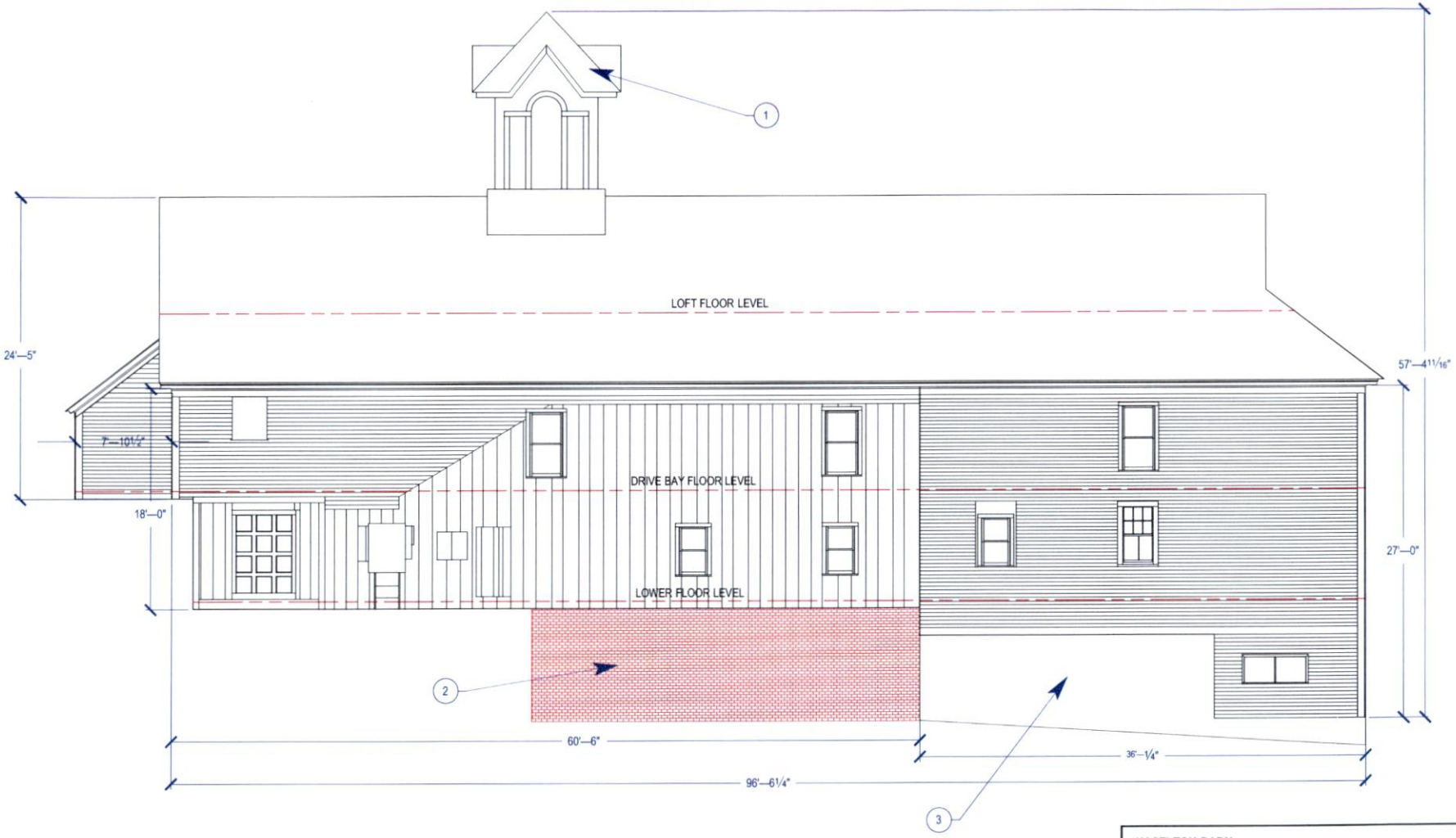
1.There is a cellar below the lower level framed floor that extends from bay 2 to bay 8. The ceiling height is approximately 10'. The foundation material consists of brick &stone.

HASELTON BARN
HUDSON, NH

South Eaves Wall Frame Elevation

SCALE: 1/8" = 1'	SHEET # 9 of 18
DRAWN BY: J. Butler	DATE 5/18/03

PRESERVATION TIMBER FRAMING INC.
POST OFFICE BOX 29, ELIOT, MAINE 03903
207 361-2091



NOTES

1. Cupola exterior inaccessible for detailed measurement.
2. Exposed brick foundation under Phase 1 Barn.
3. Plywood infill.

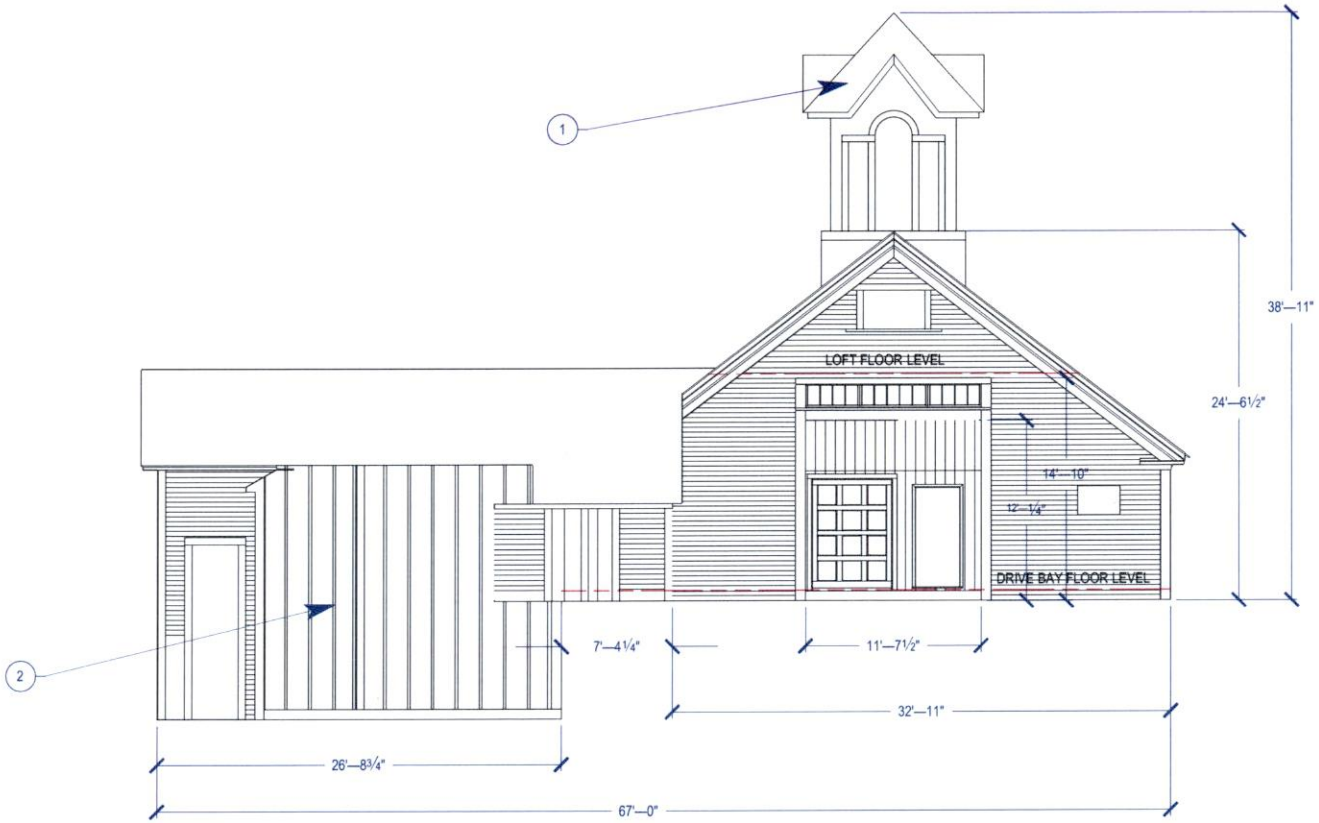
SCALE OF FEET

HASELTON BARN
HUDSON, NH

North Eaves Wall Elevation

SCALE: 1/8" = 1'	SHEET # 10 of 18
DRAWN BY: J. Butler	DATE 5/18/03

PRESERVATION TIMBER FRAMING INC.
POST OFFICE BOX 29, ELIOT, MAINE 03903
207 361-2091



NOTES

1. Cupola exterior inaccessible for detailed measurement.
2. Exposed framing and interior sheathing of the attached silo, parts of which are no longer extant.

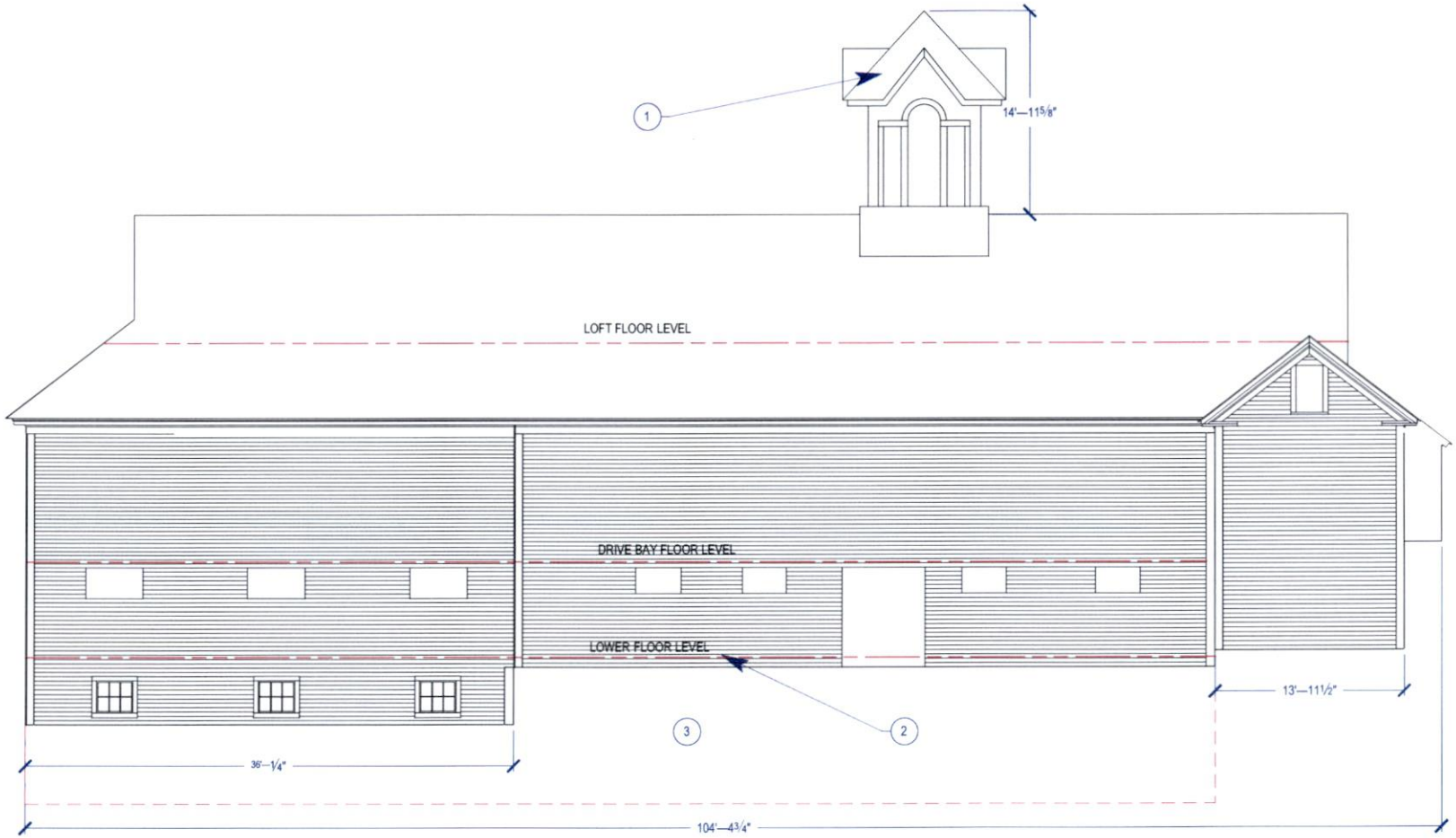
SCALE OF FEET

HASELTON BARN
HUDSON, NH

East Gable Wall Elevation

SCALE: 1/8" = 1'	SHEET # 11 of 18
DRAWN BY: J. Butler	DATE: 5/18/03

PRESERVATION TIMBER FRAMING INC.
POST OFFICE BOX 29, ELIOT, MAINE 03903
207 361-2091



NOTES

1. Cupola exterior inaccessible for detailed measurement.

2. The drive bay floor on the South side of the barn is approximately 22" lower than the center drive bay's floor.

3. Cellar area below Lower Level framed floor, approximately 10' ceiling height, foundation material brick/stone.

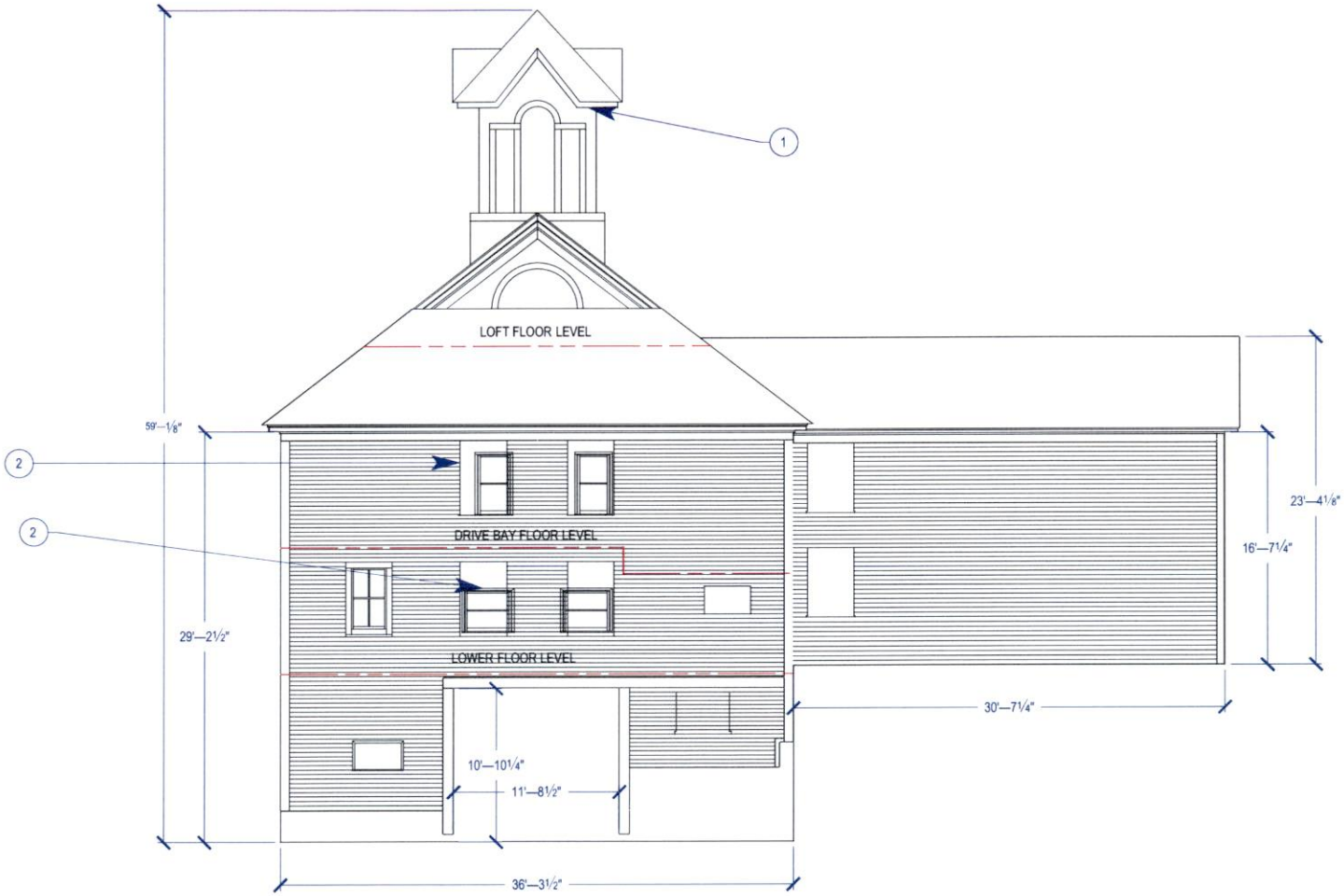
SCALE OF FEET

HASELTON BARN
HUDSON, NH

South Eaves Wall Elevation

SCALE: 1/8" =1'	SHEET # 12 of 18
DRAWN BY: J. Butler	DATE 5/18/03

PRESERVATION TIMBER FRAMING INC.
POST OFFICE BOX 29, ELIOT, MAINE 03903
207 361-2091



NOTES

1. Cupola exterior inaccessible for detailed measurement.
2. Contemporary windows a over-layed on the locations of earlier windows possibly dating to the second building phase.

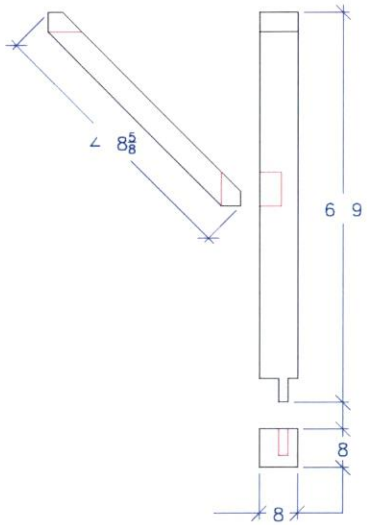
SCALE OF FEET

HASELTON BARN
HUDSON, NH

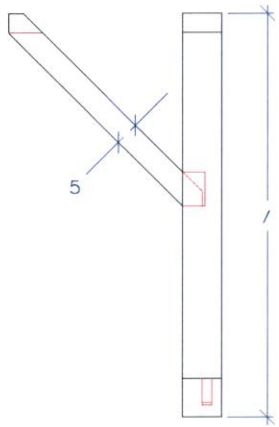
West Gable Wall Elevation

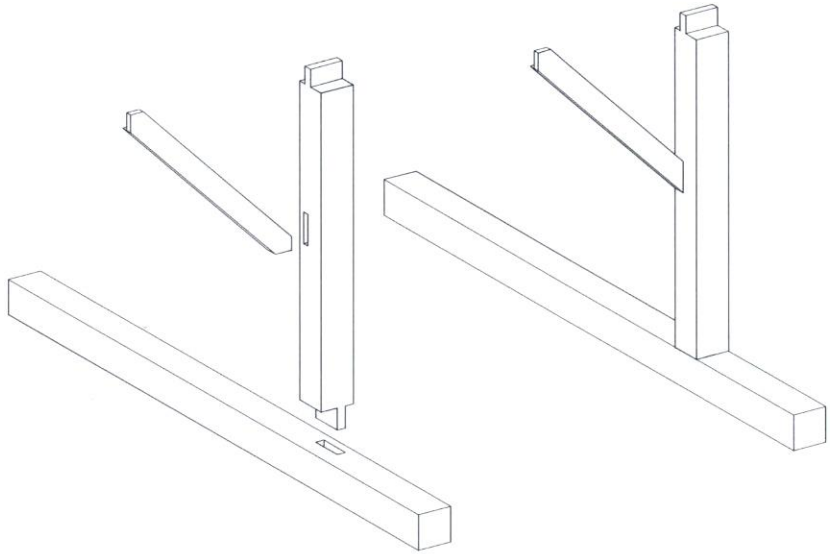
SCALE: 1/8" = 1'	SHEET # 13 of 18
DRAWN BY: J. Butler	DATE 5/18/03

PRESERVATION TIMBER FRAMING INC.
POST OFFICE BOX 29, ELIOT, MAINE 03903
207 361-2091



Side





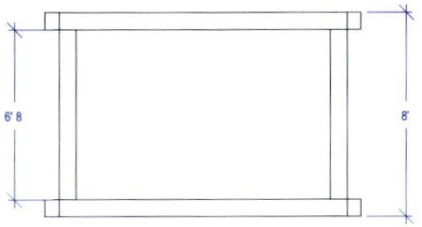
Axonometric

HASELTON BARN
Hudson, New Hampshire

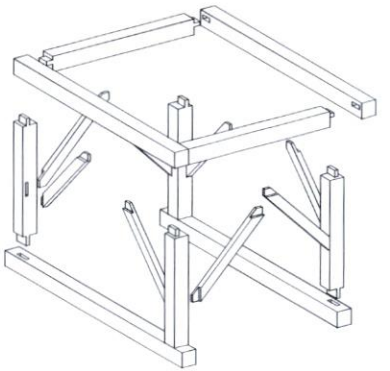
Timber Frame Support Structure for the West Gable
Section and Axonometric Views

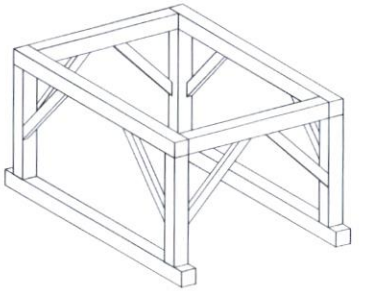
SCALE: No Scale	SHEET # 14 of 18
DRAWN BY: J. Butler	DATE: 5/15/03

PRESERVATION TIMBER FRAMING INC.
POST OFFICE BOX 29, ELIOT, MAINE 03903
207 361-2091

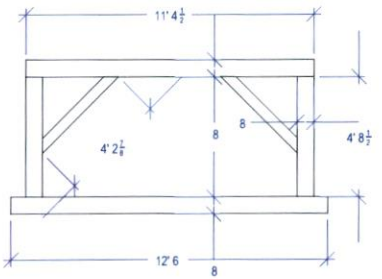


Top

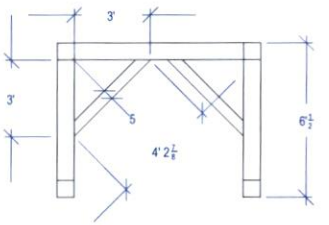




Axonometric



Side



Front

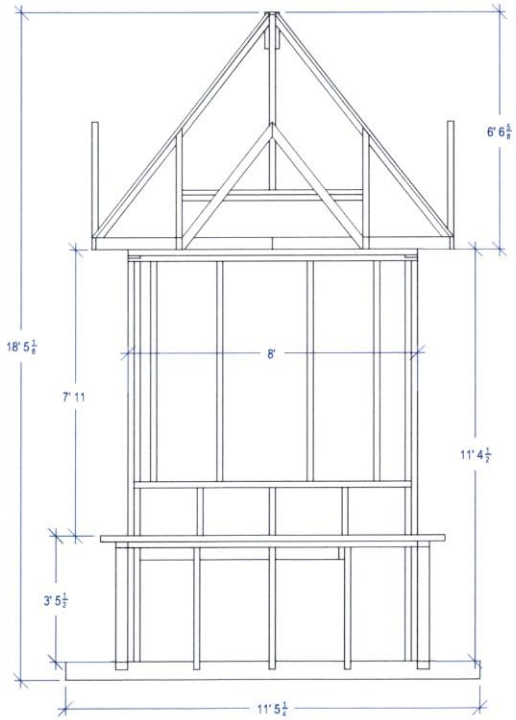
HASELTON BARN
Hudson, New Hampshire

Cupola Support Base
Elevation, Plan and Axonometric

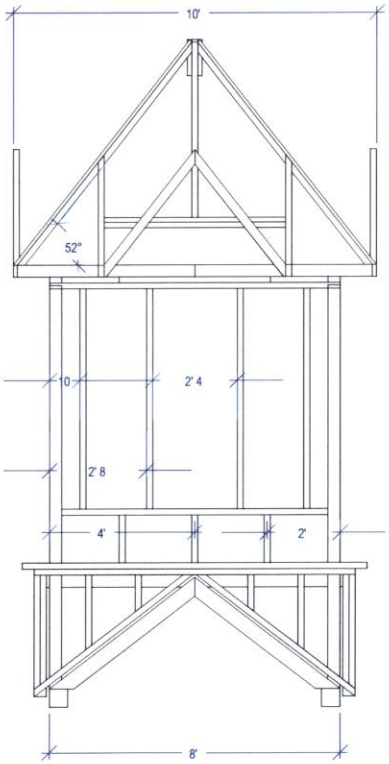
SCALE: No Scale | SHEET # 15 of 18

DRAWN BY: J. Butler | DATE: 5/15/03

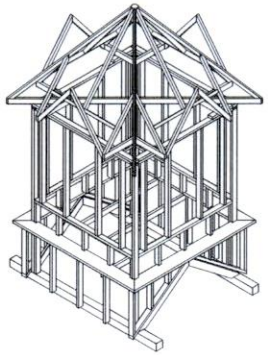
PRESERVATION TIMBER FRAMING INC.
POST OFFICE BOX 29, ELIOT, MAINE 03903
207 361-2091

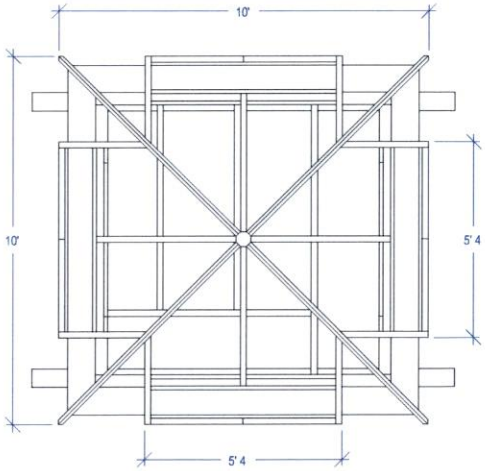


North/South Sides



East/West Sides





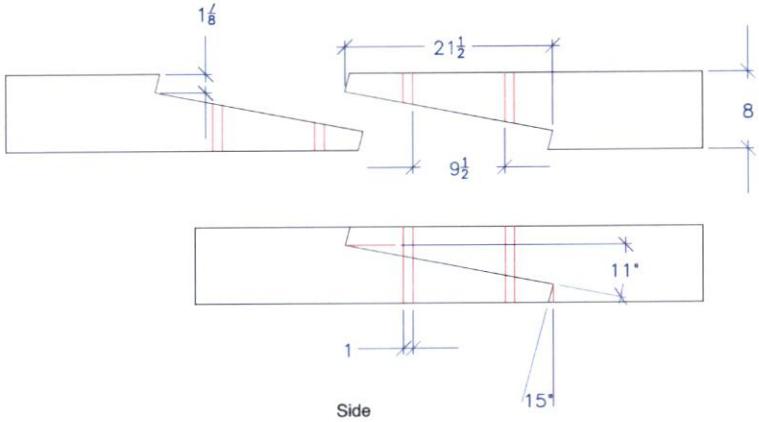
Top

HASELTON BARN
Hudson, New Hampshire

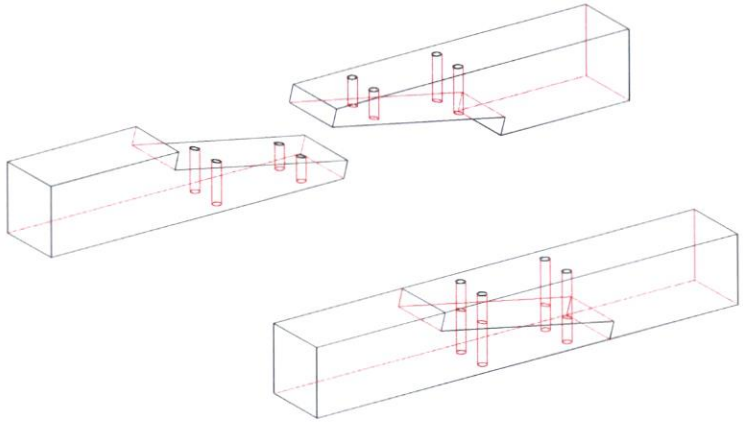
Cupola Framing
Elevation, Plan and Isometric

SCALE: No Scale | SHEET # 16 of 18
DRAWN BY: J. Butler | DATE: 5/15/03

PRESERVATION TIMBER FRAMING INC.
POST OFFICE BOX 29, ELIOT, MAINE 03903
207 361-2091



Side



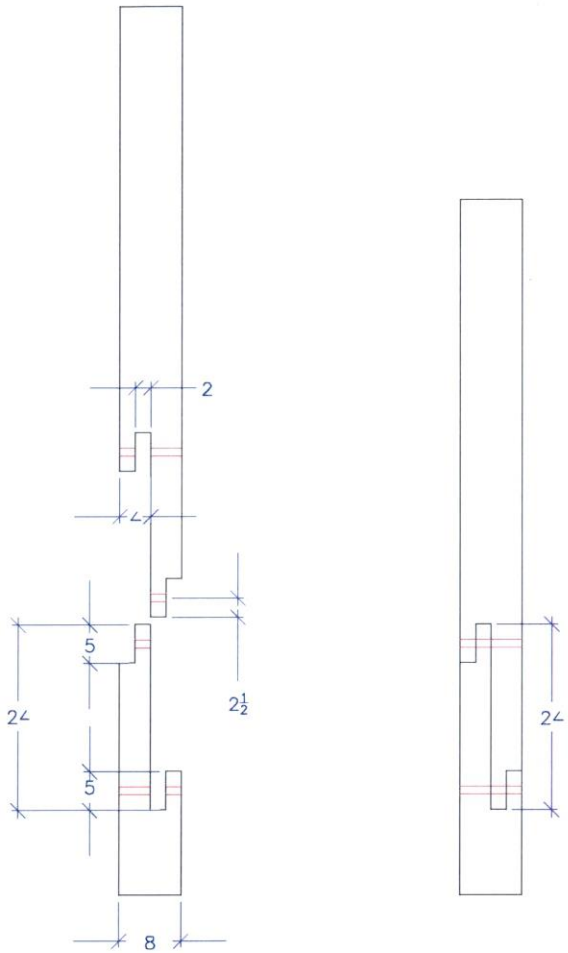
Axonometric

HASELTON BARN
Hudson, New Hampshire

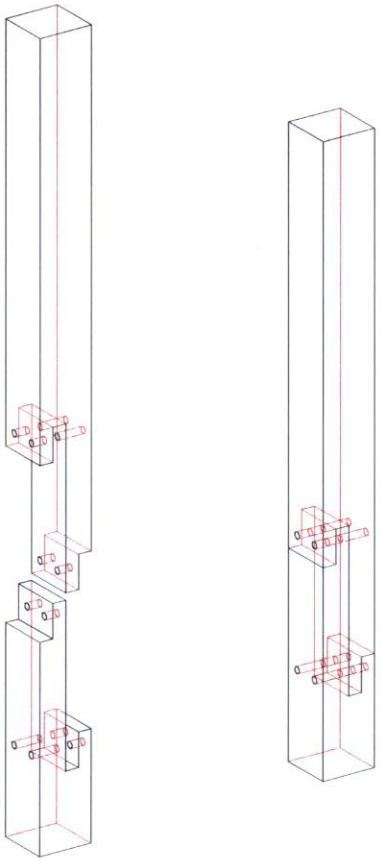
Typical 2nd Phase Barn Stop-splayed Scarf Joint
Section and Axonometric Views

SCALE: No Scale	SHEET # 17 of 18
DRAWN BY: J. Butler	DATE: 5/15/03

PRESERVATION TIMBER FRAMING INC.
POST OFFICE BOX 29, ELIOT, MAINE 03903
207 361-2091



Side



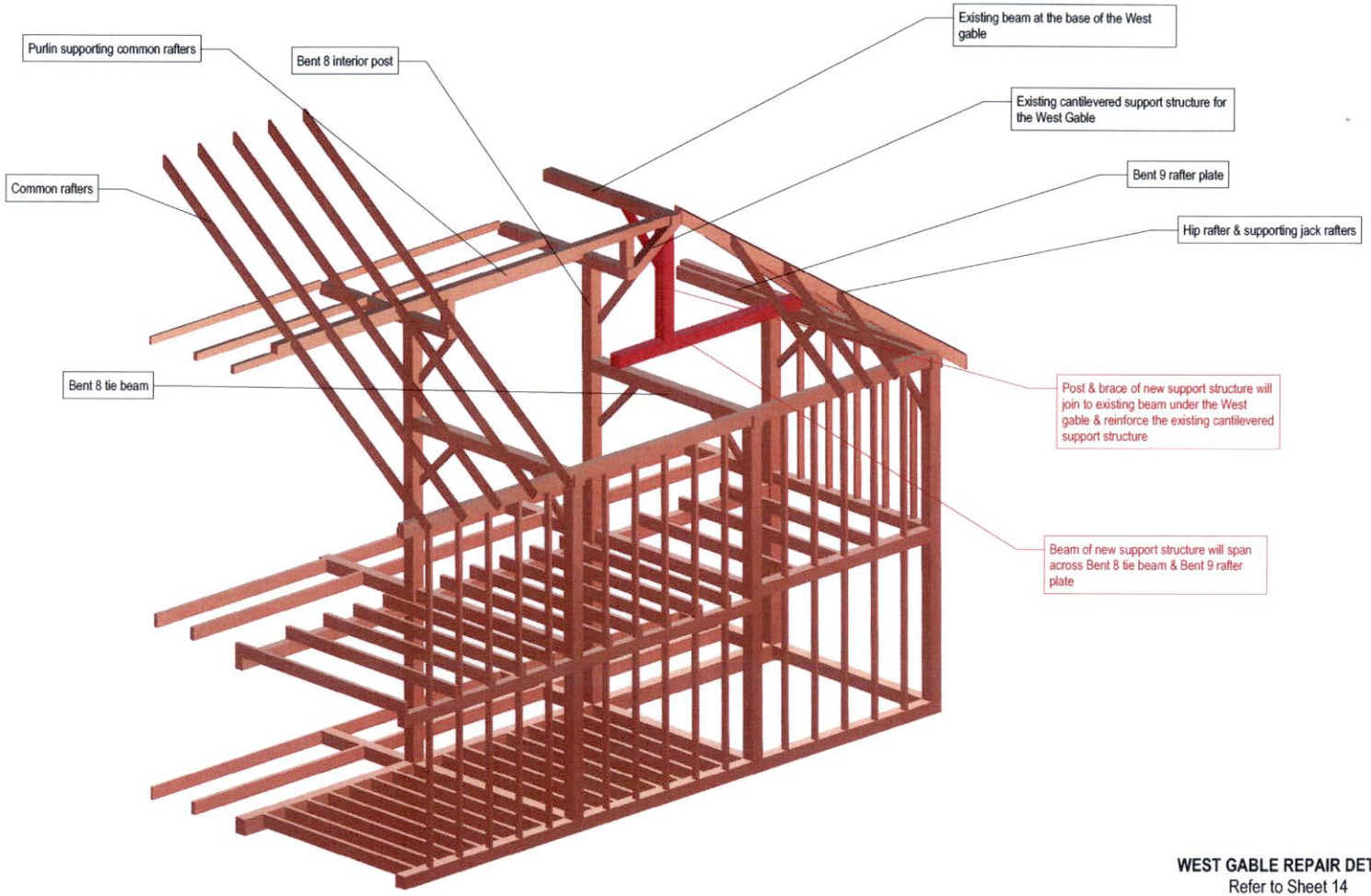
Axonometric

HASELTON BARN
Hudson, New Hampshire

Typical 1st Phase Barn Post Bottom Bladed Scarf Joint
Section and Axonometric Views

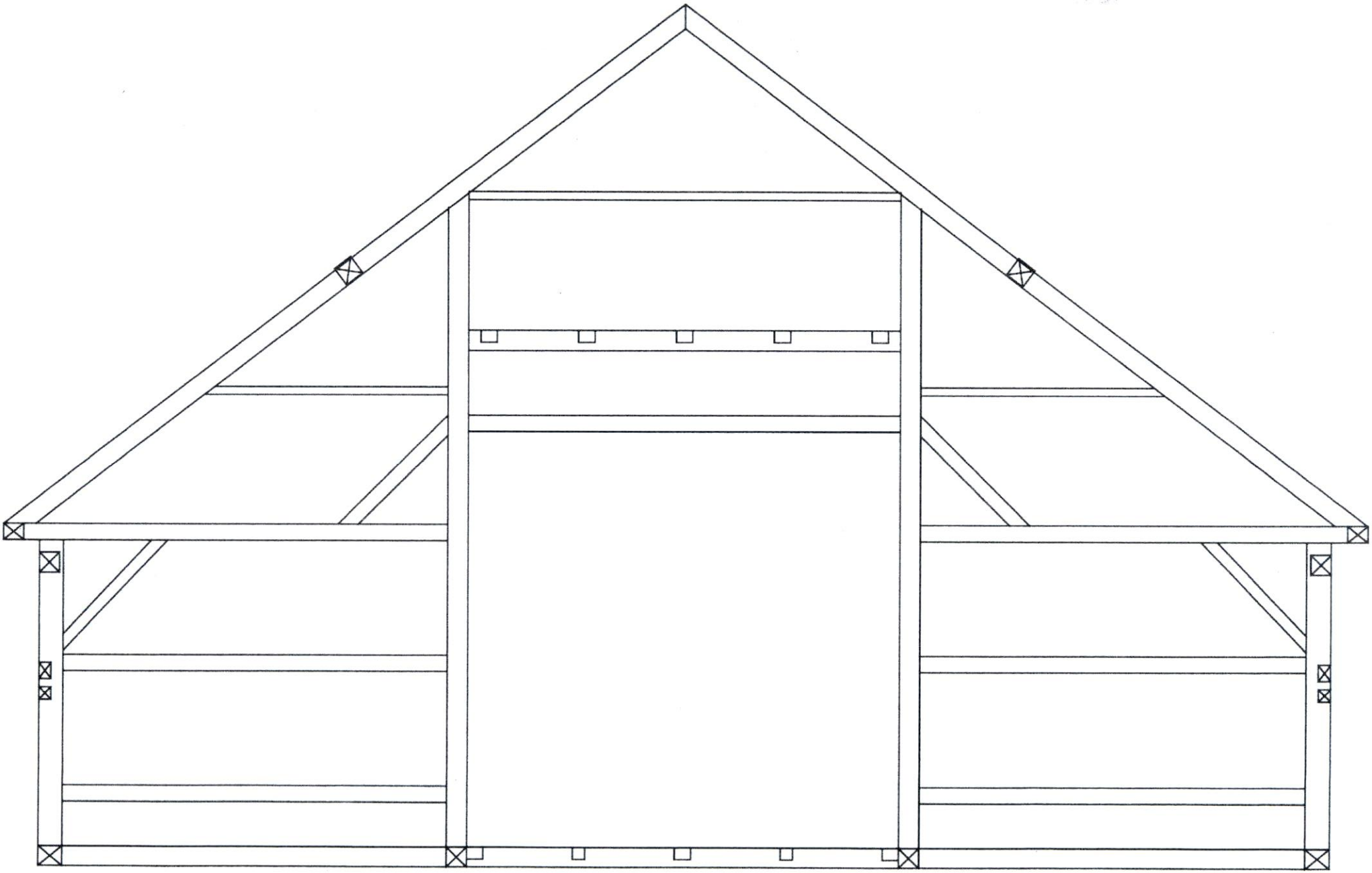
SCALE: No Scale	SHEET # 18 of 18
DRAWN BY: J. Butler	DATE: 5/15/03

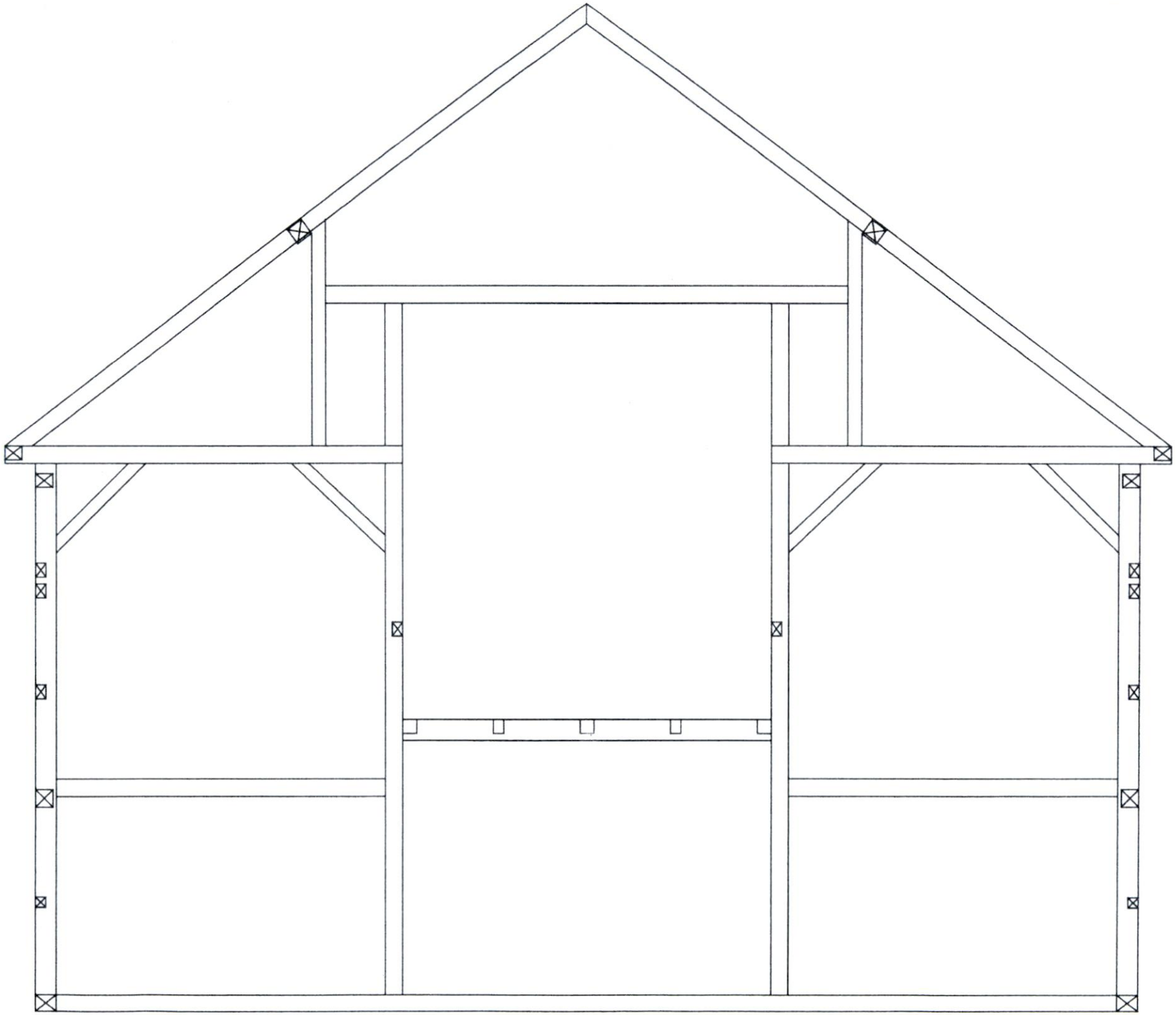
PRESERVATION TIMBER FRAMING INC.
POST OFFICE BOX 29, ELIOT, MAINE 03903
207 361-2091

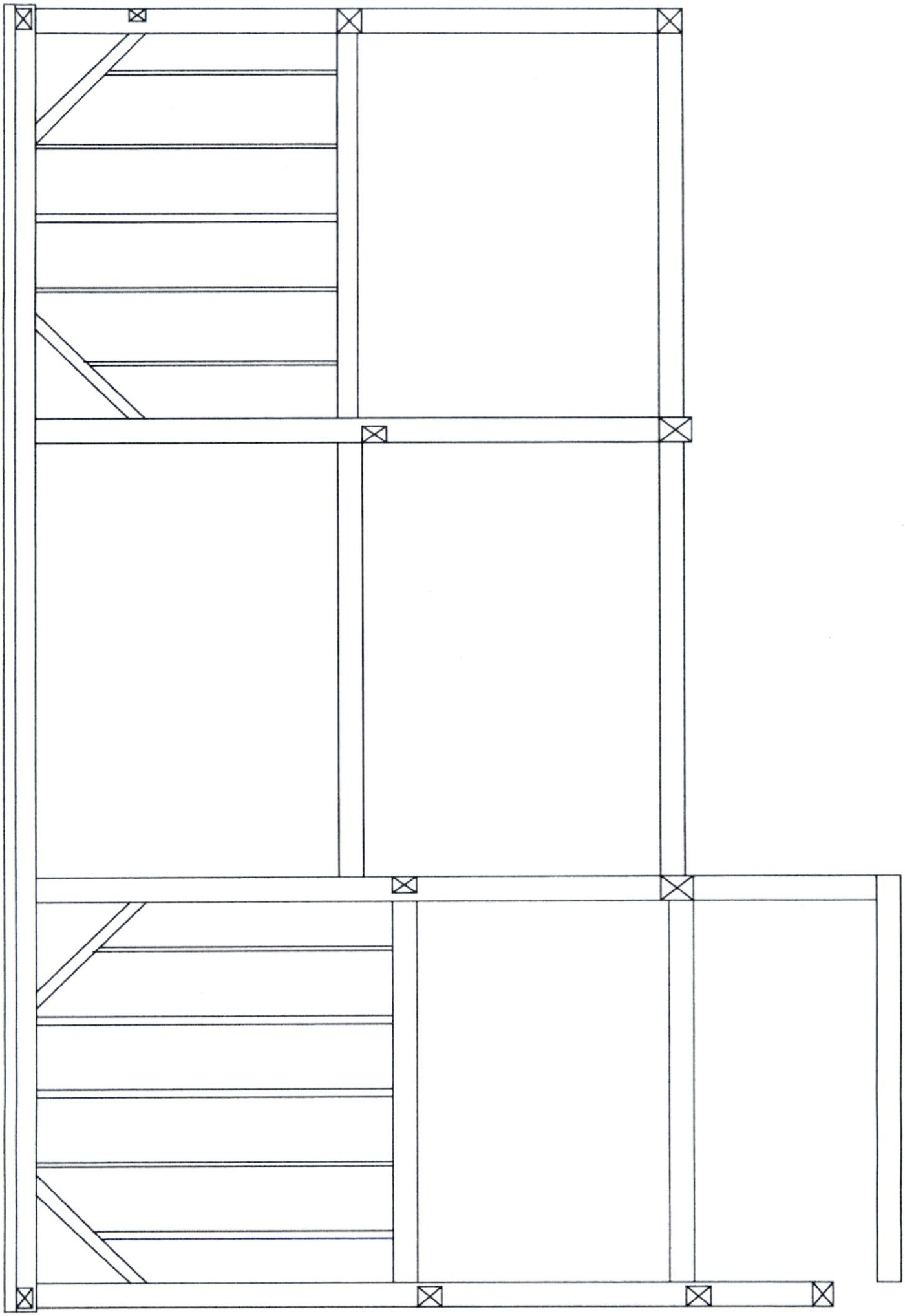


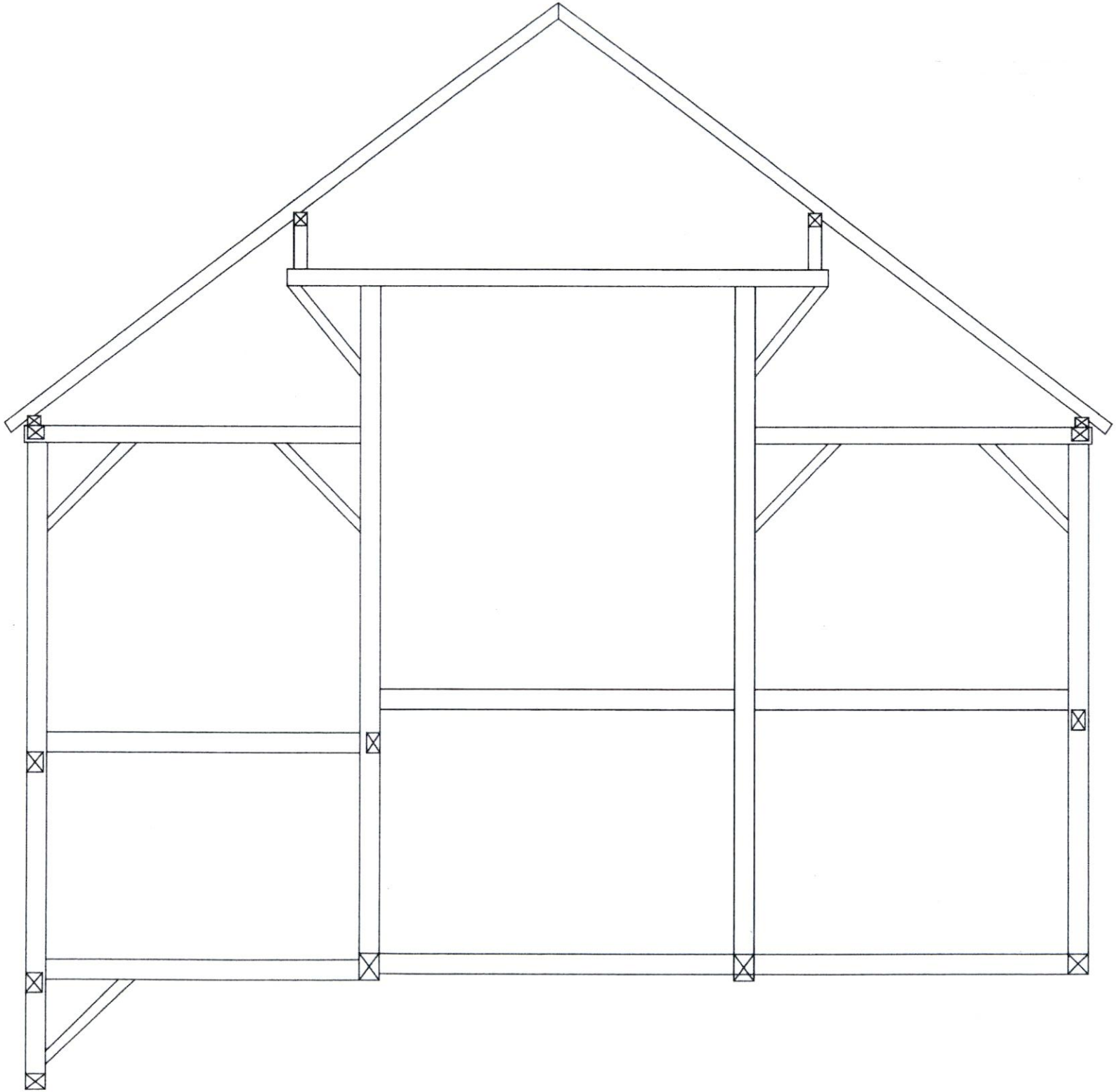
WEST GABLE REPAIR DETAIL

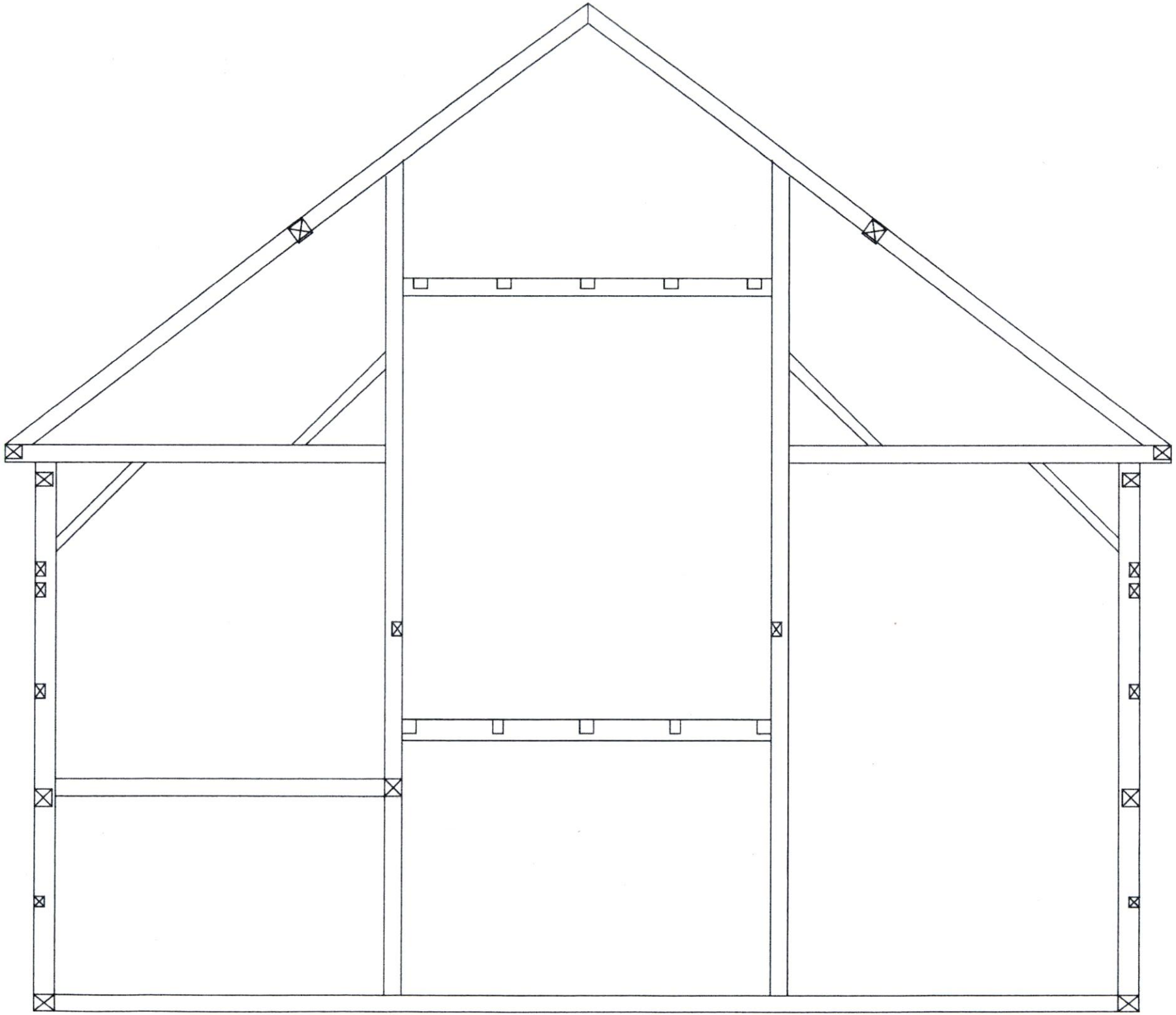
Refer to Sheet 14

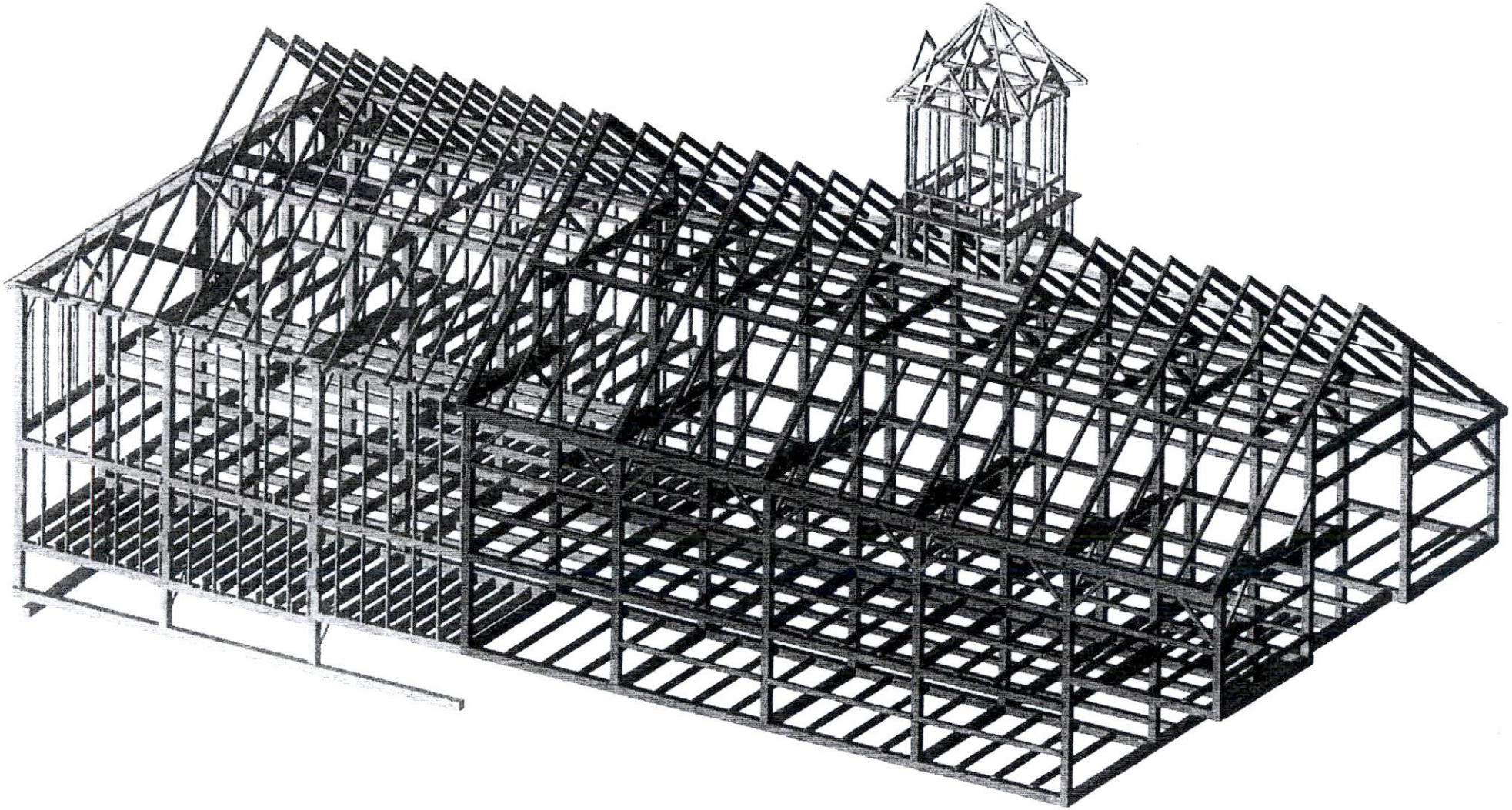




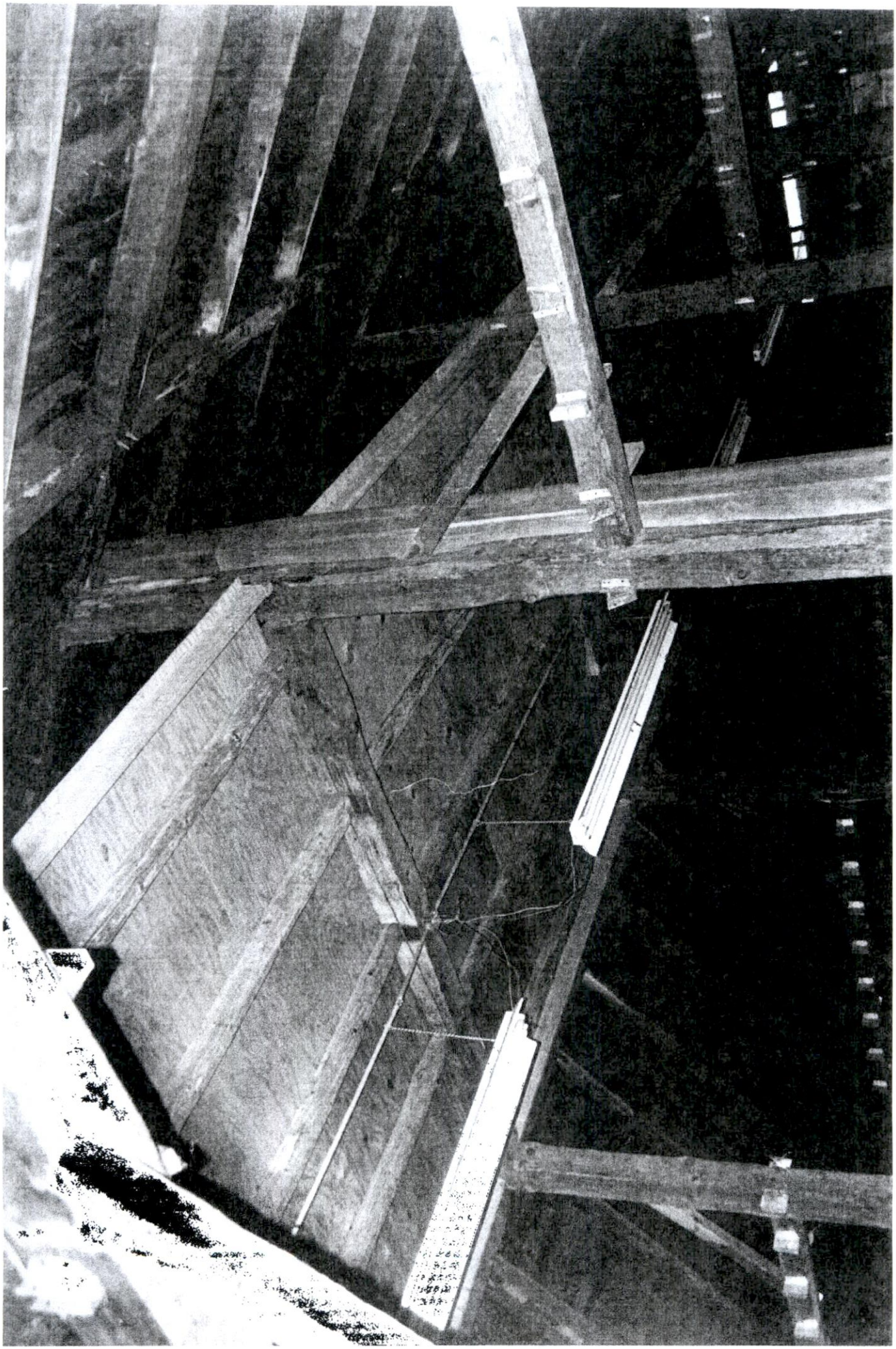


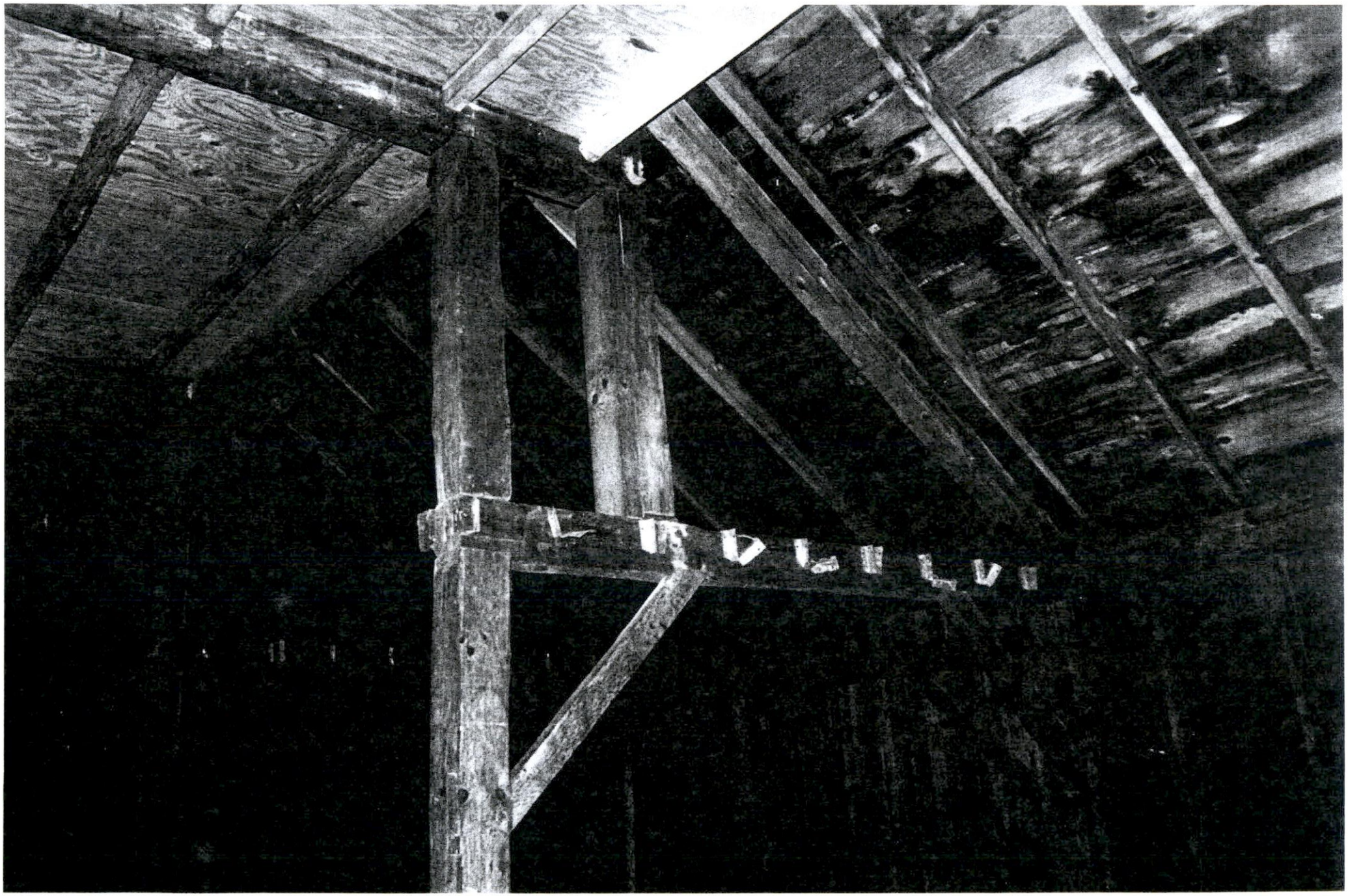


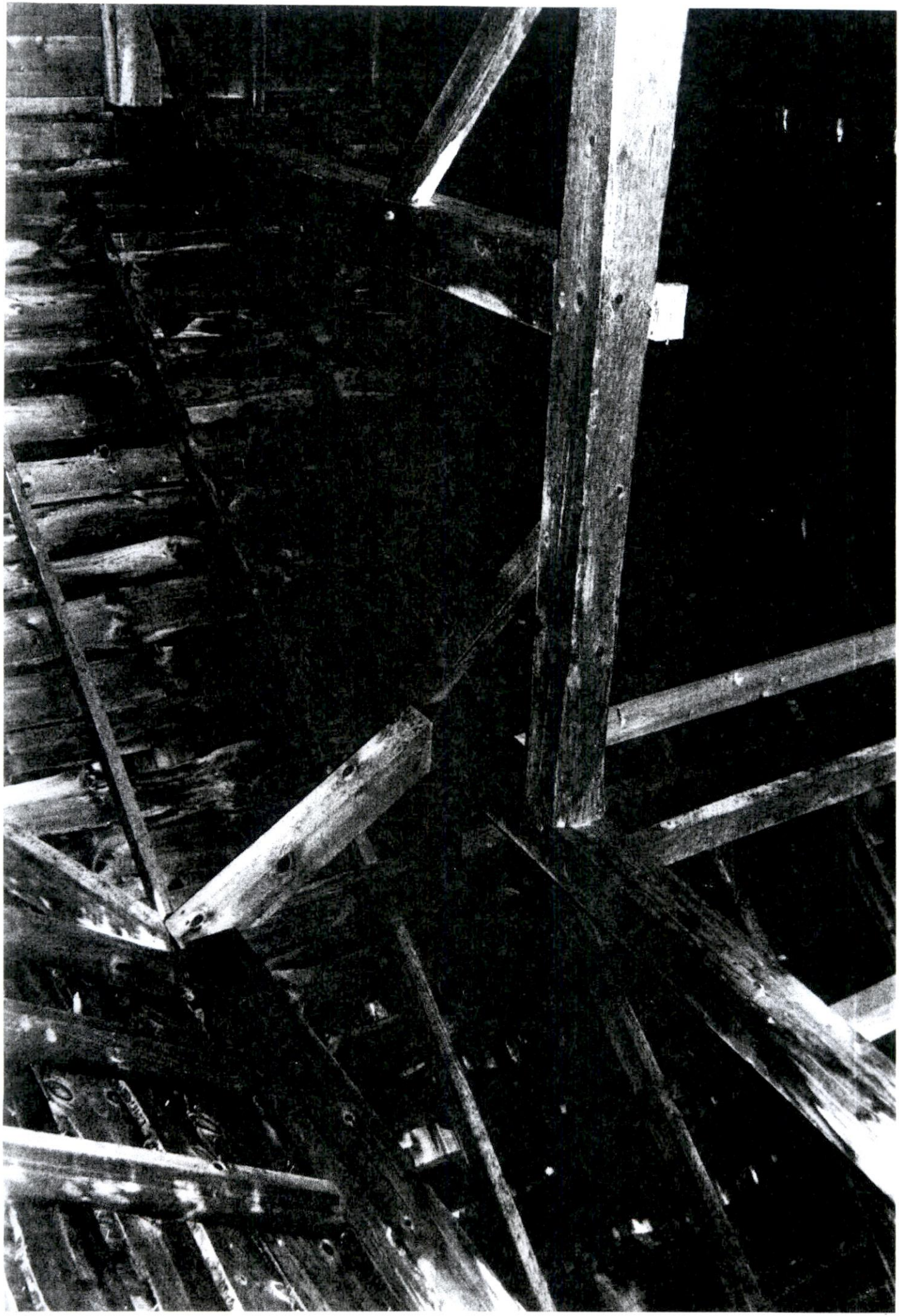




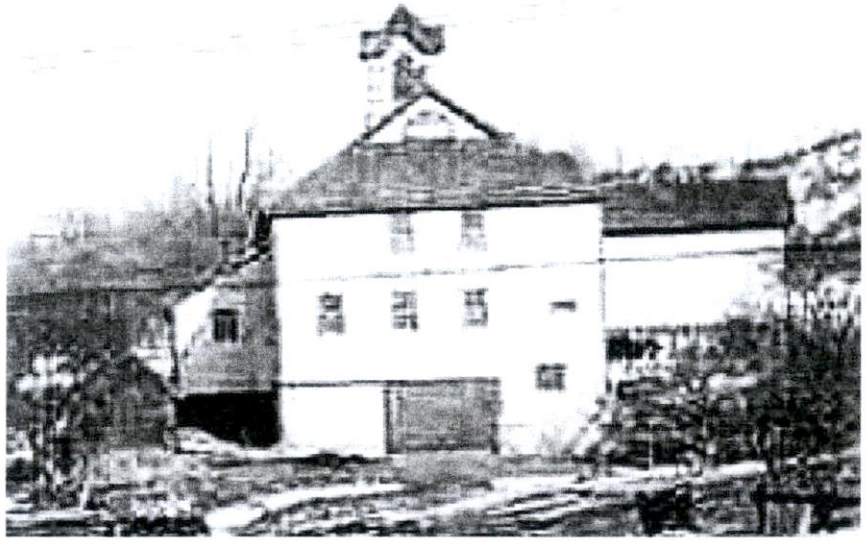
Barn Photos

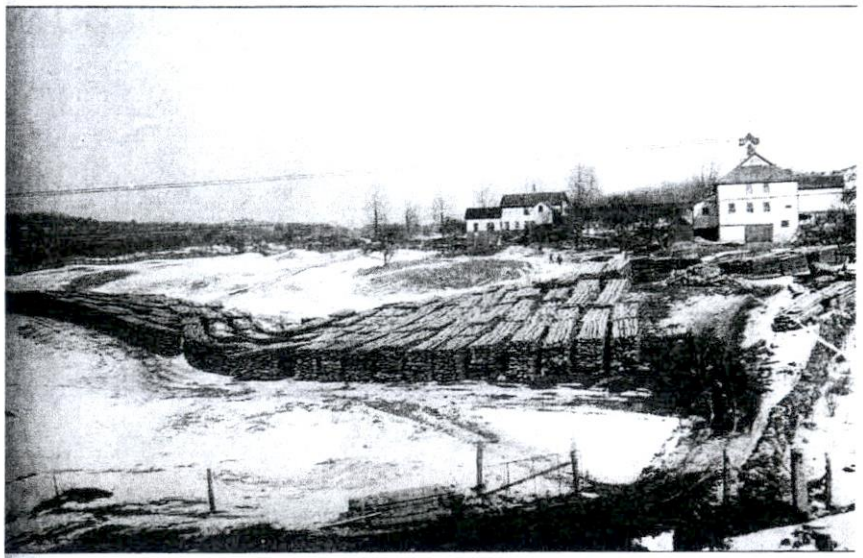






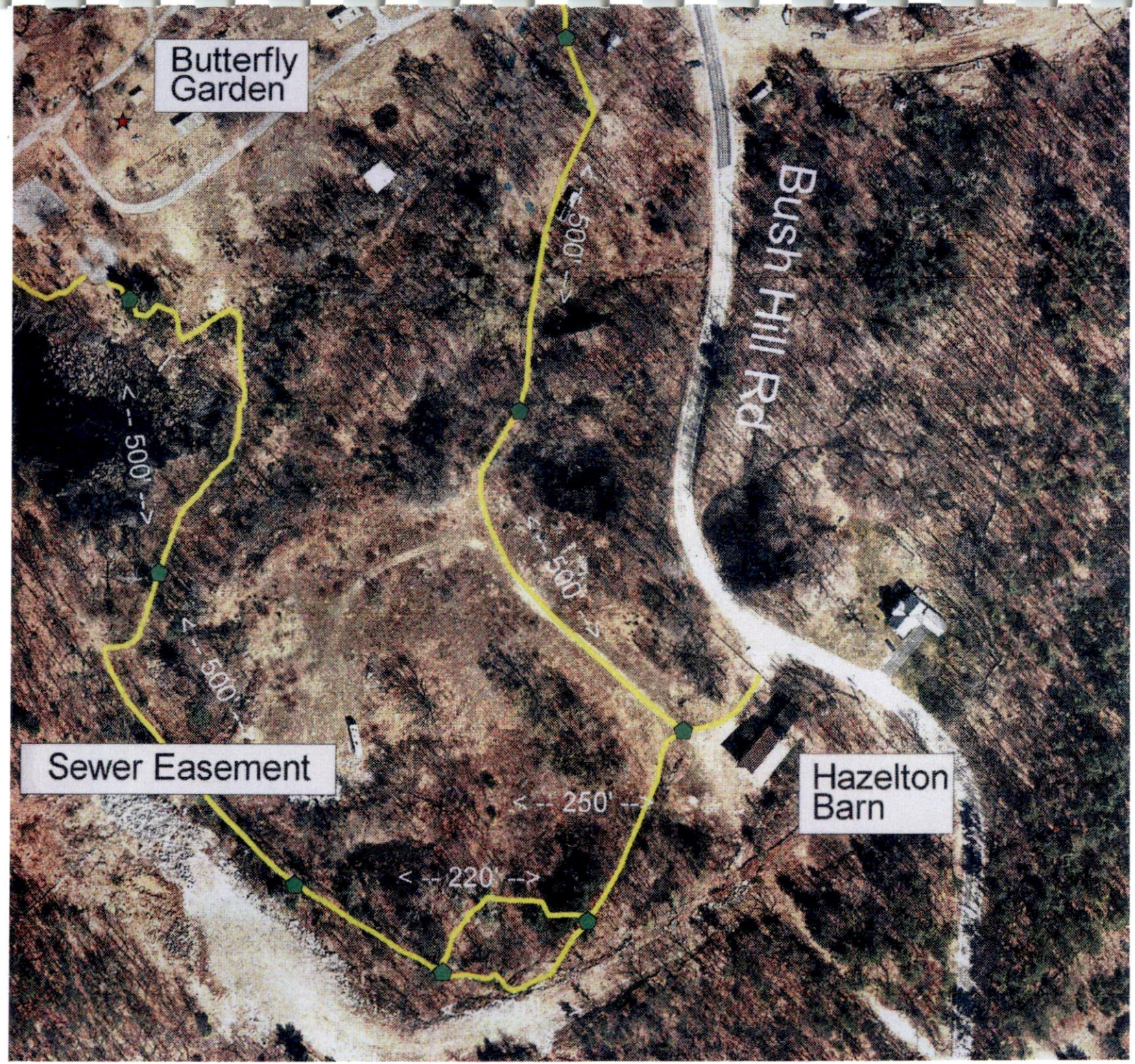
Historic Photographs





his is a view of the rear of the Haselton barn on Bush Hill Road.

Maps


Butterfly Garden
Bush Hill Rd
<-- 500' -->
<-- 500' -->
<-- 500' -->
<-- 500' -->
Sewer Easement
Hazelton Barn
<-- 250' -->
<-- 220' -->

Benson's Property Master Plan

Hudson, New Hampshire

Power Point Presentation

BENSON'S

Historic Structures Reports

Town of Hudson, New Hampshire

50% Contract Submittal
February 11, 2003

LCHIP

BENSON'S

Project Team:

- S. Elizabeth Sasser, AIA
- Arron J. Sturgis,
- John Butler
- Linda Pate

LCHIP

Arron Sturgis, Preservation Timber Framing, Inc., Eliot, ME - Principal Investigator for Haselton Barn

John Butler, Preservation Artisan, Hollis, NH - Architectural documentation for Haselton Barn.

Linda Pate - Architectural Investigator

Historic Structures Reports (HSRs):

- Significance
- Integrity
- Character-defining features (CDFs)
- Condition

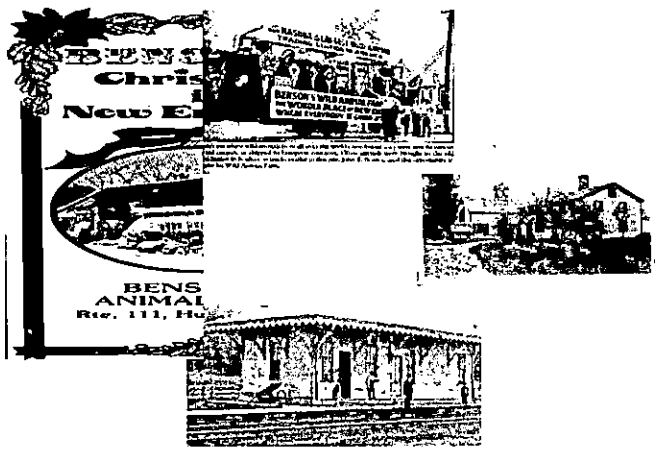
The purpose of a HSR is to develop an understanding of a building's physical history and condition, and provide specific, useable information for developing a treatment plan.

Significance - The building's place in history through its context and associations.

Integrity - The degree to which the ideas and values that make a building significant can be recognized in, and identified with its existing form, construction, and materials.

CDFs are those aspects of a building that define its particular aesthetic quality, and without which its architectural or historical integrity would be diminished or lost.

Research Methodology:



- Limited documentary and archival research

Substantial archival and documentary research was completed in 1992 for the NH Division of Historical Resources Inventory.

NH State Library

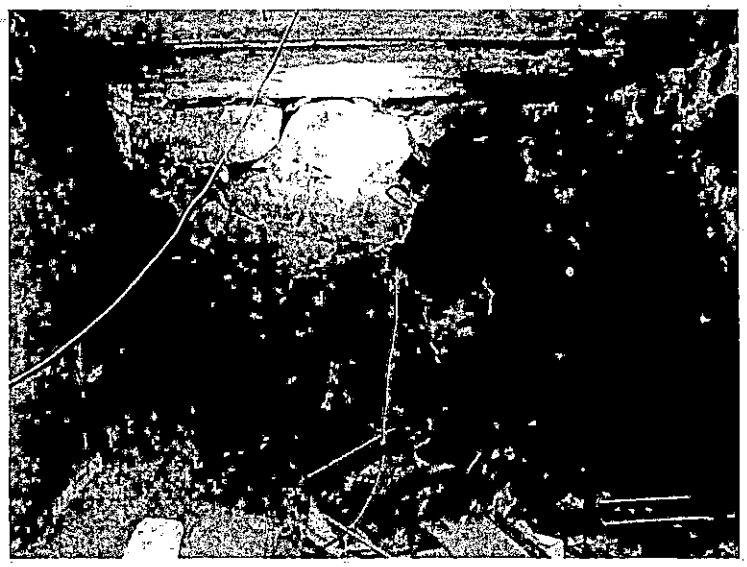
•Hudson Town Library

•Hudson Historical Society

•private collections

Recent location of an additional historic photograph of the Haselton Barn in the collection of the Hudson Historical Society by Mr. Jasper an important find.

Some additional documentary research is planned. It is hoped that member of the community will continue to come forward with additional materials.



• Field investigation & data collection

Understanding the construction and evolution of a building through existing architectural evidence including:

workmanship

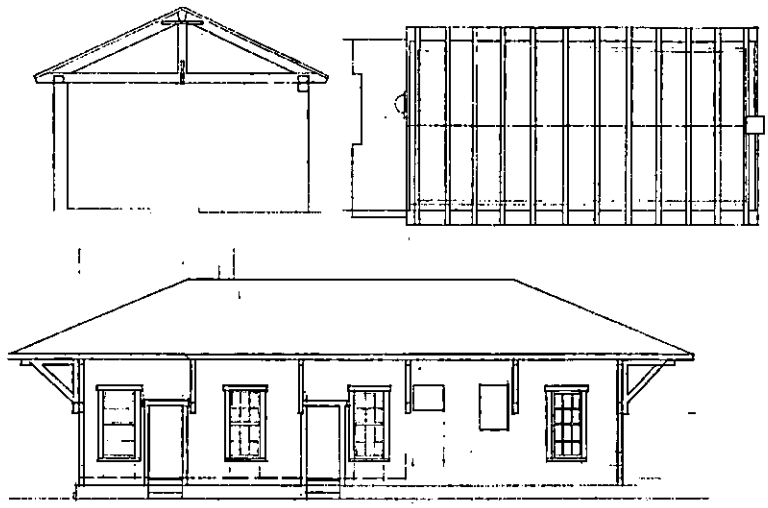
materials

fabrication techniques

architectural style

building sequence

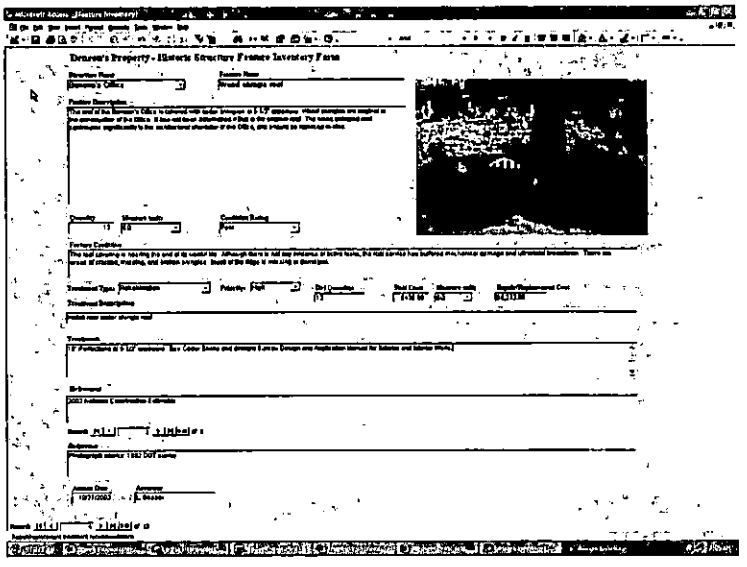
Most of the field documentation is complete, but additional field work will continue as long-term treatment recommendations are developed.



• Development of architectural drawings

Field work 80% complete for measured drawings of Benson's Office and Kitchen and Depot. CAD work in progress.

2D CAD drawings complete for the Haselton Barn frame. 3D CAD drawings in progress.



• Development of database for recording feature information & treatment recommendations

Fields include:

Structure and feature name

Feature description

Quantity and measurement units

Condition Rating - missing/unsalvageable, poor, fair, good

Condition description

Treatment type: stabilization, preservation, rehabilitation, preservation maintenance

Priority - Critical, high, medium, low

Deficient quantity, measurement, and unit cost. Calculated field for treatment cost.

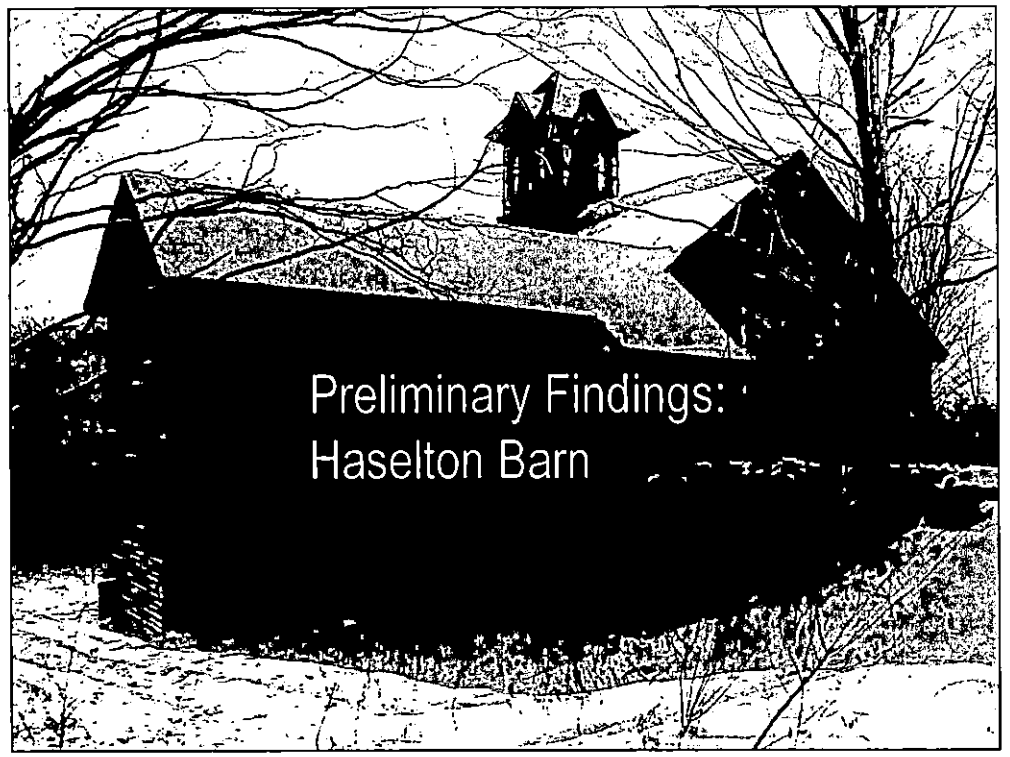
Treatment description (multiple treatments possible for a single feature).

Treatment references

Feature references

Assessment made by and date

Data entry is in progress for all three structures.



The Haselton Barn has gone through numerous changes over time. However, these changes are part of a continuum of use and evolution that represent the qualities that make the barn historically significant. The overall form, design, materials, and craftsmanship present in the structure retain a high level of integrity, both from the period of its original construction, and during the historic period of John T. Benson's ownership of the property.

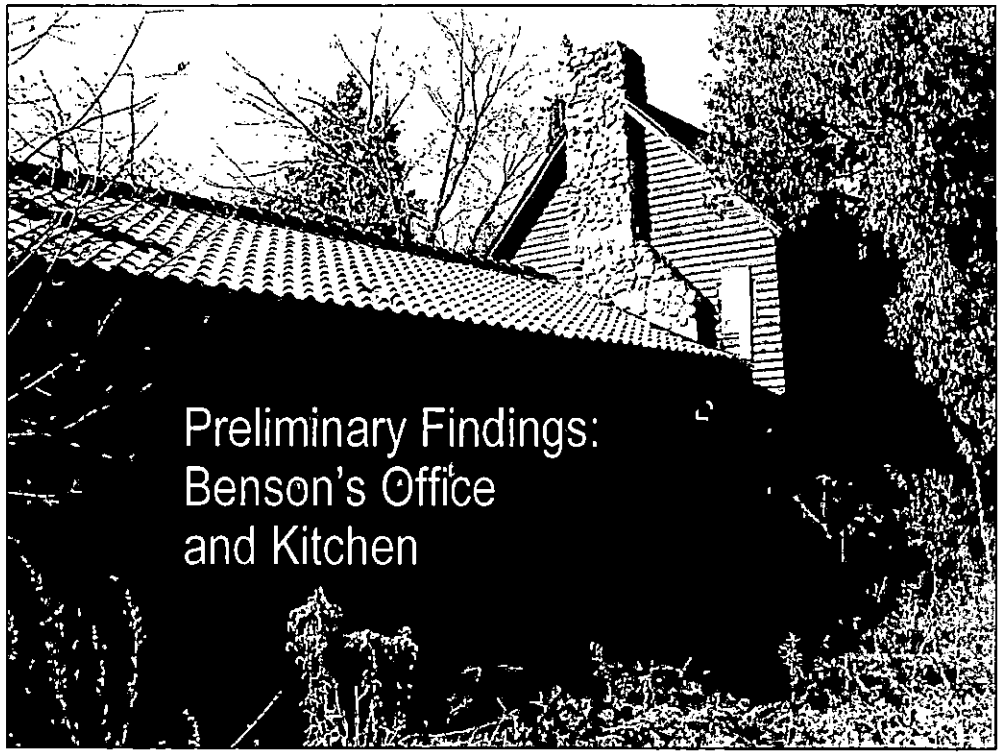
The earliest sections of the existing gable-front bank bark were constructed in the period 1860-1880.

Square rule typology

floor plan design

mixed use of hewn and circular-sawn timber

1885-1910 additions include the cupola, three bays added to rear of the barn, silage storage ell, and west side ell (since demolished)



The Benson's Office and Kitchen were among the early permanent structures built by John T. Benson. With the loss of most of the other Benson's structures, the Office and Kitchen are the ones that relate most directly to his influence.

The Office and Kitchen were constructed as two separate buildings. The covered passageway is a later addition that replaces and open balcony or deck on the south wall of the Office.

The east elevation of the Kitchen opened originally into the now demolished restaurant area. The existing dropped ceiling and center partitions were later additions, probably constructed during Arthur Provencher's ownership. The original roof structure of recycled hand-hewn timber beams and king-post trusses was designed to be visible. The design element seen in the roof framing was continued in the braced timber posts framing the opening. These have been removed and replaced with a steel "I" beam and pipe column.

The Office interior has also been modified. The existing bathroom and north room are late additions. The pine log rafters and board sheathing originally visible on the interior have been covered with v-notch wood paneling.

Preliminary Findings: B&M Railroad Depot

The Depot was moved to the Benson's Property in 1983, from its former location on Greeley Street in Hudson Center. The interior was remodeled as an apartment. The original room layout was largely preserved, and most historic finish materials exist below the later additions.

Mr. King of the Benson's Committee has located some valuable historical documentation in the 1916 Valuation Records of the Interstate Commerce Committee including interior floor plan, wall section, and condition notes.

BENSON'S

Thanks To:

- Board of Selectmen, Town of Hudson
- Benson's Committee
- Sean Sullivan, Community Development Director
- Betsy Hahn, Nashua Regional Planning Commission

LCHIP

BENSON'S

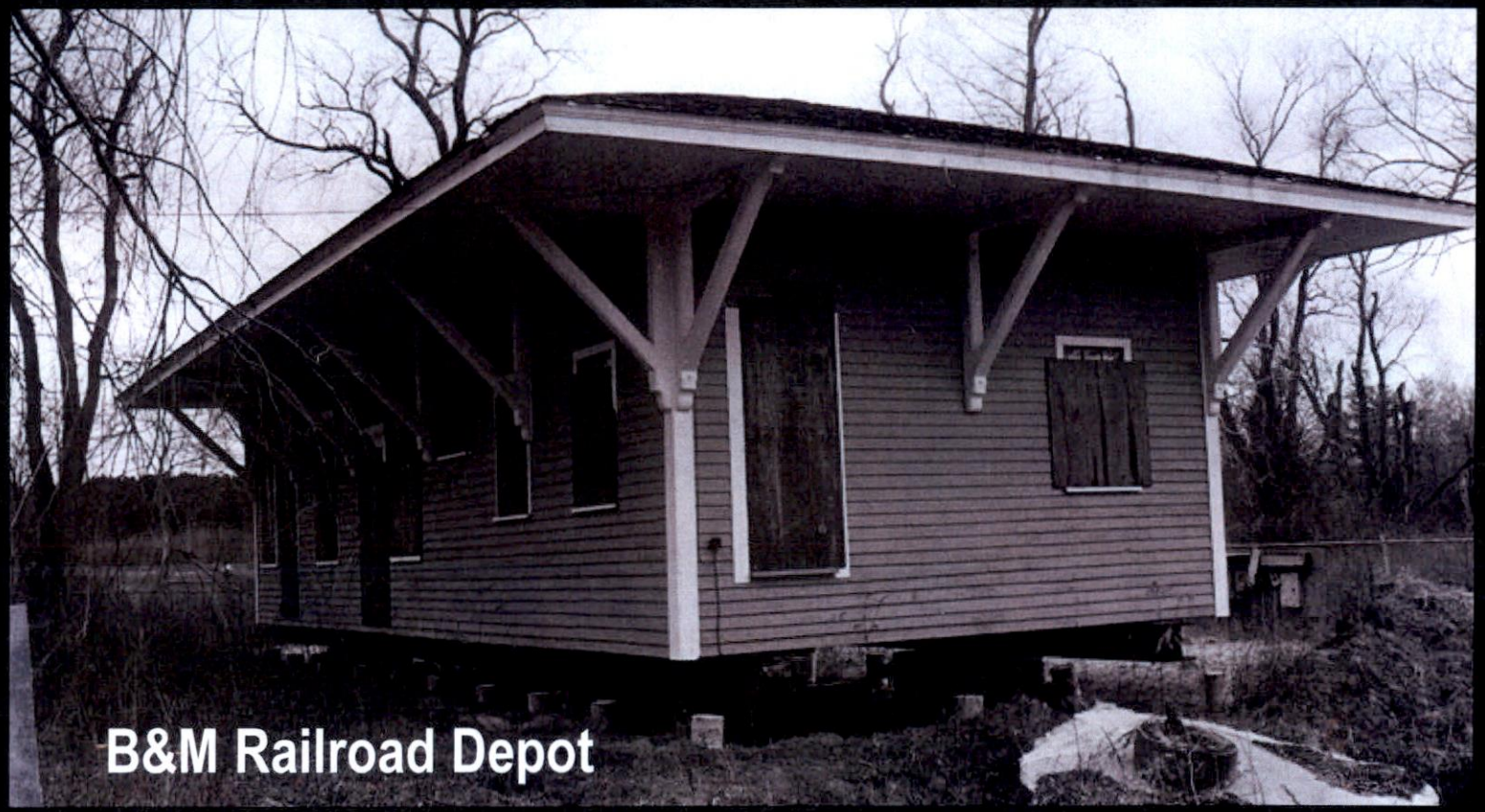
Historic Structures Reports
Town of Hudson, New Hampshire

LCHIP Round 3 project to document 3 remaining historic structures at the former Benson's Wild Animal Park. 50% project submittal on February 11, 2003

Project Team:
Town of Hudson Board of Selectmen
Benson's Committee
Project Manager: Betsy Hahn, Nashua Regional Planning Commission
Historical Architect: S. Elizabeth Sasser, AIA
Principal Investigator, Haselton Barn: Arron J. Sturgis, Preservation Timber Framing, Inc.
Architectural Documentation, Haselton Barn: John Butler
Architectural Investigator: Linda Pate

The earliest sections of the existing gable-front bank barn were constructed in the period 1860-1880, based on analysis of square-rule frame typology, floor plan design, and mixed use of hewn and circular sawn material in the construction of the frame. A late 19th century photograph of the Haselton Barn shows an extensive lumber milling operation. Architectural evidence dates a number of additions to the barn to the period 1885-1910. During this period the ornate cupola was constructed and three bays were added to the rear of the barn. A silage storage ell was added at the east side of the barn as well as a shell ell on the west side (since demolished).

The Benson's Office and Kitchen were among the early permanent structures built by wild animal trainer, zoo operator, and entrepreneur John T. Benson after the opening of Benson's Wild Animal Park in Hudson, New Hampshire. The rustic style of the c. 1930 Office is in accord with the "naturalistic" principles of zoo design that Benson adopted from his mentor Carl Hagenbeck. The Kitchen and no longer extant "Bavarian Beer Garden" are modeled directly on the Hagenbeck example. Due to the peripatetic nature of his business life, there are no other known sites or structures that exemplify his considerable influence on the development of the American amusement industry in the first half of the twentieth century.



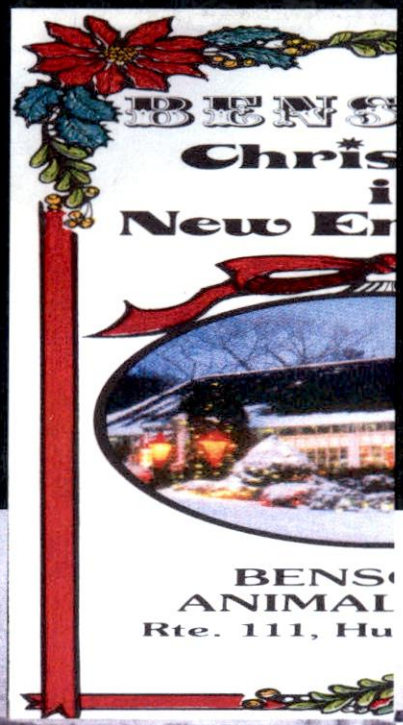
The 1873 Depot was moved to the Benson's Property in 1983, from its former location on Greeley Street in Hudson Center. The interior was remodeled as an apartment. The original room layout was largely preserved, and most historic finish materials exist below the later additions.

Project Purpose and Methodology

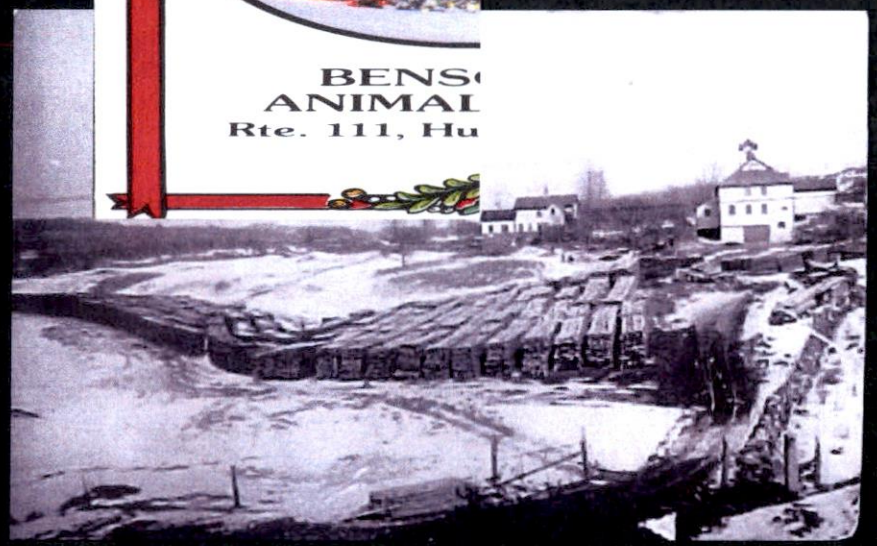
This project is being completed under Contract with the Town of Hudson, New Hampshire, with assistance from the New Hampshire Land and Community Heritage Investment Program (LCHIP), grant ID: 2002-R3-06. The purpose of the reports is to provide guidance for the interim stabilization/preservation and long term rehabilitation of historic structures in the former Benson's Wild Animal Park, as an element of the implementation of the 2002 Benson's Property Master Plan. Although specific functional programs have not been finalized for the remaining historic structures, the buildings individually possess substantial significance and integrity, and are structurally well suited to a broad range of compatible adaptive reuse. The total project cost is $28,000, including a $14,000 matching grant from LCHIP.

The Historic Structures Reports are being developed in the format established by the National Park Service in *NPS-28: Cultural Resources Management Guideline* (1993). The principal focus of the investigation is the documentation of the individual structures, assessment of existing conditions, and interpretation of evidence of physical evolution. Research goals are as follows:

- Existing conditions assessment
- Determination of structural condition
- Analysis of structural threats and causes of deterioration
- Identification of "character-defining features"
- Stabilization plan and cost estimate
- Development of rehabilitation guidelines and cost estimate
- ADA and code compliance assessment
- Projection of long-term maintenance needs and costs



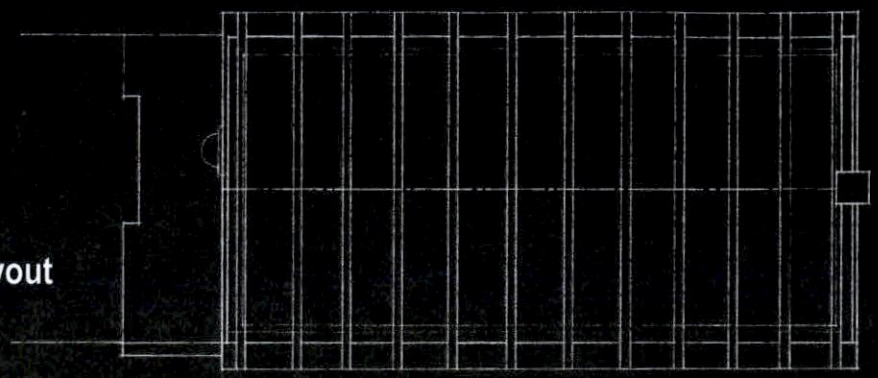
Benson's was where wild animals from all over the world came before they were sent to various zoo and circuses, or shipped to European countries. Often animals were brought to the old Union Station in Nashua on trucks similar to this one. John T. Benson used this opportunity to advertise his Wild Animal Farm.



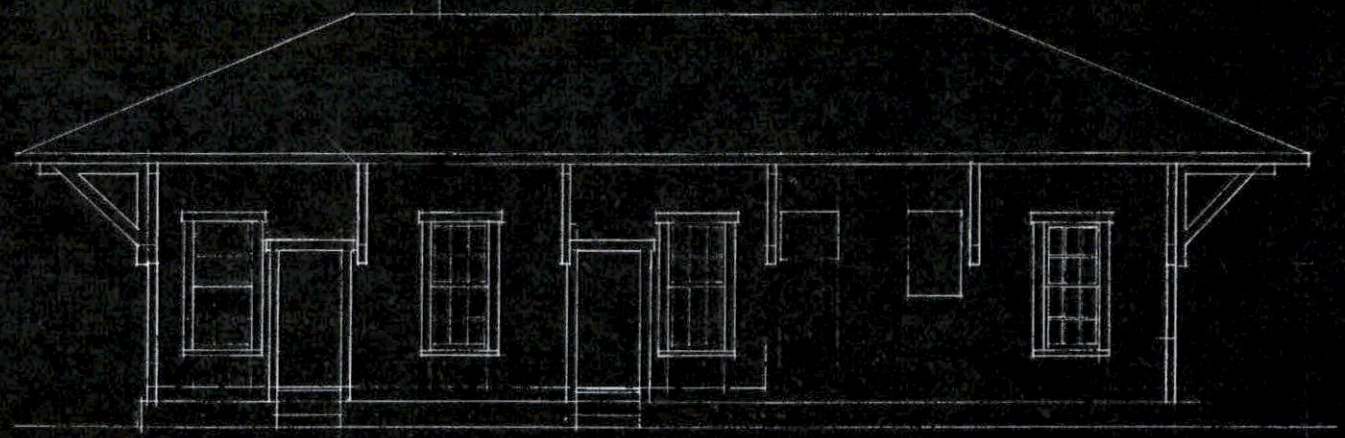
Documentary and Archival Research

Architectural Investigation

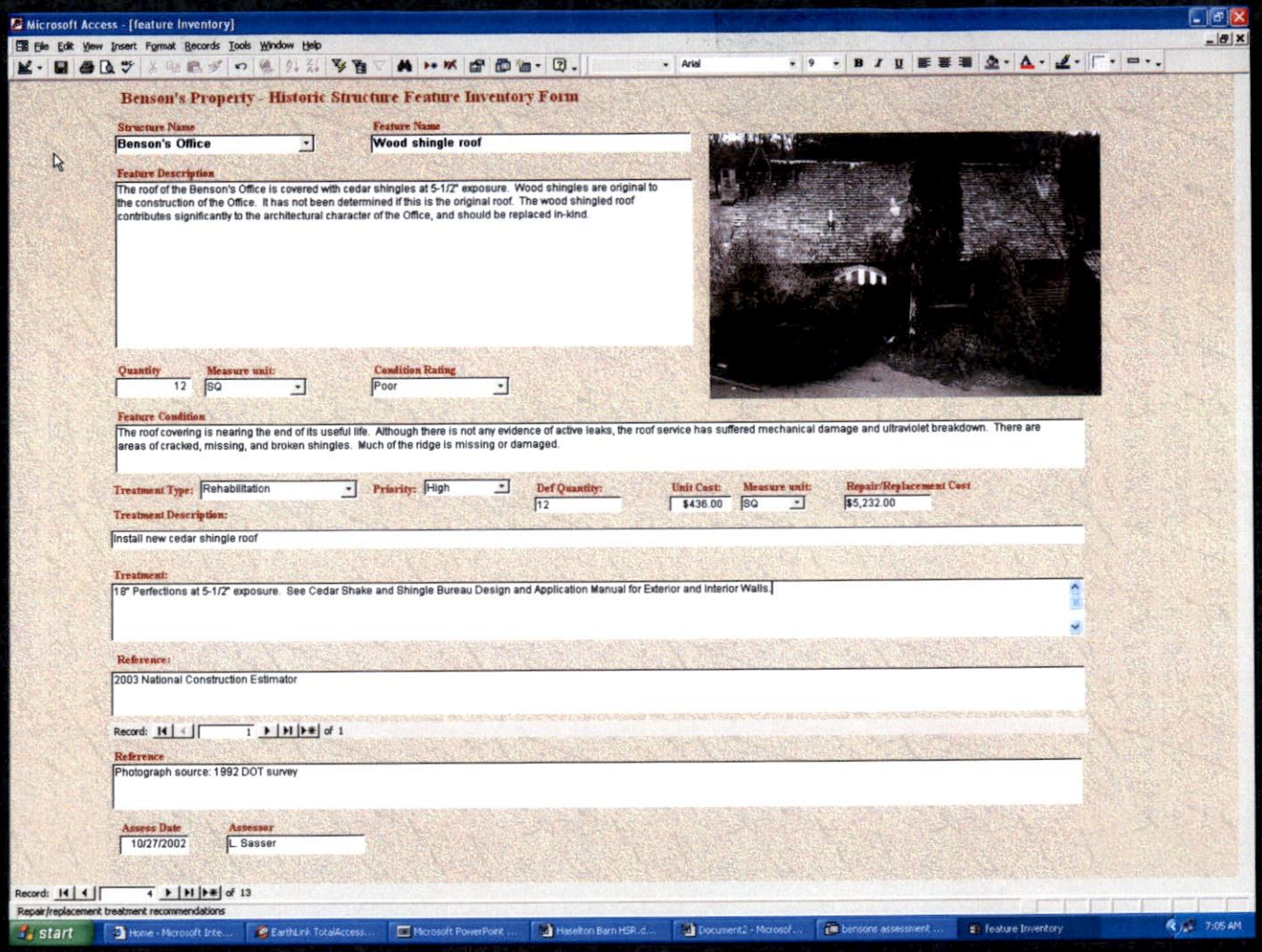
Kitchen roof structural layout



Architectural Documentation



East Elevation, B&M Railroad Depot



Feature Inventory Database

Records information on feature description, treatment recommendations, quantity takeoffs, unit costs, and treatment cost estimates