

## **District No. 5 Schoolhouse**

**Underhill, VT**

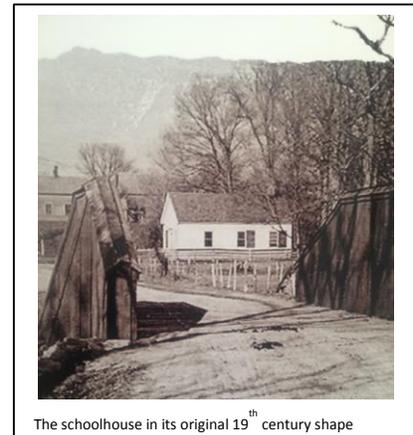


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**Funded in part by the Preservation Trust of Vermont**

The District No. 5 Schoolhouse in Underhill is a picturesque structure. The backdrop for the building is Mount Mansfield, and the tall narrow shape of the schoolhouse compliments the Mountain nicely. At first glance, the building is a fair amount taller in proportion to its footprint than is typical for a 19<sup>th</sup> century structure. That is because it was originally built as a single story timber frame c. 1820 with the second story walls added on top of the original building in 1915. Although almost all of the original structure on the first floor is covered up, it is possible to find the critical timbers in the design which suggest that it was built as a four bent frame measuring 24'6" x 36'6". It has undergone many updates throughout the years, most notably being the addition of the second story at which time they appear to have completely re-sided the building as well.

On the East side of the building, there had been a woodshed attached to the eave wall which was removed in the 1980s restoration. It appears that much of the framing was re-built along this wall when the shed was removed and about three quarters of the siding was replaced. On the front gable there had been a large door, just to the West of center. During the most recent restoration work that was removed and the central door re-instated along with a first floor window, to the West of the door.



The schoolhouse in its original 19<sup>th</sup> century shape

On February 2<sup>nd</sup>, 1951 there was a fire that damaged much of the interior of the building and charred many of the framing members. It was decommissioned as a school after the fire and a new school built. A large hole was cut in the front of the building and the first floor removed so that the town could park the school bus inside. Later, it was used to store a steamroller, salt, and recreation equipment. Restoration of the building was carried out from 1984-1989. During that time period the roof was replaced, a new first floor installed, new windows built, and the exterior repaired. More recently, in 1995, the building was finished off on the first floor in order for the town office employees to move into while the town hall was being renovated.

It appears as though there was some heavy damage to the original timber frame along the East wall at the second floor level. Other areas of the timber frame are impossible to inspect because of the finished space below. If the second floor is going to be used for public assemblies in the future, the condition of the frame will need to be inspected throughout and potentially restored or at least reinforced. There is some sheetrock cracking occurring on the East wall and it may be wise to remove the sheetrock there not only to remedy the structural issue that is causing the cracking but also to inspect the timber frame for soundness.

### Interior

The stairs from the first floor to the second floor had been in the Northwest corner. The newel post at the West end of the stairs against the outside wall is still intact as is the half newel post that is on the North wall which would have been across the top of the stairs from the main newel post which is now missing. All of the railings and balusters have been removed as well and the staircase opening boarded over. Coming up the stairs to the second floor would have brought you into a front foyer approximately 9' deep with hooks on the back wall and a door in the center. To the East of the door is a large 20"x40" chimney set just in front of the wall. Through the doorway there is just one large open room, the chimney with a hole through the wall and many windows along the West and South sides. The interior of the upstairs is sided with tongue and groove boards on the inside of the studs that have been covered up with sheets of Masonite and little strips of wood over the vertical joints.

### Frame

The original frame for the schoolhouse appears to be a four bent structure framed out of hand hewn spruce 8x8s mainly. The bents are evenly spaced so that there are three equal 12' bays. The tie beams appear to tenon horizontally into the side of the top plates instead of being dropped down and tenoned into the posts as is typical. Into the 8x8 tie beams, reciprocally sawn, true 2x8" floor joists have been notched into



Half newel post on the West wall at the top of the stair opening (stairs to the right)

the side of the beam with the lap 2" deep into the beam and 4" tall. On top of the East top plate just to the North of the second floor door, a step lap pocket for a rafter was uncovered. This is an angled notch in the top and back side of the plate so that the rafter is locked into place without any real mechanical connection. The uncovered rafter pocket is directly below one of the existing rafters, which happen to be half round spruce poles (the typical rafter material for a 19<sup>th</sup> century building in this area). The rafters, unpeeled and spaced 3' on center, now sit on top of 9'6" tall 2"x4" stud framed walls. At the peak, the rafters are butted with a vertical plumb cut, most likely nailed together with large square cut nails. All of the rafters appear to be of the same vintage and with a detail at the foot where it now sits on a stud framed wall which looks like it is part of an earlier roof frame.

My guess is that the original rafters are still intact and in their original locations, just set on top of the new stud framed walls. Typically, by the time the second floor was added there would have been a bad rafter or two and the rafter spacing may have been changed when the roof framing was put back together. Having the existing location of the rafter be directly above the original location may have been intentional but it is worth pointing out. Another peculiarity of the roof frame is that it is sheathed with what appears to be the original roof sheathing, still in its original location. One would think that if the roof was stripped, the rafters taken down, and the second floor walls built and roof put back on that there would be larger patches of newer sheathing and that they would be more random. It would not have been unheard of to jack up the entire roof the 10' and build the stick framed walls underneath the elevated roof system.



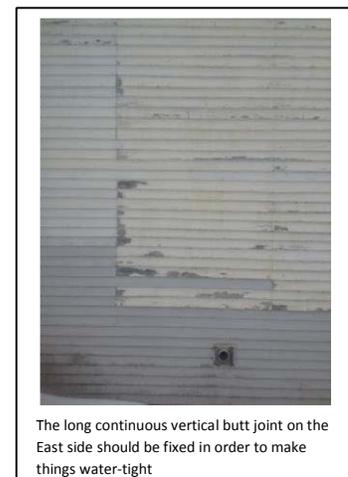
The charred horizontal timber is the original top plate to the building, now at the second floor level. The notch in the center of the beam is a step lap pocket, in which, the rafter once sat

Because the building is now a platform framed structure, it requires a strong diaphragm at the second floor level in order to keep things from shifting and distorting. In order to accomplish this, the existing 1x4 maple strip flooring that is currently the top layer should be removed carefully for potential re-use. The reciprocally sawn 1" subfloor boards should also be removed as many of them are fire damaged. Once the floor joists have been inspected and repaired or reinforced as needed, a new plywood subfloor should be installed or diagonal boards on top of the joists.

At the new plate level, the tops of the studs are held together by ceiling joists nailed to the side of the studs just below the plate. The joists and studs are set at 18" on center. The joists are sistered together in the middle where they rest on a box beam supported on a lally column and the interior wall which in turn rests on the same support in the first floor. Downstairs, the interior has been completely redone with insulation and sheetrock throughout. There is no real historical significance to anything on the first floor at this point other than the 10' tall ceilings and long bank of six windows on the West side which give the obvious appearance of a schoolhouse. There is updated electrical and flooring throughout the first floor. The floor framing was redone during the most recent restoration and it appears as though whatever there was for a crawlspace under the floor system was closed off completely. The floorboards are all slightly cupped, which is evidence that there is moisture trapped underneath the floor. It would be beneficial to open up several holes on either side of the foundation with vents so that there is some air flow moving through under the floor. Outside, the foundation visible behind the snow banks appeared to all be dry laid stone that had been pointed later with Portland cement.

## Exterior

The East side of the building at one point had an annex attached to it. Currently, there are no penetrations through the wall except for the second floor door that is accessed by the long metal staircase that leads up the side of the building. Most of the clapboards on the wall have been replaced with pre-primed spruce which has not been painted since its installation. There is also a smaller amount of slightly earlier spruce replacement clapboard that was not pre-primed but was painted in place. There are a couple areas throughout the wall that should be addressed at some point in order to make sure that things are watertight. For instance, there is a large section in the middle of the wall where there is a common vertical butt joint. The lower sections of the corner trim has been replaced with new pre-primed pine but the cuts made to the original trim boards are a square 90 degree cut instead of a 30 degree bevel as is typical in order to shed water that gets into the joint away from the building. Also troubling is the fact that there is a large amount of charring on the interior of this wall, visible from the second floor inside. This may or may not relate to the cracks in the sheetrock that are visible downstairs. It would be wise to strip a fair amount of the clapboarding and sheathing from the outside in order to thoroughly inspect the framing. It is possible that the sill has moved slightly and is causing the cracking but it would be good to make sure that it isn't a result of insufficient framing in the first floor walls due to the fire that is causing the movement. Any new clapboards should be pre-



The long continuous vertical butt joint on the East side should be fixed in order to make things water-tight

primed quartersawn spruce or clear vertical grain hemlock with the eased edge ripped off on the table saw. Clapboards should be installed on top of 30 pound felt paper. All end cuts should be re-primed, joints staggered and the primed product painted with at least on coat of latex within 180 days of installation.

The North side of the building retains more of the earlier siding. It is sided mostly with quartersawn spruce clapboards fastened with wire nails and set at a 2 3/4" reveal on average. The wire nails indicate that this is a second generation of siding as the first would have been hung with square cut nails. The entrance on the North wall had been widened and shifted to the West from its original position. The most recent restoration brought back the North façade to its earlier appearance with a wide hung door at the center of the first floor flanked by a double hung window on either side. The front door and trim have been replaced but are appropriate; however there is some rot present in the door. At the peak of the roof, a tall flagpole is held out off the face of the building with iron brackets. The cornice returns on either side of the roof are in fair condition despite only having wooden drip caps covering them. The caps should be covered with metal at some point in order to better keep out the elements.

The West side of the building appears to be almost completely intact from the original reconfiguration of the schoolhouse. There are twelve windows total, six on each floor. They are the same six over six large double hungs, 42"x70", seen elsewhere around the building. The paint on the West façade is in very poor condition but most of the clapboards with the exception of the lowest four or five courses still appear to be okay. There will likely be some corner trim repairs needed as well as the clapboards in the lower courses. A thorough scraping and painting of the West side would make a large visual improvement to the barn and will add to the longevity of the wood. The existing paint on the building likely contains lead paint so it is important that a contractor qualified in this work be enlisted and that the EPA guidelines for paint removal are abided by.



The West side is in desperate need of a thorough scraping and paint

The south side of the building is largely intact from the 20<sup>th</sup> century remodel with the few changes being the exterior door, window trim and lower clapboards. Like the rest of the windows in the building, these have been replaced with new single pane wooden sash, fitted into the original jambs. The only original sash I discovered was the pair on the South wall in the southeast corner of the second floor. The reproduction sash seems to be in decent condition, however like the rest of the building, they are badly in need of paint on their exterior. In order for them to have any energy efficiency if the building is ever heated again, exterior storm windows should be installed.

The roof on the building is an early standing seam metal. It was largely covered with snow during the site visit but it appears to be in good condition and just in need of a good paint job with a high quality roofing paint. On the East side of the ridge, a little ways north of the middle of the building, the brick chimney extends up through the roof, rising 2-3' above the peak of the building. A foot down from the top of the chimney, the brickwork corbels out over four courses, then back in, with the top three courses being parged in cement.

### Rough Cost Estimate

Remove the paneling on the interior of the second floor; take up the flooring and subfloor. Assess the building structurally, repair and supplement the existing floor, wall and roof frame as necessary-	\$21,500
Remove approximately two thirds of the clapboards and sheathing on the East wall (mainly on the lower half of the building). Assess the framing, reinforce and repair as necessary. Re-sheath and clapboard the wall with new pre-primed quartersawn clapboards-	\$19,000
Repair the clapboards and trim on the North, West and South sides. Feather in new pre-primed quartersawn spruce clapboards to replace those missing or rotten. Repair and replace trim boards with pre-primed pine boards- \$14,000 Rebuild the stairs on the interior to replicate what would have been there originally based on physical evidence still intact-	\$11,500
Install triple track storm windows throughout-	\$18,000
Scrape and paint the building with one coat of oil based primer and two coats of latex. Follow EPA guidelines for lead paint removal-	\$15,000