Conditions Assessment
of the
Old Firehouse/Freewill Baptist Church
Huntington Center

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The structure known most recently in Huntington was originally built as a Freewill Baptist church in 1841 with a mix of timbers donated for the project and others that appear to be contemporaneous to the construction. The 28'x38' building has four pairs of eaves posts visible downstairs, several of which are still encased in interior trim. The top of the trim has a steep, convex curve to it, suggesting that originally the building was built with a coved wall to ceiling transition. It is quite likely that some evidence of the nailers necessary for this are visible underneath the existing beaded fir ceiling. Often, the original plaster ceiling is still intact beneath the fir that was often added to churches to keep cracking portions from falling on parishioners.

On the North wall of the first floor, the lath and plaster were removed in the 1970's and fiberglass insulation and the ubiquitous 70's paneling installed in its stead. Behind earlier paneling on the South wall, the original plaster, some sections later covered with wallpaper was discovered. Around the two garage doors that were cut into the East side and on the section of the West wall that still exists, much of the earlier paneling is still intact and likely has the same split lath and plaster behind it. Split lath was largely replaced with sawn lath around 1850, so this finish is probably original, with the wallpaper added in 1911 as a note and signature discovered suggest.

The quartersawn clapboards that likely sided the building for the first 130 years of its life were also removed in the 1970's remodel and replaced with vinyl siding. Much of the vernacular Greek revival exterior trim is still intact, with the window casings and roof trim still in good condition. The roof is elegantly trimmed out with a tall entablature made up of a double frieze, both of which are wide and separated by a chine strip. Bed moulding which appears to be a larger version of that which is under the window drip caps, is at the transition from the frieze to the deep overhang, which is enclosed with a double wide soffit as well. As the entablature comes up the roofline, it is topped off with a wide fascia and elegant crown moulding at the roof's edge.

At the center of the front gable is the only person door into the structure. While the door is newer, judging by the head casing, the trim and location is likely original and would have been flanked by a window on either side, the same as those that exist on the North and South walls. Along the North and South walls, there are three evenly spaced windows. The sash are fairly large for that time period, each nearly 3'x3' and made up of six over six 9x15" wavy glass panes. The muntins profile is an elongated concave curve, with squared shoulders against the pane and extended to a squared point on the interior, typical of other sash built from 1830-1850[1]. With so little original fabric of the building existing, the sashes are perhaps one of the most essential items to preserve. On the South side of the building, they are very weathered and will need to be disassembled in order to replace several muntins but most of the sash need only reglazing and painting. A preservation carpenter experienced in the preservation of historic windows should be enlisted to perform this work.

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[1] Garvin, James. *A Building History of Northern New England*. Hanover, NH, University Press of New England, 2001.

While re-siding the building and restoring the original façade would make the biggest difference in the appearance and the public's appreciation of its beauty, the vinyl siding is for the time being an effective material to preserve the walls. When it does become appropriate in terms of the long range planning, the vinyl siding should be removed, a thin drainage plane or siding underlayment installed and new pre-primed quartersawn spruce clapboards installed with a traditional reveal of 2.5-3". The original reveal can be inferred from the height of windowsill to drip cap, to which the clapboard reveal should be an even factor. Investigation of the front gable should show the location of the windows that flanked the front door, with a wider stud spacing mortised into the underside of the tie beams making up the rough openings for the windows.

As previously described, there are four pairs of posts visible downstairs but it does not appear that they align with the nine tie beams that make up the ceiling joists, to create proper bents. There is no joinery between the posts and the ties requiring them to be in line with the ties and evenly spaced support for the plate, out of the way of the windows was the most important factor. The posts sit on top of the sill (barely existent at this point) and support the 38' long continuous 9x12 top plates. The sills have been encased with the concrete slab, for which they were essentially the forms to which the slab was poured. Like all timbers that concrete is poured up against, the sills have rotted as a result and only really appear to be partially intact on the North wall, where at least they can still breath a bit from the exterior, the top of the foundation here being well above grade.

The nine 8x10 spruce tie beams lap over the top plates with a half dovetail joint. Looking down at the joint in plan view, one side of the joint is straight across and the other side tapers, from inside to out (half of a dovetail joint), each joint is fastened with one 1" peg. If the ties and plates were sufficiently dried when the joinery was cut and if a reasonable amount of tension is put on the joint, it is strong enough. As soon as the tie beam shrinks during curing, the joint is able to slip, and spreading occurs. The tie beams are hung from the rafters with 1" thick cleats that connect the two, creating a crude truss that helps the tie beams to carry the ceiling weight. These cleats are fastened with cut nails and appear to be original to the construction of the church. There are newer cleats that have been added down the slope from the original ones, more in an attempt to hold up the roof weight by supporting the rafters on the tie beams. Unfortunately, the ties are unsupported below except at the wall plane, so these cleats (props really) bend the tie beams, deflecting them and induce shear failure at the dovetail.

Tie beam number five (with number one being the road side, East gable) is rotted on both ends. In order to hold up the tie and support the ceiling someone installed a sleeper timber to sit on top of ties four and six and hang number five with a through bolt. In addition, they added cleats between the rafters and tie five presumably to hang it as well. Under any sort of load however, those will transfer weight down to the tie

beam five, which then hangs off of its neighbors. The dovetail joint does a moderate job of tying the walls together but it was not designed to carry any load beyond the ceiling weight. The sleeper that hangs tie five is actually transferring the roof load of the two rafters above it, as well as all of the ceiling weight for three tie beams, to ties four and six. It has already completely sheared the dovetail joint on the South end of tie beam six but it can be easily stabilized by installing a temporary shore post from the slab, up to the underside of the ceiling at the South end of tie beam five. Some exploratory work should be done to ensure that there is direct contact between the ceiling and the tie beam but presumably, since the tie is the joist, they are touching. This is not a long-term solution and should be monitored, as the slab and foundation are susceptible to frost and may have differential heaving and settling.

The thorough, long-term solution will be to lift the building up from underneath the ceiling at first to replace the sills, repair the post bottoms and deal with the foundation. Then, the walls can be set down and the roof system lifted up with the same internal jacking setup underneath the ceiling, with false work added to transfer the support through the tie beams up to the rafters, allowing the top plates to be isolated and removed for replacement. It appears from the attic that the full length of both top plates will need to be replaced, but if there are significant portions that are still in good condition and can be scarfed into a new timber while remaining structurally sound, those portions should be saved. Any new timbers should match the originals in size, species and joinery and should be continuous timbers unless historic portions are incorporated as discussed. At this time, the roofing should also be removed at the middle of the building in order to access and likely replace tie beams #4,5,6 with new timbers to match the originals. The existing metal roofing should be removed, the roof sheathing investigated and replaced with new wide pine boards to match the original where necessary. The sheathing should then be covered with a high quality underlayment paper and new roofing material, preferably standing seam metal roofing, installed.

As Jan Lewandowski described in his 2006 conditions assessment of this structure, there is a lack of any transverse bracing within the building. This bracing, which would run perpendicular to the ridge beam, would keep the eaves walls plumb and would prevent racking. It is likely that the framing for the coved ceiling provided this originally and reinstating this detail may be the best way to accomplish this in the future. The other alternative would be to add posts that align with the tie beam and install diagonal bracing from post to tie, but this would be nearly as much work as the first option and moving away from the original appearance.

In many prominent buildings of this era, especially churches, the rafter pairs would often be in line with the tie beams so that the tie beams can be properly trussed, or hung off of the rafters with joined timbers rather than the applied cleats. The geometry and layout of this design is complicated, especially when camber is induced into the tie beams (which become lower chords once they are part of a truss). Cambering trusses was common with churches and covered bridges in order to compensate for loading of the trusses without the bottom chords deflecting, which can

be quite disconcerting. Trusses were not used however in the construction of the Freewill Baptist Church. Instead, the +-6" rafters sit at a 36" on center spacing, with a step lap joint into the top plates. The tie beams are spaced at 54" on center, so with the exception of the gable ends, the ties and rafters are not in line. While this detail is inconclusive, the break from the typical framing details could suggest that the layout and framing was more of a community effort rather than the commission of a master framer as would typically have been the case.

Another inconclusive detail that would support this is the five sided ridge beam, which the rafters tenon into at their peak. When sighting down the length of the ridge beam, it appears that it is asymmetrical, possibly due to poor hewing. The South bearing face of the ridge beam is square to the roof system but the North side is shallower than square, something that they would have had to compensate for in the peak cut on the rafters in order to make the joint tight. The rafters themselves are half round spruce poles, flatted on the top for the roof sheathing and left in the round, with the bark on in the interior. They are notched into the top plates with an uncommon step lap detail, in which the heel is locked into the plate by way of a plumb, rather than square, step lap and then pegged on the downhill slope square to the roof. The combination of the plumb cut and square peg angle lock the heel of the rafter into the plates incredibly well, likely to prevent uplift of the roof at its eaves. While this is not a common detail, I have seen several other structures in Huntington that utilize it as well.

Another peculiar detail is found at the East end of the top plates, where there are half laps cut into the top of the two top plates, apparently for a beam other than the existing tie beam. At the beginning of the half lap, there is a rafter pair on the same layout as the rest of the roof, but shy of the gable wall plane by about a 10". On top of the tie beam, there is another pair of rafters, which make up the framing for the gable end. The redundancy of the rafters on layout and the curious nature of the exposed half lap, suggest that perhaps the top plates, with the step laps already cut, were salvaged from an earlier building and perhaps the tie beams added contemporaneously to the existing structure. Additional removal of the 1970's paneling on the interior might expose other errant joinery details in the top plates that could give some clues as to their origins.

The foundation is only visible along the North wall, where 2-3' is exposed at the edge of the small stream that crosses the road, right alongside the building. The fieldstone foundation was dry-laid in its construction and then pointed with a lime-based mortar. Much of the mortar has weathered away as is typical with lime but portions of it still remain and an original sample could be gathered. Many of the stones have shifted and several of the larger ones are tipping away from the building. This condition will likely become accelerated, as it becomes easier for water to infiltrate behind the stones, heaving and shifting them through the spring freeze thaw cycle. On the East and South sides, the top of the foundation wall is below grade and not visible. This will present an issue for the foundation long term as the top of the wall should be higher than the road by enough of a height to allow positive drainage away from the building, especially as the road height continues to be built up. It would be advisable to add 1-2

feet of height to the entire foundation when the building is lifted up to replace the sills. At that point, it might be most efficient to replace the frost wall portions of the foundation below grade with concrete and use the original stone above grade

Rough Cost Estimates

Restore the original window sash. Two of the windows on the South wall will need to be leveled by lifting and temporarily shoring the wall, as the openings are racked- **$6000**

Jack up the building with supports on the inside of the building, initially lifting the entire building off of the foundation in order to facilitate repairs and replacement of the post bottoms, sills and foundation- **$7200**

Excavate the perimeter of the building for new concrete frost walls- **$30,000**

Pour new concrete frost walls up to grade and re-lay the stone foundation above grade and a new slab on the interior- **$20,000**

Set the building back down on the rebuilt foundation and use the same jacking supports to lift the tie beams and rafters up off of the top plates. The eaves trim will need to be labeled and carefully removed in order to bring the new plates into the building from the outside, or attempt to install it from the inside, if it can be swung into place. Repair or replace both top plates as well as tie beams #4,56 with any new timbers to match the originals in size, species and joinery- **$12,000**

Remove the vinyl siding, install building wrap and drainage plane and side the building with new, pre-primed quartersawn clapboards- **$18,000**

Install plasterboard and diamond coat veneer plaster on walls and ceiling (will require building coved transition as well)- **$22,000**

Interior of the building, with three posts exposed, the first of which is shown with it's apparently original casing, still intact. The top of the post casing is cut to a convex curve on the two sides, which suggests that the original ceiling was coved. The other two posts are bare and have empty mortises at varying heights, suggesting that they are re-used material from an earlier frame.

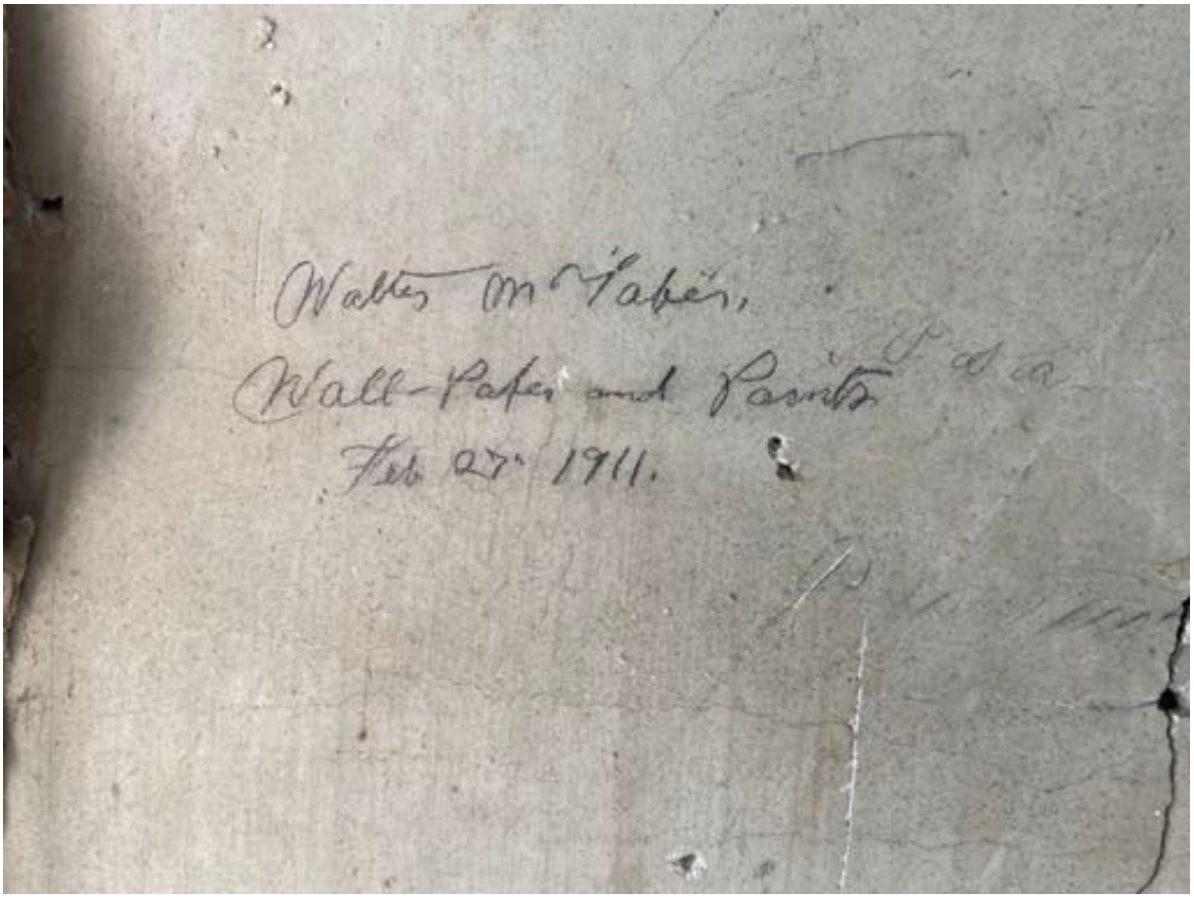
Timber posts in the Northwest corner, with empty mortises at different heights which suggest they were originally cut for a different structure. The post in the foreground shows brace mortise, below the large mortise on the inside face. In its current orientation, the housing indicates that that brace would be descending into the interior of the space, which is unlikely. Empty mortises throughout, indicate that most of the timbers were re-used from what appears to have been a full two story tall building based on the post mortises. The original joinery was cut using the square rule, demonstrated by the housings at the mortises. This method of layout was widespread by 1800.

Post casing, showing the steep coved ceiling that was likely original to the church. Removal of the newer beadboard ceiling should uncover the top of this curve.

A small section of split lathe and plaster that was uncovered behind the 1980's paneling. Cut lathe replaced split lathe around 1850, so this section of wall predates that transition and is likely original to the structure.

The south side of the building with the interior paneling removed at a recent work party to reveal original lathe and plaster. The boards at the top of the middle bay were added when the paneling was installed to fasten the paneling to. Before that, the coved ceiling would have sprung from the wall plane but this was removed. More evidence of that cove is likely still intact on the gable ends, where the paneling has not yet been removed.

Split lathe and plaster, covered by wallpaper . The window trim and portions of the baseboard are still intact.



One of the many signatures found on the uncovered plaster wall. Dating to the painting and wallpapering in 1911 apparently.

A continuous five-sided ridge beam connects the half round spruce rafters at their peak. The bark was left on the rafters, suggesting that they were cut in the winter, when park needs to be peeled off of the logs with a drawknife and was often overlooked in the interest of a speedy raising. The applied cleats appear to be original and were used as a makeshift truss, hanging the tie beams or bottom chord off of the rafters. The engineering behind this is problematic however and doesn't really work without a tension connection at the end of the rafters.

Close up of the five-sided ridge and rafters. It appears that the geometry of the hewing is off slightly with the South side being slightly steeper than a square angle to the roof, which is the typical design. This is likely an error in the layout of the hewing .

Cutting edge from a plow attached to the top of tie beam three on the South end for reinforcement.

The sleeper between tie beams four to six, on the South side of the building. The sleeper sits on top of four and six and via a through bolt at tie beam five, hangs the middle tie, off of the other two. This weight on top of the tie beams is difficult for them to support; the dovetail on the ends of the ties is meant to tie the building together and be strong enough to support the ceiling. It was not designed to carry any roof load however, as it wasn't originally asked to do so. This repair transfers that roof load down through the two dovetails, instead of to the top plate, where the load path of the roof is meant to be.

Half dovetailed tie beam end with rafter to plate connection shown as well. The step lap (two separate laps cut into the plate as the name suggests), usually has a step between the two that is square to the roof plane. Here, as is visible, the step is plumb. This is not a typical design but has been seen in other contemporaneous structures in Huntington and scattered around Vermont. With a pegged connection in the plate, which is square to the roof, the two angles work together to make uplift from any wind events nearly impossible.

Severe rot at the South end of tie beam five.

The connection from tie beam to plate in the Northeast corner. The top plate has a half lap much larger than the width of the tie beam on both the North and South ends of the first bent. This is a peculiar detail, along with the rafter spacing, and suggests possible re-use of the plates as well, or simply a mistake in the joinery.

The Southeast corner roof trim detail, with a double frieze and deep soffit, adding to the simple vernacular elegance of the original building.

The slight concave curve of the muntins is typical for sash built from 1830-1850.

Six over six window on the North side of the building with the original trim and vinyl siding added. The existing woodwork is generally in good condition throughout and generally only in need of a thorough scraping and painting. Care should be taken to use precautions for lead in the paint removal process.

The North side of the building, with the only portion of the stone foundation still visible. To the North of the building is a small drainage stream. The banks of this stream are covered in Japanese Knotweed, which is currently being managed.

The stone foundation on the North wall. A few of the stones have shifted and need to be reset but the majority of the stonework simply needs repointing. The original mortar was lime-based and replacement mortar should be mixed to match the original.