



TOWN OF MIDDLEBURY POLICE DEPARTMENT

Energy Conservation Measures / Community Room Upgrades

JANUARY 24, 2019

PROJECT NARRATIVE

The Town of Middlebury Police Department, in response to Energy Audits conducted by Zero by Degrees LLC of Fairlee, Vermont and encouragement by the Town's Energy Committee, is seeking to improve their energy consumption profile as well as building occupant comfort. Following through with recommendations made by Zero by Degrees in their Building Energy Plan dated May 25, 2018, the Police Department wishes to implement the following identified Energy Conservation Measures from that report:

- | | |
|--------|---------------------------|
| ECM #1 | Wall to Roof Air Sealing |
| ECM #3 | Community Room 105 infill |
| ECM#5 | Wall to Floor Air Sealing |

The focal point for this project will be to implement the above improvements to Community Room 105, and to estimate and apply discoveries made in this process particularly for ECM #1 to the entirety of the Police Department Facility at #1 Lucius Shaw Lane in Middlebury, Vermont. The full content of the Zero by Degrees Report as well as As-Built Drawings and Specifications for the Police Department Facility are available for examination at the Department Facility by appointment with Chief Tom Hanley.

PROJECT DESCRIPTION

The Town of Middlebury Police Department wishes to solicit proposals from local General Contractors for the following scope of work:

ECM #1 **Wall to Roof Air Sealing (to be executed by experienced installers only)**

Air leakage is occurring in both directions between the metal roof deck and steel beams below, where the deck meets exterior walls. Intermittently, bar joists complicate this detail, where they sit on supporting steel I-beams. See **Zero by Degrees diagram, Pg 4.**

SOLUTION: Seal the wall to roof connections from the inside with and insulating closed cell spray foam, applied between the metal roof deck and the steel I-beam below.

“Where bar joists interrupt this detail intermittently, the foam shall be sprayed continuously onto either side of the bar joists and foam shall be introduced between the two pieces of angle iron at the center of the bar joists’ terminal ends over the I-beam. This foam will need to be covered with a 15-minute thermal barrier.”

See Specification Note **(1) Page 3**

Note: It shall be the responsibility of the General Contractor to provide access to all spaces for the Approved Insulation Installer, to verify that all work is accomplished as specified, and that all spaces are returned to equal or better-than condition upon completion of insulation work.

ECM #5 **Wall to Floor Air Sealing**

Zero by Degrees reports there is evidence of air leakage at wall-to-floor connections in some locations in the building. Although not a general problem, the Owner wishes to make corrections in the Community Room, Conference Room, and Exercise Room.

SOLUTION: Remove the baseboard to expose where the drywall meets the floor, and caulk that joint.

ECM #3 **Community Room / #105**

Infill of storefront walls on east and south elevations with new assembly

Zero by Degrees confirms that Chief Hanley’s assessment of this room’s thermal performance is correct. Due to the high ratio of non-thermally broken storefront glazing (with integral doors) to insulated wall on the two corner exterior walls of the space, **occupants are frequently uncomfortable**, a situation that cannot be adequately mitigated by the mechanical system alone. Although insulated blinds have been installed, the improvement in comfort level for occupants has been only marginally improved. In addition to comfort level compromise, the existing storefront system presents a **security risk** for the building and its occupants.

SOLUTION: Remove the two sections of existing storefront system entirely (each approximately 12' wide by 9'-2" high). Replace approximately 80% of this wall system with a new insulated wall system, matching the adjacent materials for a uniform quality exterior appearance that will maintain the building's 50-year lifespan status. Replace the top 20% of this wall system with a new high-performance dual pour-debride thermal barrier storefront system such as Tubelite 24000 series, to maintain some natural light at the transom level.

ARCHITECTURAL NOTES: Although infill for these openings could have been accomplished using less durable and costly materials with equal energy saving characteristics, the Police Department and its design team have chosen to place high priority on maintaining the architectural integrity of this facility by using only materials already expressed in the building's primary architectural palette. We desire to make these infill panels feel as if they were integrated into the original design, and are not an ill-considered retrofit.

To that end, the cmu infill units have been chosen to match the band of honed block units adjacent but above the openings in question, to avoid a potential issue of a marginal color match between old and new at the same height. The sill under the new transom units shall be fabricated of pre-cast concrete, and with the same profile as adjacent operable windows. At the level of the existing pre-cast concrete ledge, a new flush honed pre-cast concrete band has been introduced to carry through the dimensions and coloration of the existing adjacent wall surfaces.

See Specification Note (2) on page 4, and Pages 5-11 for wall sections, elevations, details, and photographs.

The overall improvement in thermal performance of this space is outlined below.

20% of wall performance improvement

Existing Storefront thermal resistance value = R 2.0

Proposed Storefront transom thermal resistance value = R 3.03

80% of wall performance improvement

Existing Storefront thermal resistance value = R 2.0

Proposed infill masonry / frame wall = approximately R 25

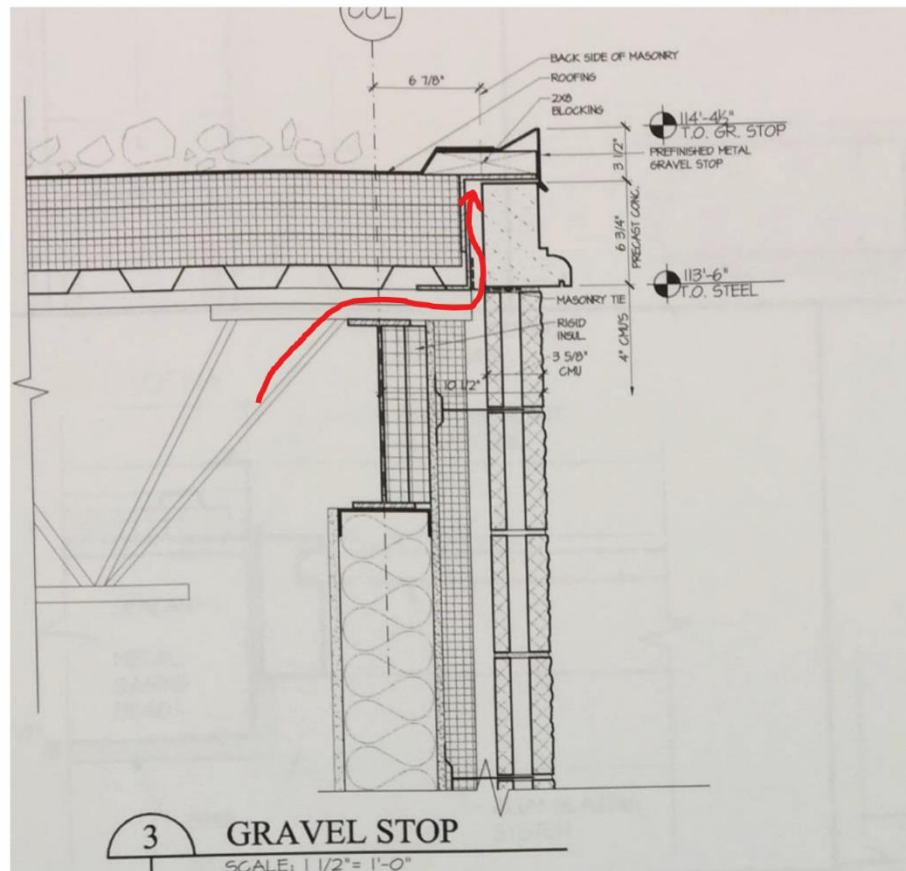
SPECIFICATION NOTES REGARDING MATERIALS: extracted from Zero by Degrees report, May 15, 2018

- (1) The Community Room, as an "occupied" space, requires application of a closed cell insulating foam system that is then covered with an approved 15-minute thermal barrier, meeting one of the following tests: NFPA 286, FM 4880, UL 1040, or UL 1715 – an approved equal to 1/2" thick gypsum board.**

(2) The wall system infill for the existing storefront shall deviate from the existing wall section designed by Bread Loaf Corporation in the following ways:

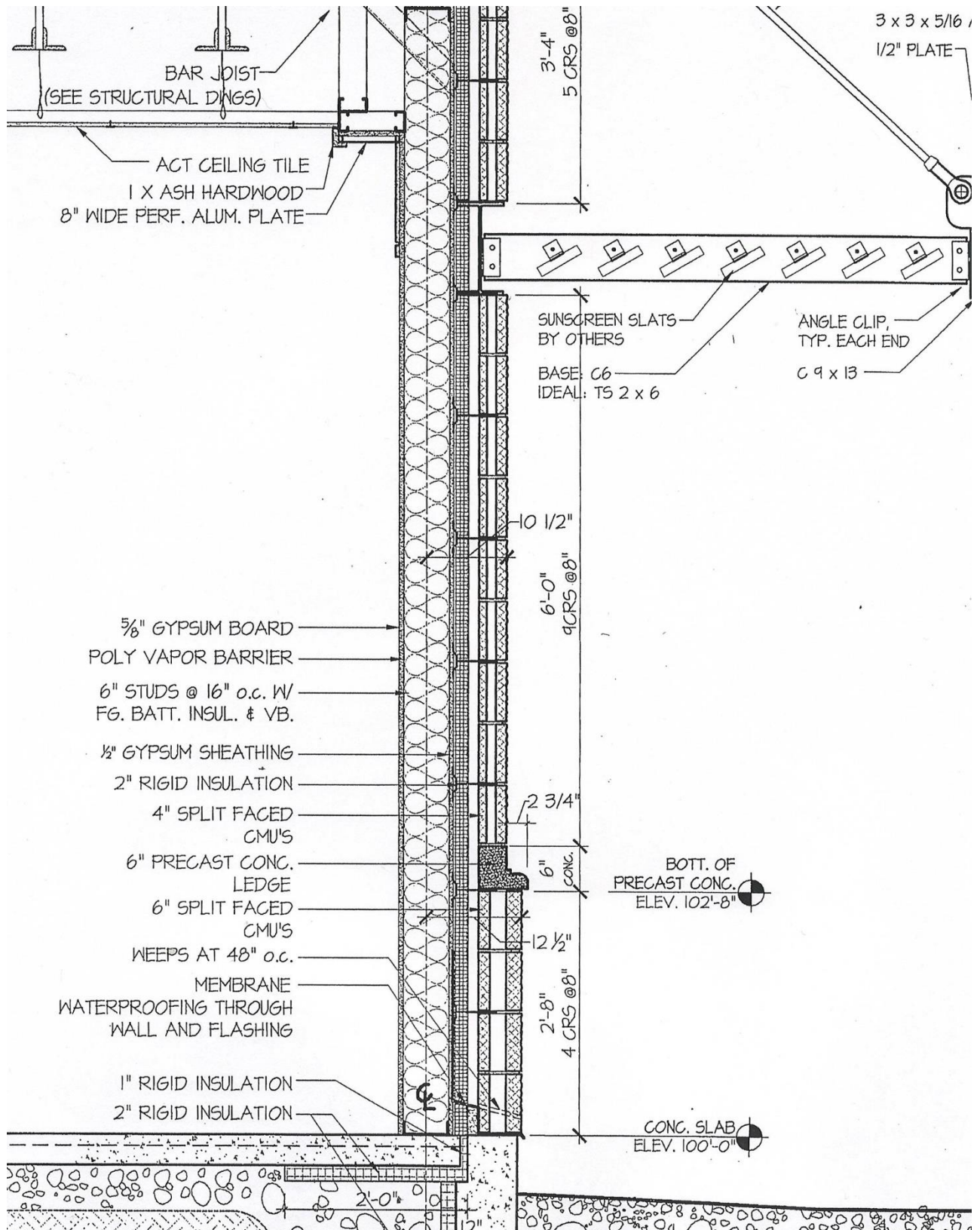
- a. The metal stud framed wall (16" o.c.) shall be sheathed on the exterior plane with fiberglass mat-faced gypsum sheathing (DensGlas or equal). Building wrap and weep details are to match the original design as shown in the existing wall section.
- b. The cavities of the 2x6 metal stud wall shall be filled with 5.5" of closed cell spray foam with good air and vapor barrier characteristics, dense, about R6 / inch, completely filling each bay (in lieu of original design utilizing fiberglass insulation batts).

ZERO by DEGREES Diagram indicating path of warm air through existing wall to roof construction

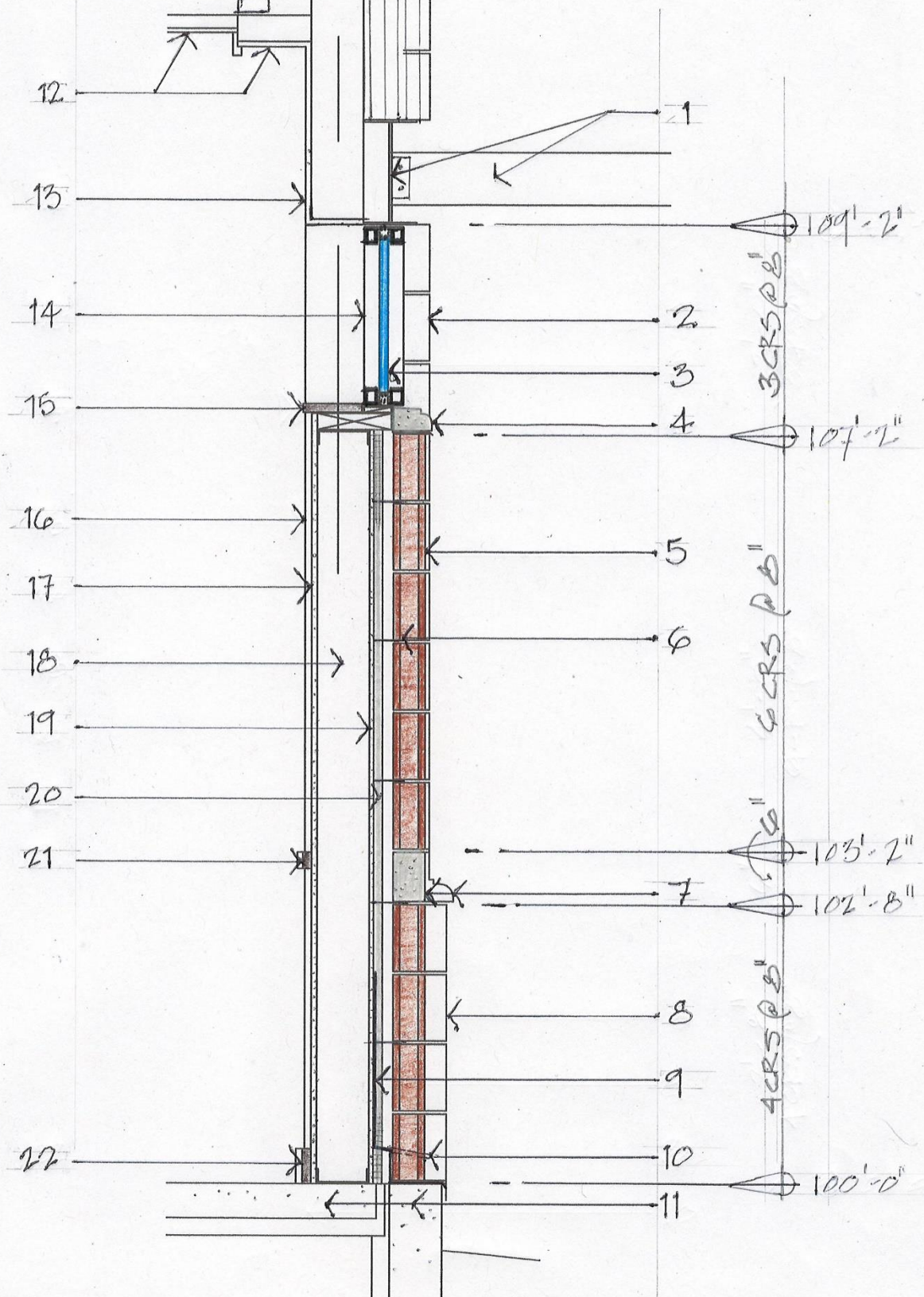


Warm air is easily able to migrate between the metal roof deck and the top of the steel beam via the pathway show, beyond any air barrier materials. Depending on the wall configuration, interior drywall or interior CMU are typically the materials acting the most like an air barrier.

BREAD LOAF CORPORATION As-Built Drawings: Typical Wall Section at Steel Screens



PROPOSED DRAWING - WALL SECTIONS at Storefront Glazing Infills



PROPOSED NOTES – re WALL SECTION at Storefront Glazing Infills

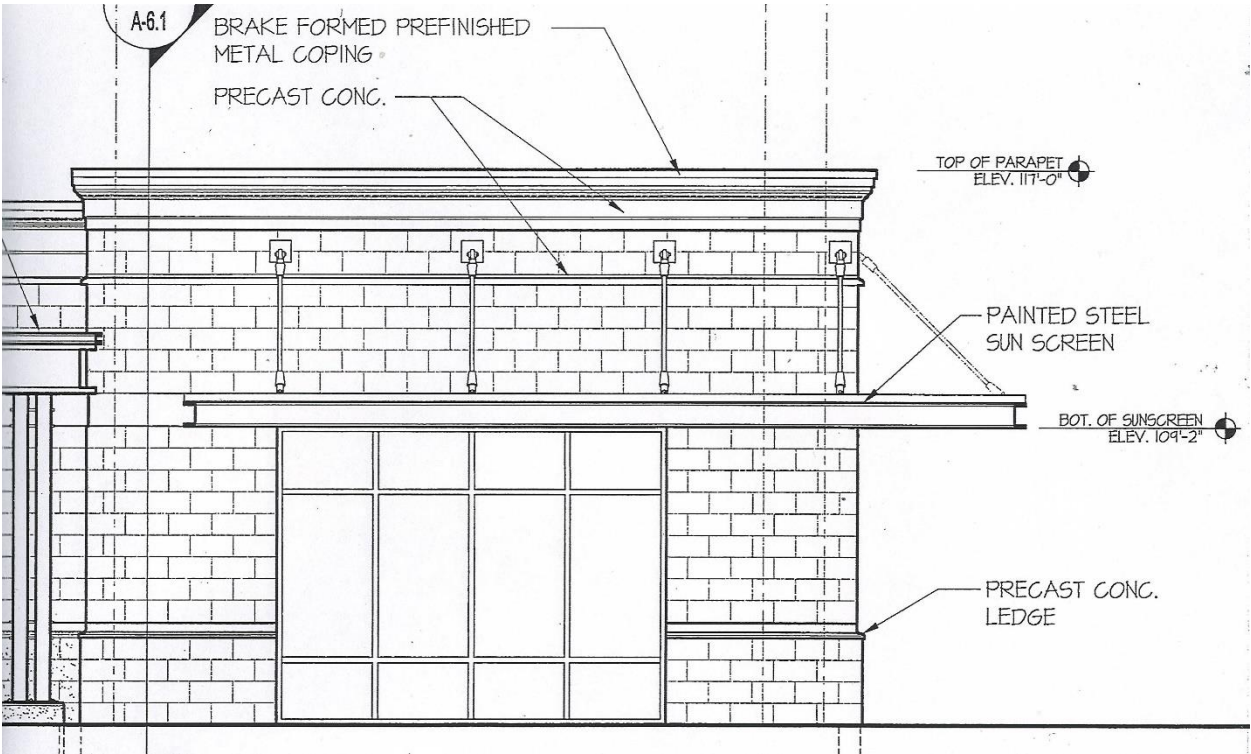
- 1 Existing painted steel beam and sunscreen canopy, suspended from 1" threaded rods**
- 2 Face of 4" split faced CMUs beyond**
- 3 1" insulated low-E glazing**
- 4 Pitched precast concrete sill - mimic section at existing window units: 2 5/8" high x 4 3/8" deep, drip cut on underside, project 3/4" from face of CMU plane below**
- 5 4" honed CMUs to match coloration of existing CMU band at beam level above. INSET these CMUs 1/2" from adjacent existing split faced CMUs at the same elevation. Match coursing and mortar joints.**
- 6 Masonry ties to match existing adjacent masonry wall details**
- 7 6" precast concrete band, flush with surrounding CMUs, matching color and coursing of adjacent existing 6" precast concrete band**
- 8 Face of existing 6" split-faced CMUs beyond**
- 9 Membrane waterproofing through wall and flashing – see existing masonry wall detailing**
- 10 Weeps at 48" o.c. – see existing masonry wall detailing**
- 11 Existing concrete floor slab and foundation wall**
- 12 Existing acoustical tile ceiling and 8" wide perforated aluminum plate at perimeter**
- 13 Plane of existing gypsum wall board beyond – gyp board return to storefront section**
- 14 Proposed thermally-broken Tubelite TU24000 Series Non-Impact Storefront. Dual pour - debridge thermal barrier 2" x 4 1/2" section, color to match existing. Masonry opening = 12' wide x 1'-9 3/8" high. Field verify.**
- 15 Clear-finish 5/4 ash sill over 2x10, projects 1/2" beyond gyp board below. Match details of existing window sections.**
- 16 Face of existing gypsum board partition beyond**
- 17 Face of proposed 5/8" gypsum board wall INSET 1/2" from plane of wall beyond**
- 18 Completely fill cavities between 16" oc steel studs with closed cell spray foam, with good air and vapor barrier characteristics, dense, about R6 / inch**

- 19 Frame wall shall be sheathed on the exterior plane with fiberglass mat-faced gypsum sheathing (DensGlas or equal). Building wrap and weep details are to match the original design as shown in the existing wall section.
- 20 1" XPS rigid insulation – maintain air space to back of CMUs
- 21 Ash chair rail 7/8" x 1 7/8" with top at +38" aff. Align with and return to existing beyond.
- 22 Ash base 1" x 4". Align with and return to existing beyond.

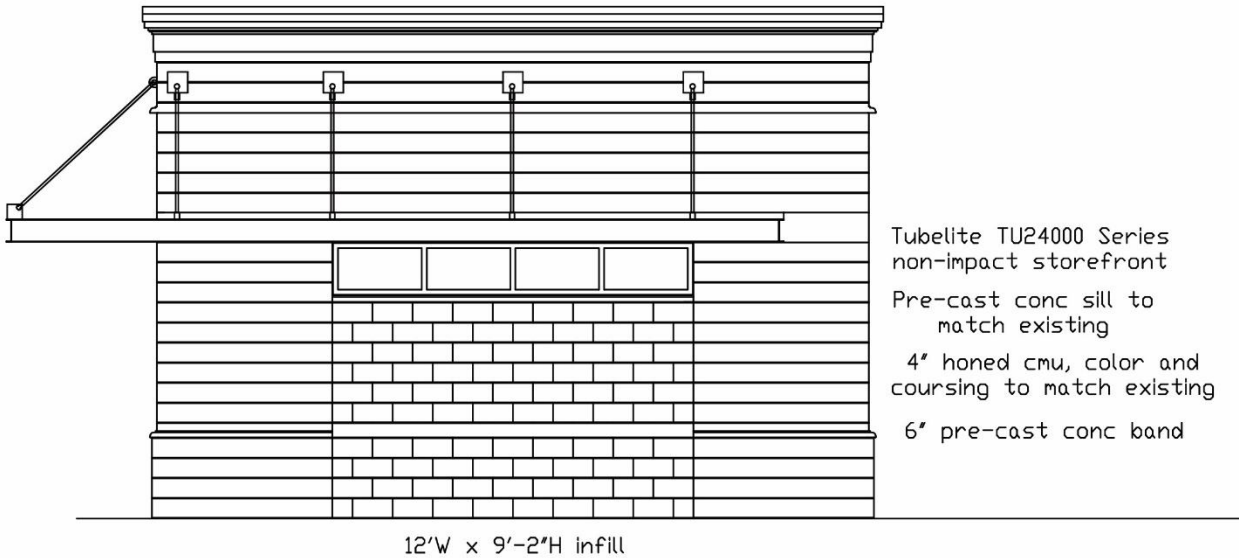
GENERAL NOTE: Two existing insulated window shade systems, electrically operated, have previously been installed as a retrofit to the two openings slated for infill on this project. These shade systems and their electrical components are to be carefully removed and salvaged to Owner, and all effected surfaces patched and refinished to original condition following wall infill.



BREAD LOAF CORPORATION As-Built Drawings: Partial South / East Elevations at Community Room



PROPOSED Partial Elevation at Storefront Glazing Infills



proposed partial east elevation
south infill similar

MIDDLEBURY POLICE DEPARTMENT

Energy Initiative . Community Room

Scale: 3/16" = 1'



Existing East Elevation Details



Interior view at same location



Ceiling Soffit Detail