Town of East Haddam
Moodus Firehouse Renovation Committee
April 26, 2023
Adopted May 8, 2023

1. CALL TO ORDER
First Selectman Haines called the meeting to order at 5:00 p.m. at the Municipal Office Complex and the Pledge of Allegiance was recited.

ATTENDANCE
First Selectman Haines, Craig Mansfield, Kevin Rutty, Walter Parkus, Don Angersola-Director of Operations and Ruth Ziobron-Recording Secretary.

2. Introduction of Members-First Selectman Haines introduced committee members.

3. Explanation of Process-First Selectman-The process was briefly reviewed.

4. New Business

A. Appointment of Chairman

Motion to nominate Craig Mansfield as Chairman.
Haines/Rutty **Passed Unanimously.**

B. Appointment of Secretary

Motion to nominate Kevin Rutty as Secretary.
Mansfield/Haines **Passed Unanimously.**

C. Appointment of Treasurer

Motion to nominate First Selectman Haines as Treasurer.
Mansfield/Rutty **Passed Unanimously.**

D. Discuss Meeting Schedule and Location

The next meeting is scheduled for Monday, May 8, 2023, at 5 p.m. A regular meeting schedule will be discussed then.

5. General Discussion

A. Review Progress of Project to Date

Committee members reviewed and discussed the following:

- EA Engineers Structural Condition Assessment and Feasibility Study dated April 24, 2023. It is included at the end of these meeting minutes.

- Mr. Angersola stated based on the structural engineering report, it did not make financial sense to fix the building, however short term it was safe.
- Set back requirements may allow for the repositioning on the lot of a new firehouse. Zoning and Health approval is required.
- Possible renovations to Company 2 were discussed.
- First Selectman Haines will work with Silver Petrucelli to complete grant opportunities with the bond commission. The deadline is the end of April.
- Silver Petrucelli will attend the next meeting.

B. Invoice Approvals

Motion to pay invoice #23369 dated 4/1/2023 to Silver Petrucelli for schematic design phase in the amount of $4,825.
Mansfield/Rutty **Motion Passed Unanimously.**

C. Other

6. Audience of Citizens

7. Adjournment
Motion to adjourn at 5:29 p.m.
Haines/Rutty **Motion Passed Unanimously.**

Respectfully submitted,

E. Ruth Ziobron
Recording Secretary

e2 engineers
structural engineers

Structural Condition Assessment
+ Feasibility Study

East Haddam Fire Dept.

44 William Palmer Road
Moodus, Connecticut 06423

April 24, 2023

info@e2engineers.com
860-437-3259

facebook.com/e2engineers
linkedin.com/e2engineers

www.e2engineers.com

e2 engineers
structural engineers

Mr. David J. Stein, AIA
Principal
Silver Petrucelli + Associates (Client)
3190 Whitney Ave. Building 2
Hamden, CT 06518

Re: Structural Condition Assessment + Feasibility Study
Job Number: 23008
East Haddam Fire Department
44 William Palmer Road
Moodus, Connecticut 06423

Dear Mr. Stein:

Per the Client's request, e2 engineers (Engineer) has performed a structural condition assessment and feasibility study of the East Haddam Fire Department Company 2 building in Moodus, Connecticut. The scope of the assessment was to determine the overall structural condition of the building, identify areas of concern, and provide a feasibility study to determine if the existing roof framing has excess capacity in order to add or modify the structure.

The existing East Haddam Fire Department building appears to be comprised of two different construction periods. These areas have been constructed adjacent to one another to form the entirety of the structure. The original building is a single-story pre-engineered metal building with a partial mezzanine, and reinforced concrete foundations. It was constructed in 1988 with a footprint of 80 feet X 60 feet. The horizontal addition is a single-story structure which was constructed against the northern wall of the original building, and matches the original building type. It was constructed in 2017, with a footprint of 40 feet X 60 feet.

Adding load to the existing roof framing via a vertical addition, or modifying the existing superstructure in any way, requires confirming that the building's gravity system (beams, columns, and decking) can support the minimum required snow loads from the Connecticut State Building Code (Code). As such, the Engineer analyzed the existing roof framing for the minimum snow loads per the Code and found areas of the existing roof framing that appear to fall short of meeting this

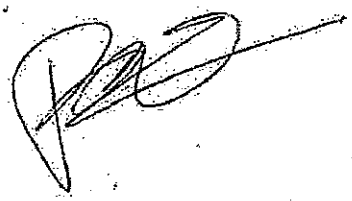
860-437-3259
488 Montauk Ave.
New London, CT 06320
info@e2engineers.com
www.e2engineers.com

requirement. Based on the analysis, the Engineer anticipates the need for significant strengthening of the existing roof framing to be necessary to conform to the current Code.

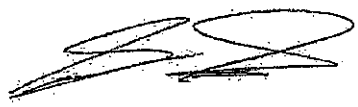
In addition to the gravity system upgrades mentioned above, constructing a vertical addition, or increasing the lateral load of the building in any way, will also require an analysis and possible upgrading of the lateral load resisting system of the building.

The following pages will summarize our investigation, findings, analysis, and load rating. We hope that this report meets your needs. If you have any follow-up questions, please let us know so that we may answer them.

Very truly yours,



R. Scott Erricson, P.E.
Principal
e2 engineers



Geoffrey Sandberg, P.E., S.E.
Associate Principal
e2 engineers

860-437-3259
488 Montauk Ave.
New London, CT 06320
info@e2engineers.com
www.e2engineers.com

Actions taken by Engineer for Purpose of this Report

The following actions were undertaken by e2 to complete the structural condition assessment:

- Performed two site visits to visually observe, measure, and document the existing structure and conditions.
- Photographed the areas of concern and observed conditions.
- Performed a structural analysis of the existing framing system(s) to determine the approximate live load capacity of the existing framing system(s.)
- Prepared this report.

Documents Available at Time of Assessment

- 'East Haddam Firehouse' drawing set by 'Robert Collier McGriff' dated 2/8/1988.
- 'East Haddam Co. 2 Firehouse Renovations' drawing set by 'Williams AIA Architects', 'Frank Marafioti', 'QGL Consulting Engineers, LLC', and 'S&R Engineers, LLC' dated 8/23/2017.
- Pre-engineered metal building shop drawings by 'Package Steel Systems, Inc.' dated 8/1/2017.

Description of Structure

The original building is an 80' X 60' single-story slab-on-grade pre-engineered metal building with a 20' X 60' mezzanine within the southern quarter of the building. Its roof framing is comprised of wide flange steel bent frames spaced 20' on center, supporting light gage zee purlins spaced 5' on center (see photo #2). The steel bent frames bear on concrete piers and footings (see photo #3). The mezzanine is roughly 9'-3" above the slab-on-grade, and is comprised of 14" deep steel open web joists spaced 24" on center with 2x4 sleepers and ¾" tongue and groove plywood subfloor decking (see photo #4). The joists are supported by either a concrete masonry unit (CMU) wall, or a wide flange steel beam and columns. The envelope is standing seam metal roofing and siding. The siding is supported by light gage girts which span horizontally between wide flange bent frames.

The 2017 single-story horizontal addition was built to the north face of the existing building. This addition is roughly 60' X 40', and matches the exact framing type as the

860-437-3259
488 Montauk Ave.
New London, CT 06320
info@e2engineers.com
www.e2engineers.com

original building with the only exception being the purlin spacing, which is roughly 3'-7 ½" on center.

See photo #1 for overall view of firehouse, and see figure 1 below for an overall plan of firehouse.

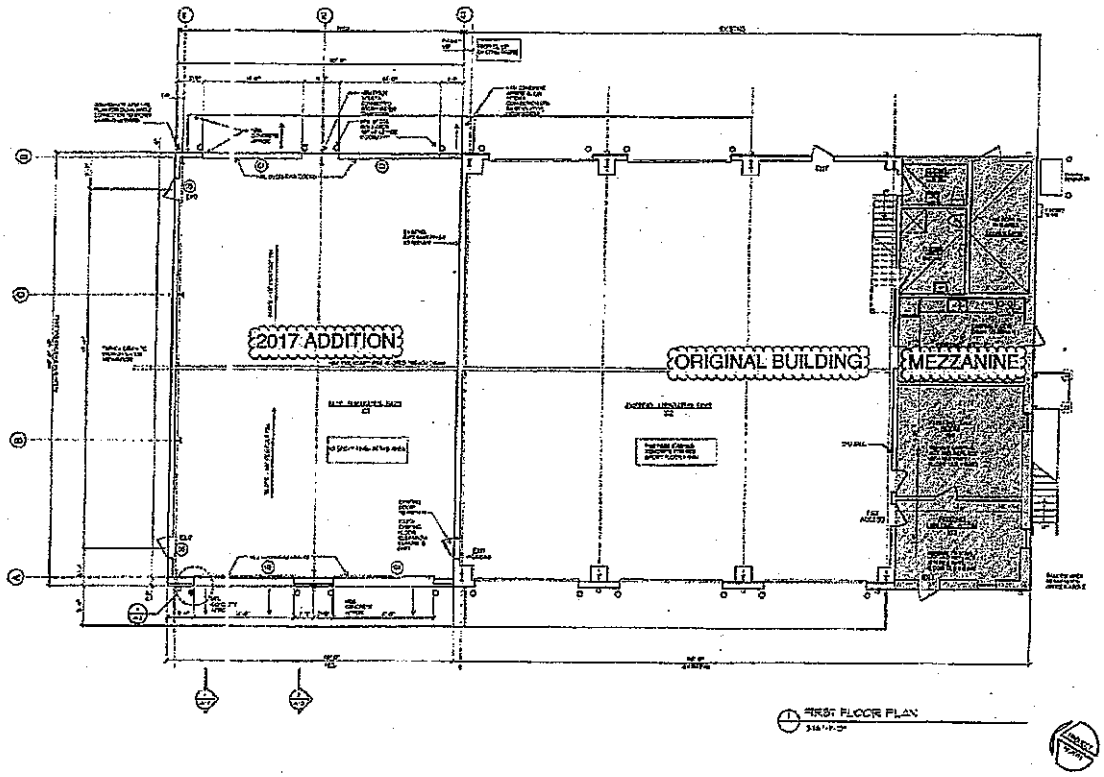


Figure 1 – Excerpt from Williams AIA Architects drawing set dated August 23rd, 2017

Structural Observations

Envelope

1. Over the existing mezzanine, the Engineer observed several locations where the underside of bag insulation has opened at the seams or ripped (see photo #5). At one of these locations, the Engineer observed water dripping through the opening in the bag insulation (see photo #6).

860-437-3259
488 Montauk Ave.
New London, CT 06320
info@e2engineers.com
www.e2engineers.com

2. In several areas along the siding bottom edge, where the siding meets the exterior apron slab or pavement, there was noticeable rust and degradation (see photo #7). This appears to be due to water collecting at the interface of the siding & paved surface.

3. In several areas the Engineer observed water has infiltrated into the building and collected on the slab, see photo #8 for an example.

Superstructure

1. The east base plate area of the steel bent highlighted in red in 'Figure 2' below (fourth bent frame from the south) had heavy corrosion (see photo #9).

2. The west base plate area of the steel bent highlighted in yellow in 'Figure 2' below (fourth bent frame from the south) had minor rusting along its exterior flange.

3. In general, most of the superstructure appeared to be in good structural condition, including the steel bents and purlins. The water infiltration in the roofing (mentioned in item #1 in the previous 'envelope' section) was dripping through the low apex of the sagging vapor barrier, which occurred between purlins, so it did not appear to affect the superstructure.

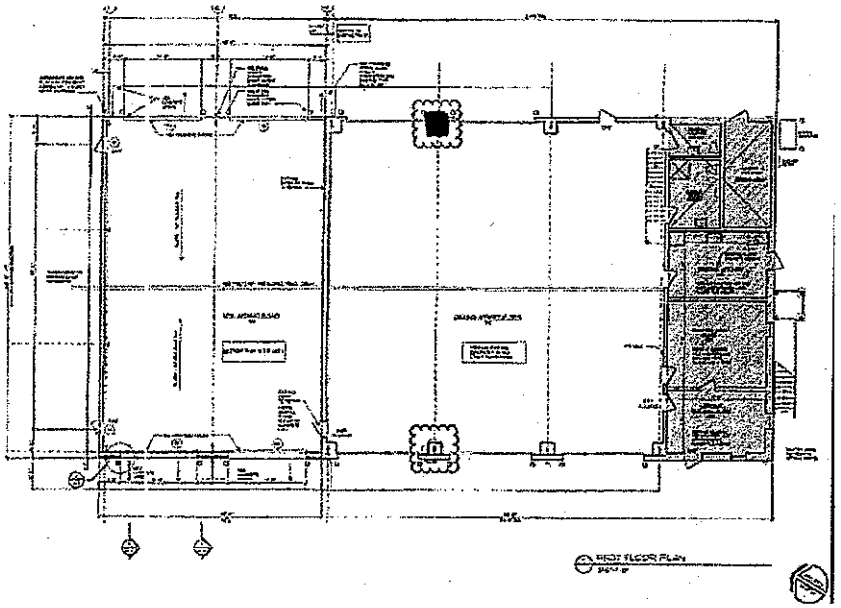


Figure 2– Excerpt from Williams AIA Architects drawing set dated August 23rd, 2017

860-437-3259
488 Montauk Ave.
New London, CT 06320
info@e2engineers.com
www.e2engineers.com

Foundations

1. The only observable foundations were the top of concrete piers and top of concrete walls along the perimeter of the building.

2. The east concrete pier supporting the base plate of the steel bent highlighted in red in 'Figure 2' above (fourth bent frame from the south) had spalled & missing concrete directly below the base plate (see photo #9).

3. In general, the top of foundation wall and its proximity to grade is problematic and the lack of proper flashing has allowed moisture infiltration.

Analysis of Existing Roof Framing Systems

Based on the information obtained during the site visits and existing structural drawings, as well as a Building Code review, the Engineer has performed an analysis on the existing roof structure. The roof framing was analyzed using the current building code required snow loadings, which requires the roof structure to be able to support a minimum snow load of 30 psf. Additionally, a 5 psf dead load (not including structure self-weight) was imposed over the roof. The Engineer performed an additional analysis of the original structure built circa 1988 using 'The BOCA National Code / 1987' loading requirements as well.

All steel bents in the original building were analyzed assuming 36 KSI yield strength, due to the era of construction. All light gage purlins in the original building were analyzed using 33 KSI yield strength. The Engineer observed light gage girts bracing the exterior flange of the columns on the east side of the building, however on the west side the columns are unbraced for their entire length (see photo #10).

For the 2017 addition, the steel bents were analyzed using A572 grade 50 (50 KSI yield strength) steel. All light gage purlins in the 2017 addition were analyzed using A653 SS grade 50 (55 KSI min.) steel. Information regarding 2017 steel members were obtained from the steel shop drawings by 'Package Steel Systems, Inc'.

Results of Analysis:

In the original building, using the design assumptions described previously and loading from the BOCA code, the analysis results show the unbraced west column of the steel bents are overstressed in bending. Otherwise, the steel bents and purlins appear to meet the BOCA 1987 code. Using the loading from the current Code, the

analysis results show the light gage purlins and steel bents are overstressed in bending.

In the 2017 addition, using the design assumptions and current Code loading described previously; the analysis results show the light gage purlins are overstressed in bending. Otherwise, the steel bents appear to meet the requirements of the Code.

Recommendations & Summary

Due to the moisture infiltration from the roof, walls, and at the perimeter along the foundations, the Engineer recommends a waterproofing and/or Building Enclosure expert be engaged to determine the proper course(s) of action.

Due to the extent of rust damage to the 'east base plate' (highlighted in red in Figure 2), the Engineer recommends the affected portion of bent frame, base plate & bolts, and concrete pier be repaired. The Engineer also recommends the existing west baseplate (highlighted in yellow in Fig. 2) receive repairs as needed.

Based on the results of the analysis, it appears additional loading of the structure is not feasible.

860-437-3259
488 Montauk Ave.
New London, CT 06320
info@e2engineers.com
www.e2engineers.com

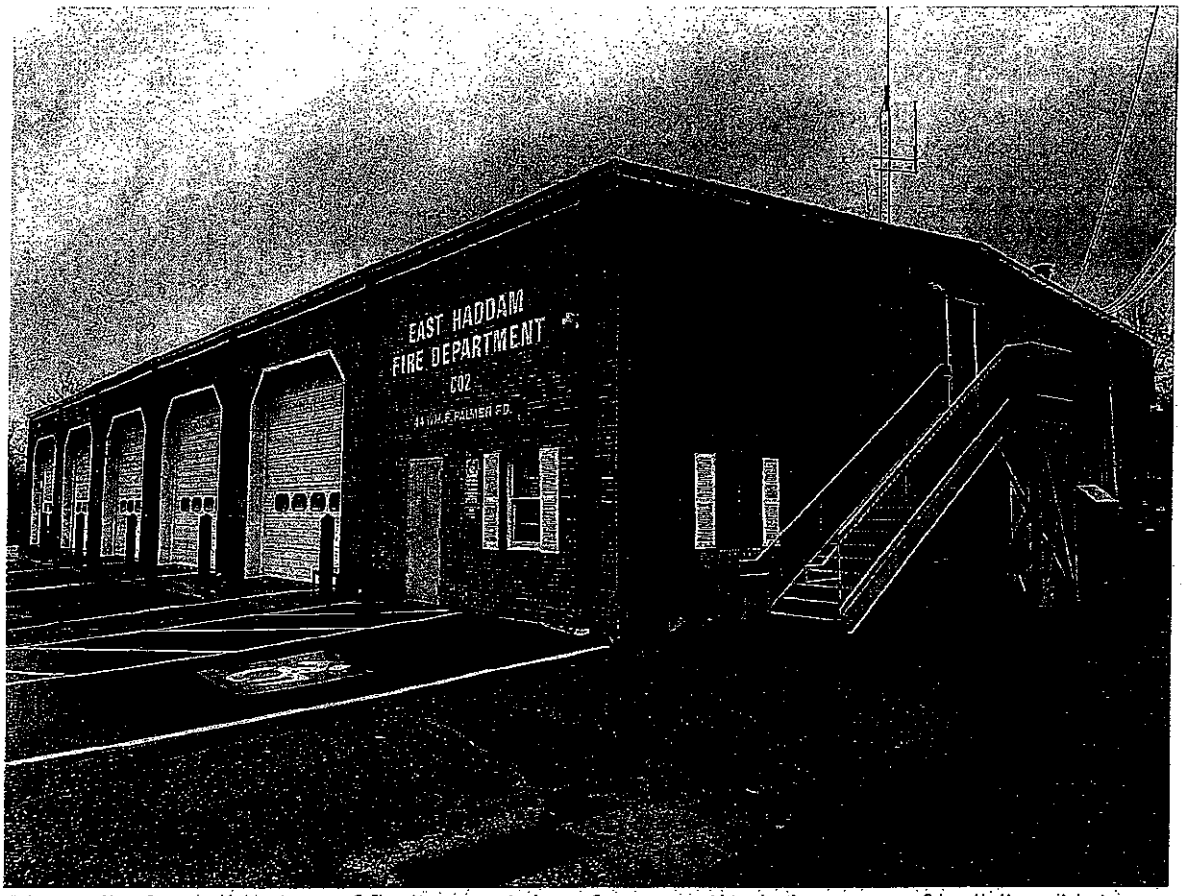


Photo #1: Overall image of firehouse, taken from southwest corner of building. Note: proximity of grade to foundation around perimeter of building.

860-437-3259
488 Montauk Ave.
New London, CT 06320
info@e2engineers.com

www.e2engineers.com

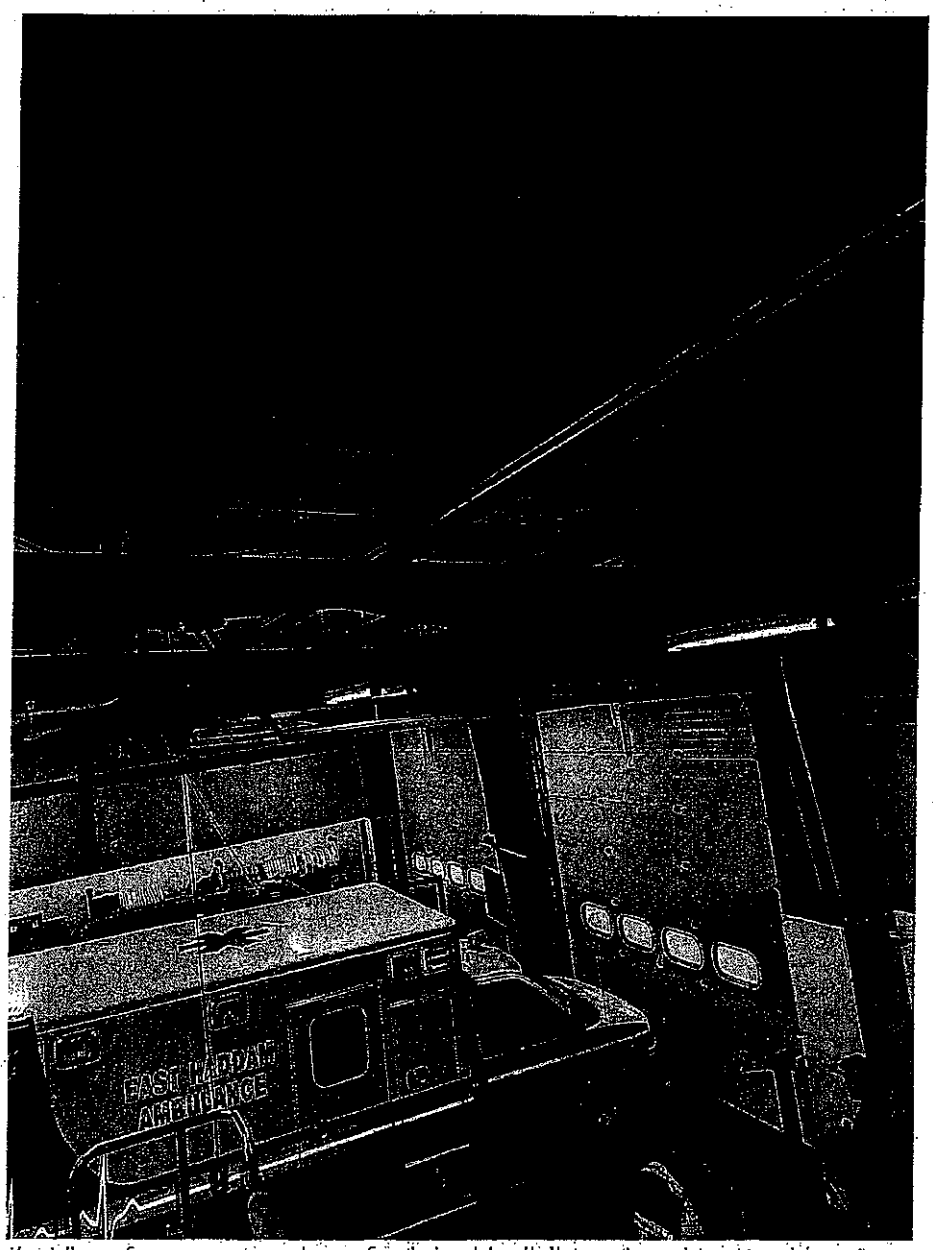


Photo #2: View from mezzanine of original building, showing steel bents and light gage purlins.

860-437-3259
488 Montauk Ave.
New London, CT 06320
info@e2engineers.com

www.e2engineers.com

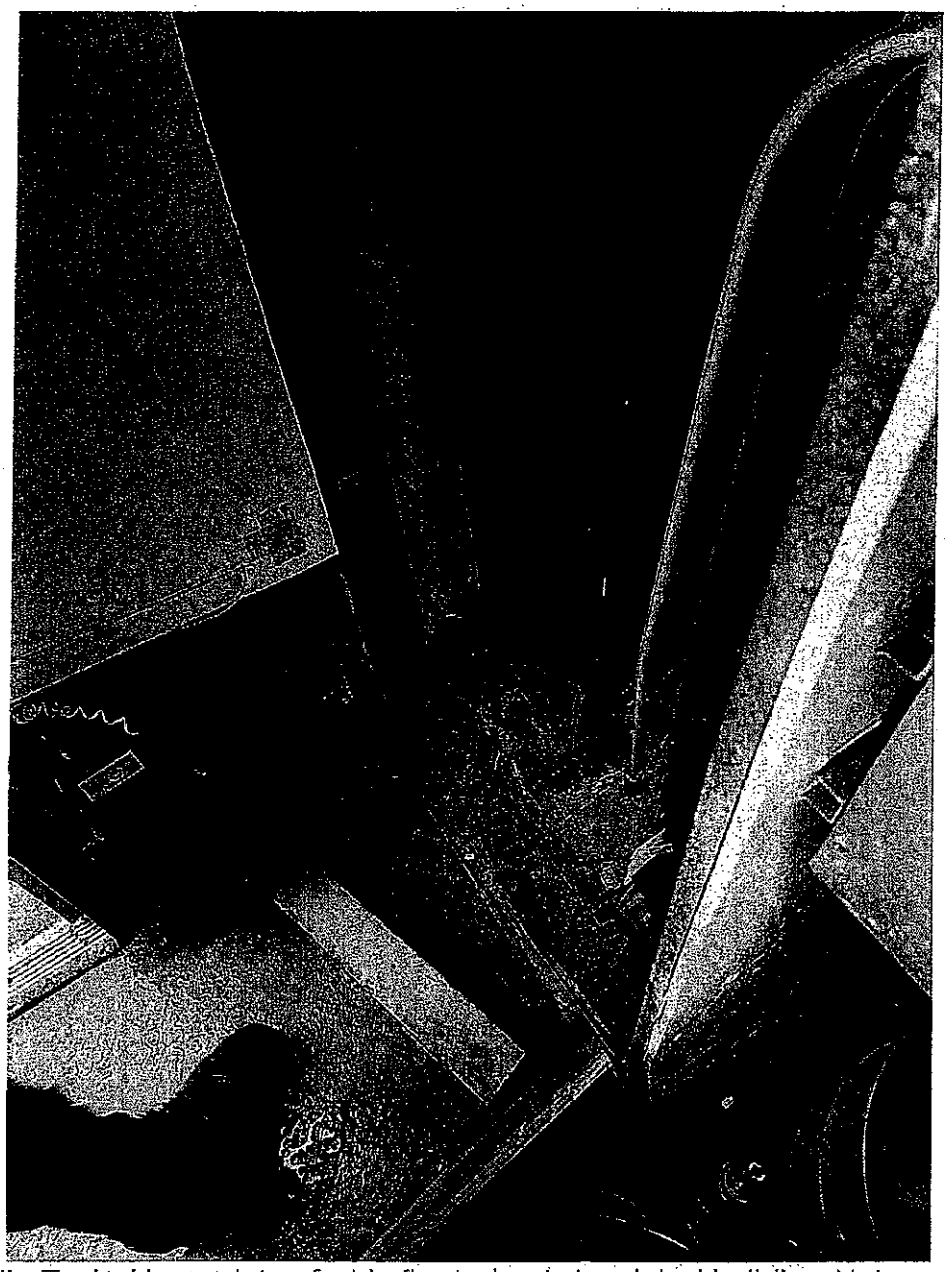


Photo #3: Typical base plate of wide flange bents in original building. Note: moisture wicking through exterior plywood sheathing at floor level.

860-437-3259
488 Montauk Ave.
New London, CT 06320
info@e2engineers.com

www.e2engineers.com

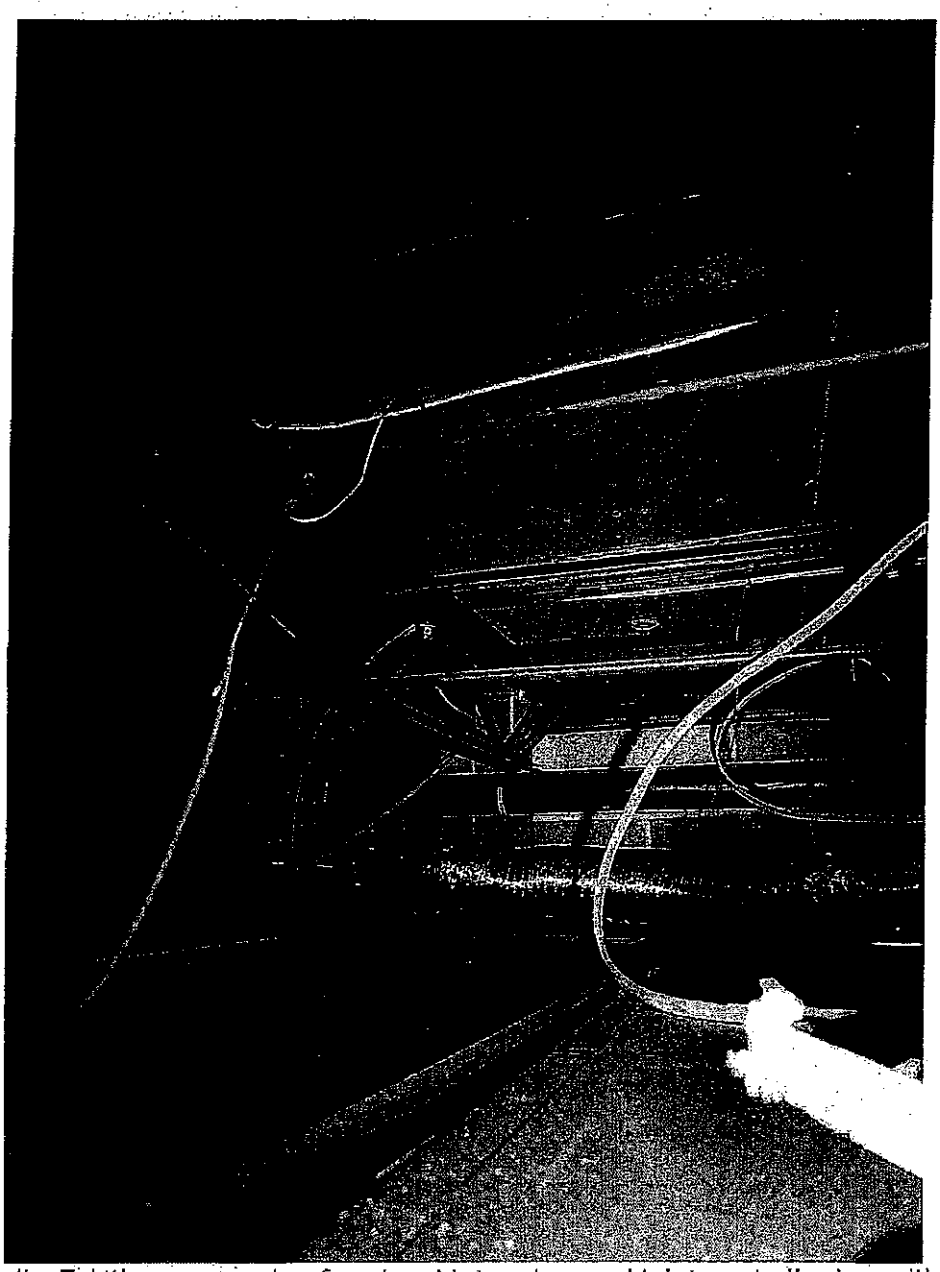


Photo #4: Existing mezzanine framing. Note: plywood joints not aligning with joist locations.

860-437-3259
488 Montauk Ave.
New London, CT 06320
info@e2engineers.com

www.e2engineers.com

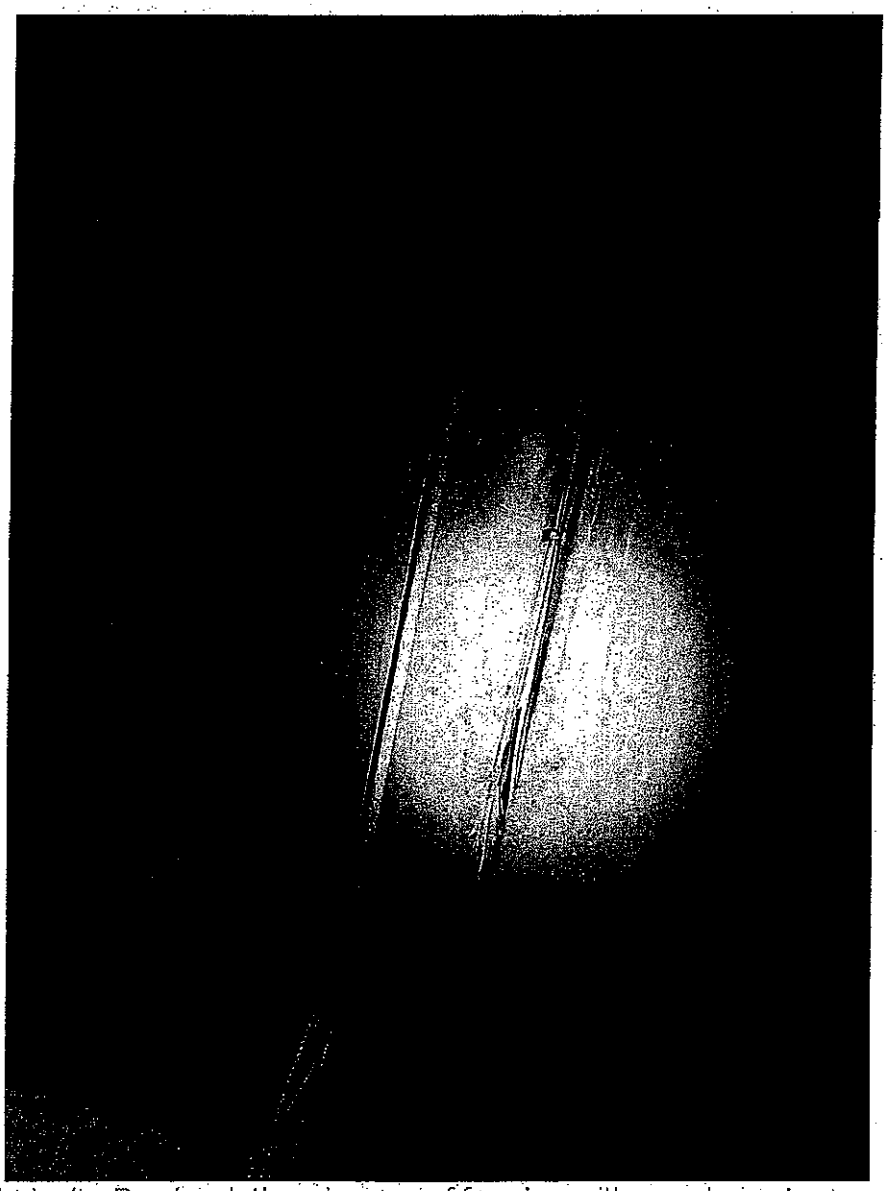


Photo #5: Bag insulation above roof framing with openings at seams.

860-437-3259
488 Montauk Ave.
New London, CT 06320
info@e2engineers.com
www.e2engineers.com

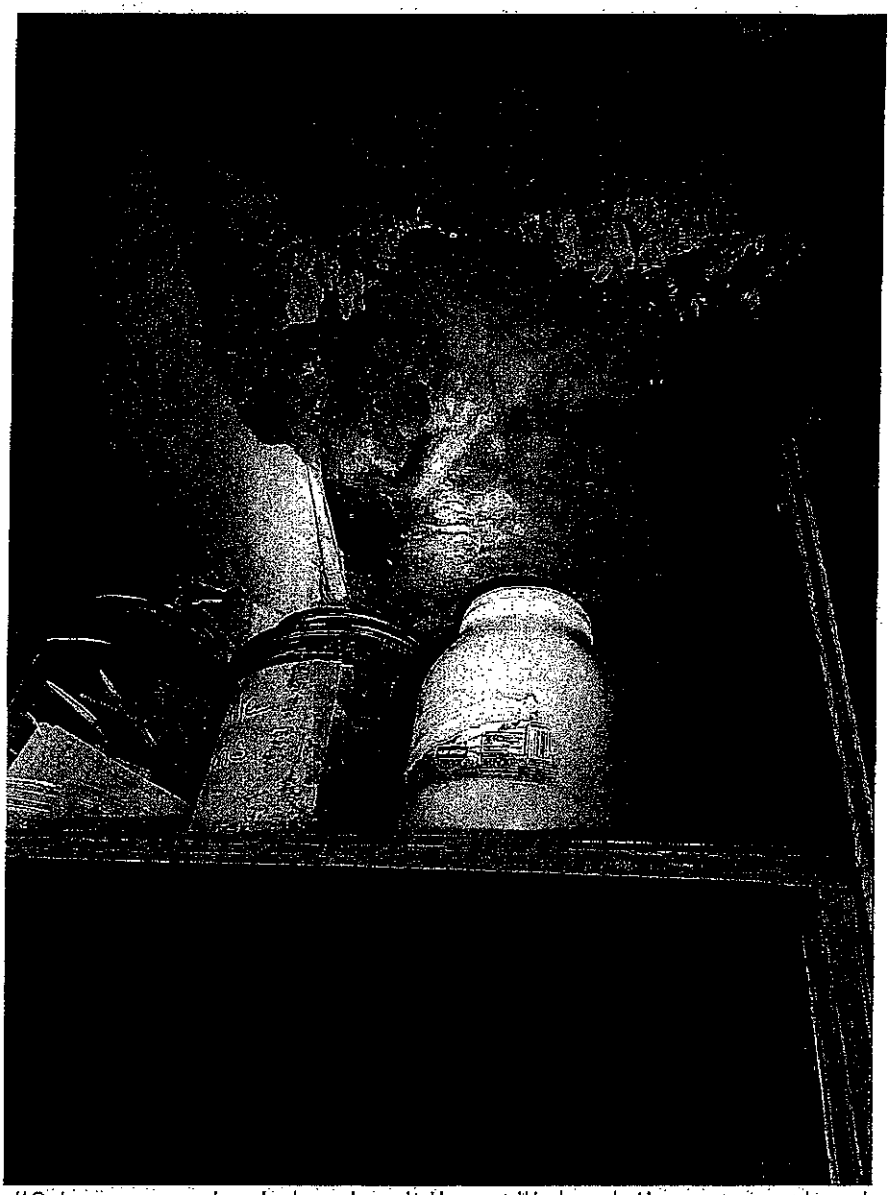


Photo #6: Large opening in bag insulation, with insulation exposed and water actively dripping through.

860-437-3259
488 Montauk Ave.
New London, CT 06320
info@e2engineers.com

www.e2engineers.com



Photo #7: Rusted siding at bottom edge, photo taken at building southwest corner.

860-437-3259
488 Montauk Ave.
New London, CT 06320
info@e2engineers.com
www.e2engineers.com

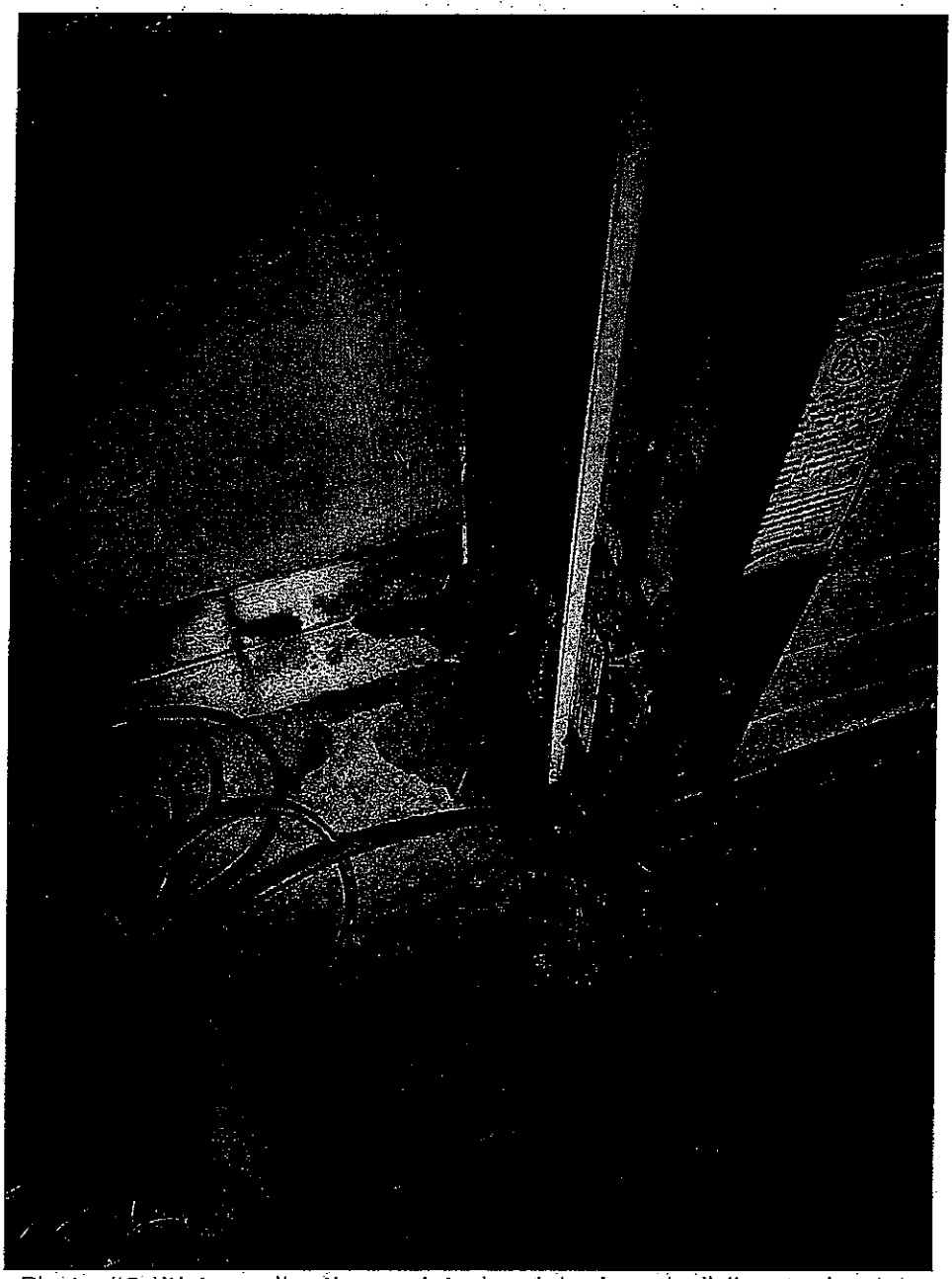


Photo #8: Water collecting on interior slab along building perimeter.

860-437-3259
488 Montauk Ave.
New London, CT 06320
info@e2engineers.com

www.e2engineers.com



Photo #9: Close-up view showing base plate area of bent steel frame along east face of building (fourth bent frame from south)

860-437-3259
488 Montauk Ave.
New London, CT 06320
info@e2engineers.com

www.e2engineers.com

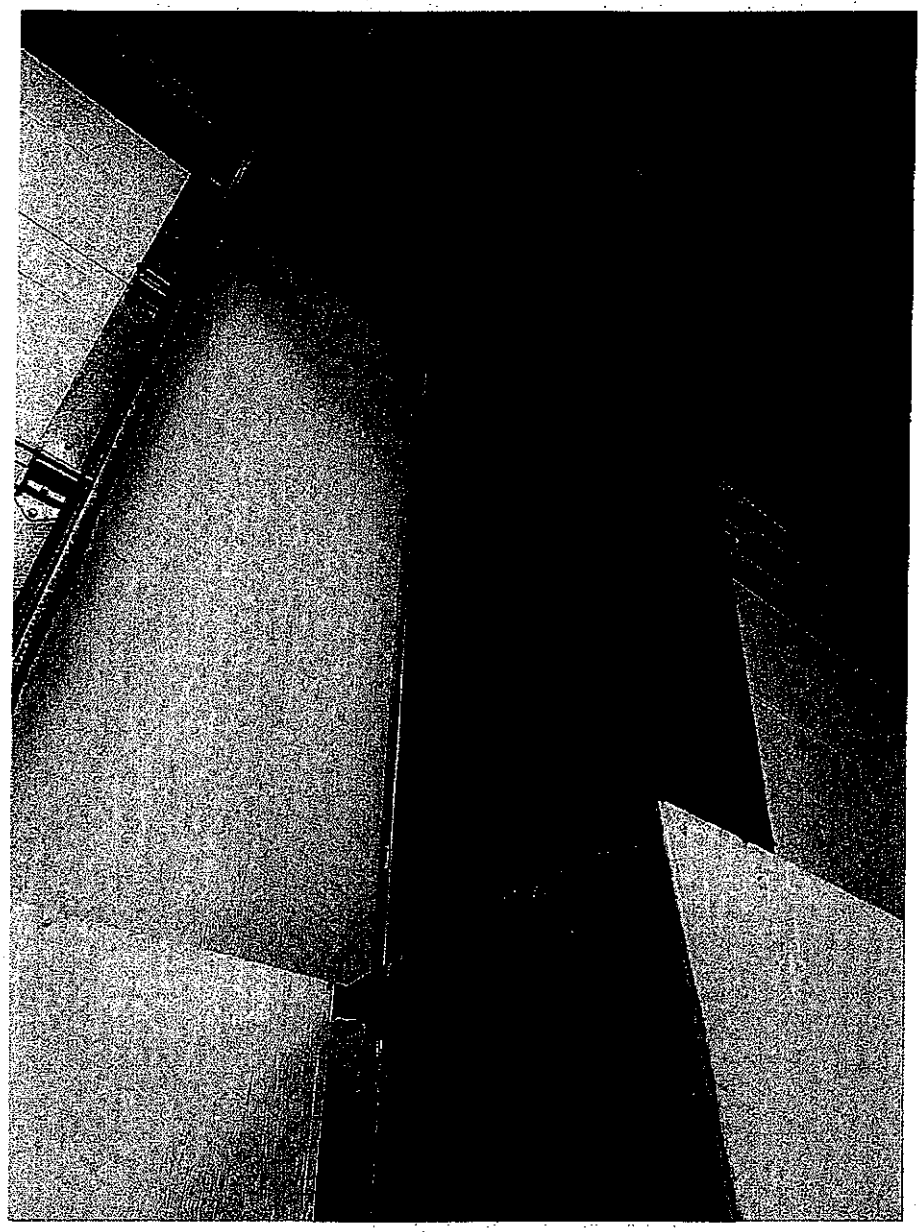


Photo #10: Typical condition of steel column along west wall in 'original building' without any bracing or girts to brace its flange.

860-437-3259
488 Montauk Ave.
New London, CT 06320
info@e2engineers.com

www.e2engineers.com