

Description of the Existing Structures

Given the type of construction the existing building was most likely built in the early 1950's. The building consists of conventional concrete spread footings with concrete foundation walls that extend down to frost depth. The main level is a steel framed floor system with an 8" or 12" concrete flat slab floor. The steel reinforcing in this concrete floor system is unknown. The building given the existence of vertical beam connections is most likely steel framed building with masonry infill walls, however there appear to be some areas where the existing masonry walls are load bearing. In particular the concrete wall in the basement supports the steel floor beams on the main level. The roof structure consists of two 24" deep girder beams that clearspan the apparatus bay portion of the building with 10" and 12" channels that are spaced at approximately 6'-8" on center. The low roof section above the office area is framed with 2x12 wood roof rafters that are spaced at 16" on center. The decking over the apparatus bay is steel wide rib roof deck where as the decking over the low roof office area is wood planking.

The main purpose for this building investigation is to determine if the existing roof structure will be able to adequately support the addition of a pitched wood roof truss roof system as depicted in one of the architectural elevation schemes.

Conclusions / Solutions

The following conclusions were based on the following criteria: The new roof would most likely be a pitched wood roof trusses system with roof trusses spaced at 24" on center, plywood decking, and shingle roofing. The attic area will **NOT** be used for storage or occupied space. The wood roof trusses would bear on the existing masonry bearing walls, and at two intermediate 10" and 12" steel roof channel beams in the existing apparatus bay. In the low roof office area the new pitched roof could either continuously bear on the existing wood roof structure or the truss span could be cut down to bear at four locations. The new state 780 CMR 7th Edition building code was utilized for the most current roof snow loading.

Apparatus Bay Roof Area:

1. Two of the existing 10" channel roof beams would require reinforcing for the new loading. The reinforcing required would be minor in nature. Refer to SKS-1
2. Four of the existing 12" channel roof beams would require reinforcing. The reinforcing required would be minor in nature. Refer to SKS-1
3. The two existing 24" deep steel girders that clearspan the apparatus bay will require to be reinforced to meet the new loading. Only the center 1/3rd of the girder will require reinforcing. The reinforcing could be located in the beam web area to maintain the existing floor to floor clearance. Refer to SKS-1

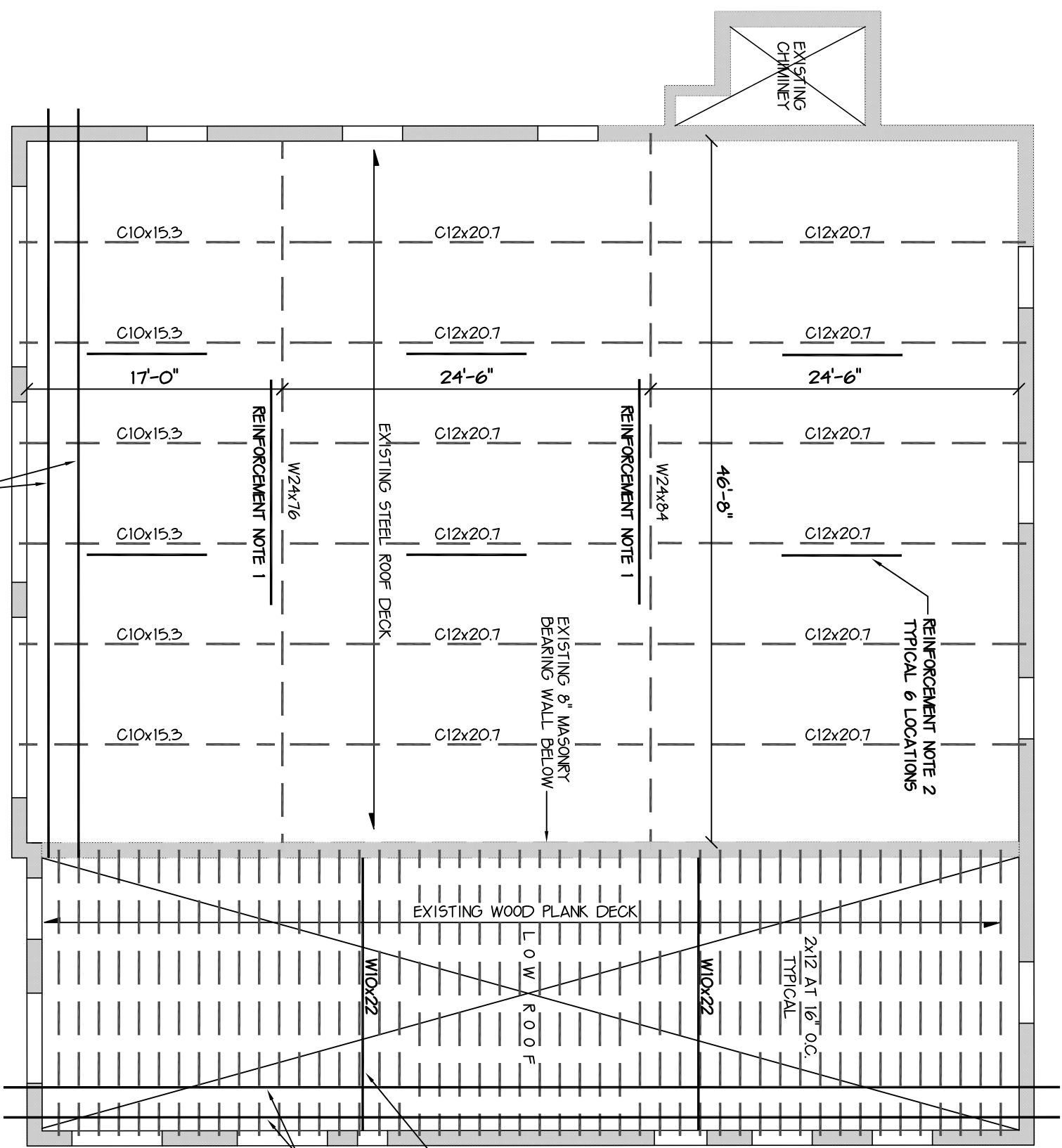
I do not recommend clearspanning the roof over the apparatus bay due to the wind uplift forces that would be required to be resolved in the existing masonry bearing walls. Thus the new wood roof trusses would bear at each masonry bearing wall location and at two intermediate roof beam locations.

Low Roof Office Area:

1. If bearing the new roof trusses continuously on top of the existing wood roof structure: The existing 2x12 wood roof rafters that frame the low roof area will require to be supplemented with additional 2x12's spaced at 32" on center which would then reduce the load on each of the existing 2x12 roof rafters. Otherwise each of the existing 2x12 rafters would require reinforcing.
2. If the new wood roof trusses bear on four points the only additional work that would be required is installing the two interior support beams. This is most likely the most cost effective method.

I do not recommend clearspanning the roof over the low roof office area due to the wind uplift forces that would be required to be resolved in the existing masonry bearing walls.

In closing, the pitched roof scheme is possible from a structural standpoint. However, the existing structure does require reinforcing in certain locations. The extent of the required reinforcing is shown and described on SKS-1.



NEW WOOD ROOF TRUSSES
SPACED AT 24" O.C. ONLY
2 SHOWN FOR CLARITY

REINFORCEMENT NOTE 2
TYPICAL 6 LOCATIONS

REINFORCEMENT NOTE 1

EXISTING 8" MASONRY
BEARING WALL BELOW

EXISTING STEEL ROOF DECK

EXISTING WOOD PLANK DECK

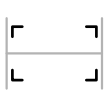
LOW ROOF

2x12 AT 16" O.C.
TYPICAL

NEW W10x22 ROOF BEAMS
2 LOCATIONS

NEW WOOD ROOF TRUSSES
SPACED AT 24" O.C. ONLY
2 SHOWN FOR CLARITY

NOTES:
REINFORCEMENT NOTE 1: REINFORCE MIDDLE THIRD OF W24 BEAMS WITH (2) - L3X3X1/4 WELDED TO THE BEAM FLANGES AS SHOWN



REINFORCEMENT NOTE 2: REINFORCE MIDDLE THIRD OF EXISTING C10 AND C12 BEAMS WITH (2) - 1/4" DIAMETER STEEL RODS WELDED TO THE CHANNEL AS SHOWN



EXISTING ROOF FRAMING PLAN

SCALE: N.T.S.



KAESTLE BOOS
ASSOCIATES, INC.
416 Slater Road, P.O. Box 2590
New Britain, CT 06050-2590
Ph: 860-229-0351 ▲ F: 860-229-5303
325 Robinson Boulevard, Suite 100
Foxborough, MA 02035
Ph: 508-549-9906 ▲ F: 508-549-9907
Pease International Tradeport
One New Hampshire Avenue, Suite 125
Foxborough, MA 02031
Ph: 508-766-1955 ▲ F: 508-766-4955

CONSULTANT:

PROJECT:

HOLDEN POLICE
AND
FIRE STATION

THIS SKETCH TO
BE READ IN
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DOCUMENTS

SKETCH GENERATED FOR:				
ADDENDUM	R.R.F.I.	A.S.I.	P.R.	C.C.D.
-	-	-	-	-

REFERENCE DETAIL/SHEET:

TITLE: EXISTING ROOF
FRAMING PLAN

DATE: August 26, 2008
SCALE: N.T.S.

DRAWN: DJT
PROJECT NO.: 02045.05
DRAWING NO.:
SKS-1