

ABINGTON FIRE STATION FACILITY STUDY

Abington, Massachusetts

Existing Conditions Structural Report - Station No. 2

December 22, 2019 - DRAFT

INTRODUCTION

Foley Buhl Roberts & Associates, Inc. (FBRA) is collaborating with *Kaestle Boos Associates, Inc. (KBA)* in the review and evaluation of Fire Station No. 2 in Abington, MA. The purpose of this *Existing Conditions Structural Report* is to identify and describe the structural systems of the building and to comment on structural issues/conditions observed.

Fire Station No. 2 is located at 5 Rockland Street in Abington, MA. Constructed in 1973, it is a smaller sub-station, housing two firefighters/paramedics and fire apparatus. The overall footprint of the facility is nearly square, comprised of three rectangular wings; including a central, double apparatus section with a high roof and smaller wings with lower roofs on the east and west sides. The east and west wings are adjoined to the central wing with an 18+/- inch wide drainage trough. The drive-through apparatus bays are accessed by overhead doors on the south (front) side of the building. The main entrance to the facility, which leads to the support spaces (office, bathroom, bunks, and utility spaces, etc.), is located at the east wing. A smaller vehicular bay with an overhead door is located at the west wing. A hose drying tower rises above the west wing, partially engaging the west exterior wall. The interior and perimeter walls of each wing are load bearing concrete masonry unit (CMU) wall construction. The building is not sprinklered. Station No. 2 has no Basement. There have been no significant renovations or additions to the building since the original construction.

The age of the high and low roofs is unknown (roofs were not accessed during the FBRA visit). Exterior walls are concrete masonry (CMU) construction with a brick veneer.

Structural conditions at Station No. 2 were briefly reviewed at the site (exposed areas only) by FBRA on November 26, 2019. Roof construction was visible (from below) in most areas.

Original construction documents were not available. No exploratory building demolition or structural materials testing was conducted in conjunction with this review. No subsurface soils information or geotechnical studies/reports were available. Accordingly, comments in this report are based on our visual observations only.

I. STRUCTURAL SYSTEMS DESCRIPTION

Station No. 2 is a one-story building with high and low flat roofs. Roof construction over each wing consists of precast, prestressed concrete plank supported by CMU bearing walls. It appears that there are parapets at limited locations in each wing (and at the hose tower, where a scupper was observed).

First Floor construction appears to be a concrete slab on grade.



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Foundations are unknown, but are assumed to be conventional concrete spread footings.

Structural Materials: No original Structural Drawings were available; however, structural materials commonly used at the time of construction would be as follows:

Concrete:	3,000+/- psi compressive strength
Precast, Prestressed Concrete Plank:	5,000+/- psi compressive strength
Mild Steel Reinforcing:	40,000+/- psi yield strength

Design Live Loads: No original Structural Drawings were available; accordingly, the roof design live (snow) loads are unknown. The construction of this building preceded the release of the Massachusetts State Building code (1st Edition promulgated in 1975); accordingly, while the building may have been designed for nominal wind loads, it was not designed for seismic loads. The building does not meet current code requirements.

Expansion Joints: There are no internal expansion joints in the building.

Roof Construction: High roof construction over the central apparatus bays consists of precast, prestressed concrete plank (thickness unknown), clear spanning the bays (east-west direction; approximately 32 feet) and supported on CMU bearing walls. Steel beams, with six inch square steel tube columns between overhead doors, support the high roof construction at the north and south ends of the central wing.

Low roof construction over the east and west wings is similar to the high roof, with precast, prestressed concrete plank (thickness unknown) clear spanning the wings (east-west direction; approximately 16 feet) and supported on CMU bearing walls.

Original insulation on the bottom surface of the precast roof planks was mostly removed at some point in time after the building was placed into service.

First Floor Construction is assumed to be a soil-supported concrete slab on grade. The thickness of the slab and the reinforcing (if any) are unknown. A continuous, north-south trench drain was provided between the two apparatus bays.

Exterior Bearing Wall Construction is typically concrete block (CMU) and brick veneer construction (8" CMU and a 4" brick veneer). The walls serve as load bearing elements and provide lateral force resistance for wind (and seismic) loads. The presence of reinforcing in these walls could not be determined; however it is expected that they are unreinforced. All CMU wall construction (including the hose tower) is stack bond. A precast concrete accent band was installed at the top of the exterior walls around the perimeter of the center wing. Overhead doors at the north and south ends of this wing are recessed, resulting in soffit conditions.

Original insulation on the inside face of the exterior walls and the inside face of the overhead doors was mostly removed at some point in time after the building was placed into service.

Interior Bearing Walls between each wing are 12" thick CMU construction, and are presumably unreinforced. Interior CMU bearing wall construction is stack bond.

Interior Partitions: Interior partitions at the east wing are 6" CMU construction (stack bond), and are presumably unreinforced.

Subsurface Soils/Foundations: No subsurface soils information was available. Foundations for masonry bearing walls are assumed to be conventional concrete frost wall and concrete spread footing construction.

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Fire Resistance: The precast, precast concrete plank construction has a fire resistance rating of at least one (1) hour. Steel beams and columns supporting the high roof construction at the north and south ends of the center wing have no fire resistance rating, except that which may be provided by the finishes. As previously noted, the building is not sprinklered.

Lateral Load Resistance: Interior and perimeter masonry walls (likely unreinforced) provide lateral force resistance for wind (and seismic) loads; however, the construction details of these walls do not meet current Code requirements.

II. STRUCTURAL CONDITION/COMMENTS

Structural Conditions at Station No. 2 were reviewed at the site (exposed areas only) by FBRA on November 26, 2019. Generally speaking, floor and roof construction (where visible) appears to be in satisfactory condition; there is no evidence of structural distress that would indicate significantly overstressed, deteriorated or failed structural members.

Foundations appear to be performing adequately; there are no signs of significant, total or differential settlements.

Structural/structurally related conditions observed during our site visit are noted below:

1. Soffit construction at the overhead doors of the center apparatus bay wing (north and south ends) is deteriorating and has separated from the bottom of the precast concrete accent band. FBRA recommends that these conditions be examined without further delay, to confirm that adequate anchorage of the soffit construction exists.
2. Normal shrinkage cracking (primarily running in the east-west direction) was observed in the slab on grade at the apparatus bays; these cracks do not present a structural concern.
3. High and low roof areas were not accessed during the site visit; drainage issues were not evaluated (no internal drains were observed). The condition of the roofing at each wing is unknown. Reportedly, roof leakage has been an on-going issue at the facility; particularly where the east and west (low roof) wings meet the central (high roof) apparatus wing. Roofing and flashing conditions at the drainage trough, which adjoins the wings, should be reviewed and repaired. The roof structure and supporting masonry walls should be evaluated in these areas, to determine if any structural deterioration has occurred.
4. The original design snow load is unknown. Snow drift conditions exist where the low roofs of the east and west wings abut the higher, central wing. FBRA recommends that snow drift loading be evaluated in conjunction with a potential future renovation of the building.
5. The exterior brick veneer at the building wings generally appears to be in satisfactory condition; repointing is required in limited areas. Masonry joints at the hose tower; however, are in relatively poor condition -100% repointing is recommended.
6. Steel loose lintels, supporting the brick veneer over windows and doors, exhibit a moderate degree of corrosion. There are no immediate structural concerns; however, all lintels should be cleaned and coated in conjunction with a potential future renovation of the building,

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7. Building exterior walls appear to be relatively plumb.
8. Concrete masonry (CMU) bearing walls (interior and perimeter walls) and interior masonry partitions generally appear to be in satisfactory condition. The condition of the masonry bearing walls where roof leaks have occurred over time should be further examined, as noted above.

End of Existing Conditions Structural Report