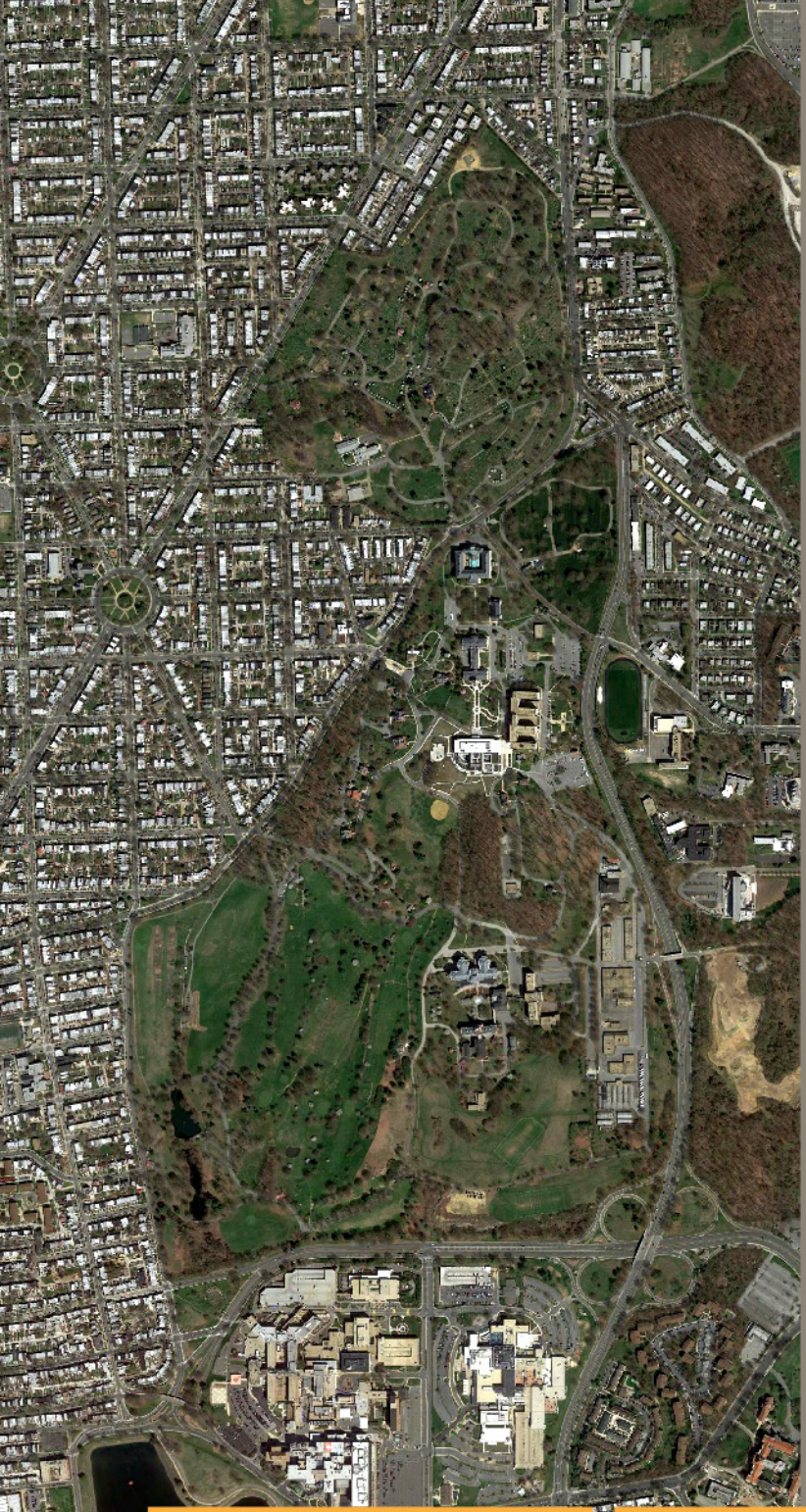


Stantec

General Structural Assessment of Several Structures at the Armed Forces Retirement Home

Barnes Building, Hostess House, Forwood Building, Mess Hall, Mess Hall Corridor, and King Hall

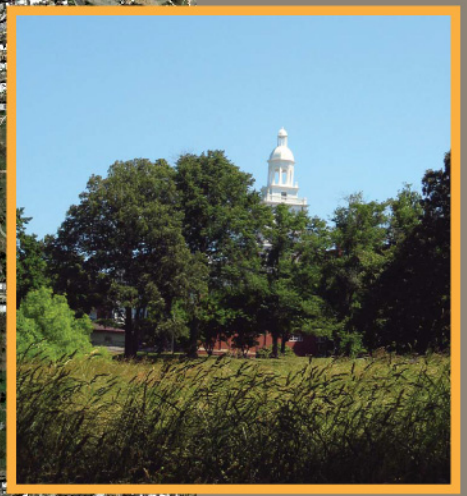
May 30, 2018

Prepared for:

The U.S. General Services Administration on behalf of the Armed Forces Retirement Home

Prepared by:

Stantec Consulting Services Inc.



Sign-off Sheet

This document entitled General Structural Assessment of Several Structures at the Armed Forces Retirement Home was prepared by Stantec Consulting Services Inc. (“Stantec”) for the account of The U.S. General Services Administration on behalf of the Armed Forces Retirement Home (the “Client”). Any reliance on this document by any third party is strictly prohibited. The material in it reflects Stantec’s professional judgment in light of the scope, schedule and other limitations stated in the document and in the contract between Stantec and the Client. The opinions in the document are based on conditions and information existing at the time the document was published and do not take into account any subsequent changes. In preparing the document, Stantec did not verify information supplied to it by others. Any use which a third party makes of this document is the responsibility of such third party. Such third party agrees that Stantec shall not be responsible for costs or damages of any kind, if any, suffered by it or any other third party as a result of decisions made or actions taken based on this document.

Prepared by Shawn Webster

Reviewed by

(signature)

Approved by

(signature)

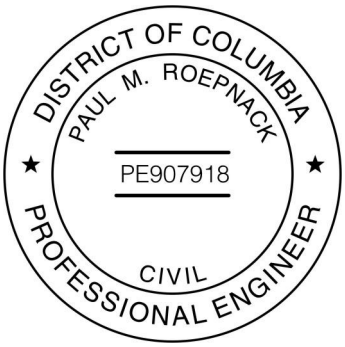


Table of Contents

EXECUTIVE SUMMARY

Stantec Consulting Services Inc. (Stantec) performed a structural assessment of five historic buildings in Zone A of the Armed Forces Retirement Home (AFRH) located at Rock Creek Church Rd. in Washington D.C. The buildings that Stantec investigated consisted of Barnes, Forwood, Hostess House, King Hall, and the Mess Hall (see Figures 1 & 2).

Due to the age of these buildings, which were built in the early 1900's, and the fact that they have been un-occupied for an extensive period; additional engineering, investigation, asbestos abatement, selective demolition, life safety, and architectural code evaluation would be required to ensure safe occupancy.

The results of the structural assessment show that these buildings have structural concerns related to water intrusion, weathering and roof degradation, with some areas needing structural reinforcement and replacement (i.e. wood porches on Forwood). However, because the majority of the structural components, such as the brick load bearing walls, are in good condition these buildings can be renovated and re-used.

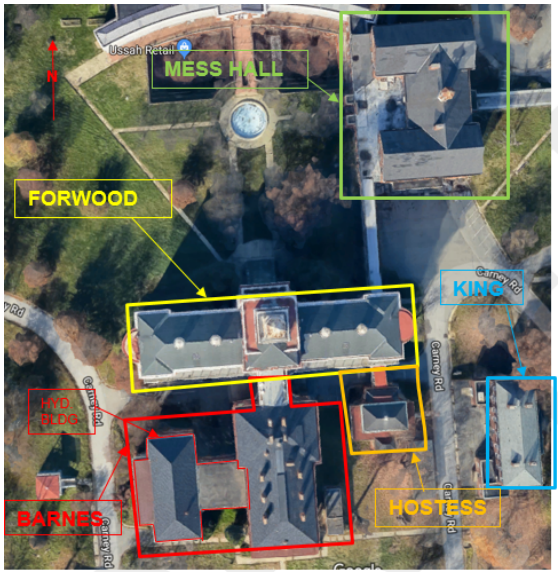


FIGURE 1: SITE KEY PLAN (CREDIT: GOOGLE MAP)

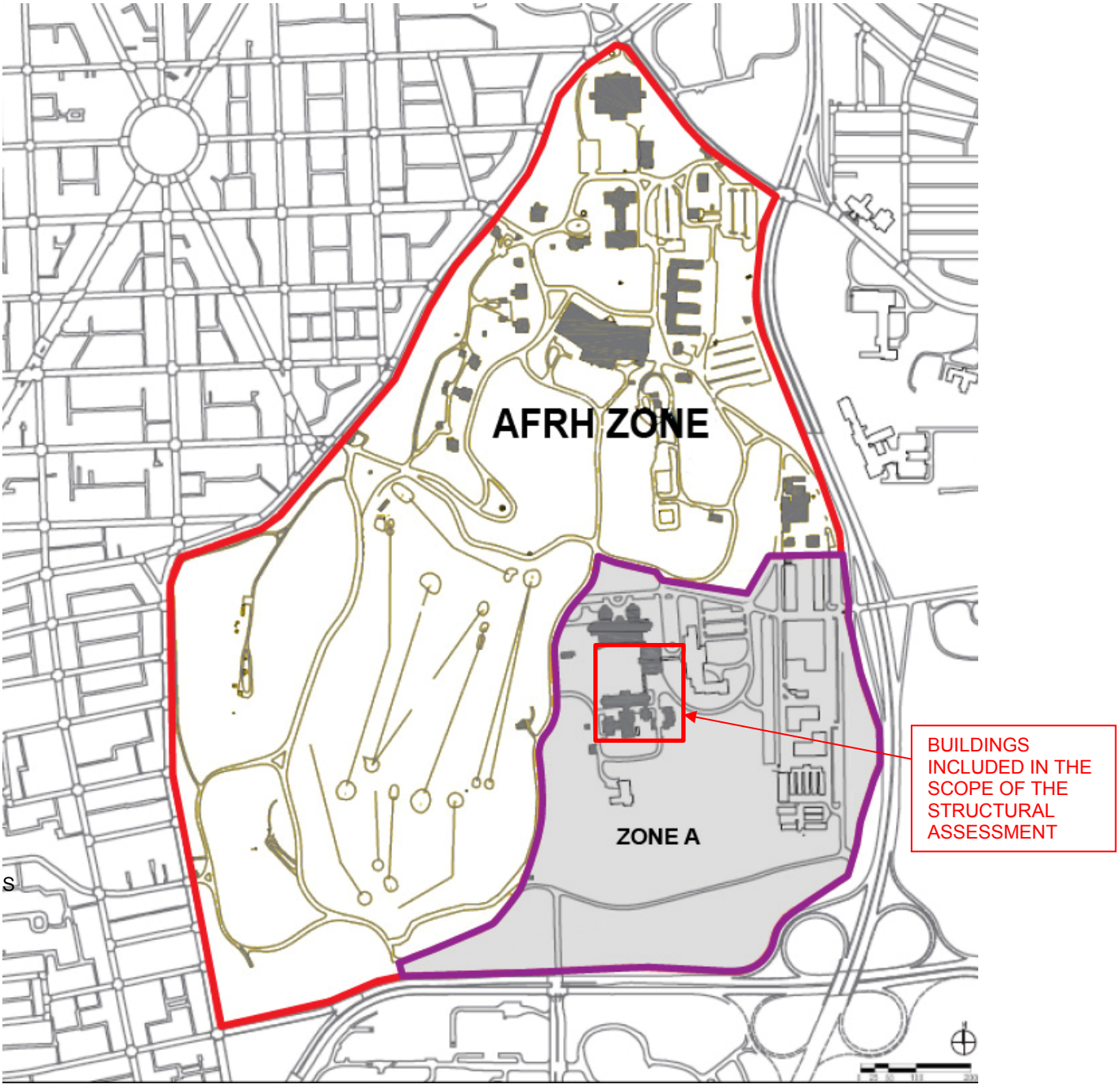


FIGURE 2: AFRH SITE PLAN

1.0 INTRODUCTION

The primary purpose of the general structural assessment is to determine the structural condition of five buildings at the Armed Forces Retirement Home (AFRH). These buildings have not been occupied for an extended period of time. The U.S. General Services Administration (GSA), on behalf of the AFRH, requested Stantec perform a general structural assessment to aid in potential re-development of the buildings. The structural assessment does not include: a load capacity analysis, structural information on every structural member, information on structural members that were not shown on construction drawings or were not accessible during site visits. This document is meant to serve as a general overview of the structural condition of the buildings for preliminary development purposes and should not be used for construction or detailed engineering. The information presented in this document is based on field observations and existing drawings and should be verified in the field.

To start the structural assessment, Stantec conducted an initial site visit on February 13, 2018 to obtain existing construction drawings for review. Stantec has scanned sets of these existing building drawings. Portable document formats (PDFs) of the existing drawings will be provided to the client and can be useful reference material which describes architectural and structural features. After reviewing the existing building drawings, Stantec performed a field investigation of each building. The field investigation conducted on March 5, 2018 consisted of visual inspection, documentation, exploratory non-structural demolition, and performing sounding methods. An additional follow-up field investigation was conducted on April 11, 2018 to gather more information on specific areas.

The following report details the findings of the existing building drawing review and the multiple field investigations of the five buildings.

2.0 AFRH BUILDING DESCRIPTIONS

2.1 BARNES

The first phase of the existing Barnes Building, was constructed before 1906 as an annex on the north elevation of the original Barnes Hospital, which was constructed in 1872. Between 1906 and 1908, a floor was added to the annex, as well as additions to the east, west, and south sides of the building. The existing roof structure appears to date from this phase of construction. Between 1915 to 1916, the Hyrdotherapevtic wing, and a walkway were added to the west side of the Barnes. The original Barnes Hospital, previously located south of the existing Barnes Building, was demolished after 1953. It is unknown if the foundations of the demolished building still exist underground. Barnes has a brick exterior, asphalt shingles, and concrete patios on the east, west, and south sides. The structure of Barnes is composed of wood, steel, concrete and structural tile. Barnes is a four-story building, and including the walkway and additions, each floor is approximately 13,600 square feet. For a detailed description of Barnes structural elements please see Figure 3 and Table 1 below. Figure 4, shown below, shows a cross section through the third-floor porch. See Figure 5 for a cross section showing the third-floor porch support girder. Figures 6,7, and 8 show portions of the floor plan for the first, second, and third floors of the original Barnes Building. Figure 9 shows an elevation of the steel roof truss and Figure 10 shows a shop drawing of the roof support beam. Finally, Figures 11 and 12 show exterior photographs at an interior hallway and inside the Hydrotherapevtic Building.

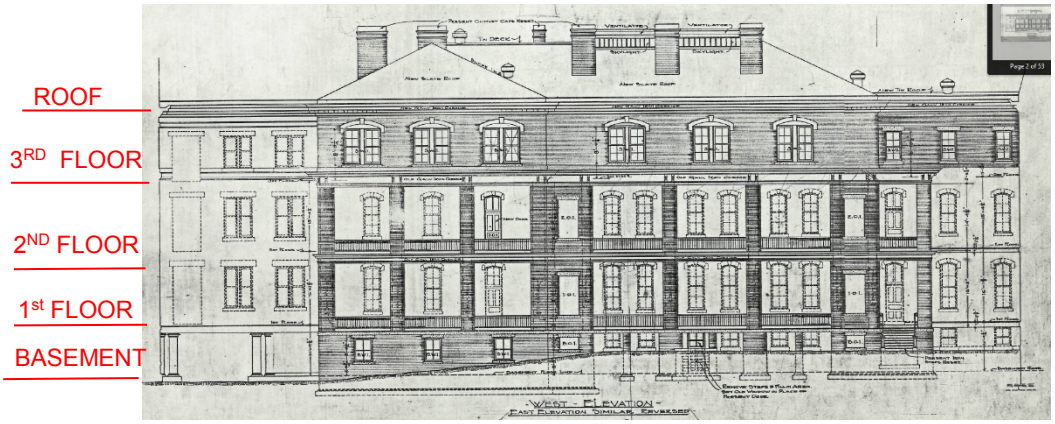
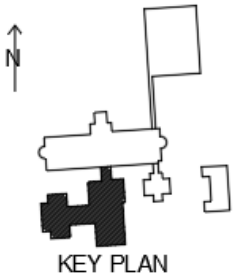
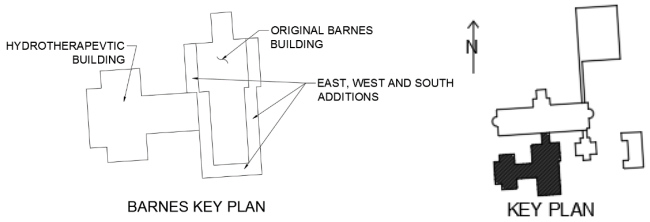


FIGURE 3: WEST ELEVATION: BARNES FLOOR DESIGNATIONS (SEE DRAWING H.5. TITLED “WEST ELEVATION” DATE: UNKNOWN)



Level/Structure Type	Original Barnes Building	East, West, and South Additions	Hydrotherapevtic Building
Footings/Foundation Wall	Information not available	Concrete foundation wall and spread footings	Concrete foundation wall and spread footings
Exterior Bearing Walls and Exterior Columns	Variable Thickness Brick Walls between 18” and 26” thick. Brick wall bumps out to 3’-8” around vents	Brick Columns	Multi-wythe Brick Walls
Interior Bearing Walls	12” thick brick walls with bump outs for vents	N/A	Multi-wythe Brick Walls
Basement	Concrete slab on grade and elevated concrete slab supported by concrete beams	Concrete slab on grade and elevated concrete slab supported by concrete beams	Concrete slab on grade
First	One-way concrete slab bearing on steel beams (10" deep I beam) at 6'-0" and 6'-6" spacing	One-way concrete slab (span varies) bearing on 19" x 5 1/2" concrete beam. Concrete beam bears on brick wall/column	4"/5"/8" depths structural tile with 2 1/2" to 3" of concrete topping
Second	Steel beams (see below) with infill structural clay tile 10” beams at 6'-6" spacing, 15” beams at 6'-0" spacing, 8” beams at 5'-0" and 6'-0"	One-way concrete slab supported by shelf angles and 12" Steel beam. Steel beam attaches to steel columns embedded in brick.	4"/5"/6" depths structural tile with 2 1/2" concrete topping
Third	Steel beams (see below) with infill structural clay tile 10” beams at 6'-6" spacing, 15” beams at 6'-0" spacing, 8” beams at 5'-0" and 6'-0"	12" Structural Tile with 2 1/2" concrete topping	N/A
Roof	Multiple sloped steel beams supporting a concrete deck. Hangers from roof beams support suspended ceiling.	Information not available	Wooden trusses and 4"x10" wooden purlins supporting wooden boards and slate roof

TABLE 1: BARNES STRUCTURAL ELEMENTS



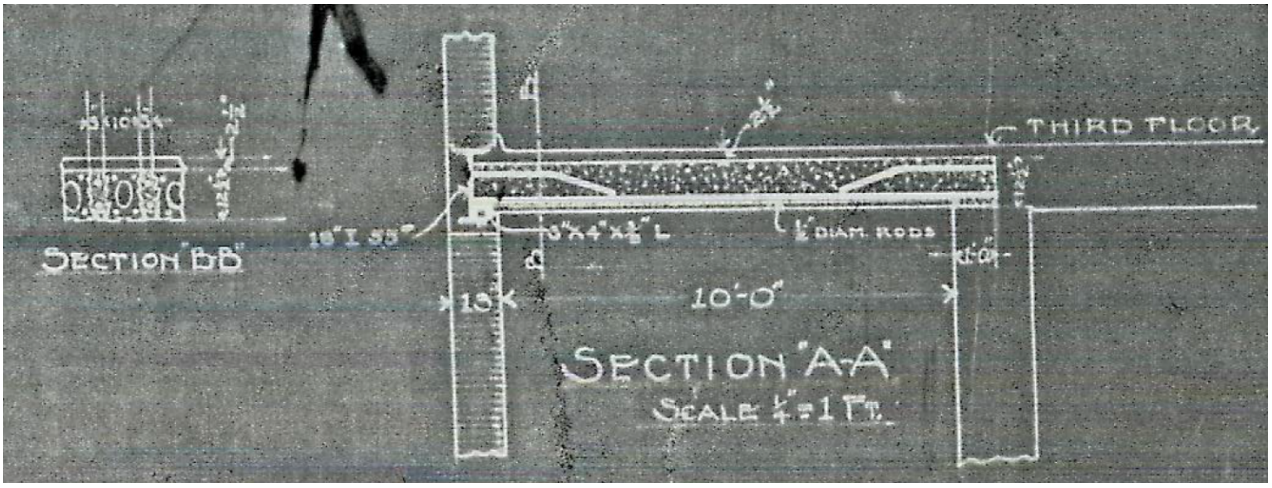


FIGURE 4: SECTION THROUGH THIRD FLOOR PORCH ADDITION SHOWING STRUCTURAL TILE AND TIE RODS (SEE DRAWING H.10. TITLED “REINFORCED CONCRETE CONSTRUCTION THIRD STORY” 1906)

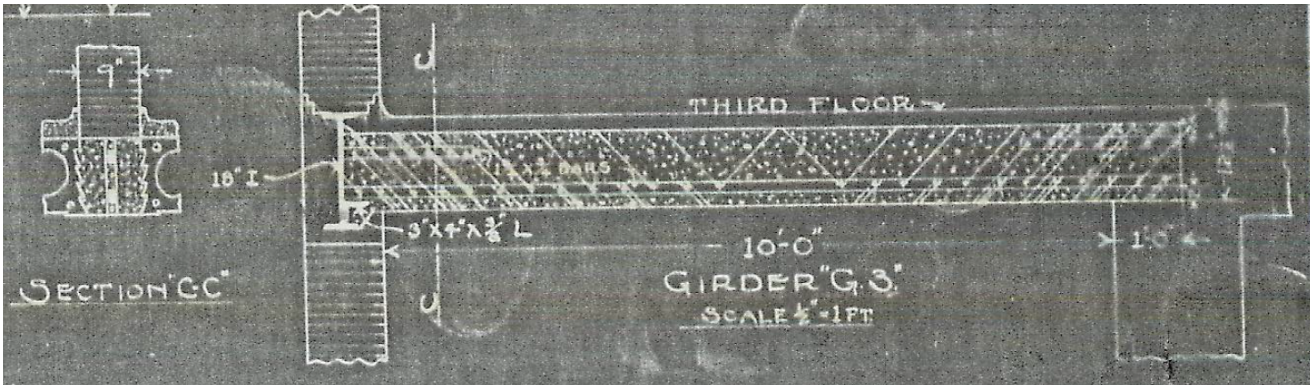
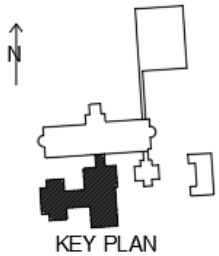


FIGURE 5: PORCH SUPPORT GIRDER AT THIRD FLOOR SHOWING CONCRETE BEAM SANDWICHED BETWEEN STRUCTURAL TILE. THE CONCRETE BEAM IS REINFORCED WITH TOP AND BOTTOM BARS CONNECTED BY INCLINED STIRRUPS (SEE DRAWING H. 10. TITLED “REINFORCED CONCRETE CONSTRUCTION THIRD STORY” 1906)



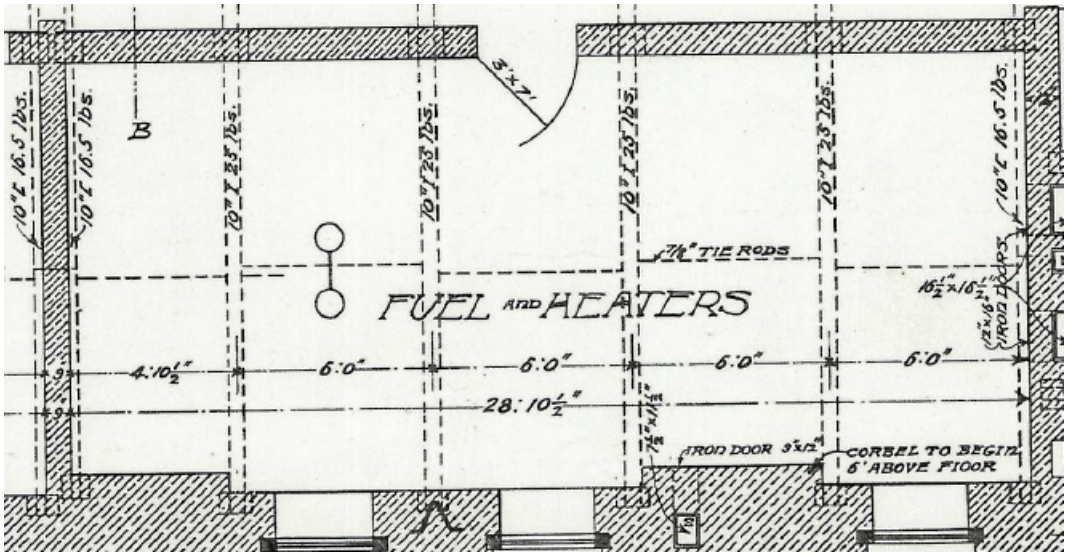


FIGURE 6: FRAMING FOR 1ST FLOOR ABOVE FUEL AND HEATERS ROOM SHOWING 10" I 25 LBS BEAMS AND 7/8" TIE RODS SUPPORTING ONE WAY CONCRETE SLAB (SEE DRAWING TITLED "BASEMENT PLAN SHOWING FRAMING FOR FIRST FLOOR" DATE: UNKNOWN)

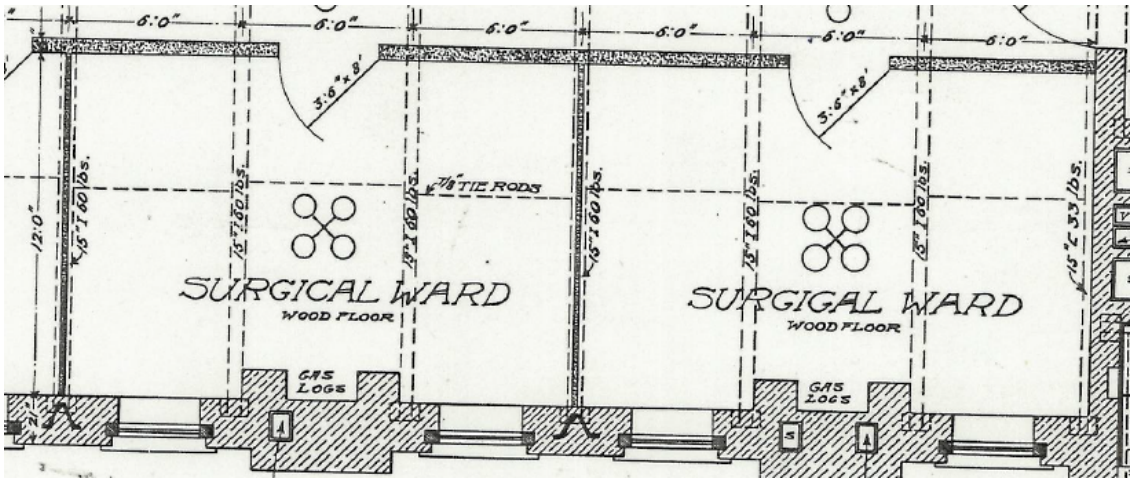
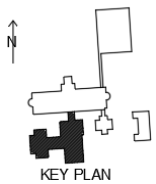


FIGURE 7: FRAMING FOR SECOND FLOOR AT SURGICAL WARD SHOWING WOOD FLOOR SUPPORTED BY 15" I 60 LBS STEEL BEAMS (SEE DRAWING TITLED "FIRST FLOOR PLAN SHOWING FRAMING FOR SECOND FLOOR PLAN" DATE: UNKNOWN)



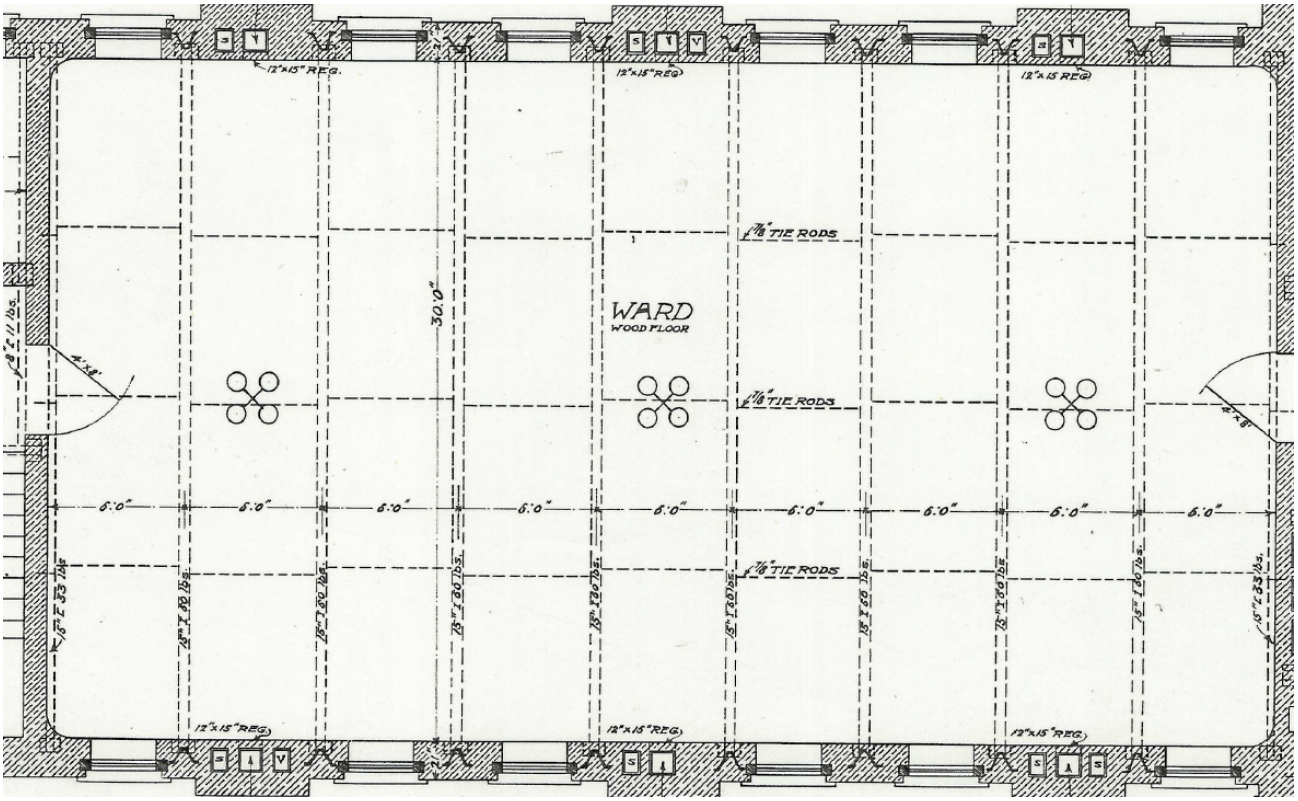
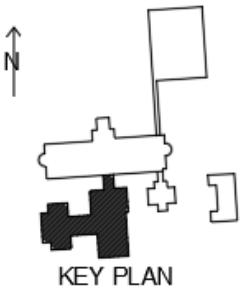


FIGURE 8: THIRD FLOOR FRAMING AT WARD SHOWING WOOD FLOOR SUPPORTED BY 15" I 60 LBS STEEL BEAMS (SEE DRAWING TITLED "SECOND FLOOR PLAN SHOWING FRAMING FOR THIRD FLOOR" DATE: UNKNOWN)



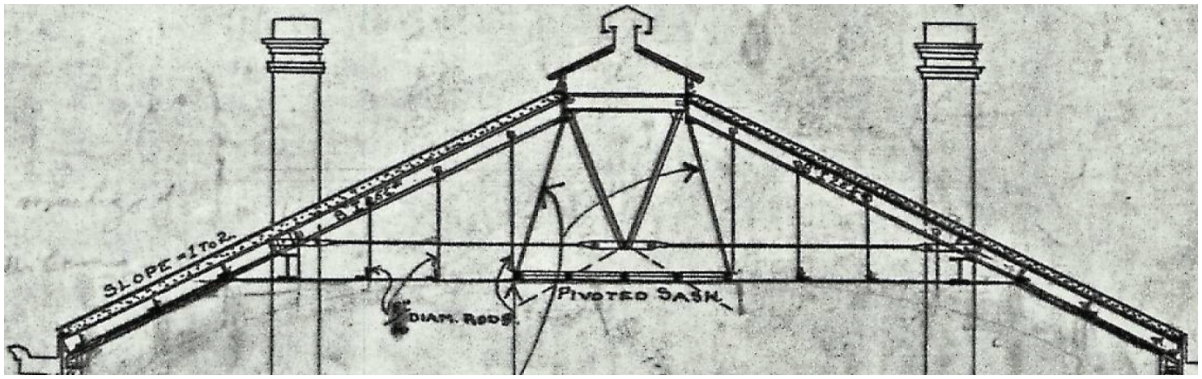


FIGURE 9: SHOWING BARNES CONCRETE ROOF SUPPORTED BY 8" I 25.25 LBS STEEL BEAMS. ALSO SHOWN IS DROP CEILING STEEL ROD STRUCTURE (SEE SECITON A-A ON DRAWING TITLED "PLAN OF CEILING FRAMING THIRD STORY" 1906)

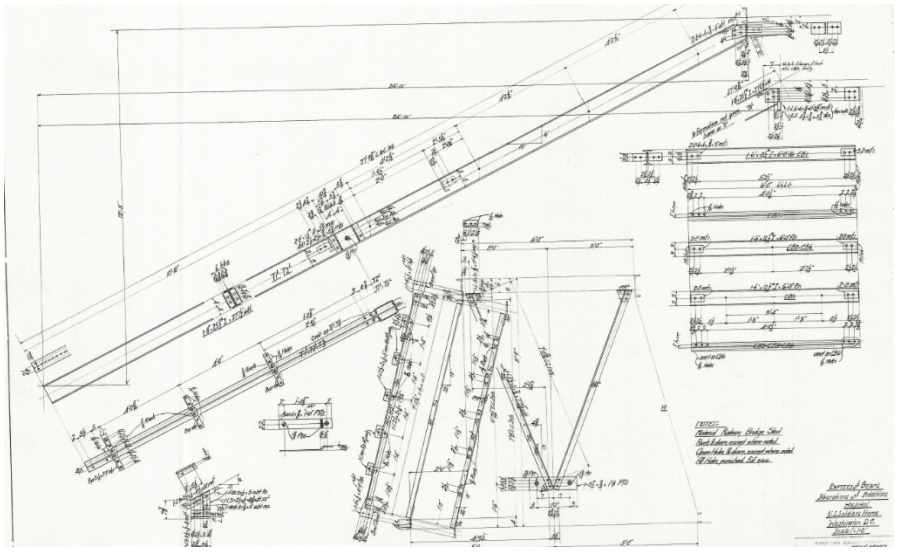


FIGURE 10: SHOP DRAWING FOR BARNES STEEL ROOF SUPPORT BEAM (8" I 25.25 LBS) SHOWING CONNECTION DETAILS, BOLT SIZES, AND HANGER SIZES (SEE DRAWING TITLED "RAFTERS AND BEAMS ALTERATIONS AND ADDITIONS" MAY, 14 1907)

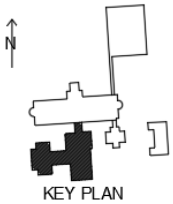


FIGURE 11: BARNES EXTERIOR AT SOUTHEAST CORNER

FIGURE 12: BARNES EXTERIOR ON EAST SIDE

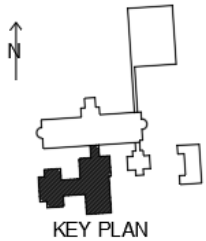
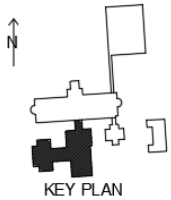


FIGURE 13: INTERIOR BARNES HALLWAY

FIGURE 14: INTERIOR OF HYDROTHERAPEVTIC BUILDING (BARNES)



2.2 FORWOOD

The Forwood Building was built in 1906 and a clock tower was added in 1920. The original roof under the clock tower was not demolished and still exists under the clock tower. Forwood has a brick exterior, asphalt shingle, multiple exterior wooden cornice columns at the front entrance, and a semi-circle solarium on the east and west sides. Forwood is a four-story building, not including the clock tower which extends approximately 80 ft. above the roof edge and has multiple levels and platforms. Each floor in the original Forwood Building is approximately 10,600 square feet. The main structure for the floors (floors 1 through 4) consists of structural clay (clay tiles grouted together and then post tensioned with a tie rod). The structural clay tile is brittle and can break easily when trying to attach bolts. See Appendix A.1 for more information on structural clay tile. Figure 15, below, shows the floor designations that correspond with the structural call outs in Table 2. Figure 16 shows the support beams that support the ceiling in the ward and Figure 17 shows the clay structural tile ceiling. Finally, Figure 18 and Figure 19 show general elevations of Forwood's exterior walls.

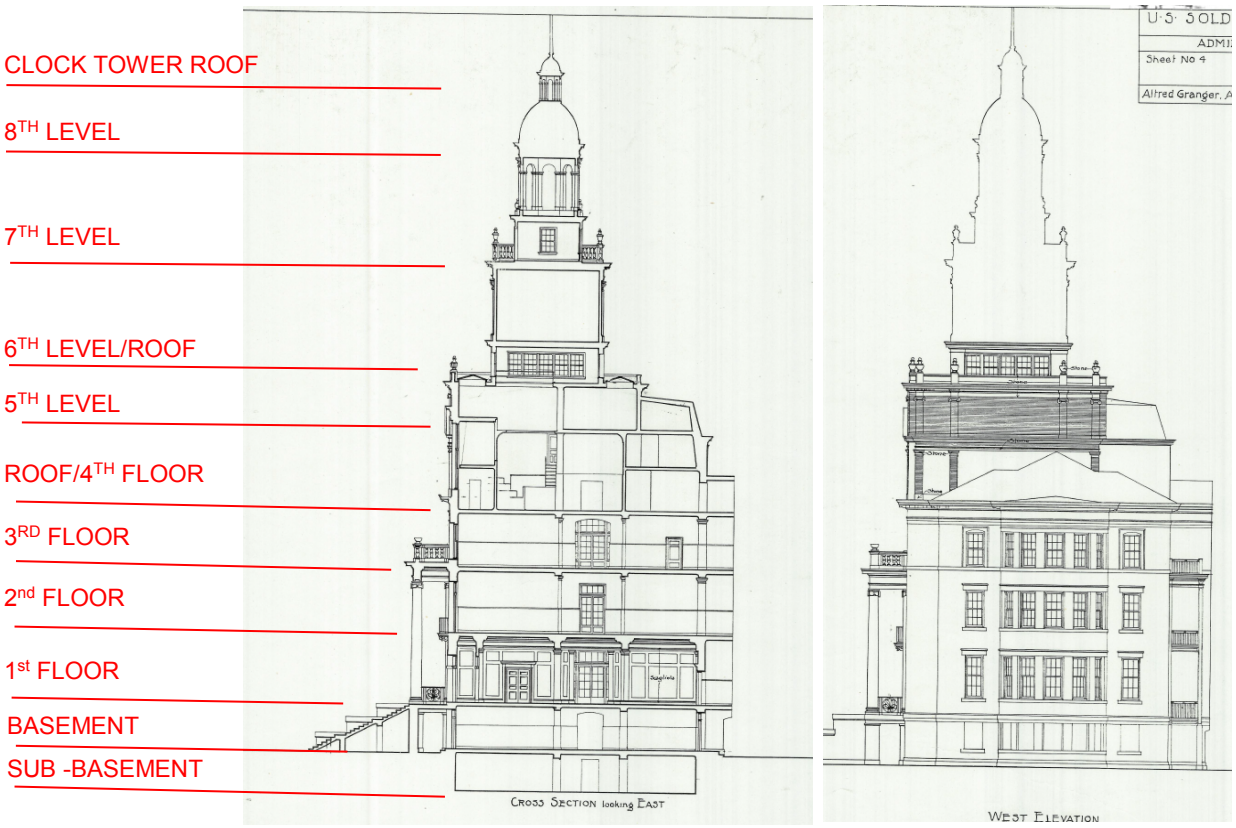
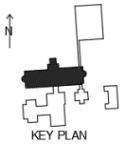


FIGURE 15: FORWOOD FLOOR/LEVEL DESIGNATIONS (SEE DRAWING TITLED "U.S. SOILDERS HOME ADMINISTRATION BUILDING" OCTOBER 21, 1919)



Level/Structure Type	Forwood Building	Clock Tower
Footings/Foundation Walls	Information not available	N/A
Exterior Bearing Walls	18" – 22" Thick Brick Wall	Wood Structure
Interior Bearing Walls/Columns	Information not available	N/A
Sub-Basement	Information not available	N/A
Basement	Information not available	N/A
First Floor	Structural clay tile supported by steel/concrete beams	N/A
Second Floor	Structural clay tile supported by steel beams	N/A
Third Floor	Structural clay tile supported by steel/concrete beams and load bearing walls	N/A
Roof/Fourth Floor	Structural clay tile supported by steel/concrete beams and load bearing walls	
Fifth Level	Structural clay tile supported by steel/concrete beams and load bearing walls	N/A
Sixth Level/Roof	N/A	Wood structure
Seventh Level	Wooden Structure	Wood Structure
Eighth Level	N/A	Wood Structure
Clock Tower Roof	N/A	Wood structure

TABLE 2: FORWOOD STRUCTURAL ELEMENTS

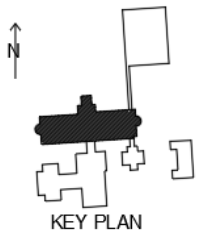


FIGURE 16: FORWOOD SUPPORT BEAMS

FIGURE 17: STRUCTURAL TILE FLOOR

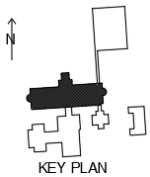
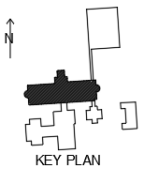


FIGURE 18: FORWOOD EXTERIOR AT NORTH SIDE

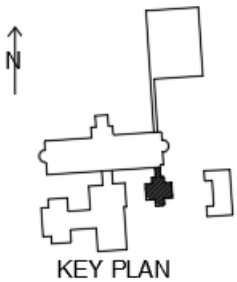
FIGURE 19: FORWOOD EXTERIOR AT SOUTH WEST CORNER



2.3 HOSTESS HOUSE

The Hostess House was built between 1907 and 1908. The Hostess House includes a bridge that connects the Hostess House to the Forwood building. The Hostess House has a brick exterior and a covered porch on the east, west, and south sides. The building is a two-story building with each floor, including the porches, having approximately 2000 square feet. Figure 20, shown below, shows the floor designations that correspond with the structural call outs in Table 3. Figures 21 through 24 show exterior shots of the Hostess House. Figure 25 shows the support beams for the first floor, and Figure 26 shows the interior of the Hostess House on the first floor.

FIGURE 20: HOSTESS HOUSE FLOOR DESIGNATIONS



Level/Structure Type	Hostess House	Hostess House to Forwood Walkway
Footings/Foundation Walls	Information not available	N/A
Exterior Bearing Walls/Columns	18” Brick Bearing Walls	8” Brick Bearing Walls and 8” deep steel columns
Basement	Information not available	N/A
First Floor	Wood floor supported by steel beams	4" of concrete bearing on 18” steel beam
Roof	Wood rafters	Concrete slab supporting wood framing

TABLE 3: HOSTESS HOUSE STRUCTURAL ELEMENTS

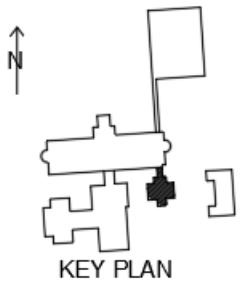


FIGURE 21: HOSTESS HOUSE EXTERIOR AT EAST SIDE

FIGURE 22: HOSTESS HOUSE EXTERIOR AT SOUTHWEST CORNER

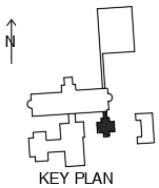


FIGURE 23: HOSTESS HOUSE ROOF AT WEST SIDE

FIGURE 24: HOSTESS HOUSE EXTERIOR AT NORTH WEST CORNER

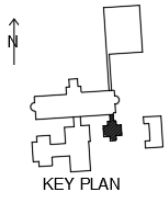
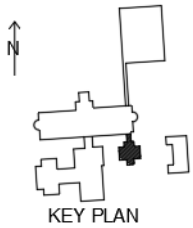


FIGURE 25: HOSTESS HOUSE FIRST FLOOR SUPPORT BEAMS

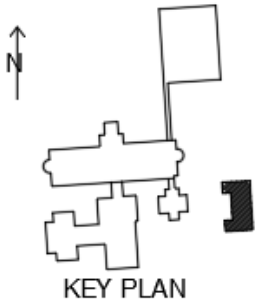
FIGURE 26: HOSTESS HOUSE INTERIOR



2.4 KING HALL

King Hall was built between 1916 and 1917. A car shelter was added west of King hall in 1983. King Hall has an all brick exterior and a covered porch on the eastern side, and an asphalt shingle roof. King Hall is a three-story building with each floor being approximately 3000 square feet. Figure 27, shown below, shows the floor designations that correspond to the structural call-outs in Table 4. Figures 28 and 29 show exterior pictures of King Hall and Figure 30 shows an interior hallway photograph.

FIGURE 27: KING HALL FLOOR DESIGNATIONS



AFRH BUILDING DESCRIPTIONS

Level/Structure Type	King Hall Building
Footings/Foundation Wall	Information not available
Exterior Bearing Walls	Brick Bearing Walls
Interior Bearing Walls	Brick Bearing Walls
First Floor	Wood joists
Second Floor	Wood joists
Third Floor	Wood joists
Roof	Wood rafters supporting wood planks

TABLE 4: KING HALL STRUCTURAL ELEMENTS

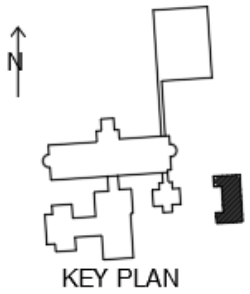


FIGURE 28: KING HALL EAST SIDE

FIGURE 29: KING HALL ROOF AT WEST SIDE

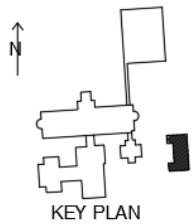
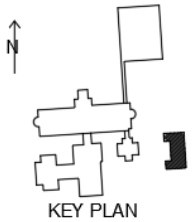


FIGURE 30: KING HALL INTERIOR HALLWAY



2.5 MESS HALL

The Mess Hall was built in 1920. Corridors were built on the north and south sides of the Mess Hall to provide interior access to Forwood and a building to the north of the Mess Hall. The original LaGarde Building, located north of the Mess Hall was demolished and replaced with the existing LaGarde Building in the 1990s. When the new building was built, the north corridor to the Mess Hall was substantially demolished. An additional corridor was added on to the Mess Hall to connect to the Pipes Building to the east. The new corridor, on the east side of the Mess Hall, was not included in the scope of this assessment. The Mess Hall has a brick exterior, asphalt shingle roof, and a wooden decorative tower on the roof. The corridors have a flat membrane roof. The Mess Hall has a large dining hall and an equally large auditorium featuring a curved drop ceiling with a clear span of approximately 40 feet. The first floor structure of the Mess Hall consists of steel florestyle pan supports and concrete. This floor system was common in the early 1900's and is similar to steel decks, such as vulcraft, that are common in new construction. The Mess Hall is a two-story building with each floor having approximately 14,000 square feet. Figure 31, shown below, shows the floor designations that correspond with the structural call-outs in Table 5. Figure 32 shows a wall section which shows the structural florestyle pan supports as well as wood support beams at the entrance. Figures 33 through 35 show exterior photographs of the Mess Hall, and Figure 36 shows the Mess Hall cafeteria.

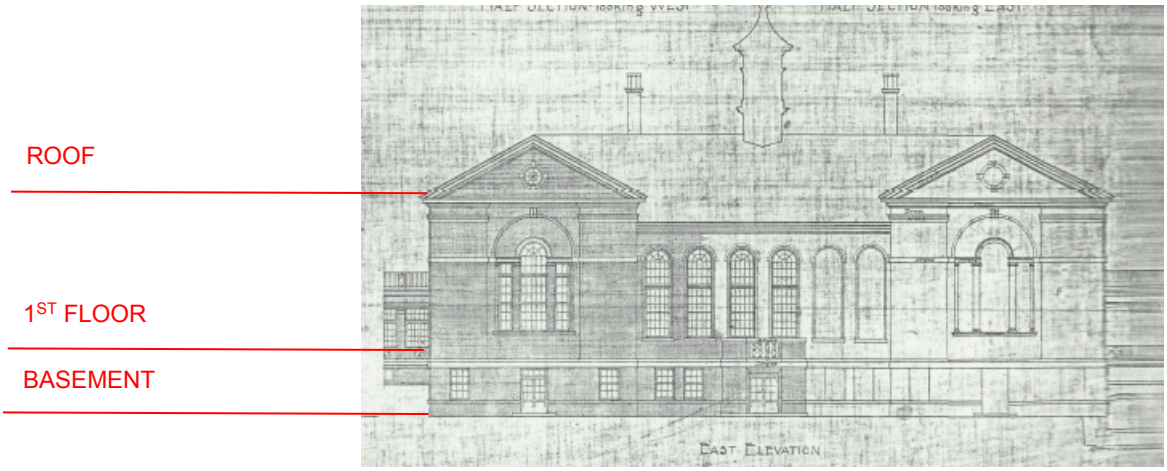
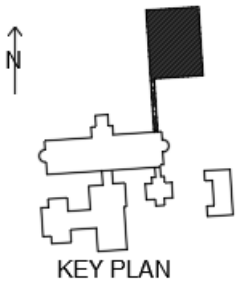
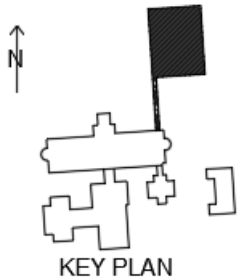


FIGURE 31: MESS HALL FLOOR DESIGNATIONS (SEE DRAWING "DINING HALLS" OCTOBER 21, 1919)



Level	Mess Hall
Footings/Foundation Wall	3'-6" square concrete footings 12" thick with ½" diameter bar 9" spacing each way. Concrete foundation wall.
Exterior Bearing Walls	Brick Bearing Walls
Interior Bearing Walls/Columns	12" square concrete columns with 4 ¾" diameter bars in basement 21" thick concrete load bearing walls in basement. Brick Interior bearing walls after first floor.
Basement	Slab on grade
First Floor	One-way slabs with florestyle steel pan supports
Roof	Wooden trusses over dining hall and auditorium. 2x10 and 2x12 at terrace and entrance

TABLE 5: MESS HALL STRUCTURAL ELEMENTS



KEY PLAN

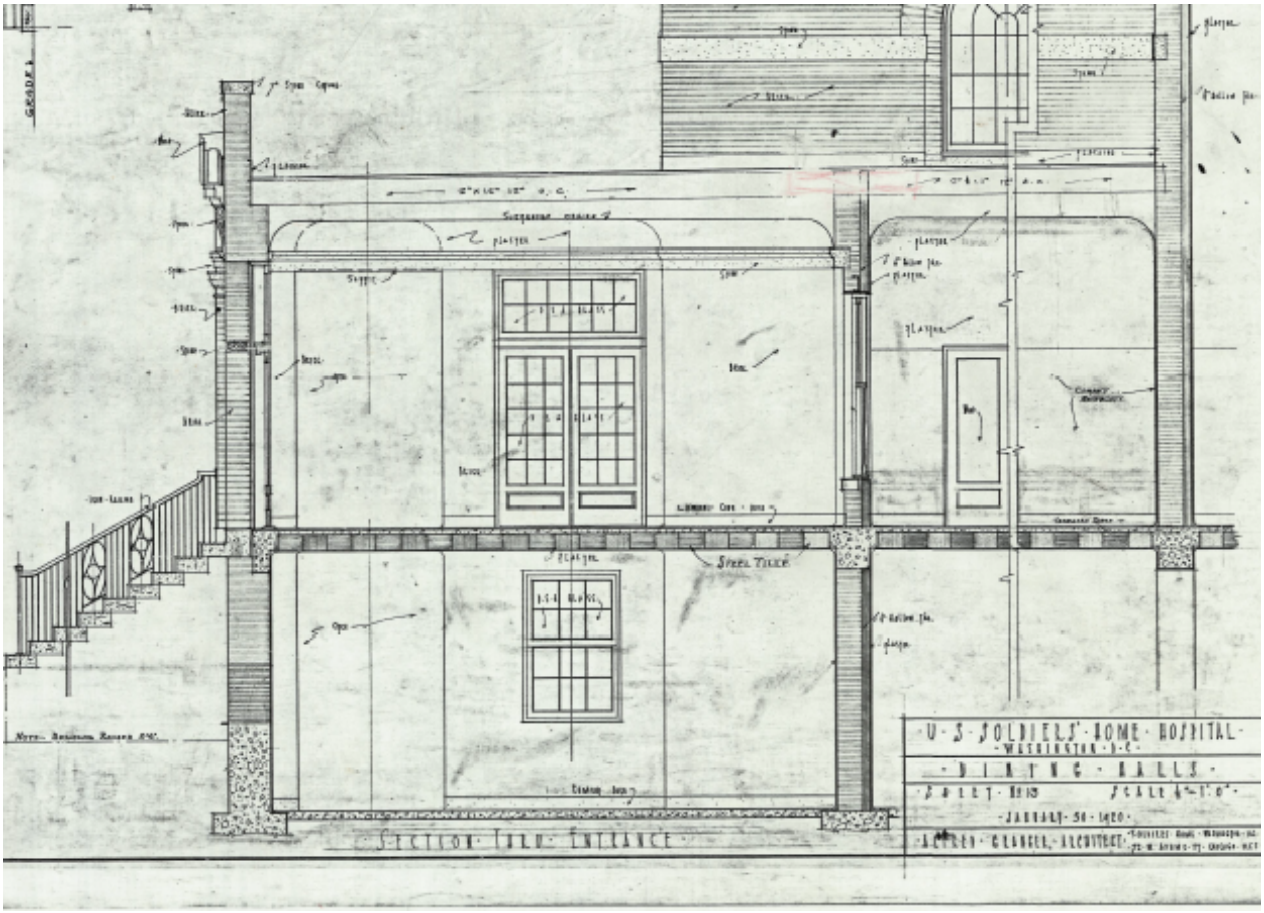


FIGURE 32: WALL SECTION AT MESS HALL ENTRANCE SHOWING BASEMENT SLAB ON GRADE, STRUCTURAL FLORESTYLE PAN SUPPORTS AT THE FIRST FLOOR, AND WOOD 2"X10" AND 2"X12" WOOD BEAMS AT THE ENTRANCE (SEE DRAWING SHEET NO 13. TITLED "DINING HALLS" JANUARY 30,1920)

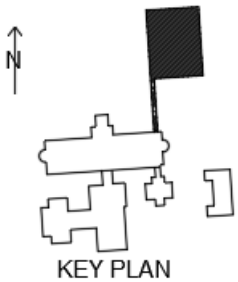
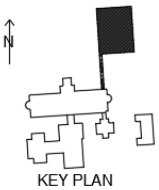


FIGURE 33: MESS HALL CORRIDOR AT EAST SIDE

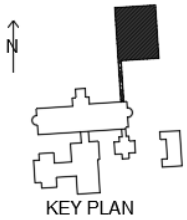
FIGURE 34: MESS HALL EXTERIOR AT SOUTH SIDE



KEY PLAN

FIGURE 35: MESS HALL EXTERIOR EAST SIDE

FIGURE 36: MESS HALL CAFETERIA



3.0 SITE INVESTIGATION

3.1 BARNES

During the site observation, Stantec observed some areas of concern at the Barnes Building. However, many of the structural components were in good condition. The roof is in good condition because the roof decks are made of concrete with steel support beams, which is more water resistant than most of the wooden roofs present on site. Stantec observed that concrete infill at the steel beams around the porch perimeter of the building have experienced water infiltration causing the encased steel beams to warp and the infill concrete to spall and crack (see Figure 37 below). There are eight encased beams in total that show signs of warping. It was noted that the wooden fascia, soffits, garage doors, and window frames for Barnes evidence deterioration due to water infiltration (see Figures 38 and 39). The brick walls were observed to have no cracking or other structural issues (see Figure 39).

FIGURE 37: EXTERIOR STEEL BEAM WARPING AND CONCRETE SPALLING AT BARNES 2ND FLOOR EAST SIDE

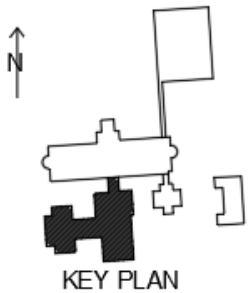
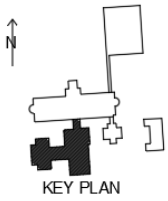


FIGURE 38: DETERIORATED SOFFIT AT BARNES

FIGURE 39: DETERIORATED SOFFIT & GOOD CONDITION BRICK WALLS AT BARNES



3.2 FORWOOD BUILDING

Several field observations were made about the Forwood Building. The south side of the building has a wooden sun porch that has deteriorated significantly (see Figure 40 below). Also, similar to other buildings at the site, the wooden fascia, soffits, and window trim are also deteriorating from old age and water damage. Water intrusion occurring at the solariums on the east and west sides of the building was also observed. Water infiltration, at all three floors, has caused mold to grow on the structural tile and has deteriorated grout in between the tiles (see Figure 41 below). The clay tile and steel beam roof of Forwood was observed to be in good shape, however, the flat roof portions of the roof over the solariums are leaking and causing water damage on the floors below. Stantec estimates a total of 1,400 square feet of floor tile will need to be replaced only at the solariums. Where exposed, structural tile in the rest of the building appeared in good condition. Similar to the other buildings on site, Stantec observed no cracking on the exterior brick elements and the wooden clocktower structure was in good condition.

FIGURE 40: DETERIORATED SUN ROOM SOUTH SIDE OF FORWOOD

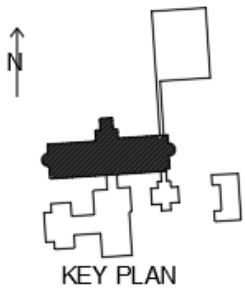
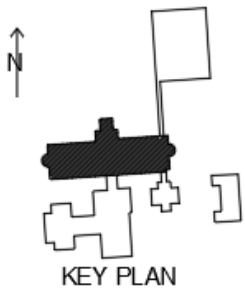


FIGURE 41: WATER DAMAGE AT THE FORWOOD SOLARIUM CEILING



3.3 HOSTESS HOUSE

There were relatively few noticeable defects in the Hostess House. The brick exterior was observed to be in good condition (see Figure 42). Stantec observed deterioration of the wooden soffits, fascia, and window frames, which is typical throughout the site. In addition, the wooden exterior of the walkway that connects the Hostess House to Forwood is severely weathered (see Figure 43). The roof of the Hostess House was difficult to access and was not inspected. Water intrusion was not observed in the Hostess House. However, some of the roof drains were not shedding storm water away from the building effectively (see Figure 44).

FIGURE 42: EXTERIOR OF HOSTESS HOUSE AT WEST SIDE SHOWING INTACT BRICK EXTERIOR

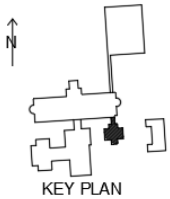
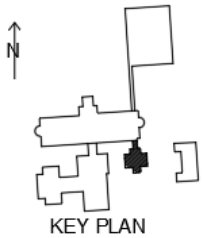


FIGURE 43: HOSTESS HOUSE WALKWAY TO FORWOOD SHOWING WOOD DETERIORATION

FIGURE 44: STORM DRAIN NOT SHEDDING WATER EFFICTIVELY AT HOSTESS HOUSE



3.4 KING HALL

Stantec observed that the King Hall Building has the same issues that are typical to the site including wooden soffits, fascia, wooden porches, and window frames that have been weathered and deteriorated (see Figure 45). However, the main structure of King Hall, including the brick exterior, was observed to be sound (see Figure 46). From what Stantec observed, the roof did not evidence substantial water infiltration. The wooden floors and inside portion of the brick walls were not accessible for viewing; however, the interior finishes did not show any signs of water damage or mold (see Figure 47). These observations show that King Hall is still shedding water effectively.

FIGURE 45: WOODEN EXTERIOR PORCH SOFFIT SHOWING SIGNS OF WEATHERING AND DETERIORATION

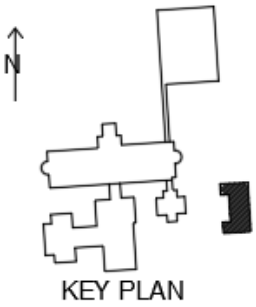


FIGURE 46: EXTERIOR PHOTOGRAPH OF KING HALL BUILDING SHOWING INTACT BRICK WORK

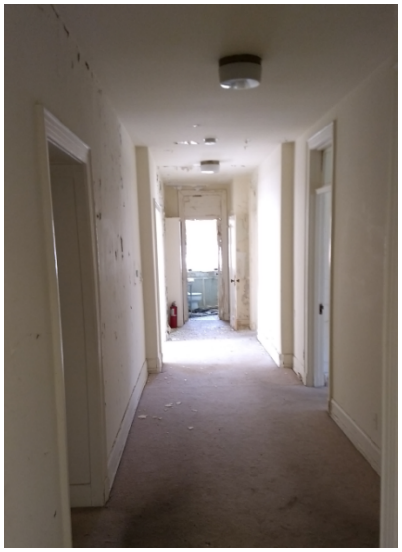
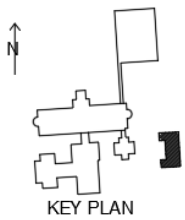


FIGURE 47: INTERIOR KING HALL HALLWAY WITH RELATIVELY INTACT FINISHES AND NO WATER INTRUSTION



3.5 MESS HALL

The Mess Hall has several issues that were observed during the site investigation. The wooden exterior elements such as the soffit, fascia, and window frames are deteriorated. In addition, the wooden trusses in the dining hall were observed to be rotted from water intrusion. The roof has holes and is missing shingles (see Figure 48 and Figure 49), which is causing the water intrusion. Water intrustion into the building is also being caused by missing windows. The steel florestyle pans that are supporting the floor are rusting, becoming thinner, and in some places the pans have broken apart at their ribs (see Figure 50 and Figure 51). Stantec observed mold throughout the basement which is further evidence of poor air circulation and water intrusion (see Figure 52).

On the exterior of the building, there is a crack in the south east corner of the building that is due to shrinkage of the concrete foundation wall. When the concrete foundation wall cured, the wall cracked due to an insufficient amount of horizontal reinforcing in the wall. This crack grew larger over time due to water infiltrating the crack and freezing, causing the crack to expand. Having the basement unheated for an extended period of time would help the water to freeze. In addition, there is a “pocket” between the stairs and the wall where snow collects and infiltrates the crack. The bricks above the wall have cracked due to a lack of a bond break between the concrete and the brick. As the concrete expanded, the friction between the concrete and brick transferred the crack to the brick (See Figure 53). Finally, the roof over the Mess Hall corridor, as seen in Figure 49 and 54, is inadequate and or is compromised, and water is infiltrating the roof, causing damage to the roof structure.

FIGURE 48: ROTTING WOOD SHEATING, MISSING SHINGLES, AND ROTTING WOOD BEAMS AT MESS HALL ROOF

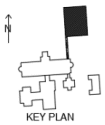


FIGURE 49: HOLE IN MESS HALL ROOF AND DAMAGED ROOFING AT MESS HALL CORRIDOR

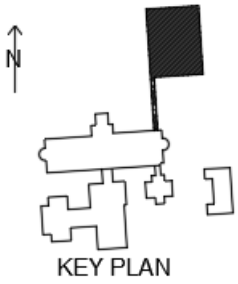


FIGURE 50: SPLITTING AND RUSTING STEEL FLORESTYLE PANS AT MESS HALL 1ST FLOOR

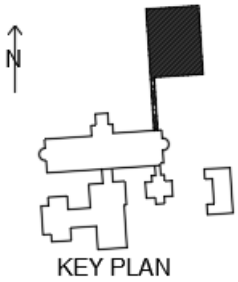


FIGURE 51: SPLITTING AND RUSTING FLOOR STEEL FLORESTYLE PANS

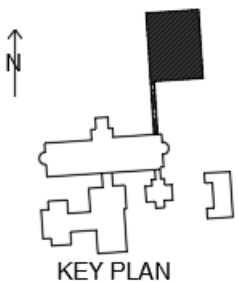


FIGURE 52: MOLD IN MESS HALL BASEMENT

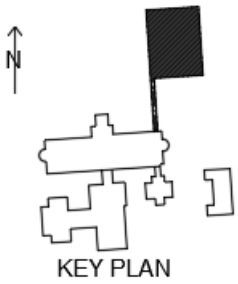


FIGURE 53: VERTICAL CRACK CAUSED BY SHRINKAGE AT MESS HALL SOUTH EAST CORNER

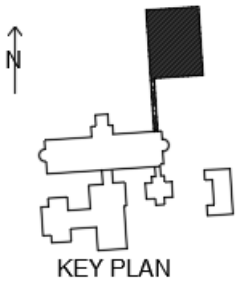
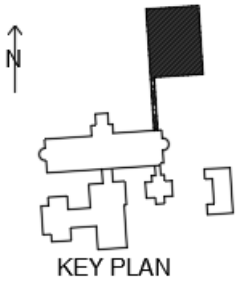


FIGURE 54: MESS HALL CORRIDOR SHOWING SIGNS OF WATER INFILTRATION AND ROOF DAMAGE



4.0 CONCLUSIONS & RECOMMENDATIONS

4.1 BARNES

The condition of King Hall indicates that it may have been in good condition and may have been occupied/maintained more recently than the other buildings. Like the other buildings on the site, the wooden soffits, fascia, and window frames are weathered/deteriorated. In addition, there were eight exterior porch support beams, on the 2nd floor, that are warping from water infiltrating the concrete encasement. Prior to construction, the concrete encasement should be removed, and the beams should be further evaluated by a structural engineer.

4.2 FORWOOD

Most of the floors, roofs, and the brick exterior of Forwood are in good shape structurally. Many of Forwood's exterior wood elements such as the soffits, fascia, and window frames are weathering, and the wooden porches (sunrooms) are structurally unsafe. Water intrusion has caused mold and deteriorating grout that has caused damage to the structural clay tile. These tiles could have interior damage such as rusting/deteriorating tie rods and loss of connection to the tie rods. If the tie rods are damaged or are no longer connected to the tile, the floors would have a major loss of structural capacity. The amount of damaged structural clay tile observed amounts to approximately 1,400 square feet.

4.3 HOSTESS HOUSE

The structure of the Hostess House was generally in good condition. The wooden soffits, the fascia, the wooden exterior of the walkway and the window frames show signs of weathering and deterioration. The wooden exterior of the walkway that connects the Hostess House to Forwood is showing signs of weathering/deterioration, and some of the gutters and downspouts will need to be cleaned and repaired. Finally, a qualified roof inspector should be hired to inspect the roof to insure no leakage.

4.4 KING HALL

King Hall is in good condition and may have been occupied and maintained more recently than the other buildings. Like the other buildings on the site, the wooden soffits, fascia, and window frames are weathered and deteriorated.

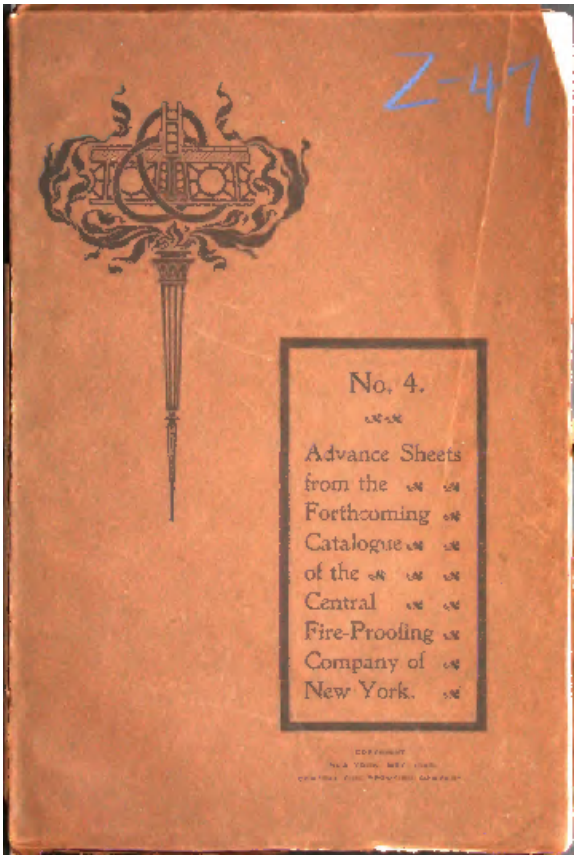
4.5 MESS HALL

The Mess Hall has multiple problem areas caused by water intrusion into the building. The roof has holes and is missing shingles. A full inspection of the roof should be done to determine the location of all leaks in the roof and how much of the wooden structure has been impacted. Rotting wood sheathing and rotting wooden beams are present throughout the roof structure. Broken windows are also contributing to the water infiltration. There is a shrinkage crack on the south east corner that will need to be repaired. Also, the steel florestyle pans that support the floors are rusting and splitting. The floor will need to be investigated further to determine how extensive the rusting and splitting is and how much of a loss in structural capacity the floor has. In addition, the wooden exterior items such as the fascia, soffit, and window frames are deteriorated.

APPENDIX

A.1 FLORETYLE STEEL DECKING INFORMATION (EMBEDDED PDF)

A.2 STRUCTURAL TILE INFORMATION (EMBEDDED PDF)



A.3 DRAWING REFERENCE LIST

FIGURE 3: DRAWING H.5. TITLED “WEST ELEVATION” DATE: UNKNOWN

FIGURE 4: DRAWING H.10. TITLED “REINFORCED CONCRETE CONSTRUCTION THIRD STORY” 1906

FIGURE 5: DRAWING H. 10. TITLED “REINFORCED CONCRETE CONSTRUCTION THIRD STORY” 1906

FIGURE 6: DRAWING TITLED “BASEMENT PLAN SHOWING FRAMING FOR FIRST FLOOR” DATE: UNKNOWN

FIGURE 7: DRAWING TITLED “FIRST FLOOR PLAN SHOWING FRAMING FOR SECOND FLOOR PLAN” DATE: UNKNOWN

FIGURE 8: DRAWING TITLED “SECOND FLOOR PLAN SHOWING FRAMING FOR THIRD FLOOR” DATE: UNKNOWN

FIGURE 9: DRAWING TITLED “PLAN OF CEILING FRAMING THIRD STORY” 1906

FIGURE 10: DRAWING TITLED “RAFTERS AND BEAMS ALTERATIONS AND ADDITIONS” MAY, 14 1907

FIGURE 15: DRAWING TITLED “U.S. SOILDERS HOME ADMINISTRATION BUILDING” OCTOBER 21, 1919

FIGURE 31: DRAWING TITLED “DINING HALLS” OCTOBER 21, 1919

FIGURE 32: DRAWING SHEET NO 13. TITLED “DINING HALLS” JANUARY 30,1920