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REHABILITATE CLARA BARTON NATIONAL HISTORIC SITE
CLBA 312325
SCHEMATIC DESIGN ALTERNATIVES

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Rehabilitate Clara Barton National Historic Site

Schematic Design Alternatives
CLBA 312325

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Introduction

The Clara Barton House and its grounds pertain to the approximately 9-acre Clara Barton National Historical Site, which together with the adjacent Glen Echo Park of the George Washington Memorial Parkway (GWMP) make up a contiguous NPS cultural landscape of 22-acres in Montgomery County, MD. The site is situated between a residential neighborhood, NPS parking lots, and the east bank of the Potomac River overlooking the C & O Canal and the Clara Barton Parkway.

The Clara Barton House was constructed adjacent to the grounds of the Chautauqua Assembly at Glen Echo, Maryland in 1891. The building resembles two Red Cross hotels that had been constructed in Johnstown, Pennsylvania, to house the victims of the 1889 Johnstown flood, and may have incorporated some of the lumber from the disassembled hotels. The building was the temporary residence of Clara Barton in 1891 but functioned primarily as a Red Cross warehouse from 1891 to 1897. The structure, which originally had a stone façade, was remodeled by Clara Barton in 1897 as her home, where she lived with her associate, Dr. Julian Hubbell, and other volunteers until her death on April 12, 1912, at the age of 90. Barton's home also served as the national headquarters of the American Red Cross from 1897 to 1904, of which she was president. Dr. Hubbell worked as Chief Field Agent for the organization and occupied the house until his death in 1929, except during a period from 1920-1925. Other than the house, no associated buildings and few if any landscape features of the Barton homestead remain extant.

The principal purpose of this site is to tell the early story of the American Red Cross through the interpretation of the life and times of its founder, Clara Barton. She was a remarkable person who dedicated her life and energies to help others in times of need both at home and abroad, in peacetime as well as during military emergencies. Glen Echo was her home for the last 15 years of her life and this structure illustrates her dedication and concern for those less fortunate than herself.

The Clara Barton National Historic Site was listed in the National Register of Historic Places as a National Historic Landmark on January 12, 1965. The established period of significance is 1897 to 1912.

Figure 1. Approach to the Clara Barton National Historic Site from the northwest.

Functional Requirements

The functional requirements for the Project Program are to rehabilitate the Clara Barton National Historic Site through appropriate treatments according to the Secretary of Interior's Standard for Treatment of Historic Properties. Rehabilitation acknowledges the need to alter or add to a historic property to meet continuing or changing uses while retaining the property's historic character.

This project will repair and rehabilitate the 130-year-old Clara Barton House at the Clara Barton National Historic Site located at 5801 Oxford Rd, Glen Echo, MD 20812. Successful completion of this project will permit the reopening of the House for increased public visitation. This project will make the Clara Barton House safe for reopening to public tours, afford greater interpretive opportunities, and provide improved climate-controlled space for historic furnishings and finishes.

The project will build on the basis of information developed by the *Clara Barton Historic Structure Report (Volume 2&3)* by Oehrlein & Associates Architects (1996), the *Conditions Assessment* by AECOM (2018), the Project Scoping Assessment (June 2020), and the documents created by this A/E team: the *Final Pre-Design Report* (November, 2022), the *Schematic Design Report* (January, 2023), and the *Cultural Landscape Report*, *Part 2* (July, 2023).

Overall, the work will address the failing building envelope and the deteriorated building systems including the mechanical, plumbing, and electrical systems which are over 40 years old. It will make the building safe by egress and other code improvements, accessible through the development of new restrooms, and comfortable and healthy with new building systems. The project goal is to minimize adverse effects to the building fabric through sensitive approaches to the integration of new systems and programmatic components.

PMIS Justification for the project reads as follows:

The project rehabilitates the 130-year old Clara Barton House. The House was originally constructed in 1891 as a warehouse for disaster relief supplies, and later became Clara Barton's residence and American Red Cross Headquarters in 1897. After her death in 1912, it was converted to a boarding house and in 1963 it was purchased by a friends' group for preservation. In 1974, Congress designated the Clara Barton National Historic Site to be managed by the NPS. The House is a National Historic Landmark and is over 14,000 square feet in floor area.

~~*The House was closed to the visiting public in 2015*~~ (M+Sa note: While most of the furniture was removed from the house in 2015, it has been operating on a limited basis with Rangers providing guided tours to the public) *due to several ongoing preservation projects, water damage, and climate control issues. The museum collection was moved into storage during this period and remains in storage today, though some tours of the unfurnished house resumed in 2018. The NPS goal is to restore the house to the 1897-1912 Period of Significance and reopen to the public for interpreting the Red Cross and Clara Barton. Emphasis would be on preserving the most historically intact rooms within the house. Rehabilitation would address deficiencies of the exterior envelope, structural framing, electrical, mechanical, and plumbing systems.*

The building exterior is in poor condition with peeling paint on the original clapboard wood siding, leaking windows

and roof. The wood siding allows air and moisture intrusion due to a lack of insulation and vapor retarder. The wood siding requires repair, lead-based paint abatement, caulking, and painting. Many original wood windows need repair and require removal, refurbishing and reinstallation. Various areas of masonry walls show signs of weathering and require repointing to prevent water damage. The six brick chimneys all require repairs, repointing, and flashing to prevent water intrusion. Although the roof is fairly new, there are problems with ponding and leaking through expansion joints and clogging downspouts which leak into the exterior walls. Thermal imaging scans performed in 2018 confirmed these areas of moisture and air intrusion.

Updated by NPS, April 2023: *"The project scope includes improving thermal performance of the building envelope. NPS is amenable to considering introduction of roof insulation, as this treatment typically provides reliable improvement in thermal performance without compromising the integrity of the historic structure. Additionally, installation of storm sash in the interior or exterior of the house typically provides reliable improvement in thermal performance without compromising the integrity of the historic structure. NPS recognizes a need to consider other treatments such as introduction of a vapor barrier and wall insulation, however, treatments that are invasive and call for extensive disturbance of historic materials with associated potential for damage are understood to be an Adverse Effect on the National Historic Landmark. Following conceptual consideration of such proposals, NPS will make a guiding decision regarding the extent of thermal performance to be achieved during the project. Standard practices for treatment of historic roof assemblies and wall assemblies would apply to this scope (refer to NPS Preservation Brief 3 for concepts and approaches that are consistent with the Standards.)"*

The original framing is structurally deficient which limits the occupancy and the use of a large portion of the House. There are areas with temporary shoring in place and all rooms and staircases have been posted with maximum occupancy limits. The 2nd and 3rd floors have a live load capacity which is significantly below the minimum design code. The 3rd floor access staircase is structurally deficient and narrow which limits access. ~~The 3rd floor balcony has rotted wood members and needs to be replaced.~~ After the installation of the new flagpole, the roof leaked into the ceiling below due to excessive vibration in structural framing and damage of the roof membrane.

Updated by NPS, April 2023: "*Contractor shall also work with NPS to establish a proposed live load capacity that would be suitable for group tours and shall propose a conceptual structural reinforcement approach that achieves the needed capacity and resolves reliance on temporary shoring. NPS will consider either accepting the house's existing live load capacity and limiting use of the house accordingly, or alternatively including structural strengthening of the house to accommodate an upper floor public tour footprint in the House. In carrying out analysis and design development for structural standards, contractor shall fully utilize IEBC Chapter 12 (1205) which allows for nonconforming conditions to be accepted."*

Updated by NPS, April 2023: *"The project scope includes the need for restoration of the 3rd floor balcony, which exhibits deterioration of structural members. Approach to this scope will include assembling physical and documentary evidence of the original design, and selective disassembly and salvage of historic components for reuse (refer to the Standards for Restoration for approach.)"*

Updated by NPS, April 2023: *"Interior finishes and materials will be affected by infrastructure improvements and have localized repair needs (refer to NPS Preservation Briefs 21 and 28 for concepts and approaches that are consistent with the Standards). Older paint coatings on the building interior include lead-based paint, which require stabilization. For wood and plaster substrates, NPS anticipates the need for new coatings to be linseed oil based and vapor permeable, to provide long service life on repaired materials".*

Many of the mechanical systems are beyond their useful lives do not meet the required heating, cooling, and humidification needs for historic museum furnishings. The existing boiler does not meet the required humidification loads. Cooling is the most critical HVAC deficiency in the House. The cooling load in the building, assuming no major

upgrades to the existing envelope, is approximately ten times undersized. The fan coil units were manufactured in 1981 and are well beyond their useful lives. There is corrosion on the casings and internal components of these units. Associated heated and chilled water piping is also in poor condition. The hot water units appear to be manufactured in the 1980's and are beyond their useful lives. The baseboard radiator heaters were manufactured in the 1980's and are in poor condition.

Updated by NPS, April 2023: "*An added criteria is the requirement to study the location of the dew point, especially under cooling loads, to assess whether new HVAC systems have potential to cause condensation within historic exterior building walls and contribute to long-term deterioration of the House. Final HVAC design should fully value the potential for a dehumidification system to provide for human comfort at relatively high temperatures (during cooling season) to reduce the temperature differential between the interior and exterior of the House, and limit water vapor transmission through walls (refer to NPS Preservation Brief 24 for concepts and approaches that are consistent with the Standards.)"*

The existing domestic water piping serving the bathroom was made of lead, and it is likely that lead piping is also serving the adjacent staff kitchen. Piping is visibly corroded and is beyond its expected useful life. The sanitary sewer lines are corroded and past their useful life.

Most of the electrical system has exceeded its useful life. The aged electrical equipment is insufficiently grounded and susceptible to failure, risking power outages and potential fire danger. By replacing the electrical systems, not only will safety and reliability be restored, but significant energy savings can be realized with more efficient lighting and equipment. The incoming telephone cables are unprotected which could be a fire hazard from lightning strikes.

Updated by NPS, April 2023: *"Project scope additionally includes installation of a lightning protection system (refer to NPS Preservation Brief 50 for concepts and approaches that are consistent with the Standards.)"*

Reopening the House to visitor tours will require code compliant emergency egress and ABAAS improvements. Currently there is no emergency fire exit from the house. ABAAS improvements require new accessible ramp and entry to front door, 1st floor tour route, and alternative interpretative devices for the inaccessible 2nd and 3rd floors. A new public restroom ~~with sidewalk access~~ is required.

Updated by NPS, April 2023: ''*This project will rely on the pending 2023 Cultural Landscape Report to address history and existing landscape and to incorporate the grounds more fully into the visitor experience. Schematic Design alternatives shall be responsive to the CLR. The project will improve ABAAS accessibility. While generally limited to the site area adjacent to the Clara Barton House, the project will develop alternatives to enhance connections between the Glenn Echo Park and the Clara Barton House and to respond to the shared history of the two sites. The design team will research local storm water management requirements and sensitively incorporate solutions into the landscape."*

Sustainable Design

Introduction

Sustainable design is an integral part of our approach to historic sites. Sustainability and the preservation of cultural resources are complementary. Historic structures like the Clara Barton House are inherently sustainable because of the embodied energy that they contain. In this rehabilitation

project, some repairs and alterations will be required for continued use. Our goal in making those repairs is to preserve the structure's character defining features and existing materials and doing so in a sustainable way.

Site Considerations

The work at the Clara Barton House is on an existing site near other residential and park development in Glen Echo, Maryland. The site is at the top of a bluff overlooking the Clara Barton Parkway,, the C&O Canal, and the Potomac River to the south. The house was sited to take advantage of prevailing breezes and the view. At one time Clara Barton tended terraced gardens on the hillside. One opportunity in this project is to regain more of the historic relationship of the house to the landscape. See Cultural Landscape Report (Part 2) recommendations for further information.

Accessibility to the house from the parking and all areas of the site is part of the sustainability program. New accessible parking will be added. Where new paving is added to re-establish the historic service road, it will be pervious to avoid excessive run-off of rainwater. There will be a storm water management plan included in one of the design alternatives. Construction activities will include the development of a Storm Water Pollution Prevention Plan to protect nearby Minnehaha Branch.

Water Use

The Clara Barton National Historic Site is approximately 9-acres. While there are no plantings on the site which require irrigation, we are recommending rainwater capture from the roof leaders to use in future maintenance of the site and gardens. This can be done with rain barrels or some other system of water storage. Perhaps Clara Barton's former terraced gardens to the south can be interpreted in some way and irrigated. Stored water can be useful in offsetting dry conditions or drought on the entire site.

New plumbing fixtures will be code compliant, low flow fixtures to reduce water usage.

Envelope Performance and Energy Use

National Park Service sustainability guidelines do not recommend insulating finished spaces which require the removal of historic plaster and lath and in the case of the Clara Barton House, historic muslin fabric. The House has platform framed exterior walls that for the most part are uninsulated, although limited portions of the house have been insulated in the past. Without removal of historic plaster, it would be impossible to develop a continuous vapor barrier on the inside surface of the exterior walls. We are recommending leaving the walls as they are and making other improvements to the thermal performance of the house, including:

- Historic windows will be repaired, restored, and weather-stripped for a tighter fit. Interior energy panels will be added for the windows where possible and appropriate
- A more energy efficient heating and cooling will be incorporated utilizing sensors and controls. Options for cooling could be: multi-zone split systems for individual spaces where needed, leaving the interpretation spaces as Clara Barton experienced them. Or central, building wide

AC with controls to minimize the possibility of condensation. Interlocking controls and energy recovery units will help maintain system energy efficiency by mitigating wasteful energy use. LED lighting systems will be provided throughout with occupancy and daylight sensors

- The third floor will be better ventilated to reduce heat build-up in the summer.

Materials and Resources

Where wood cladding is required to be replaced due to condition, it will be done in kind from sustainable lumber sources.

Wherever possible, existing materials that cannot be reused due to their conditions, will be diverted for recycling. New framing members will be harvested and supplied in a sustainable manner.

New steel if required will incorporate recycled materials.

Interior Environmental Quality

The improved HVAC system and materials used in the design will improve indoor air quality and thermal comfort. Moisture will be better controlled by preventing leaks through the roof. Low emitting paint finishes and flooring will be utilized in the interior finishes. Local controls will be provided for lighting and HVAC.

Guiding Principles for Sustainable Federal Buildings

A narrative will be prepared which will incorporate resilience measures to mitigate the impacts of climate change and natural hazards. A Natural Hazards Assessment has been performed. See below.

Climate Change and Natural Hazards

Climatic phenomena that have a major impact in the region include flood producing extreme precipitation, winter storms (Nor'easters), ice storms, heat waves, drought, hurricanes, and fog.

Climate change has increased the risk of precipitation with shifts towards greater variability and higher totals.

There is also an increase in anticipated days over 95 degrees, as well as decrease in the number of days below 32 degrees.

The proposed rehabilitation will take in to account that precipitation may increase. Mitigation of water drainage of the site will be a priority. Structural analysis will include wind loading in future phases

There will be an increase in cooling degree days and a decrease in heating degree days. The climate control system for the house will take this into account and strategies will be employed to reduce the

cooling load through thermal glazing, window shading, insulation, and temperature sensors and thermostat controls.

Potential Hazards

A Natural Hazards Checklist includes the following natural hazards:

- Earthquake
    - There is a minimal risk of an earthquake in the Washington, DC metro region. A 5.8 magnitude earthquake occurred on August 23, 2011 in Mineral, Virginia (Louisa County), whose epicenter was roughly 100 miles southwest of the project site. This was estimated as a 1,000-year event, but future seismic events, though rare, are possible. There was also a 3.0 magnitude earthquake on January 17, 2016 with an epicenter approximately 50 miles northwest of the project site in Ranson, West Virginia (Jefferson County). The probability of another earthquake within the next 50 years is less than 0.01 according to the U.S. Geological Survey (USGS) 2009 Earthquake Probability Mapping
    - Data from geotechnical surveys will be used to analyze the structure with regard to seismic activity
- Landslide/Avalanche
    - Landslide and Avalanches should be of low probability at the site area. The site is located near an existing embankment that slopes down to Clara Barton Parkway; however, there is no known indication of potential landslides. The slope can be visually assessed for evidence of slope creep or potential instabilities
- Cave/Karst (Sinkholes)
    - According to Maryland geologic maps, cave and karst conditions are not a concern given the geology of the site.
- Shrinking and Swelling Soils
    - Limited excavation and earthwork will be performed within this layer; therefore, the clay will not be exposed to the elements (i.e., excessive wet/dry weather) that would cause shrinking/swelling of this layer. However, disturbed or exposed subgrade soils are anticipated to degrade and soften when exposed to moisture or wet conditions
- Hurricane
    - The site is located within a wind speed region of 120 MPH (Hurricane -> 140 MPH) Ultimate Design Wind Speed according to the IBC Figure 1609B. The site is subject to high wind speeds and flying debris. Storm surge does not affect the property as it is located about 100 feet above the Potomac River
- Tornado
    - There is a high risk of tornados in Montgomery County, MD. There have been 129 tornados recorded since 1950. According to records, the largest tornado in

the Montgomery County area was an F3 in 1979 that caused 6 injuries and 1 death
    - One tornado was recorded in Olney, Montgomery County, MD on May 28, 2022 20 miles from the site
- Flood
    - The Clara Barton National Historic Site is sited approximately 100 feet above the Potomac River elevation providing protection from Coastal Storm Surges, Tsunami, Rivertine and Flash Floods
    - According to the FEMA FIRM map 24031C0435D (September 2006), the project is located within Flood Zone X (outside of the 500-year flood zone) and it is not at risk for regular flooding

Unique Design Parameters

Dark Sky Management

The replacement of existing site lighting and limited addition of new egress lighting will align to night sky preservation goals. While the site is within a larger residential setting with overhead street lighting, the lighting design makes use of more sustainable lighting that is compatible with both the historic site and the residential setting. Where possible best practices will include:

- Energy efficient, low lumen LEDs with a warm color hue rather than blue or white
- Full cut off light fixtures to reduce light spill and glare
- Two façade flood lights will be removed.

The design anticipates overall lighting levels to match current levels and make use of best practices to aid night sky preservation.

The project scope includes egress and exit lighting including a single porch light and bollards at the accessible walkway and ramp.

Natural Soundscape Preservation and Noise Management

During the proposed project, construction activities are likely to increase noise levels, but will be temporary in nature. Noise will affect park goers and visitors to the adjacent Glen Echo Park and residential neighborhood. The effect of noise on the residential areas is not known, but work hour restrictions can be put in place during construction if this is a concern.

Once the site is open to the public, noise levels from a greater number of visitors will increase from their current state.

Code Analysis Summary

Applicable Codes: The code analysis is based on the requirements of the following documents:

- IBC, International Building Code – 2021 Edition (IBC)
  - NFPA 101, Life Safety Code (National Fire Protection Code)– 2021 Edition (LSC) when IBC is silent
- ABAAS- Architectural Barriers Act Accessibility Standards – 2015 Edition (ABA)
- IEBC, International Existing Building Code – 2021 Edition, (IEBC)

The building is classified as historic and is listed as a National Historic Landmark. The LSC and IEBC provide exceptions for historic buildings that can allow certain non-compliant features to remain. Variations will be sought for non-compliant character-defining features.

Determination of Occupancy

The 2021 International Building Code and the International Existing Building Code will be used to determine the required live loads for the proposed uses for the Clara Barton House. A previous structural report was completed in November 2018 by AECOM of Arlington, VA. In section 4.2 Structural of AECOM's report, a structural live load analysis was completed. It was concluded in that report that the floor framing had the live load capacities of the following:

- First Floor – 60 PSF
- Second Floor – 3 PSF to 23 PSF
- Third Floor – 15 to 22 PSF

The current A/E team structural engineers, Keast & Hood, completed independent calculations to confirm the previous analysis; refer to S1.2A for the live load capacities at the second floor by room. Per the IBC, certain sections of the first floor require 100 PSF (corridors) or 50 PSF (offices, less intensive uses); certain sections of the second floor require 80 PSF (corridors) or 50 PSF (offices). For areas that require less than 80 PSF capacity, an additional 15 PSF must be added to account for partition loading. Based on the calculations, the corridor portions of the first floor do not have the required structural live load capacity. Additionally, no portion of the second or third floors has the required structural live load capacity.

The scope of work for all three alternative designs will increase the live load capacity at the first floor to meet the code requirements through supplemental framing in sections of the basement. The proposed first floor uses will thus have occupancy calculated by the IBC Occupant Load Factor of Table 1 and the area of the spaces.

The design alternatives include options for addressing the insufficient load capacity at the second floor: 1) no supplemental framing which limits occupancy to fewer than ten people, and no group tours or public uses, 2) increasing capacity with reinforced framing which falls short of full code-compliancy, 3) increasing

capacity with sufficient structural framing to meet compliancy. The third alternative has occupancy calculated by the IBC Occupant Load Factor of Table 1 and the area of the spaces.

Table 1 - Occupant Load Factor

Use	Occupant Load Factor (ft^2/person)
Assembly -Exhibit, Gallery, Museum	30 net
Assembly - unconcentrated	15 net
Reading room	50 net
Business	150 gross
Business - concentrated	50 gross
Mechanical	300 gross
Storage	300 gross

The Occupant Load Factor in Table 1 shows the code defined factor for the square footage required for each occupant for a particular use. For example, exhibit spaces require a minimum of 30 SF per occupant. Determining the appropriate occupant load factor for a given space requires judgment by the design professional based on the intended, or possible, use of the space. This factor provides conservative estimates of the maximum occupant loads for each area and floor level.

Table 2 summarizes the calculated occupant loads; where the structural limitations govern, structural capacity loads are utilized rather than load factor. NPS should review the calculated occupant loads to ensure that they accurately reflect the maximum possible use of each floor level or area. The maximum occupant load will be determined based on the final alternative and review by the Authority Having Jurisdiction. A Park Management Plan must be put in place to ensure that occupancy loads are enforced.

Table 2 - Summary of Occupant Load - 3 Alternatives

Alternative	Level	Area (net)	Maximum Occupant Load (persons)
1	Basement	3010	12
	First Floor	2820	90
	Second Floor	2500	< 10*
	Total	8330	**112***
2	Basement	3010	12
	First Floor	2820	92
	Second Floor	2500	77*
	Total	8330	**181***
3	Basement	3010	12
	First Floor	2820	92
	Second Floor	2500	105
	Total	8330	**209**

*Limited occupancy due to structural loading. All Alternatives assume no occupants on the third floor.

Other Code Deficiencies

The Code Analysis prepared as part of the Accessibility Assessment in the Pre-Design report indicated the following deficiencies:

Finding No.	Section	Issue
CD-0	**Fire Protection Systems**	**Fire protection Systems**
CD-1	**Arrangement of Exits**	**Arrangement of Exits**
CD-2.1	**Stairs**	**Stair deficiencies at main stair**
CD-2.2	**Stairs**	**Stair deficiencies at back stair**
CD-2.3	**Stairs**	**Stair deficiencies at Basement Room B-5**
CD-3	**Emergency Lighting**	**Emergency lighting required**
CD-4	**Exit Signage**	**Exit signage required**
CD-5.1	**Means of Egress**	**General Means of Egress**
CD-5.2	**Means of Egress**	**Door Deficiencies at Main Entrance**
CD-5.3	**Means of Egress**	**Headroom Deficiencies at Basement Rm B-1**
CD-5.4	**Means of Egress**	**Door Deficiencies throughout the Building**
CD-5.5	**Means of Egress**	**Floor Surfaces**
CD-5.6	**Means of Egress**	**Exit Access Deficiencies in the Main Halls**
CD-5.7	**Means of Egress**	**Exit Access Travel Distance**
CD-6	**Interior Environment**	**Ceiling Height Deficiencies**
CD-7.1	**Accessibility**	**Guardrail Deficiencies in Main Hall**
CD-7.2	**Accessibility**	**Public Entrances**
CD-7.3	**Accessibility**	**Door Deficiencies Throughout Building**
CD-7.4	**Accessibility**	**Elevators**

The following modifications are required to be made to provide safe public access:

- New emergency egress stair (only if visitation is permitted at the second floor in Alts 2 and 3).
- Accessibility of public approach, including parking, entrance ramp, and main entry into house
- Accessible restroom will be provided on each program level- first (and second in Alts 2 and 3)
- Removal of doors in targeted locations to increase clear width at accessible route at first and second floors.
- Emergency lighting and exit signage
- High thresholds on accessible route will be modified for accessibility

Variations will be sought for the following:

- The existing main stair as a second means of egress without additional upgrades for deficiencies such as railings, headroom, and open stair configuration.
- Door opening clear, existing historic door hardware
- Existing railings at atrium
- Headroom at various locations

Access is not required at the second floor per the IEBC, 306.7.16 for Historic Structures where the requirements for accessible routes would threaten or destroy the historic significance of the historic structure, as determined by the authority having jurisdiction. ADAAG 206.2.3, Exception 7 also states that vertical access to stories above or below the accessible story is not required. As such, all alternatives rely on the stairs as vertical circulation. We have provided an Alternative 3B which incorporates a lift into the design to provide access from the first to second floor.

Preservation Architecture

Character Defining Features[1]

Exterior

Uncoursed rubble stone façade and corner towers

The house rests on an exposed rubble stone foundation composed of multiple piers. The house originally had a stone façade that was altered to clapboard by Clara Barton in 1897. The stone tower at the north corner of the building was left in place to avoid destabilizing an existing three-story stone vault at the north corner of the building. The stone was also left at the opposite corner to balance the front façade creating flanking stone towers. The towers are remnant of the 1891 stone façade. Historic documentation indicated that the stone towers were painted under Clara's direction to match the color of the house, though the stone also appears to have been covered with ivy during most of her occupancy. The side of the stone tower facing the porch is brick with stucco and paint.

German Siding

The exterior walls are wood novelty, German siding. In areas that have been replaced or modified, vertical trim boards have been introduced. North siding typically had a 5" exposure and a 1" undercut. The front façade has a false gable. The east elevation has a 5 3/8" exposure and ¾" undercut. The south elevation has a 5" exposure and ¾" undercut (some replacement). The West elevation has various sizes of German siding: At the northeast end, and outside the kitchen and dining room, the siding has a 5" exposure and a 1 ¾" undercut. Outside rooms 103 and 203 there is a 4 ½" to 5" exposure and a ¾" undercut. At the southwest end of the wall there is a 5" exposure and a ¾" undercut panels at the clerestory level.

Flagpoles

A wood flagpole rises from the center of the central pyramidal roof at the third-floor level. The flagpole penetrates the roof structure. Another flagpole was located at the front gable.

Original porch (demolished)

A porch was constructed as part of the 1897 renovation in a traditional, vernacular style with painted wood railings and balusters as well as a small gabled overhang roof with posts over the main entrance.

Windows

The original wood windows in the building are 6-over-6 sash. They retain original glass. When Clara Barton altered the front face in 1897, the windows included 4-over-2 sash and 4-lite fixed sash, as well as various stained-glass sash including the 9-over-2 double hung and "Red Cross Windows" at the front, third level and a large multilight window at the main stair that was altered in 1898. There are also fixed

[1] *Character defining features are listed from the original materials identified in the Historic Structure Report.*

stained glass panels at the clerestory although documentation indicates that some of the clearstory panels may have been replaced with Plexiglass.

Doors

There are double painted wood panel doors with arched detailing at the front entrance and painted wood board batten doors on both the east and west elevation leading to basement and appear to date to Clara Barton's occupancy.

Trim

Windows and door have simple 1x wood surrounds. At the first and third floors, the door and window heads have an applied triangular pediment while the second-floor openings have an applied segmental pediment.

Roof

Standing seam sheet metal roof, false gable, and sheet metal mansard roofs at towers.

Interior

Muslin

There are muslin ceilings throughout the building on both the first and second floor. Some rooms retain original muslin such as the central atrium space while others like the Red Cross Offices and former dining room on the first floor and Clara Barton's Bedroom and Clara Barton's Sitting Room on the second floor have been replaced in kind. The closet doors in various spaces room also contain original muslin.

Fabric Finishes

An approach of applying a paper backing board below a textile fiber covering was used throughout the interior which correlates with notations in Clara Barton's journal entries. This has helped to establish the finishes as historic to the period of significance. Based on the function of the room, the fabric may have received an adhered wallpaper or just painted. All fabrics were identified as woven cotton with an uneven nap typical of early industrial or hand-woven fibers. Most have a typical plain weave while the rarer occurrence of a twill weave pattern is also present. There is also colored woven 'ticking' covering some doors which is supported by a journal entry dated July 17, 1897.

Painted Finishes

Varnish and paint layers found in the interior were sampled proving historic and significance. Evidence suggests the interior was originally decorated with a simple, austere scheme in which wooden surfaces were typically coated with shellac, a transparent varnish, while remaining surfaces were painted in light, neutral shades of off white/pale yellow-white or light yellow-tan. More utilitarian spaces maintained limewash finishes.

Plaster

There is plaster throughout the interior on the first, second, and third floors. Material analysis indicates that the plaster is original. Throughout the house there are layers of post-historic material covering historic plaster.

Wood Wall Finishes

The central interior of the house has vertical beaded board over stud walls. There are board and batten wood storage closets doors as part of wall system. The atrium also has wood railings/balusters along floor openings. There are nine types of beaded board throughout the house with different profiles including Type 1, Type 2, Type 3, Type 4, Type 5, Type 6, Type 7, Board and Batten (Type 1) and Board and Batten (Type 2).

Trim profiles

There are seven types of wood trim profiles identified throughout the house. They include Symmetrical Trim (Type 1), “Victorian” Trim (Type 2a), “Victorian” Trim (Type 2b), Sanitary Trim, “Colonial” Trim (Type 3), “Colonial” Trim (Type 5) and Symmetrical Trim (Type 6)

Baseboard trim with ogee shoe and cap

Cyma recta crown molding

Door trim on plinths at select openings. There are two types of wood corner blocks at door openings identified throughout the house. They include Bull’s-Eye Corner Block (Type 1) and Bull’s-Eye Corner Block (Type 2).

Wood Floor Finishes

The flooring throughout the first and second floor is a random width tongue-and-groove pine board which is original and significant.

Vault

The brick and steel vaulted floors within the vaults, the steel doors on the first floor, and steel door frames, and basement wood board doors that are part of the vault are original and significant.

Windows

The first level vestibule has panel windows and transom pane windows surrounding opening to atrium space. Second level low rectangular single-light windows with colored glass alternating in width with pattern. Transom windows over doors on second level.

Doors

The Historic Structures Report and past photographs show evidence of stained double doors with a custom stained-glass pattern representing the Red Cross present at threshold from atrium into Red Cross Office. This would have been a significant view from entry looking through atrium space. No evidence of where doors are and why they were removed has been uncovered. Wood panel doors and metal hardware – hinges**.**

Custom Cabinetry

There are custom built painted wood cabinets in the kitchen and two unpainted wood corner cabinets in the former dining room space.

Cabinet in Room 112

Fixtures

The house has existing and/or remnants of ductwork and metal furnaces with three remaining, one in the main atrium space with ductwork up through central space, one in Clara Barton's sitting room, and one in the Vestibule. There are also wall duct covers present in the Red Cross Office and Clara Barton's Bedroom showing evidence of former furnace locations that have been removed.

There is also a lantern in the atrium space that also appears to be significant original to Clara Barton's occupancy, but limited documentation is available.

Statement of Significance[2]

1. Historical Significance
In both 1972 and 1979, the property was assigned significance in the area of social/humanitarian influence. Clearly the building has abundant historical significance under Criterion B, its association primarily with the life work of Clara Barton. This document further supports that association. Although not noted on the National Register forms, one should consider that social/humanitarian associations with the house apply also to Julian Hubbell, who as chief field agent of the American Red Cross led the majority of relief efforts for the organization for over 20 years. Although a little-known figure, Hubbell was Barton's primary partner in founding the American Red Cross and was more personally involved in establishing the network of local Red Cross Societies throughout the country than Barton herself. In addition, he was either with Barton, or, often alone, in being the first in the field to actually distribute and administer relief, whether it be medicine, food, clothing, building supplies, or actual housing.

2. Architectural Significance
Neither the 1972 nor the 1979 National Register inventory forms identify the Clara Barton House as significant for its architecture (Criterion C). The reason for this omission is that the house/warehouse/headquarters does not fit easily within a stylistic or function label. The National

[2] *Statement of Significance is taken from the Historic Structure Report, Volume 1, 2002.*

Register nomination should be amended to include Criterion C, because the work is a strong piece of vernacular architecture, drawing inspiration from summer and Chautauqua cottages and from purely functional prototypes like warehouses. By amending the nomination, the physical fabric of the structure will be preserved as well as the interpretive collection that is associated with the house's historical significance. Julian B. Hubbell was a partially trained engineer/architect who then changed fields to enter into medical and humanitarian work. He designed the building in 1891 with Clara Barton's input. Barton herself remodeled it in 1897 while Hubbell was managing the Red Cross Park in Indiana.

3. Recommended Changes to the National Register/NHL Nomination
As mentioned above, Criterion C ought to be added to a revised National Register/NHL nomination. The nomination also should be amended to change the period of significance. The period of significance ought to be stated clearly as 1891-1912.

In the 1979 National Register documentation, the statement of significance suggests an umbrella and then, a more specific period of significance: "The property is significant as the home of Clara Barton from 1897 to 1912, with special emphasis on the years 1897-1904 when it was also executive headquarters of the American Red Cross." The "specified dates" listed on the form are 1897-1904. It goes on to say: "The significance of the Clara Barton National Historic Site which qualifies it for listing in the National Register is its association with Clara Barton and the Red Cross, especially in the years 1897-1904." The period 1897-1904 begins in the year that Miss Barton remodeled the building into her permanent residence and the headquarters of the American Red Cross and ends at the time that she resigned as President of the American Red Cross.

Figure 2. Red Cross window in Room 301

The structure is most significant for Criterion B, its association with Clara Barton, and therefore, the period of significance rightfully ought to begin with her association of the house (1891) and end with it (1912), since it is the place wherein she died. Barton had the structure constructed in 1891 as a "cottage dwelling, "lived in it briefly that year, used inconsistently as a warehouse from 1892 to 1897, began considering living there permanently as early as 1895 and actually remodeled and moved into the structure, making it her home/warehouse/headquarters of the American Red Cross in the late winter/early spring of I897.

The year 1912 is valid for restoration of the physical structure, since it represents the last year of Barton's life, and a time when both she and Hubbell inhabited the house. Interpretive exhibits of furnishings and objects can be based more loosely on what is known about the inhabitants' lives. For example, a 1904 newspaper photograph is the best source for interpretation of Barton's sitting room, and a ca. 1930 photograph may be the best source for interpretation of Hubbell's room.

While it is important to interpret the house as the headquarters of the American Red Cross, the house was more than just the headquarters of the American Red Cross, it was Barton's beloved home and a small country farm complete with outbuildings. It was a most unique creation that highlighted her personal values and, in some cases, peculiar solutions. By using a broader period of significance, NPS can interpret the early years of Barton's association with the National Chautauqua at Glen Echo and her later years after retirement. It also leaves open the possibility that should information on aspects of the house yet uncovered eventually come to light for the period 1891-1897 or 1905-1912, that information could be used to further restore the house.

4. Integrity

Overall, the integrity of the building is quite high. The exterior still reads plainly to its period of significance, as does the interior, with the exception of newer bathrooms, a kitchen, and a closet being inserted as uses into historic spaces. The building has integrity of feeling, association, design, workmanship, location, materials, and setting. The grounds owned by Barton still exist, although the pasture she used without owning is now the site of the Glen Echo Park parking lot and has been graded. The result or the grading is a non-historic steep drop between the front lawn of Barton's house and the grounds between the property line and Macarthur Boulevard.

The site does not currently reflect the Clara Barton period of occupancy, and the integrity of the site is therefore rated as low in the Cultural Landscape Report.

Design Narrative for (3) Alternatives

Lead Design Firm: Mills + Schnoering Architects, LLC

Landscape Architect Design Firm: Heritage Landscapes, LLC

Civil Design Firm: Langan

Structural Design Firm: Keast & Hood

Architectural Design Firm: Mills + Schnoering Architects, LLC

Mechanical Design Firm: Henry Adams

Electrical Design Firm: Henry Adams

Commissioning Authority: NA

Construction Manager: NA

Other Design Firms: NA

Opportunities for Integration:

- Establish a stronger relationship between the house and its landscape setting.
- Recover historic site features that have been lost through research and documentation.
- Develop an understanding of the archeological potential of the property and its cultural resources.
- Work with the structural engineer to strengthen the building to support the intended loads safely.
- Develop a more energy efficient and comfortable internal environment for future uses with mechanical and electrical engineering.
- Make the site and the building more accessible to people with disabilities and clarify the accessible route from parking to the entrance and to the facilities within the building with civil engineering.

Tradeoffs discussed and made:

- Limit use of the third floor
- Location of fire stair core
- Location of Code required restrooms
- No additional thermal upgrade of exterior walls
- Location of lift: exterior or interior, or leave out

Materials and Methods

The work below is organized into a Base Bid and 3 Design Alternatives. The report is organized by discipline, with each discipline providing a base bid and up to three alternatives.

The *Schematic Design Report* (January, 2023) details much exterior, interior, and site repair and rehabilitation work that is included as the base bid; this work was reviewed at the time to identify the most appropriate treatment and approach and therefore its scope is carried through this Schematic Design. The new addition that was proposed in the previous report has been eliminated from the project. The three alternatives utilize new programmatic goals and varying structural and other building and site interventions to arrive at designs.

Staging, Base Bid for all disciplines

- Fixed scaffolding to access architectural work; netting and scrim for safety
- Site fencing and pedestrian management / signage
- Tree and landscape protection.
- Temporary Facilities: Bathrooms, waste management and disposal
- Temporary Utilities: data as required by contractor.
- Owner to allow contractor to tap into site electric and water.
- Office and storage trailers, lockboxes

Architectural

Exterior Architecture Recommendations, Base Bid

Roofing

- Restore metal roofing.
    - Repair, prep and repaint sheet metal roofing at low roofs.
    - Replace third floor penthouse roof and roofing at towers and back of false gable. (Note: existing roof may contain lead.) Provide new underlayments including ice and water shield.
    - Reuse existing copper downspouts at penthouses.
    - Install fall protection system at roof.

Masonry

- Exterior repointing at towers and foundation – Assume 50%
- Stucco at side walls of towers

New porch

- Remove 1919 porch and deteriorated third floor balcony.
- Construct new front porch with documentation and drawings prepared by NPS in 1976-78, reflecting the 1897 porch.
    - Wood framed with wood deck (species) and wood railings and posts
    - Wood shingle porch roof with snow guards
- Provide porch benches.
- Provide new ABAAS-compliant route and ramp to new front porch and building entry at front façade at east side.
    - Raise grade with fill from excavation work elsewhere.
    - Provide wood ramp deck.
    - Steel handrail on wood posts and rail with stainless steel cable rail infill.
- Restore third floor balcony.

Exterior Siding and Trim

Since the Clara Barton House is a National Historic Landmark and much of the exterior clapboard is original fabric, we recommend that the approach to the exterior envelope be "preservation" as part of the larger Rehabilitation of the house, as defined in the Secretary of Interior's Standards. We would replace existing material only where required by its level of deterioration. Where replaced, the approach is to replace in kind.

The different designs of the siding where it was replaced or patched over the history of the building are evidence of the evolution of the house over time. In that regard, we recommend keeping the existing clapboard that is not consistent with the original. We do not recommend "restoring" the siding design

to the original period. If its condition requires replacement, replace in kind from sustainable lumber sources.

Our drawings present our understanding of what is known about the origin and condition of the exterior siding, and recommendations for the scope of rehabilitation work.

- Abatement of lead-based paint from exterior trim and clapboard-to-remain at north, east, and south.
    - West clapboard was abated previously.
- Selective removal and replacement of deteriorated exterior wood siding and trim.
    - Replace clapboard at north façade above porch 100%.
    - Replace clapboard and trim where indicated. Assume 20%.
- Exterior woodwork repairs
- Repaint based on paint analysis. See Conservation Assessment – Paint Analysis (*Final Pre-Design Report*).

Insulation

The exterior walls of the house present challenges to adding new insulation. Ideally, one would install new insulation batts between the studs of the exterior walls with a full and continuous vapor barrier to prevent condensation. However, the interior finishes of plaster, wood board, and muslin fabric are considered historic and character defining features of the house. Our recommendations include conservation treatments to those finishes. The National Park Service's Sustainability Guidelines do not recommend insulating of a finished space which may require removing of historic plaster and lath.

Some years ago, and prior to these guidelines, portions of the envelope were insulated by removing interior finishes and adding insulation with a vapor barrier. There is photographic documentation of that work. We have prepared illustrations of where and how much of the envelope is insulated. See *Final Pre-Design Report, Volume 3*, pgs 40-43. The Dew Point Analysis is included as an appendix to this report.

We have considered the possibility of insulating the remainder of the exterior walls from the outside to save historic plaster and muslin. Under this option, most of the clapboard would be removed and the sheathing could be drilled or partially removed to pump in insulating material such as fiberglass, rock wool, or a sprayed foam system. Unfortunately, there is no ability with this method to create a continuous vapor barrier on the tempered side of the insulation to prevent condensation within the structure of the walls.

Several manufacturers of sprayed foam products advertise that the foam serves as a vapor barrier. However, it is discontinuous at each stud, and with building movement over time cracks and gaps will develop allowing moisture migration, and the foam can actually trap moisture. We cannot assure ourselves or the National Park Service that such systems will not cause long term damage to historic fabric. Certain types of foam can "off-gas" over time which may affect the occupants of the building.

This leads us to recommend doing nothing to insulate the exterior walls beyond what has already been done and relying on the building to "breath" to expel excess moisture as it has done in the past.

Windows

The windows themselves are in need of rehabilitation and full repairs are recommended. Much of the glass is thin, wavy, and historic and we recommend keeping as much as possible to preserve the historic character of the building. The repairs will create a tighter fit along with recommended new weatherstripping. We are also recommending interior glass energy panels for the windows with UV shielding.

- Restoration of existing wood windows and doors;
    - Replace windows where indicated, including second floor windows at north elevation. A detailed Window survey is included in the *Final Pre-Design Report, Volume 3*, pgs 16-23.
    - Restore Red Cross stained glass window at third floor balcony (north) with existing glass.
    - Restore existing windows:
        - Remove UV film from glass.
        - Salvage and reuse existing wavy glass.
        - Replace broken glass where indicated with restoration glass with lite wave by Bendheim Glass, or approved equal.
        - Remove and replace window putty 100%.
        - Repair bottom rails with new wood rail or epoxy consolidation.
        - Repaint and refinish interior and exterior.
        - Replace or refurbish existing sash locks.
        - Restore broken cords where indicated.
    - Install interior storm windows with compression fitting for energy conservation and UV protection. Match color of frame to window frame color as required.
    - Remove existing roller UV shades.
    - Install new window treatments
    - Repair/replace existing wood window screens.

Doors and Door Hardware

- Restoration of existing doors;
    - Restore original paired wood entry doors. Reverse swing and provide panic hardware and power door operator.
    - Provide new exterior doors at grade (basement level) and areaway to provide entry to basement at west and emergency exit where shown.

Interior Architecture Recommendations, Base Bid

Basement

- Remove hazardous materials where noted.

- Remove floor slab where shown for concrete footings.
- Firestopping at penetrations

The extent of firestopping at exterior walls will be determined during Design Development. The building is platformed framed rather than balloon framed and may not require firestopping. The structural frame requires reinforcement see Structural Design for more information.

First Floor, Second Floor, Third Floor

- Restore historic finishes at floor, walls, and ceilings at the 1st through 3rd floors.
    - Remove lead paint
    - Refinish existing wood floors to consistent finish
    - Repair plaster walls where indicated
    - Remove historic muslin ceiling at first floor Hall (Rooms 101 and 102) and crate for dry cleaning and conservation treatment. Reinstall on new backing after structural reinforcement is complete.
        - Tack and spacing to match existing
    - Install new fire-retardant treated muslin ceilings where indicated in place of non-historic ceilings.
    - Remove muslin ceiling at Room 303 for conservation treatment and reinstallation. Install new framing in penthouse.
    - Remove all ceilings at 1st floor in other rooms not indicated above, as well as Room 211 to install new framing.

- Remove hazardous materials where noted. See Hazardous Materials report for full extent.
    - The only ACM found that would affect a significant material or space is the gray asbestos backing paper in the NPS restored muslin ceilings in Rooms 212 and 213, Clara Barton's Sitting Room and Bedroom. The backing and muslin is not original and dates to c. 1978.The ceiling of the Bedroom 213 has already been insulated, however the painted muslin surface finish is damaged from water staining and may require restoration work. The other muslin backing papers found through the house (brown) are not considered hazardous.
- Construct ABAAS-compliant public restroom where shown on first floor.
    - Provide new finishes and fixtures.
- Provide new finishes and fixtures for existing restroom below main stair (Room 106).

Interior Doors

- Clean and restore existing door finishes. See Conservation Assessment.
    - Historic salvaged doors in basement may be incorporated into the interior if their original location can be determined or stored off-site in appropriate storage facility.
- The existing historic door hardware will remain.
- Provide ABAAS-compliant accessible routes throughout 1st floor – Remove door from hinges to provide clear width at accessible route.
    - Widen approximately 3 to 4 existing door openings at first floor

- Assume two will include closet alterations

Equipment

Break room

- Include outlets above counter for microwave, coffee maker, etc.
- Refrigerator/Freezer
- Sink and counter

Janitor closets

- Sinks

Exhibit design, lighting, and climate-controlled cases will be provided under a separate contract.

Architectural Program

The program for the house is to provide interpretation and educational experiences for park visitors with space available for NPS staff.

NPS museum spaces will include furnished period rooms and space for interpretation and exhibits with collections items dispersed in climate-controlled display cases.

Period rooms will include (at minimum):

- Front Parlor (Room 119)
- Rear Parlor (Room 118)
- Historic Kitchen (Room 111)
- Dining Room (Room 112)
- Red Cross Office (Room 113)
- Red Cross Office (Room 114)
- (1) Demonstration closet, first floor
- Alternatives 2, 3A, and 3B also include:
    - Vault (Room 204)
    - Clara Barton's Sitting Room (Room 212)
    - Clara Barton's Bed Chamber (Room 213)
    - Red Cross Chamber (Room 301)

In addition, NPS museum staff will utilize a work area and space for storage of supplies, rotating of museum collections on exhibit, and for general collections management activities. Collections and archive will be stored off-site. Recommendations from *CLBA NHS Building Use Needs Proposal (*March, 2023) identified spaces for the following:

- Interactive Children's Exhibits
- Distance Learning Studio
- Reading Room or space within another room
- Classrooms (up to three: one large, one medium, one small)
- Eastern National (bookstore) space
- Administrative spaces
    - Touchdown workspaces for two NPS staff
    - Breakroom for two to four people
    - Work product / equipment storage
    - Custodial supply room and maintenance
    - Custodial workroom
- Visitor orientation space to hold 20+ persons in climate-controlled space with chairs available

Architecture Alternative 1

In conjunction with mechanical Alternative 1, perform architectural upgrades to Boiler House.

- Remove mold.
- Remove vinyl siding; install cement board siding.
- Provide louver for ventilation.
- New paired hollow metal doors.

Architecture Alternative 2

- Construct an egress route stair within the building footprint.
    - Modify exterior wood door at grade (basement level) and provide new areaway at basement east side. Basement door will need to be heightened by approximately 12". Provide compliant egress door and exit hardware.
- Provide new ABAAS-compliant restroom where shown at second floor.
- Refer to Structural Recommendations for additional work.

Architecture Alternative 3A

- Construct an egress route stair within the building footprint in a fire-rated shaft.
    - Modify exterior wood door at grade (basement level) and provide new areaway at basement east side. Basement door will need to be heightened by approximately 12". Provide compliant egress door and exit hardware.
- Remove and reinstall non-muslin ceilings (plaster and gypsum board) at first floor to reinforce second floor framing. Also remove muslin ceilings at Rooms 112, 113, and 114 and reinstall.
    - Install new structural framing for second floor within joist space (See Structural recommendations).
    - Install new square columns to carry loads through second floor to the basement. (See Structural recommendations).
- Provide new ABAAS-compliant route to public restrooms where shown at second floor.
- Refer to Structural recommendations for additional work.

Architecture Alternative 3B

- Construct an egress route stair within the building footprint in a fire-rated shaft.
    - Modify exterior wood door at grade (basement level) and provide new areaway at basement east side. Basement door will need to be heightened by approximately 12".
- Provide ABAAS-compliant accessible route through 2nd floor– Remove door from hinges to provide clear width at accessible route.
    - Widen approximately 3 existing door openings at second floor
    - Provide compliant egress door and exit hardware.
- Remove and reinstall non-muslin ceilings (plaster and gypsum board) at first floor to reinforce second floor framing. Also remove muslin ceilings at Rooms 112, 113, and 114 and reinstall.
    - Install new structural framing for second floor within joist space (See Structural recommendations).
- Provide new ABAAS-compliant route to public restrooms where shown at second floor.
    - Install new square columns to carry loads through second floor to the basement. (See Structural recommendations).
- Provide a vertical platform lift in fire-rated shaft from the first floor to second. The lift is not anticipated to penetrate the roof.
- Refer to Structural recommendations for additional work.

Archeological

Proposed excavations on the interior and exterior as well as utility trenching have the potential to disturb archeological resources. Archeological investigations, test pits, and monitoring during construction will minimize the effects of these ground disturbances. Potential resources could also be impacted by compacted soils from heavy machinery. Construction access and staging could also result in soil compaction. The lawn areas and trees will require protection to minimize compaction of soils. Ground surface protection will be utilized, where necessary, to reduce or avoid any potential soil compaction.

Structural

The renovation designs for the Clara Barton House will use the 2021 International Building Code (IBC) and the International Existing Building Code (IEBC).

Live Load Analysis

The renovation designs for the Clara Barton House will use the 2021 International Building Code and the International Existing Building Code. These building codes will be used to determine the required live loads for the proposed uses for the Clara Barton House. A previous structural report was completed in November 2018 by AECOM of Arlington, VA. In section 4.2 Structural of AECOM's report, a structural live load analysis was completed. As part of our due diligence, we completed independent calculations to confirm their analysis. See the attached S1.1B.

Per the IBC and per the proposed uses of the space, certain sections of the first-floor require 100 PSF (corridors) or 50 PSF (offices); certain sections of the second-floor require 80 PSF (corridors) or 50 PSF (offices). For the office spaces, an additional 15 PSF must be added to account for partition loading. Based on calculations, the corridor portions of the first-floor do not have the required structural live load capacity. Additionally, no portion of the second-floor has the required structural live load capacity. Therefore, it is our recommendation that supplemental framing be installed to reinforce portions of the first-floor and all of the second-floor to increase the floor framing's live load capacity to meet the code required live loads.

Existing Building Previous Structural Reinforcements

In 1981, supplemental support framing was added below the first-floor framing on the north side of the basement. The new framing included three rows of steel pipe columns supported on reinforced concrete foundations. The columns support three rows of W6 steel beams spanning north-south; the outer two rows replace the existing wood framed stud bearing walls and their (assumed) stone foundation walls. The center row of new columns supported the center bay of framing at their mid-span; this reduced their span lengths which enabled their live load capacities to increase.

The existing west exterior stone foundation wall was underpinning for a portion of the wall at the northern end. A reinforced concrete bench foundation was placed along the interior side of the existing east exterior stone foundation wall. This allowed the interior floor elevation to be lowered without underpinning the existing stone foundation wall. After the 1981 renovation project, additional supplemental supports were added below the first-floor framing on the eastern side of the structure. These supports consist of 8"x16" CMU piers supporting a timber beam. The basement floor elevation at the far north end of the basement space was not lowered; therefore, the existing soil floor elevation slopes up at the north end. Additionally, the first-floor framing was supplemented by additional floor joists or sisters; in many locations, the current floor framing is spaced at 12" on-centers.

However, at the south end of the first floor, supplemental framing (supports or floor joist sisters) was not added. Therefore, their live load capacities were not increased.

Proposed Existing Building Structural Modifications

Structure Alternative 1

Reinforce the first floor to achieve the required live load requirements and keep the second and third floors as unoccupied.

Foundation System:

The foundation system will be comprised of new reinforced concrete spread footings supporting the additional supplemental steel columns to reinforce the first-floor framing. At the potential new restrooms on the south portion of the basement, a new reinforced concrete slab-on-grade will be placed; this slab will be thickened below all partition walls.

First-Floor Framing System:

At portions of the first-floor, new steel beams will span east-west between steel columns and new steel beams located near the existing mid-span, thus reducing the spans of the existing floor joists. See the attached S-1.1.

Second-Floor Framing System:

The existing live load capacities of the second-floor do not meet the code required live load capacities. As part of Design Option 1, no supplemental reinforcing of the existing second-floor framing will be completed. No public or official use of the second-floor will be permitted. See the attached S1.2B.

Third-Floor Framing System:

The existing live load capacities of the third-floor do not meet the code required live load capacities. As part of Design Option 1, no supplemental reinforcing of the existing third-floor framing will be completed. No public or official use of the second-floor will be permitted.

Roof Framing System:

The existing roof framing on the two sides of the center atrium consists of a flat 2x4 with a 2x4 centered above. The existing roof framing in the southwest corner is currently shored in a deflected state. Therefore, the roof framing should be supplemented with additional rafters; new 2x6's should be installed centered between the existing roof rafters spanning from the exterior wall to the interior load-bearing stud walls. At the center of the building, a flagpole is located at the top of the pyramid shaped roof. The flagpole extends down through the existing framing and is braced by four struts to the existing hip rafters. Due to the existing roof framing conditions and the higher code required wind

loads, reinforce the four hip rafters with steel plates and install hold down anchors at the ends of each hip rafter to the wall structure below. Additionally, along the east and west edges of the lower roof, solid blocking will be installed within the stud wall thickness to anchor the fall protection anchors.

Structure Alternative 2

Reinforce the first floor to achieve an increased live load capacity. Reinforce the second-floor framing by sistering the existing framing with cold-formed metal framing (CFMF) to increase the live load capacities. However, the third-floor remains unoccupied.

Foundation System:

The foundation systems will be supplemented as described in Alternative 1 above. No additional foundation work will be required within the existing building footprint for this design option.

First Floor Framing System:

The first-floor framing will be supplemented as described in Alternative 1 above. No additional first-floor reinforcing will be required within the existing building footprint for this design option.

Second-Floor Framing System:

The second-floor framing will be reinforced; the reinforcing will consist of 6" deep cold-formed steel joist sistered on all second-floor joists. This will allow an increase in live load capacity. However, it will not achieve the code required live loads. The governing condition is based on allowable deflection criteria. The live load capacity for the perimeter rooms will be 40psf and the atrium floor space will be 60psf. Local code officials will determine if the second floor can be occupied. See the attached S-2.2.

Third-Floor Framing System:

The existing live load capacities of the third-floor do not meet the code required live load capacities. As part of Design Option 2, no supplemental reinforcing of the existing third-floor framing will be completed. No public or official use of the third-floor will be permitted.

Roof Framing System:

The existing roof framing on the two sides of the center atrium consists of a flat 2x4 with a 2x4 centered above. The existing roof framing in the southwest corner is currently shored in a deflected state. Therefore, the roof framing should be supplemented with additional rafters; new 2x6's should be installed centered between the existing roof rafters spanning from the exterior wall to the interior load-bearing stud walls. At the center of the building, a flagpole is located at the top of the pyramid shaped roof. The flagpole extends down through the existing framing and is braced by four struts to

the existing hip rafters. Due to the existing roof framing conditions and the higher code required wind loads, reinforce the four hip rafters with steel plates and install hold down anchors at the ends of each hip rafter to the wall structure below. Additionally, along the east and west edges of the lower roof, solid blocking will be installed within the stud wall thickness to anchor the fall protection anchors.

Second Floor Accessibility:

In order to use the second floor a second means of egress and an accessible means of access must be added. It is proposed to add a new stair opening on the south side of the building. For the new stair opening, the existing floor framing will be removed between the exterior load-bearing wall and the interior load-bearing wall. Provide a horizontal wall brace along the exterior wall at the second-floor level to brace the exterior wall framing.

Structure Alternative 3A

Foundation System:

The foundation system will be comprised of new reinforced concrete spread footings supporting the additional supplemental steel columns. In some locations, existing columns and foundation will be removed in order to add other columns. See the attached S-3A.B.

First and Second Floor Framing System:

The supplemental framing will include steel columns inserted through the floor framing from the basement up to the underside of the second floor supporting new steel beams placed within the depth of the existing second floor framing. At portions of the first floor and all of the second floor, new steel beams will span east-west between steel columns and new built-up laminated veneer lumber (LVLs) beams will be inserted and recessed up within the depth of the existing floor framing, thus reducing the spans of the existing floor joists. The existing floor joists will be re-supported on the LVL's with joist hangers (Simpson Strong-Tie or design professional-approved equal). This design concept attempts to limit the depth of the supplemental floor framing to not be deeper than the existing floor framing; this will be a challenge since the existing second floor framing is approximately 6" deep.

Third Floor Framing System:

The existing live load capacities of the third-floor do not meet the code required live load capacities. Additionally, the columns being installed from the basement up to the underside of the second-floor are located outside of the (2) interior load-bearing stud walls. If these columns were to be extended up to the third floor, the majority of the columns would be outside of the building envelope.

Therefore, a design decision was made to not reinforce the third-floor framing; this floor will be an unoccupied and inaccessible floor.

Roof Framing System:

The existing roof framing on the two sides of the center atrium consists of a flat 2x4 with a 2x4 centered above. The existing roof framing in the southwest corner is currently shored in a deflected state. Therefore, the roof framing should be supplemented with additional rafters; new 2x6's should be installed centered between the existing roof rafters spanning from the exterior wall to the interior load-bearing stud walls. At the center of the building, a flagpole is located at the top of the pyramid shaped roof. The flagpole extends down through the existing framing and is braced by four struts to the existing hip rafters. Due to the existing roof framing conditions and the higher code required wind loads, reinforce the four hip rafters with steel plates and install hold down anchors at the ends of each hip rafter to the wall structure below. Additionally, along the east and west edges of the lower roof, solid blocking will be installed within the stud wall thickness to anchor the fall protection anchors.

Lateral Load-Resisting System:

The existing structure does not have any apparent lateral load-resisting system. Therefore, it is assumed that all the sheathed exterior load-bearing walls are acting as shear walls and resisting all the applied lateral loads. With the proposed insertion of new steel columns and beams, this will provide the opportunity to add some additional lateral stiffness to the existing structure. In two locations, diagonal bracing will be located from the basement floor up to the second floor; this bracing will be concealed in closets on the first floor.

Structure Alternative 3B

For this Alternative option, there is only one change from Alternative 3A. This alternative includes a vertical platform lift within the footprint of the building.

For the addition of a lift from the first floor to the second floor, floor openings will be required at the first floor and second floor levels. In the basement, two new concrete foundations supporting two new steel columns will be located below the west side of the lift. The east side of the lift will be supported by the existing steel beam and steel columns. The existing wood floor framing at the first floor will be headed off and resupported on the new steel framing at the first floor. For the floor opening at the second floor, the existing floor joists on the north and south sides of the lift will be reinforced with a steel channel spanning from the corridor wall to the exterior wall.

Mechanical

Introduction

The mechanical portion of this project includes providing a new HVAC system to condition the Clara Barton House.

Applicable Adopted Codes, Standard, and Regulations

1. International Building Code (IBC) 2018
2. International Existing Building Code (IEBC) 2018
3. International Energy Conservation Code (IECC) 2018
4. International Mechanical Code (IMC) 2018
5. International Plumbing Code (IPC) 2018
6. National Electrical Code (NEC) 2017
7. National Fuel Gas Code (NFGC), ANSI Z223.1, NFPA 54 with DLLR Modifications
8. International Fuel Gas Code (IFGC) 2018
9. ASHRAE 62.1 – Ventilation Standards
10. ASHRAE 90.1 – Energy Guidelines
11. National Fire Protection Association Standards referenced in codes listed
12. All current amendments, appendices, references and supplements to the codes listed
13. Current Adopted ASHRAE and IES Standards
14. Sheet Metal & Air Conditioning Contractors (SMACNA) HVAC Duct Design & Construction Standards
15. American Society of Mechanical Engineers (ASME) Codes

Basic Building Data

Basic building data as indicated form the basis of the design of the Mechanical systems.

Building Envelope Requirements: Existing exterior walls, windows and roof are to remain.

Environmental Temperature Criteria:

Exterior Environmental Conditions:

	DB	WB	WIND VELOCITY
Summer			
Building Heat Gain	95°F	78°F	7-1/2 mph
Air Cooled Condenser– Mounted on Grade	95°F	-	-
Winter			
Building Heat Loss	0°F	-	15 mph
Infiltration	0°F	-	15 mph

Interior Environmental Conditions:

General: Indicated interior conditions are design criteria on which equipment capacities are specified at the exterior conditions listed above. All normally occupied areas will be air-conditioned. Areas such as toilet rooms, general storage, closets, and similar spaces without exterior exposure will generally be ventilated, but will not be heated or cooled.

SPACE	SUMMER		WINTER		NOTES
	DB	RH	DB	RH	
Occupied Spaces	75°F	50%	72°F	-	
Unoccupied Mechanical Rooms	105°F	-	65°F	-	
Toilet Rooms/Storage/Etc. without exterior exposure	75°F	50%	70°F	-	(1)
Toilet Rooms/Storage/Etc. with exterior exposure	75°F	50%	70°F	-	
Electrical/IT/AV/Data Closets and Rooms	75°F	50%	65°F	-	

NOTES:

(1) Ventilated with transfer air.

Life Cycle Cost Analysis

A 20-year life cycle cost analysis has been performed for the following two HVAC systems:

1. Full Heating and Partial Cooling of House. This option has a propane-fired hot water boiler with heating water pumps to provide the heating. There will be hot water baseboard heaters in each space. This option has direct expansion (DX) split systems to provide cooling to only some of the spaces. This option has a dedicated outdoor air system (DOAS) to provide ventilation air to the house. The DOAS units consists for an energy recovery wheel, DX cooling coil, electric heating coil, filters, and supply and exhaust fans.

2. Heat Pump Variable Refrigerant Flow (VRF) system. This option consists of two VRF heat pump systems – one for the east half of the house and one for the west half of the house. Each system consists of one outdoor heat pump unit and multiple indoor units. The indoor and outdoor units are connected with refrigerant piping. This option has a dedicated outdoor air system (DOAS) to provide ventilation air to the house. The DOAS units consists for an energy recovery wheel, DX cooling coil, electric heating coil, filters, and supply and exhaust fans.

Life Cycle Cost Analysis Results:

Life Cycle Cost Analysis – HVAC Options				
System	**First Cost**	**Annual Energy Cost**	**Annual Maintenance Cost**	**20-Year Life Cycle Cost**
Full Heating/Partial Cooling	$825,432	$16,392	$11,604	$1,480,944
VRF System	$864,502	$6,421	$10,630	$1,267,305

The life cycle cost analysis indicates that the most cost-effective system is the VRF System. The VRF has the lowest energy cost and lowest maintenance costs. This is the system that is recommended.
At this time, it has been assumed that there will not be any insulation provided in the exterior walls and roof. If insulation is provided, then the systems can get smaller. At this point it is also assumed that the space temperature setpoints will be 75 degrees F for cooling and 70 degrees F for heat.

HVAC Design Alternatives

Mechanical Alternative 1 – Partial Cooling/Full Heating

Under this alternate the building will be fully heated, but only partially cooled. Only the normally occupied spaces such as offices will be cooled.

Baseboard hot water radiators will be located in each space. A propane fired boiler will be provided to provide the heating hot water. The boiler will be sized for 250 MBH and will be located in the existing shed on the site. The shed would need to be updated to meet the requirements of the new boiler. There will be two heating water pumps in the boiler shed. It still needs to be determined if the existing below grade heating water pipes can remain or if they need to be replaced. The propane tanks would likely need to be replaced. All new heating water piping will be routed within the building to the baseboard heaters. A majority of the heating water piping will be routed in the basement with risers up to the 2nd floor concealed in closets.

The cooling will be provided by cooling only multi-zone split systems. There would be three 5-ton cooling only split systems. Each system would have one outdoor air-cooled condensing unit and multiple indoor fan coil units.

a. Basement: Unoccupied portion of basement - Floor mounted console fan coil units. Occupied portions of basement – Floor mounted console units with custom enclosures over the fan coil units to help blend into the historic appearance of the building.
b. First Floor: Most of the first floor spaces will be served by vertical AHU type fan coil units located in the basement. These fan coil units will be ducted to floor mounted registers on the first floor. Floor mounted console fan coil units with custom enclosures over the fan coil units to help blend into the historic appearance of the building or ducted fan coil units in the basement ducted to floor registers in the first floor.

Under this option there will also be a Dedicated Outdoor Air System (DOAS) that will provide outdoor air to the building. The DOAS unit will provide neutral air (75 degrees F / 50% RH) to the building. The DOAS

unit will be a split DX heat pump that will have that will have an energy recovery wheel and DX coil and electric heat. It will have an air-cooled condensing unit outdoors on grade. The DOAS unit will be sized for 2,600 CFM, 13-tons of cooling and 25 kw of heat. The DOAS will be located in the basement. The outdoor air will be brought in from a louver in the basement wall. The Relief/Exhaust Air will discharge through a louver in the basement wall. The neutral air supplied by the DOAS unit will be ducted to registers in each space. Duct risers will need to be brought up through the closets. The exhaust/relief air will all be pulled from floor mounted registers in the Main Hall on the First Floor.

Even though this partial cooling option is being presented, it is not recommended. The non-cooled spaces would get pretty hot in the summer and may be uncomfortable. It is also possible that there could be condensation issues. If Alternative 1 is selected, it does not mean the partial cooling option needs to be selected. It is possible to have a VRF system to fully condition the building. If a VRF system was selected for Alternative 1, There would be two VRF systems. The East VRF System would be sized for 16 tons cooling and 127 MBH heating. The West VRF System would be sized for 16 tons cooling and 122 MBH heating.

Mechanical Alternative 2, 3A, and 3B – VRF Heat Pump System

Under these alternates a Variable Refrigerant Flow (VRF) Heat Pump System will be provided to condition the building. There will be two VRF systems – one for the east half of the building and one for the west half of the building. Each VRF System will have one heat pump unit which will be located outdoors on grade. These two units will most likely be located on the southeast side of the site where the existing condensing unit is located. There will be multiple indoor VRF fan coil units located throughout the building. There will be refrigerant piping routed from the outdoor heat pump units to all of the indoor fan coil units. A majority of the piping will be routed in the basement with risers up to the 2nd floor concealed in closets.

Alternative 2 (East VRF System): 16 tons cooling / 127 MBH heating
Alternative 2 (West VRF System): 17 tons cooling / 122 MBH heating
Alternative 3A (East VRF System): 16 tons cooling / 127 MBH heating
Alternative 3A (West VRF System): 17 tons cooling / 122 MBH heating
Alternative 3B (East VRF System): 16 tons cooling / 127 MBH heating
Alternative 3B (West VRF System): 17 tons cooling / 122 MBH heating

The VRF fan coil units can be either ducted units, ceiling mounted cassette units, wall mounted units, or floor mounted console units.

c. Basement: Unoccupied portion of basement - VRF floor mounted console fan coil units. Occupied portions of basement – VRF floor mounted console units with custom enclosures over the fan coil units to help blend into the historic appearance of the building.
d. First Floor: Most of the first floor spaces will be served by vertical AHU type fan coil units located in the basement. These fan coil units will be ducted to floor mounted registers on the first floor. VRF floor mounted console fan coil units with custom enclosures over the fan coil units to help blend into the historic appearance of the building or ducted fan coil units in the basement ducted to floor registers in the first floor.

e. Second Floor: VRF floor mounted console fan coil units with custom enclosures over the fan coil units to help blend into the historic appearance of the building.
f. Third floor: VRF floor mounted console fan coil units.

Under this option there will also be a Dedicated Outdoor Air System (DOAS) that will provide outdoor air to the building. The DOAS unit will provide neutral air (75 degrees F / 50% RH) to the building. The DOAS unit will be a split DX heat pump that will have that will have an energy recovery wheel and DX coil and electric heat. It will have an air-cooled condensing unit outdoors on grade. The DOAS unit will be sized for 2,600 CFM, 13-tons of cooling and 25 kw of heat. The DOAS will be located in the basement. The outdoor air will be brought in from a louver in the basement wall. The Relief/Exhaust Air will discharge through a louver in the basement wall. The neutral air supplied by the DOAS unit will be ducted to registers in each space. For spaces with ducted VRF fan coil units, the outdoor air will be ducted to the fan coil unit return duct. Duct risers will need to be brought up through the closets. The exhaust/relief air will all be pulled from floor mounted registers in the Main Hall on the First Floor.

Plumbing

Plumbing System Design Criteria

Incoming Water Pressure: A flow test was performed on 05/23/2017. The flow test indicated a static pressure of 88 psi. This is adequate pressure for the domestic water system. However, since this flow test is five years old, a new flow test should be performed to confirm that the pressure is still adequate.

Plumbing Systems

Storm Water System:

1. The roof is currently drained by gutters and downspouts.
2. There is an existing simplex sump pump in the northwest corner of the basement near the fire protection backflow preventer. The sprinkler drain and a condensate drain discharge into the sump pit. It is not known what else the sump pit collects. The sump pump discharge ties into the sanitary piping in the basement. If this sump pump needs to remain, it will be replaced and the discharge will be taken to grade.

Sanitary Drainage and Vent Systems:

1. All of the existing sanitary and vent piping within the House will be replaced.

2. Plumbing fixtures above the sewer invert will be drained by gravity through soil, waste, and vent stacks and will connect to the existing sanitary sewer system.

3. Plumbing fixtures below the sewer invert will be drained by gravity to sewage pumps and pumped into gravity house drains.

Domestic Water Supply Systems:

1. All existing domestic water piping within the House will be replaced.

2. The existing ¾" domestic water backflow preventer will be replaced with a 2" backflow preventer.

3. The domestic water will be distributed though all new valved mains, risers, and branches to plumbing fixtures and equipment, using existing street pressure for distribution.

4. Hot water will be generated at 140 degrees F and mixed down at the fixtures.

New Plumbing Fixtures and Equipment

Plumbing Fixtures:

1. Materials: Vitreous china, acid resistant enameled cast iron or stainless steel, wall hung type, unless otherwise noted, with chrome plated brass trim and individual stop valves.

2. Water Closets: Floor-mounted with manual operated flush valve.

3. Lavatories: Countertop type with ADA compatible metered faucets with mixing valve.

4. Double Compartment Sink: Countertop mounted stainless steel sink.

5. Single Compartment Sink: Countertop mounted stainless steel sink.

6. Service Sinks: Precast terrazzo corner unit floor mounted fixture.

7. Drinking Water Coolers: Double wall hung or recessed unit with front and side pushbars.

Plumbing Equipment:

1. Domestic Water Heater: 3 kw electric storage type water heater with 30 gallons of storage located in the basement.

2. Hot Water Recirculation Pump: An inline circulator pump will be provided adjacent to the water heater.

3. Sewage Pump: A duplex sewage pump with basin, basin cover and all controls will be provided as necessary for only the fixtures that can't drain by gravity.

4. Simplex Sump Pump: A duplex sump pump with basin, basin cover, and all controls will be provided to replace the existing one if needed.

ADA Compliance:

1. Mounting heights and clearances in accordance with ADA Section 305 and 306.

2. Flush valve and drinking water cooler pushbars rated for 5 lbs force.

3. Wheelchair offset supplies and tailpieces.

4. Insulation protection for exposed traps and supplies.

Estimated Water Usage

The estimate annual water usage was calculated for the Clara Barton House. It is estimated that the Clara Barton House will receive an average of approximately 90 visitors per day. It is estimated that there will be 20 full time staff members. It is expected that the Clara Barton House will be open to the public 354 days a year, about 10 to 12 hours per day. The standard assumptions for daily use have been used and are indicate table below.

Estimated Water Usage						
Occupant Type	**Fixture Type**	**Consumption (Gallons per Minute)**	**Daily Uses per Person**	**Duration (Minutes)**	**Number of Occupants per Day**	**Daily Water Uses (Gallons)**
Visitor	Water Closet - Male	1.6	0.5	-	45	36
Visitor	Water Closet – Female	1.6	0.5	-	45	36
Visitor	Lavatory	0.5	0.5	0.30	90	6.75
Staff	Water Closet - Male	1.6	3.0	-	10	48
Staff	Water Closet – Female	1.6	3.0	-	10	48
Staff	Lavatory	0.5	3.0	0.30	20	9
Total Daily Water Usage (Gallons)						183.75
Days of Operation per Year						354
Total Annual Water Usage (Gallons)						65,047.5

Fire Protection

The sprinkler system is in very good condition and can remain. The one recommendation would be to pipe the sprinkler system main drain to the exterior. It currently discharges into a sump pit in the basement. The sump pit appears to be small for the main drain. It would be better if it discharges to the exterior to avoid possibly flooding the basement.

If there are any changes to the floor plans, etc., it is possible that some of the piping and/or sprinkler heads may need to be relocated. If there are exhibits that are added, it is possible that additional sprinkler heads may need to be provided. These would be minor changes that should not affect the sprinkler demand or pipe sizes.

It may also be desired to replace all of the heads on the first, second and third floors with concealed heads. This would just be an aesthetics upgrade if desired.

Electrical

Applicable Codes and Standards

- NFPA 70: National Electrical Code (NEC) 2020
- National Electrical Safety Code (NESC) 2017
- AHRAE/IES 90.1 2016
- International Building Code (IBC) 2021
- NFPA 72: National Fire Alarm and Signaling Code 2019
- NFPA 101: Life Safety Code 2021
- NFPA 780: Standard for the Installation of Lightning Protection Systems 2023
- Illuminating Engineering Society (IES) Lighting Handbook – 10th Edition

Electric Load Summary

Room square footage was used in conjunction with estimated loads for lighting, power, HVAC, and specialty equipment to determine the overall building electrical service size.

- The service size maintaining single-phase will be 800-amps.
- Loads for the basic catering/break room equipment, and AV/IT loads were also included in the calculations.
- The service sizes account for 20% growth for future loads or projects to the building.

Building Distribution and Systems

- Panelboards
    - A main distribution panelboard (800-amps single-phase) will be located in the northeast corner of the basement at the service entrance point. This will serve mechanical equipment, and additional lighting and appliance panelboards.
    - Lighting and appliance panelboards will be fully rated with main circuit breakers and will be provided with surge protective devices.
- Grounding and Bonding
    - Grounding and bonding for the facility and site will be designed in accordance with NEC Article 250. The service entrance ground will be established at the point of building entry. All grounding electrodes present will be bonded together to form a grounding electrode system.
    - A main grounding bus bar will be used to connect all components for a single grounding point. Systems to be connected to ground bar include water service piping, communications and security systems, lightning protection, and other grounding requirements.
    - Feeders will each include an individual ground conductor.
    - All branch circuits will have a green ground wire pulled with all circuits.

- Surge Protection
    - Surge protective devices will be provided on the service entrance panelboard and any branch circuit panelboards to protect equipment. Surge protection is also required for the lightning protection system.
- Cabling
    - Conductors will be copper, single conductor THHN-THWN, solid for 10 AWG and smaller, stranded for 8 AWG and larger.
    - The minimum wire size to be used for lighting and power systems is 12 AWG.
    - Smaller gauge cable may be used for lighting controls where required.
- Raceways/Conduit
    - Conduit will generally be EMT except that PVC, IMC or RSC may be used in special conditions.
    - Metal Clad (type MC) cable will not be used unless provisions are made by NPS to limit disturbance to historic fabric.
    - Low voltage wiring, such as that for lighting controls, will be installed in raceway.
    - Conduits will generally be installed concealed within finished walls, ceilings and floors. In finished areas where raceways cannot be installed concealed, they will be installed parallel and perpendicular to surfaces of exposed structural members and surface contours. Raceways installed exposed in finished areas will be painted to match adjacent surfaces.
- Wiring Devices
    - Switches and receptacles will generally be specification grade.
    - Convenience receptacles will be provided in the exhibit areas in coordination with the Exhibit Designer.
    - Additional convenience receptacles will be provided in other areas of the building for offices, break rooms, workshops, and general use.
    - Device finish will generally match adjacent baseboard or wall finish.
    - Exterior Receptacles: Outdoor receptacles will be weather resistant with extra duty weatherproof while-in-use covers and will be provided with integral ground fault protection in accordance with the NEC. A few on the building and near mechanical equipment will be sufficient for the use of the House.
- Lightning Protection
    - Roof repairs will be part of the rehabilitation, so the addition of a lightning protection system will be provided to help protect the building from lightning strikes and potential damage to the structure.
    - The lightning protection system will be designed in accordance with NFPA 780 standards and include strike termination devices, conductors, ground terminals, and associated connections and fittings.
    - Down conductors will be exposed on the sides of the building, but concealed from view behind the stone veneer/chimneys.
    - The system will utilize Class I materials because the structure will is less than 75 feet high. System components will generally be copper. Stainless-steel strike termination devices will be used. Where the roofing, flashing, and surfaces are aluminum, the system materials will also be aluminum.

    - A UL Master Label will be required for the system.
- Identification
    - Identification of wiring and raceways shall meet minimum industry practice and requirements except that supplemental identification will be provided where requested, for the benefit of building operation and maintenance personnel.
- Testing and Field Instruction
    - The contractor will be required to instruct the NPS on the proper operation and maintenance of the equipment and systems.

Interior Lighting

- The interior illumination levels will be designed to meet the recommendations of the IESNA Lighting Handbook, 10th edition
- Provide new interior LED lighting in rooms that will require permanent lighting. Decorative and periodic-style lighting will be utilized and approved by the Park. Provide track lighting in addition if desired by the Park for future exhibit layouts.
- The basement will include 4' linear LED strip luminaires.
- At a minimum, automatic lighting control devices including occupancy sensors and photosensors should be installed per energy code and good design practice. The ample windows allow for significant daylight into most perimeter spaces and should supplement the artificial lighting. Localized switches should be provided for each enclosed space to further dim the lighting to the occupant's liking.
- Where applicable, individual task lighting will be supplied for each work station.
- Common areas such as the central halls, corridors, and vestibule areas will utilize occupancy sensors and maintain the lights on during normal business hours. Any exhibit space with permanent lighting will also be controlled via occupancy sensors.

Emergency and Egress Lighting

- Under emergency power conditions, the means of egress illumination must be not less than an average of 1 footcandle and a minimum at any point of 0.1 footcandle measured along the path of egress at floor level. Additionally, a maximum-to-minimum illumination uniformity ratio of 40 to 1 shall not be exceeded.
- Provide exit signs and emergency lighting along egress routes in accordance with the life safety egress plan to meet 90-minute backup power requirements as noted in NFPA 101 Life Safety Code.
- Low-profile emergency battery unit luminaires will be used or concealed style dual emergency lights with a door that would flip open in the event of a power outage.
- Exit signs will consist of edge-lit acrylic panels, clear for single faced and mirrored for double faced, for public spaces. Exit signs will consist of die-cast aluminum housings for "back-of-house" spaces. Legend construction will consist of red or green text depending on the authority having jurisdiction. Signs will utilize long-life LED.
- The emergency egress and exit lighting system will be powered, under a normal circuit power outage, from integral battery backup.

Exterior Lighting

- The exterior illumination levels will be designed to meet the recommendations of the IESNA Lighting Handbook, 10th edition.
- Limited exterior lighting will be added to the project unless requested by the Park and/or landscape architect for pathways around the building.
    - The front porch, egress doors, and the ADA accessible ramp will be illuminated.
    - The two existing façade flood lights will be removed unless the Park wants them to be retained. These provide significant uplighting and are not Dark Sky compliant.
- Some exterior lighting may remain on throughout the night to assist any exterior security cameras.
- All exterior lighting will be routed through a lighting control system with scheduling to allow the Park to program on and off times for the lighting.

Telecommunications/Security

System Distribution

Direct buried conduits will be provided for telecom/data service to the building. The conduits will be routed underground from a utility pole at the end of Oxford Road.

- NPS will have to provide the active service accounts serving the Clara Barton House (Verizon, etc.) and what services are required as part of the design (analog telephone system or VoIP, fiber, Wifi, coax, etc.).
- NPS requested this equipment be located in a dedicated and conditioned room or closet that can only be accessed by those with appropriate permission. Existing room B-2 in the basement was previously used for a water heater but is available for use in the new design.
- The room will be lined with 3/4” plywood sheets for mounting of equipment.

Telecommunications Equipment and Devices

The existing and outdated telecommunications equipment in the basement will be replaced. It is located in the open basement area that will be renovated.

- New network interface boxes will be provided in the basement for utility service termination for internet, phone, fiber, etc.
- A standard 19” x 19” network rack for switches will be installed to neatly maintain and organize cabling, network switches, video recorders, UPSs, etc.
- New data and telephone cabling will be provided to outlets in offices, common spaces, bookstore, and other spaces for future exhibits as required by the Park.
- All Category 6 cabling will be in conduit.
- Stacked closets and other chases will be utilized to distribute cabling in conduit from the basement to the first and second floors.

Security/Intrusion Equipment and Devices

There are limited existing security devices and cameras. New systems will be installed to accommodate the floor plan renovations.

- A security system panel will be provided in the dedicated telecommunications room. It will serve motion sensors, door and window contacts, glass break sensors, a master keypad at building entry, and a secondary keypad at basement entry. The Park will assist the design team in determining exact locations of devices.
- All wiring will be in conduit.
- The system will be capable of expansion to include sensors for exhibit cases as warranted by the Park.
- A CCTV system will be provided in the dedicated telecommunications room. It will serve cameras as determined by the Park (assume 5 cameras) and video recorder.

Fire Alarm

The existing fire alarm system installed in 2016 is in very good condition and is code compliant. Devices should remain in place where applicable but will be relocated as necessary to accommodate renovations of room layouts and exhibits.

- The existing fire alarm control panel (FACP) is a Silent Knight 5820XL. It is located in the basement just outside the proposed room B-4 in southwest corner of the building. It is interfering with the proposed egress door and will be relocated in the B-1 space. New wiring will have to be provided to all existing and new devices to eliminate cable splicing.
- Existing devices will be protected with dust covers during construction to limit contamination and debris infiltration.
- New devices will be installed to meet the requirements of applicable codes and standards, including but not limited to IBC Section 907, NFPA 72, NFPA 70, and NFPA 13.
- Initiating devices will include manual fire alarm boxes, automatic fire detectors (smoke detectors and heat detectors), and automatic sprinkler system waterflow devices.
- Notification appliances will be located throughout the building to meet the audibility and visual signaling requirements in IBC Section 907.5 and NFPA 72.
    - Audible Notification Appliances:
        - Horns throughout the building.
        - Horns must have a sound level at least 15 dB above the average ambient sound level or 5 dB above the maximum sound level having a duration of at least 60 seconds, whichever is greater.
        - The sound level will be measured 5 feet above the floor in the area served by the system.
    - Visual Alarm Notification Appliances (Strobes):
        - Strobes will be located in public use areas and common use areas of the building, (e.g., corridors, open workstation/flex area, conference rooms, toilet rooms, and other rooms made available for shared use by two or more people).
    - Circuits and Pathways:

- All fire alarm wiring must be solid copper.
- Fire alarm wiring will be installed in conduit for improved physical protection.
- All fire alarm wiring must be installed in rigid metal conduit or electrical metallic tubing with a minimum ¾-inch inside diameter. Compression fittings and couplings must be used.

Site Utilities

Electric and Communication utilities to the Clara Barton House are extended from Macarthur Boulevard via overhead lines along Oxford Road.

- Electric service will be increased for the additional load on the building.
- Telephone and fiber lines will be routed to the building for NPS office spaces, proposed exhibit functions, building security, and reconnection to the existing fire alarm system.
- Both utilities will transfer underground before entering the building to limit visibility on the site and building.
- Both utilities will be routed in a single underground trench to limit site disturbance.

Electrical Service Distribution

The existing single-phase service to the House is distributed overhead by a series of utility poles on the west side of Oxford Road and around the south and east sides of the building. These poles also serve residential homes on Oxford Road. This existing service is undersized for the proposed renovations, which includes the addition of an HVAC system, future exhibits, and a potential lift. Upgrading to three-phase power will be extremely expensive, so all alternates will include a heavy-up of existing single-phase power. This will maintain the existing poles on Oxford Road and feeds to existing residences.

- PEPCO will provide the utility poles, pad-mounted transformer(s), and the primary feeder.
- The contractor will install the underground conduits to the building. PEPCO will provide the cabling in the conduits to the CT cabinet and meter.
- Secondary feeders from the meter will be provided by the contractor.

PEPCO rules require the metering equipment to be on the building that the meter is serving. There is no remote option available. The conduits will poke up from below-grade into a wire trough. The conduits will enter a CT cabinet and meter on the outside of the building or inside the building and into the basement to a service disconnect. This will be concealed from view as much as possible. Other landscaping can also conceal this from view. The renovated basement height will also play a factor for the electrical equipment.

Electrical Alternative 1

Alternative 1 will retain the existing utility poles to the east and south of the building. PEPCO will provide a service heavy-up of the existing overhead single-phase service lines from Macarthur Boulevard. PEPCO will provide a pad-mounted transformer near the pole at the southwest corner of the site. The utility lines will transition underground at the pole and enter the east basement. A CT cabinet and meter will have to be located on the outside of the building per PEPCO standards. The CT cabinet may be able to go inside if there is room.

Electrical Alternative 2

During the fire alarm/fire suppression project in 2016, two 3" conduits were installed from a proposed future PEPCO pole to the northeast corner of the basement. Inside the basement, these conduits are located directly adjacent to the sprinkler system assembly and just outside the door to the Fruit Cellar room. This is not an ideal location for service entrance as there is no wall space for equipment.

Alternative 2 will retain the existing utility poles to the east of the building. PEPCO will provide a service heavy-up of the existing overhead single-phase service lines from Macarthur Boulevard. PEPCO will provide a pad-mounted transformer near the pole at the southeast corner of the site. The utility lines will transition underground at the pole and enter the west basement. New conduits can be installed under the service road and away from the sprinkler assembly to wall space that is more open for new electrical equipment. A CT cabinet and meter will have to be located on the outside of the building per PEPCO standards. The CT cabinet may be able to go inside if there is room. This is a more photographed side of the building, so a meter may not be ideal on this wall.

Electrical Alternative 3

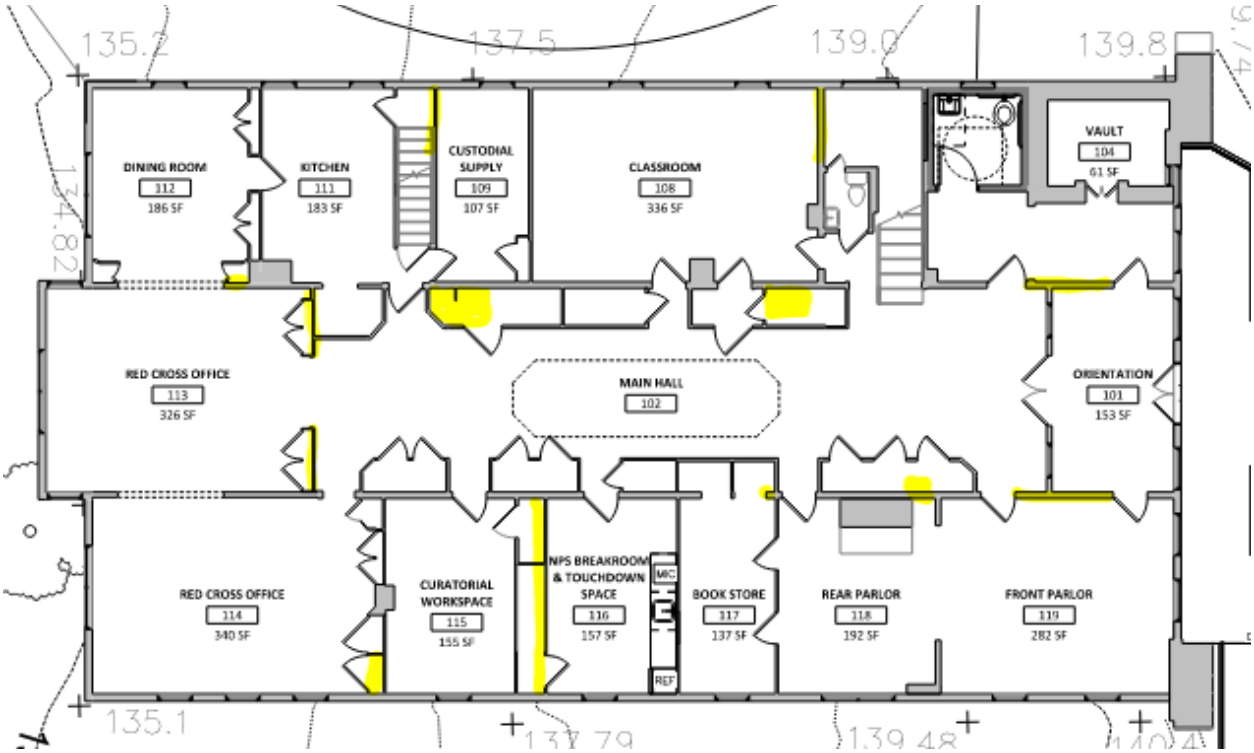
Since the north end of the building will have a major upgrade to the façade, porch, and accessibility improvements, it would be recommended to route the underground conduits in this area that will already be disturbed, but outside of the porch footprint. The west wall of the basement is already allocated to fire protection equipment and the north wall would be directly under the porch. The best available basement space is on the east side. Service conduits would have to be routed underground to the northeast corner where they could enter the building.

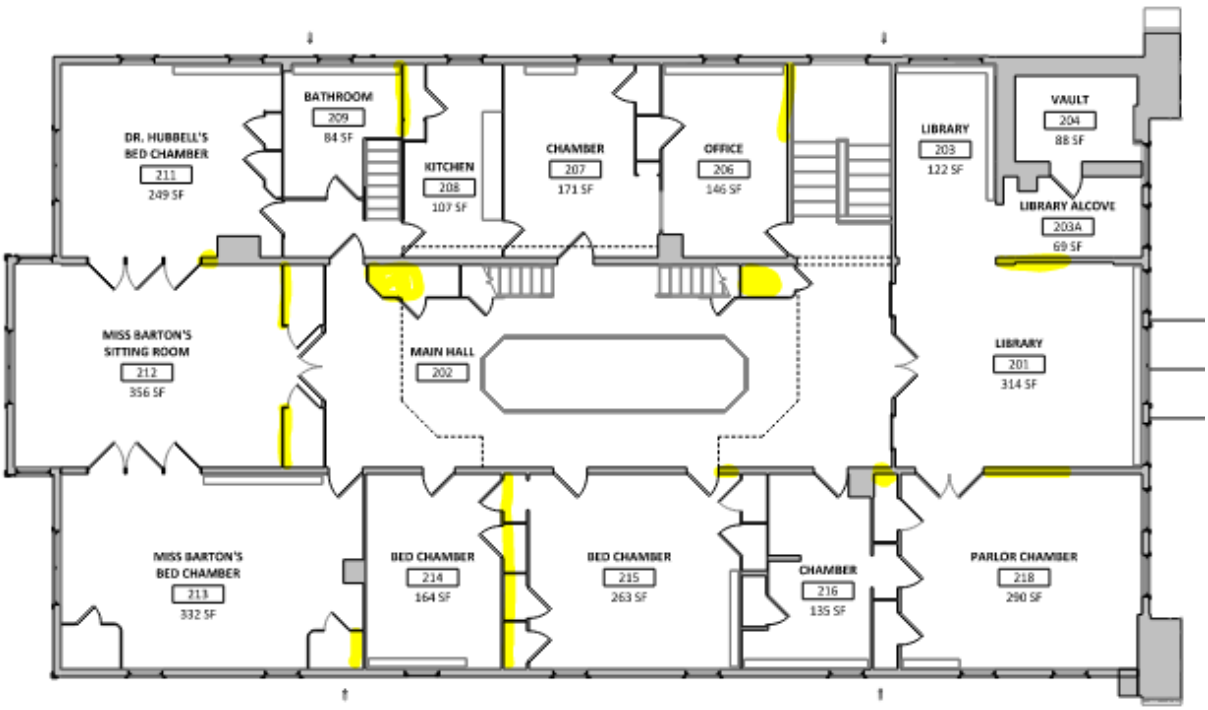
Alternative 3 will be similar to the previous SD submission. Utility poles to the east and south of the building will be removed. This will free the site from unsightly overhead lines and utility poles. PEPCO will provide a service heavy-up of the existing overhead single-phase service lines from Macarthur Boulevard to the last pole along Oxford Road before entering the Clara Barton site. The service conductors will transition underground at this pole and follow the wood line or proposed walking path towards the building. PEPCO will provide a pad-mounted transformer at the northeast corner of the site as far out of view as possible. The secondary lines will continue underground from the transformer and enter the east basement. A CT cabinet and meter will have to be located on the outside of the building per PEPCO standards. The CT cabinet may be able to go inside if there is room.

Chases Within Building

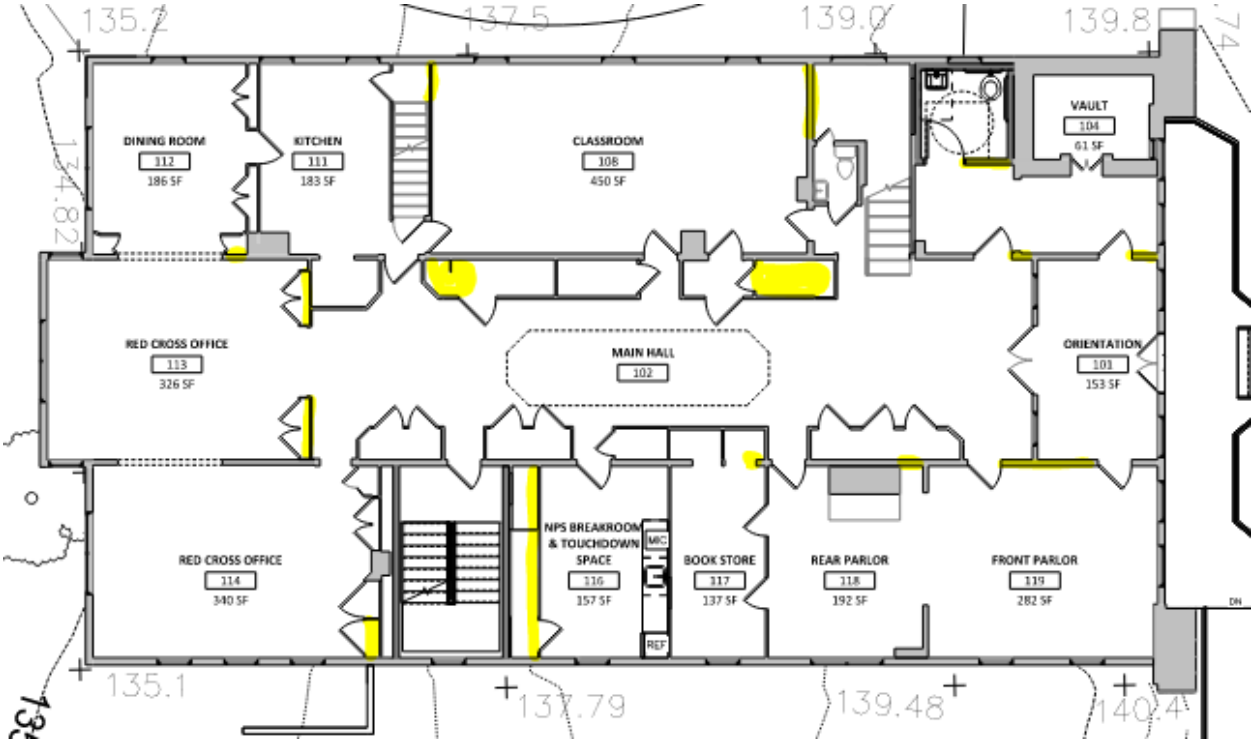
In order to provide power and data for exhibits and classrooms on the first and second floors, chases need to be utilized to conceal wiring and conduit from view. There are several closets and interior walls that can bring the required cabling to these areas from the basement. The following pages highlight potential chase locations.

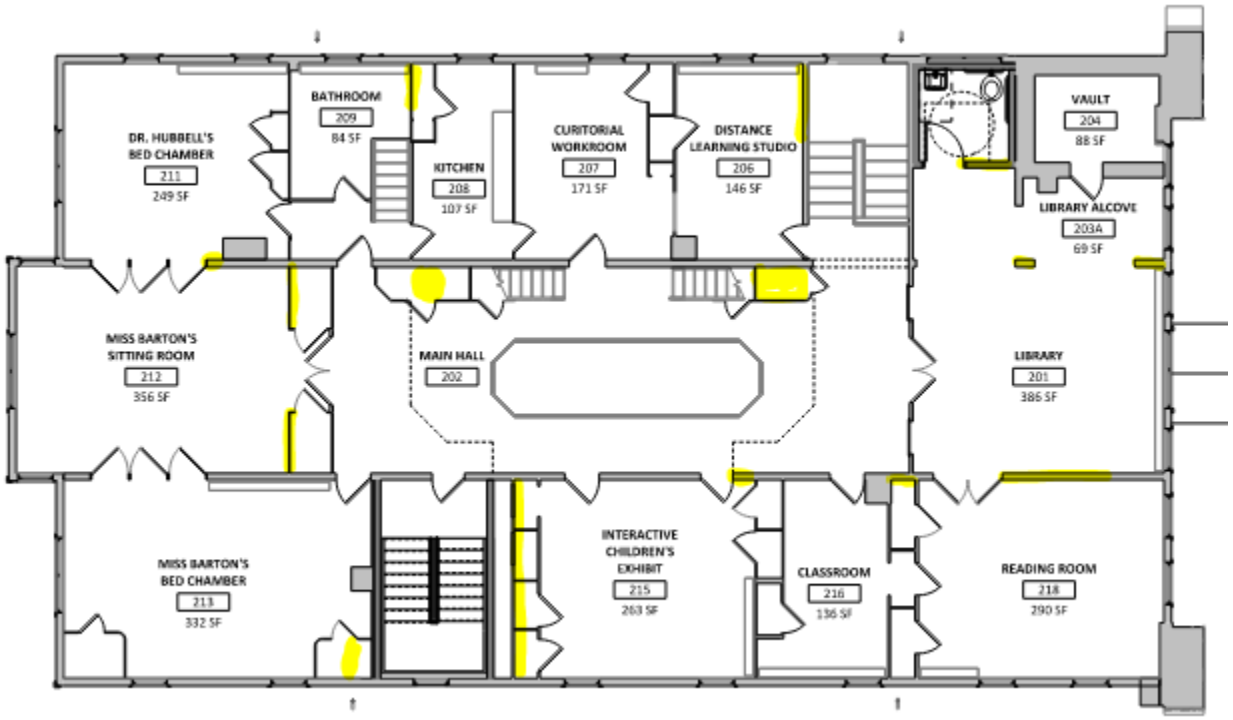
Alternative 1 – Chase Locations Between First and Second Floors



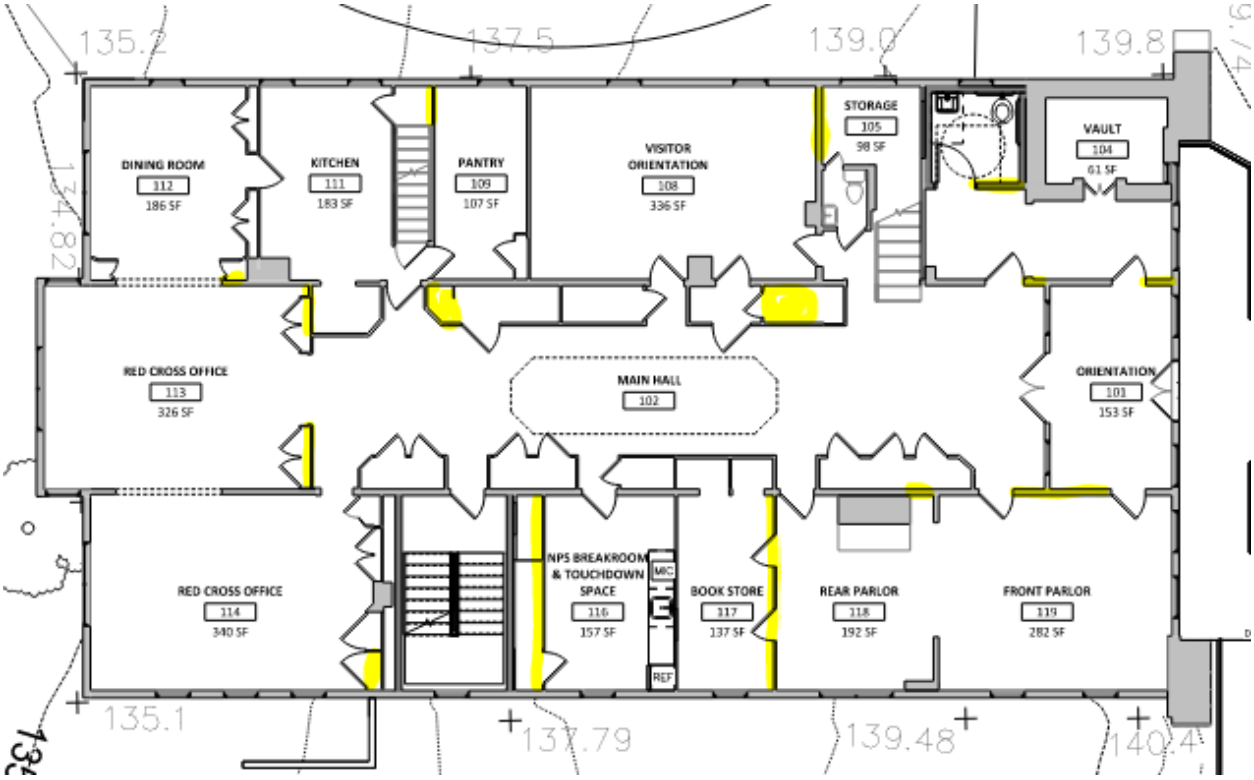


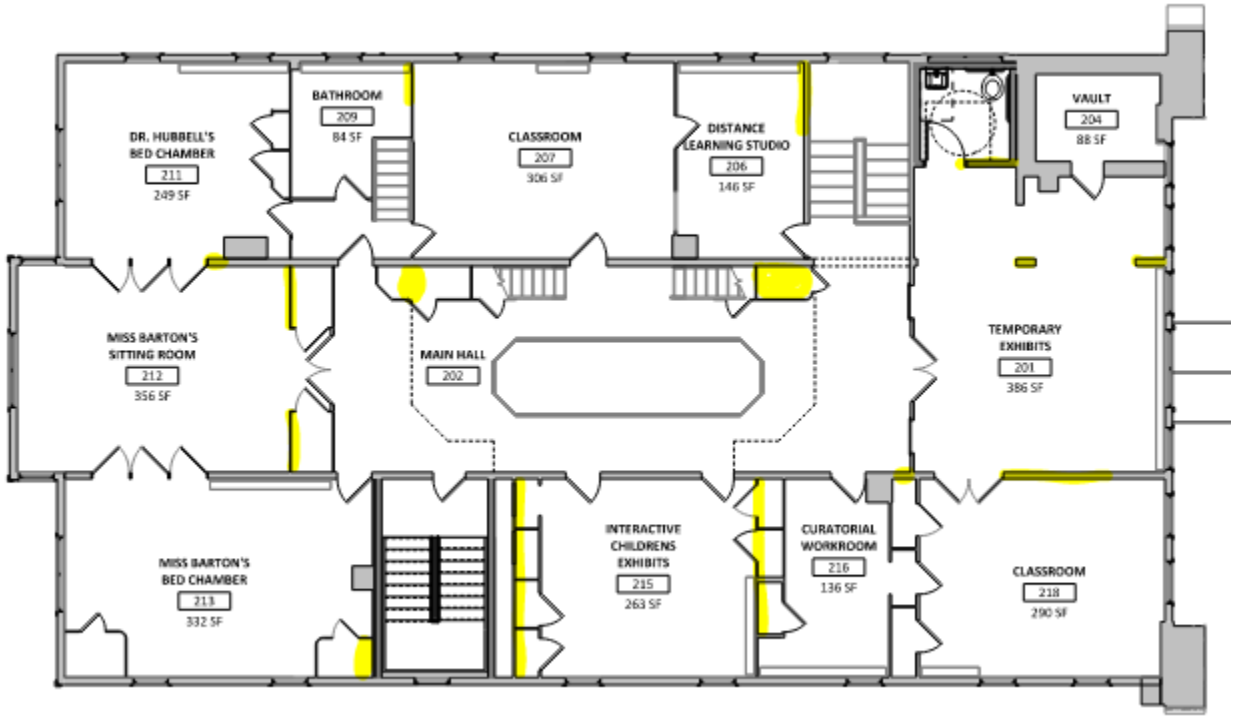
Alternative 2 – Chase Locations Between First and Second Floors





Alternative 3A & 3B – Chase Locations Between First and Second Floors





Site Improvements

Site improvements required to support the proposed building renovation consist of installation of new ABA parking spaces, an accessible route to the building, supporting sidewalks, site utilities and minor regrading. Site demolition, soil erosion and sediment control, and stormwater management requirements depend on the extent of the proposed improvements, therefore we have provided three site improvement alternatives as described below:

Site Alternative 1: This alternative minimizes the proposed site work and is limited to new ABA parking stall area, an accessible route to connect the new parking stalls to the main entrance of the building, and utility improvements.

Site Alternative 2: This alternative expands the scope of work slightly and includes an ABA parking stall area, an accessible route to connect the new parking stalls to the main entrance of the building, an additional sidewalk from the existing gravel loop to a basement door located on the south side of the building, and utility improvements.

Site Alternative 3: Site improvements for Alternative 3 are the same as Alternative 2. They include an ABA parking stall area, an accessible route to connect the new parking stalls to the main entrance of the building, an additional sidewalk from the existing gravel loop to a basement door located on the south side of the building, and utility improvements. All differences for Alternative 3 are captured within other disciplines.

Additional detail regarding stormwater management, permitting and approval requirements, utility improvements, parking and survey for each alternative is provided below.

Stormwater Management

All three alternatives are anticipated to be exempt from MDE stormwater management requirements and will only be subject to Soil Erosion and Sediment Control review and approval. Stormwater management is required when the limits of disturbance exceed 5,000 square feet and all three alternatives are under that. Detailed areas of disturbance for each alternate are broken down below. Please note: the limits of disturbance below are approximate and subject to change as the design is progressed. Final design for any of the alternatives may have stormwater management requirements if the 5,000 square feet threshold is exceeded.

Alternative 1: The proposed site improvements result in an overall site disturbance of approximately 8,600 square feet, out of which 4,200 square feet are considered maintenance. Maintenance work is exempt from stormwater management requirements, so the effective disturbance is 4,400 square feet. This is under the 5,000 square feet threshold and stormwater management is not anticipated to be required.

Alternative 2: The proposed site improvements result in an overall site disturbance of approximately 9,150 square feet, out of which 4,200 square feet are considered maintenance. Maintenance work is exempt

from stormwater management requirements, so the effective disturbance is 4,950 square feet. This is under the 5,000 square feet threshold and stormwater management is not anticipated to be required.

Alternative 3: As noted above, the proposed site improvements for Alternative 3 are the same as Alternative 2. The proposed site improvements result in an overall site disturbance of approximately 9,150 square feet, out of which 4,200 square feet are considered maintenance. Maintenance work is exempt from stormwater management requirements, so the effective disturbance is 4,950 square feet. This is under the 5,000 square feet threshold and stormwater management is not anticipated to be required.

Soil erosion and sediment control measures will be implemented to all alternatives in accordance with MDE requirements.

Permitting and Approvals

A Site Plan permit will be needed for the proposed porch repairs, parking stalls and sidewalk. This permit is processed through Montgomery Planning Development Review Committee (DRC). To be able to obtain the Site Plan permit, a Natural Resources Inventory (NRI) or Forest Conservation Plan Exemption (FCPE) is needed. The NRI or FCPE permit can be submitted as part of the Site Plan permit.

As noted in the Stormwater Management section, based on the anticipated limits of disturbance all three alternatives will be exempt from stormwater management requirements and will only be required to submit for soil erosion and sediment control approval.

Because this is a federal site on the National Register of Historic Places, review and approval of the project through both the National Environmental Policy Act (NEPA) and Section 106 of the National Historic Preservation Act (NHPA) is required as well.

Utility Corridor or Routing

The site is currently serviced by water, firewater, sewer (likely septic or a leach field), gas, heat, telecom and electrical services. The proposed building improvements include upgrading the electrical and telecom services to underground ductbanks, cleaning or replacing stormwater roof leaders, maintain or improve the existing sanitary piping as needed, and re-using all other existing services. Stormwater roof leaders currently discharge both at grade and underground and these improvements do not include upgrading the configuration of the discharge points. To date, no investigation of the existing sanitary sewer system has been completed due to accessibility constraints. Once final occupancy loads of the building have been determined additional steps to assess the condition of the exterior system will need to be completed. It is likely that intrusive methods, including test pits or open trenching, will be required to fully assess the system.

Roadway and Parking

The current parking for visitors is located offsite, just north of the property. Due to the existing topography the currently designated ABA parking stalls and access walkway do not meet the federal ABA standards.

Two new ABA complaint spaces are being proposed on-site just north of the existing asphalt driveway, with an ABA compliant pathway from the parking stalls to the building.

Existing Topographic Survey

The site is essentially a plateau, with most of the property being relatively flat and raised above the adjacent area. There are significant slopes down to the surrounding areas at or beyond the property line. The existing and proposed improvements are generally located within the flat, plateau area. A new boundary, topographic, and utility survey has been completed as part of this project and has been used to develop the project alternatives.

Hazardous Materials

Hazmat Assessment

Langan conducted a Limited Pre-Renovation Regulated Building Materials (RBM) Survey for the existing building in July 2022. The objective of the survey was to identify the presence of asbestos-containing materials (ACM), lead-containing paint (LCP), polychlorinated biphenyl (PCB)-containing materials, and universal waste or other RBMs for compliance with applicable federal and state EPA National Emission Standards for Hazardous Air Pollutants (NESHAP) and Occupational Safety and Health Administration (OSHA) regulations prior to the planned renovation.

Asbestos Containing Materials (ACM)

The following homogenous areas (HAs) were confirmed to be ACM (i.e. >1% asbestos):

- HA-9 – 12”x12”brown speckled vinyl floor tile (VFT) located in room 106.
- HA-15 – Tan cove base mastic located in room 217.
- HA-19 – Gray paper backing behind gauze / fabric wall coverings located in rooms 212 and 213.

The following suspect ACM homogenous areas (HAs) were not sampled due to the limitations of our scope of our services and/or the necessity of destructive sampling methods, and are either presumed to be present and/or assumed to be ACM until sampled and confirmed otherwise:

- HA-22 – 1” x 1” ceramic floor tile grout located in the basement.
- HA-23 – 1” x 1” ceramic floor tile adhesive located in the basement.
- HA-24 – Fire door located in the basement.
- HA-25 – 9” x 9” white speckled VFT located in room 117.
- HA-26 – Floor tile mastic associated with HA-25.
- HA-27 – 12” x 12” brown VFT located in room 104.
- HA-28 – Floor tile mastic associated with HA-27.
- HA-29 – 12” x 12” black VFT located in room 104.
- HA-30 – Floor tile mastic associated with HA-29.

Langan was also provided two previous ACM survey reports from Apex Companies, LLC (Apex) for review. The following ACMs were identified by Apex in those two previous survey reports:

- Beige with brown & blue floor tile in basement.
- Tan 12x12 inch floor tile with wormy gouges, first floor kitchen.
- Gray 9x9 floor tile, first floor office.
- Tan 12x12 inch floor tile, second floor west bathroom.
- Off-white 12x12 floor tile, second floor vault foyer.
- Black glue dots on drywall of second floor bathroom ceiling.

Prior to disturbance of assumed ACM, Langan recommends that it be inspected, sampled by a MDE-licensed asbestos inspector, and analyzed to confirm if whether it is ACM, or that it be treated as ACM and removed by a Maryland-certified asbestos abatement contractor with oversight and air monitoring by a consulting firm, in accordance with applicable federal, state, and local regulations. Maintenance, renovation, or demolition activities that will impact identified confirmed ACM should only be conducted by a properly qualified asbestos abatement contractor in accordance with applicable federal, state, and local regulations.

Lead Based Paint (LBP)

Detectable concentrations of lead were identified in the basement support beams; on first, second, and third floor interior plaster and drywall, wood walls, stone walls, and doors; exterior porch columns; and exterior wood walls, doors, and window components. Paint chips collected from basement stone and wood walls did not have concentrations of lead above the laboratory reporting limit.

Langan was also provided a previous limited lead survey report, dated July 22, 2011, from Apex for review. Detectable concentrations of lead were identified by Apex in the previous survey reports:

- Yellow chimney paint in bedroom.
- Tan plaster wall paint in bedroom.
- Tan plaster ceiling paint in bedroom.
- Beige wood closet paint in bedroom.
- Tan wood wall paint in bedroom.
- Tan plaster ceiling paint in bathroom.
- Tan window sill paint in bathroom.
- Tan plaster wall paint in kitchen.
- Yellow exterior wood siding paint.
- Tan ceiling paint in the original kitchen.

Based upon the age and use of the building, and testing results, painted surfaces should be assumed and treated as containing lead. Regardless of the type of building, any disturbance of paints that contain lead

or are assumed to contain lead will need to be performed using lead-safe work practices in compliance with OSHA regulations.

The OSHA Lead in Construction Standard does not currently define a specific concentration of lead that must be present within paint for it to be considered "lead-containing." In addition, the EPA lead-based paint regulations do not pertain to this Site as they only regulate target-housing (i.e. residential structures older than 1978) and child-occupied facilities. Therefore, painted and glazed surfaces that contain detectable concentrations of lead must be handled in accordance with the OSHA Lead in Construction Standard. Persons performing work that could impact lead-containing surface coatings should be informed of the testing results, and should take appropriate actions to comply with the OSHA Lead in Construction Standard.

PCB in Caulk

None of the caulk samples were reported to have concentrations of PCBs exceeding 50 milligrams per kilogram (mg/kg), which is the definition of PCB bulk-product waste. Therefore no specific recommendations regarding PCBs in the caulking sampled are necessary.

Landscape Design

Landscape Base Bid

- Rehabilitated lawn north of porch.
- Rehabilitated planting beds on along porch, on south side of house, and along entry walk (657 SF).
    - Planting bed plants include roses and perennial species, to be determined.
    - Planting beds integrate bollard lighting to consolidate landscape features and reduce maintenance.
    - Durable planting bed edges in segments between bed and turf or gravel.
- One sweetbay magnolia (Magnolia virginiana) south of entry ramp.
- Relocated interpretive wayside to south side of entry walk within view of house but at edge of potential future north vista.
- Relocated NHL stone and plaque near existing location in planting bed by NW corner of house.
- *Vehicular swing gate at driveway entrance, compatible with future fencing.
- *Rehabilitated entry walk is exposed aggregate concrete in general alignment of former board walk.
- *New non-historic walks are plain concrete.

Site Alternative 1

- Disturbed areas reseeded with turf grass (3,847 SF)
- *Paved walks: Entry walk only.

Site Alternative 2

- Disturbed areas reseeded with turf grass (4,131 SF)
- Screen planting around utility units in southeast corner include 7 common lilac (Syringa vulgaris). Option: transplant existing duetzia (Deutzia scabra) and sweetshrub (Calycanthus floridus) from west side of property.
- *Paved walks: Entry walk and south and east egress walk.

Site Alternative 3

- Disturbed areas reseeded with turf grass (4,131 SF)
- Screen planting around utility units in southeast corner include 7 common lilac (Syringa vulgaris). Option: transplant existing duetzia (Deutzia scabra) and sweetshrub (Calycanthus floridus) from west side of property.
- *Paved walks: Entry walk and south and east egress walk.

Appendix : Dew Point Analysis

Dew Point Analysis

Overview:

Due to the fact that The Clara Barton House does not have a proper vapor barrier, the following dew point analysis was performed to determine if condensation will form within the exterior envelope of the Clara Barton House.

There are multiple types of existing wall constructions used on the House. The chart below from the Historic Structures Report lists the different existing wall types:

Estimated R-values for Walls

Wall Type	Typical Wall Locations	Wall Components	Approximate R-value
A	Rooms 112, 113, 114 and 213	• 7/8" German Siding • 1" Wood Sheathing • 2 x 4 Stud with 3½ Foil Backed Batt Insulation • Building Paper • Fabric and Paint	R=19
B	Rooms 103, 105, 108, 109, 115, 116, 117, 118,119, 203, 203A(?), 206, 207, 208, 211, 214, 215, 217 and 218	• 7/8" German Siding • 1" Wood Sheathing • 2 x 4 Stud with ± 4" air space • ± ¾ Plaster on wood lath or Gypsum Board	R=4
C	Rooms 101, 111, 201, 209, 212, 301, 302, 303, 304 and 305	• 7/8" German Siding • 1" Wood Sheathing • 2 x 4 Stud with ±4" air space • 7/8" Beaded Board	R=4.5
D	Rooms B-4, B-5 and B-6	• 1" Wood Board & Batten Sheathing • 2 x 4 Stud with 3½ Batt Insulation • ± ¾ Gypsum Board	R=18.5
E	Rooms 104 and 204	• 1'-8 Brick	R=4
F	Rooms B-1, B-3, B-4, B-6 and B-8	• ± 2'-0" Stone	R=2
F	Room B-1	• 1" Wood Board & Batten Sheathing	R=1.5

There are also multiple existing roof types used on the Clara Barton House. The chart below from the Historic Structures Report lists the different roof types:

Estimated R-values for Roofs			
Roof Type	Typical Roof Locations	Roof Components	Approximate R-value
A	Above Rooms 107, 203, 203A, 206, 207, 208, 209, 211, 213, 214, 215, 216, 217, 218	• Standing Seam Metal on Rosin Paper • 1" Wood Roof Deck • 5½" Air Space • ± ¾ Plaster on wood lath	R=3.5
B	Above Room 303	• Standing Seam Metal on Rosin Paper • 1" Wood Roof Deck • 5½" Air Space • Fabric and Paint	R=3
C	Above Rooms 301, 305	• Standing Seam Metal on Rosin Paper • 1" Wood Roof Deck • 7" Air Space • Fabric and Paint	R=3
D	Above Rooms 301, 302, 304 and 305	• Standing Seam Metal on Rosin Paper • 1" Wood Roof Deck • 3½" Air Space • Fabric and Paint	R=3

To analyze the conditions occurring in the wall and roof systems, a temperature profile for each type of material was created to determine the surface temperature at the face of each material. The worst case summer and winter dew point temperatures are shown in the spreadsheet. Any point where the surface temperature is less than the dew point temperature is where condensation can occur.

Walls:

The analysis of the existing wall conditions shows that condensation is not being controlled during the winter. During the winter, the movement of moisture is from the indoors to the outdoors. When the indoor space temperature is 70 degrees F and 15 percent or higher relative humidity, the surface temperature drops below the dewpoint temperature within the wall assembly for both Type A and D walls. For Type A walls, condensation will form in the space between the wood sheathing and siding. For Type D walls, the condensation will form in the space between the batt insulation and the wood board. When the indoor space temperature is 70 degrees F and 17 percent or higher relative humidity, the surface temperature drops below the dewpoint temperature within the wall assembly for Type B, C, and E walls. For Type B walls, condensation will form in the space between the wood sheathing and siding. For Type D walls, the condensation will form in the space between the batt insulation and the wood board. For Type E walls, the condensation will form on the inside surface of the brick. For Type F walls, the condensation will form on the inside surface of the stone when the indoor space temperature is 70 degrees F and the relative humidity is above 19%.

The results for the summer wall conditions are marginal. During the summer, the movement of moisture is from the outdoors to the interior. At outdoor conditions of 95 degrees F and 50% relative humidity, the surface temperatures of the walls remain above the dewpoint. However, Wall Type A and D are close, so under the worst wet bulb temperature conditions, it is possible that moisture could occur on the inside surface of the walls, of the Type A and D walls.

Base on the results for both winter and summer, the two wall types with insulation are the most likely to have condensation form. So that means that it is not advisable to add insulation to the non-insulated walls without adding a vapor barrier.

Roofs:

The analysis of the existing roof conditions shows that condensation is not being controlled during the winter. During the winter, the movement of moisture is from the indoors to the outdoors. When the indoor space temperature is 70 degrees F and 17 percent or higher relative humidity, the surface temperature drops below the dewpoint temperature within the roof assembly for all roof types. The condensation will form in the space between the air space and roof deck.

The analysis of the existing roof conditions shows that condensation will not likely form during the summer. During the summer the movement of moisture is from the outdoors to the interior. At outdoor conditions of 95 degrees F and 50% relative humidity, the surface temperatures of the roofs remain above the dewpoint.

A scenario with insulation added to the attic was also analyzed. For both the summer and winter it made it more likely for condensation to form within the roof assembly.

Volume 2: Drawings

Under separate cover.

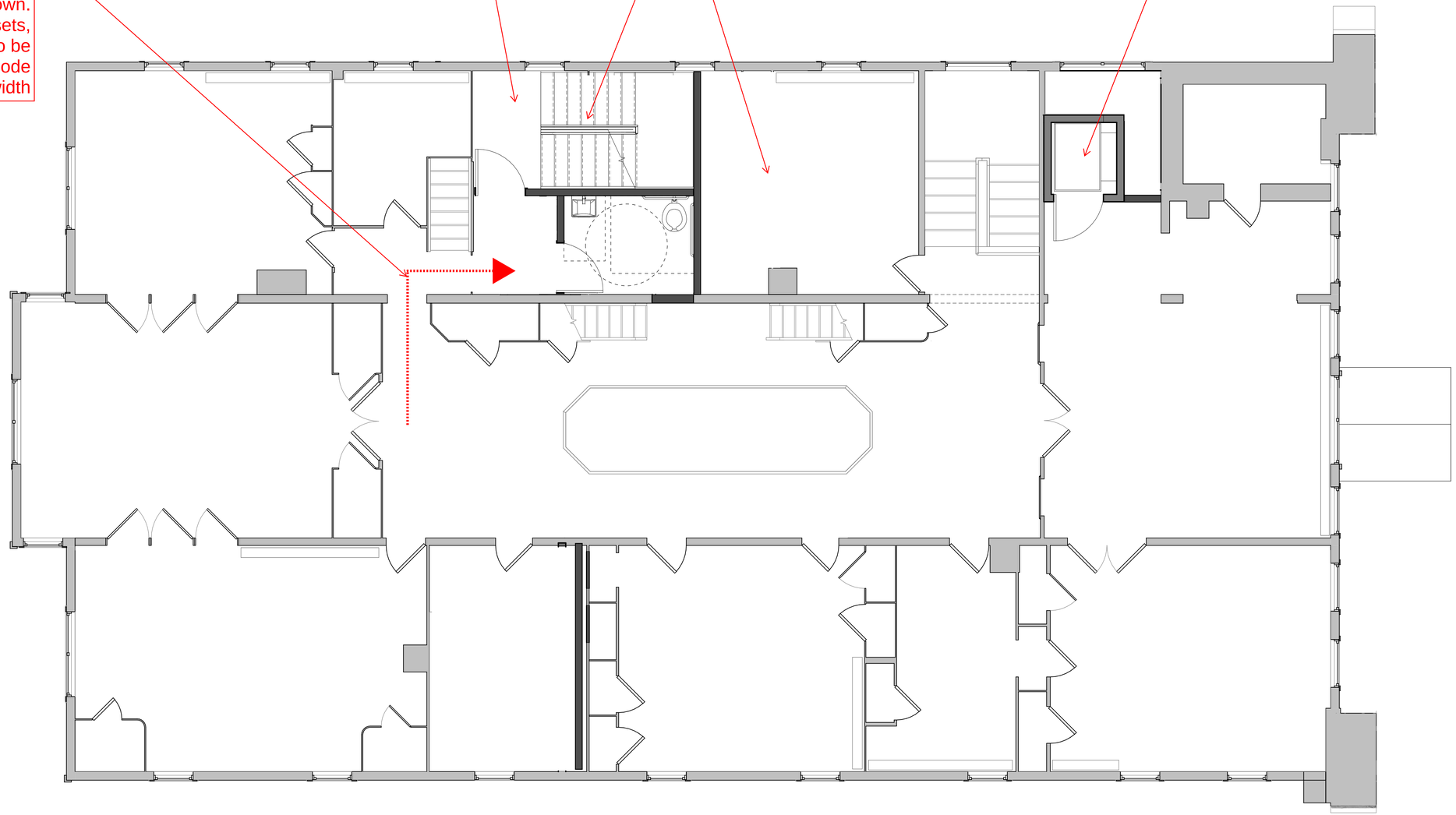
III

Existing openings on this exit access and accessible route have less than the required minimum 32 inch clear width (IBC 1010.1). There is also not enough required clear width for a wheelchair to make a 90 degree turn as shown. Historic fabric (stair, closets, partitions) would need to be removed to satisfy code required clear width

The existing roof slope creates a ceiling height of less than 7'-0" above floor landing in this egress stair. Any ceiling above the means of egress path shall be not less than 7'-6" above finished floor (IBC 1003.2)

Dismissed stair and toilet room locations require removal of existing partitions, doors, and closets on first and second floor locations.

Vertical platform lifts require an overrun (86" above the 2nd floor level). This dismissed lift location would penetrate the existing roof fabric because of the overrun requirement. Our proposed Alternative 3B recommends the lift to be against the existing atrium wall, in effort to fit the required overrun beneath the existing sloped roof structure.



This drawing shows an example of locations explored for the proposed egress stair, toilet room, and vertical platform lift. As shown in the markups, the existing conditions create challenges with code compliance for means of egress clear width and headroom, and accessible path clear width. These locations were dismissed because significant amounts of historic fabric (closets, roof, openings) would need to be removed.

DISMISSED LOCATIONS FOR EGRESS STAIR, TOILET ROOM, AND VERTICAL PLATFORM LIFT

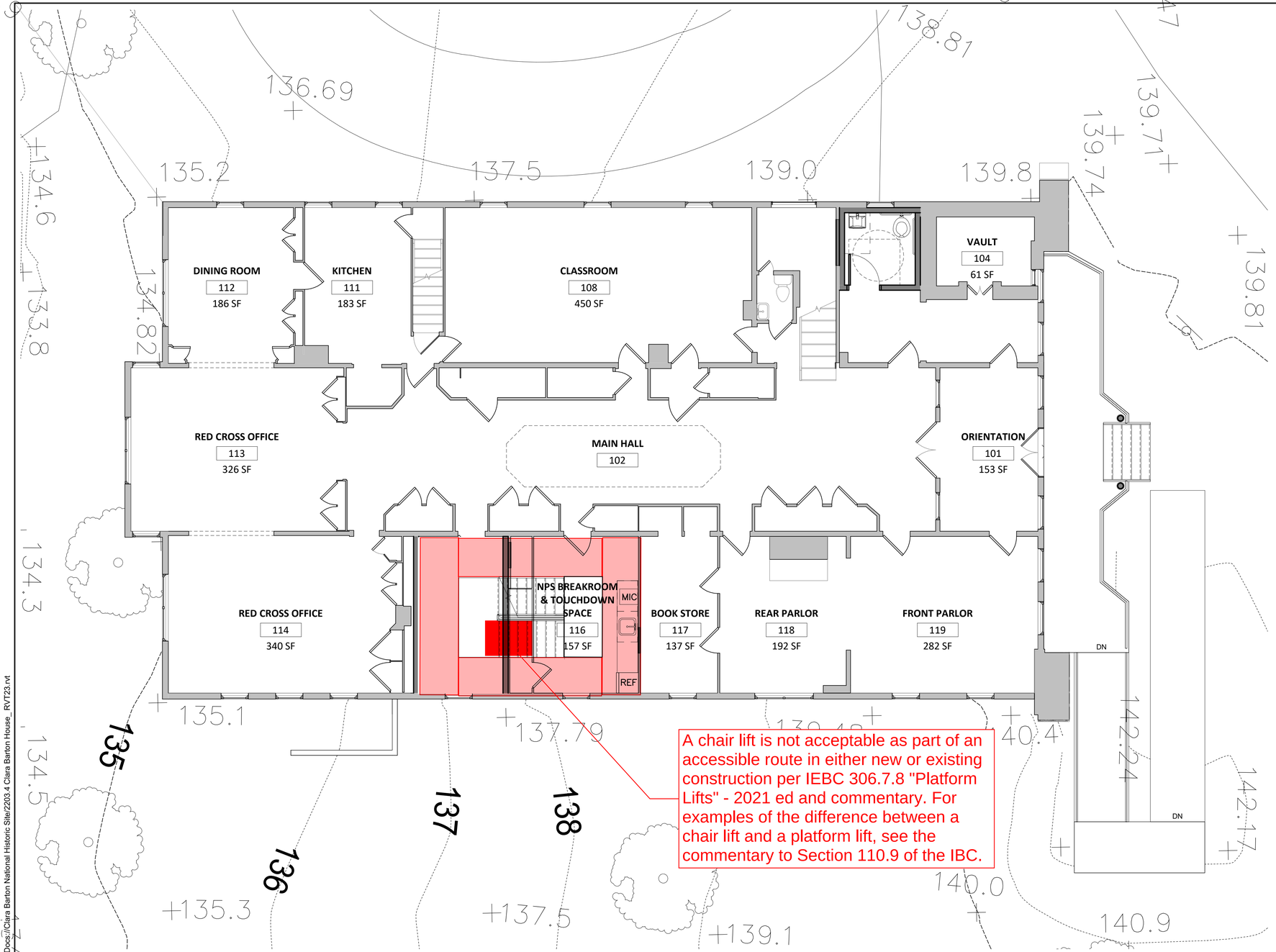
REHABILITATE CLARA BARTON NATIONAL HISTORIC SITE

4 0 4 8

SCALE OF FEET

Mills + Schnoering Architects, LLC
Architecture + Historic Preservation

7/5/2023 4:48:18 PM



FLOOR PLAN LEGEND

- NEW WALL
- EXISTING WALL TO REMAIN
- PARTITION TYPE (XX)
- DOOR TYPE & TAG (XXX)
- EXISTING DOOR & TAG (XXX)
- NEW FLOOR INFILL

GENERAL FLOOR PLAN NOTES

1. ALL DIMENSIONS TO FINISHED FACE OF CONSTRUCTION, UNLESS OTHERWISE NOTED.
2. CONTRACTOR TO VERIFY ALL CONDITIONS AND DIMENSIONS IN THE FIELD. REPORT ALL DISCREPANCIES IN THESE DRAWINGS AND RELATED SPECIFICATIONS TO ARCHITECT FOR RESOLUTION PRIOR TO START OF CONSTRUCTION. FAILURE TO VERIFY ALL CONDITIONS AFFECTING THE WORK AND FAILURE TO REPORT DISCREPANCIES WILL NOT RELIEVE THE CONTRACTOR OF COMPLETE COORDINATION OF ALL ASPECTS OF THE WORK.
3. ALL MATERIAL TO REMAIN IS TO BE PROTECTED DURING CONSTRUCTION. CONTRACTOR IS RESPONSIBLE FOR REPAIRING ANY DAMAGE.
4. REFER TO SPECIFICATIONS AND ALL TRADE DRAWINGS FOR ADD'L INFORMATION.
5. CONTRACTOR IS RESPONSIBLE FOR ALL TEMPORARY SUPPORT AND SHORING.
6. REFINISH EXISTING WOOD FLOORS. PATCH WHERE REQUIRED.
7. CLEAN EXISTING TRANSPARENT FINISHED WOODWORK.
8. REPAINT ALL WALLS AND PAINTED WOOD TRIM TO MATCH HISTORIC PAINT COLORS. SEE CONSERVATION ASSESSMENT.

FLOOR PLAN NOTES

1 / A–2.1 SCALE Ⓐ

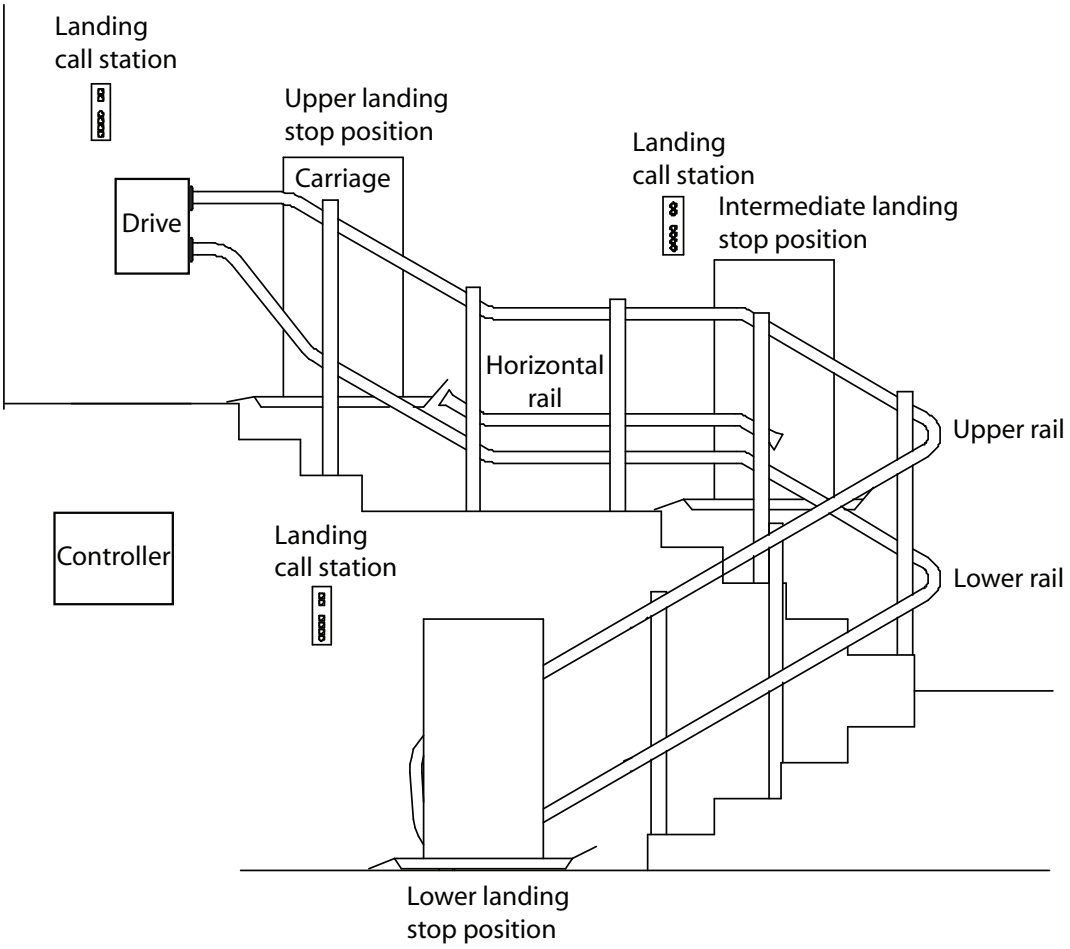
DISMISSED SCHEME WITH A CHAIR LIFT

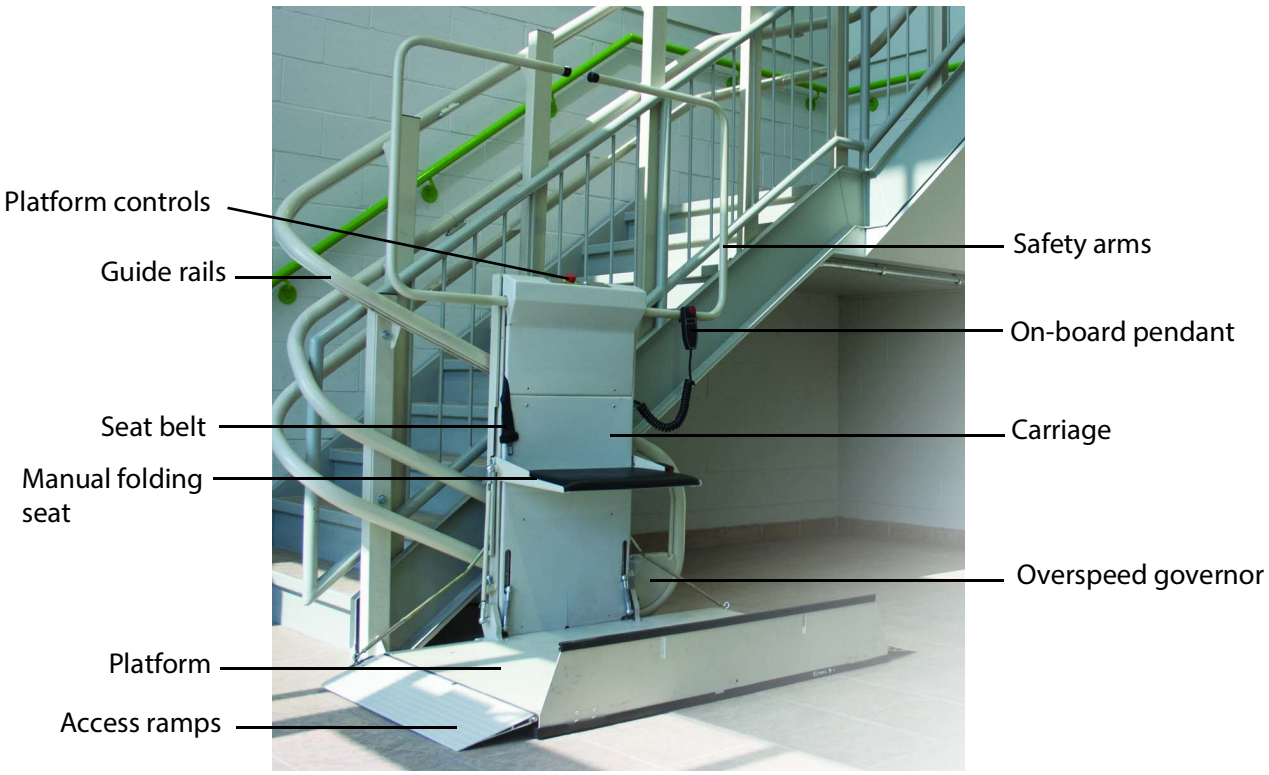
4 0 4 8 12

SCALE Ⓐ SCALE OF FEET

DESIGNED: KF	SUB SHEET NO. A-2.1	TITLE OF SHEET (ALT 2) FIRST FLOOR PLAN	DRAWING NO. 895 179603
DRAWN: SS		REHABILITATE CLARA BARTON NATIONAL HISTORIC SITE	PMIS/PKG NO. 312325
TECH. REVIEW: MS			SHEET ___ OF X
DATE: 6/23/2023			

Lift components





IEBC 1203.3 Means of Egress
Existing door openings and corridor and stairway widths less than those specified elsewhere in this code may be approved, provided that, in the opinion of the code official, there is sufficient width and height for a person to pass through the opening or traverse the means of egress.

IBC 1010.1 Size of Doors (Means of Egress)
The required capacity of each door opening shall be sufficient for the occupant load thereof and shall provide a minimum clear opening of 32 inches (measured between the face of the door and the stop when open 90 degrees).
Most existing doors throughout the building have less than the minimum 32 inch clear width, **and we are only going to recommend modifying doors that are a part of the means of egress.**

IBC 1010.2.2 Hardware
Door handles, pulls, latches, and locks on doors required to be accessible shall not require tight grasping, tight pinching or twisting of the wrist to operate.
There are many existing door knobs throughout the building that require twisting of the wrist to operate. We should recommend that the doors are fixed open for rooms required to be accessible.

IEBC 804.4.1 Number of exits
Two exits are required for the work areas based on travel distance that exceeds 75'-0" (IBC 1006.3.4).

IBC 1005.7.1 Doors (Encroachment)
Doors, when fully opened, shall not reduce the required width by more than 7 inches. Doors in any position shall not reduce the required width by more than one-half. These doors are nonconforming because their open swing reduces the required means of egress width by one-half. There are (2) similar closet doors on the 2nd floor that do this when opening towards the atrium guardrail. **Can there be an exception for closet doors?**

IBC 1208.2 Minimum Ceiling Heights
Bathrooms, **toilet rooms**, kitchens, **storage rooms** and laundry rooms shall have a ceiling height of not less than 7'-0" above the finished floor.
The existing toilet room and storage room do not conform because they have ceiling heights of less than 7'-0" above the finished floor.

IBC 1007.1.1 Two Exits or Exit Access Doorways
Where two exits are required from any portion of the exit access, they shall be placed a distance apart equal to not less than one-half of the length of the maximum overall diagonal dimension of the building or area to be served measured in a straight line between them.
Where a building is equipped throughout with an automatic sprinkler system, the separation distance shall not be less than one-third of the length of the maximum overall diagonal dimension of the area served.
The proposed second exit location in all of our Alternatives conforms with this exception for fully sprinklered buildings.

IBC 1028.2 Exit Discharge
Exits shall discharge directly to the exterior of the building. The exit discharge shall be at grade or shall provide a direct path of egress travel to grade. The exit discharge shall not reenter a building. **The combined use of Exceptions 1 and 2 shall not exceed 50 percent of the number of the required exits.**

1. Not more than 50 percent of the number of interior exit stairways is permitted to egress through areas, including atriums, on the level of discharge, **provided that all of the following conditions are met**:

1.1. Discharge of the interior exit stairways shall be provided with a free and unobstructed path of travel to an exterior exit door and such exit is readily visible and identifiable from the point of termination of the enclosure.
The exterior exit door is readily visible and identifiable from the point of stair termination

1.2 The entire area of the level of exit discharge is separated from areas below by construction conforming to the fire resistance rating for the enclosure. The entire area of the level of exit discharge **is not separated** from areas below by conforming fire resistance rated construction

1.3 The egress path from the interior exit stairway on the level of exit discharge is protected throughout by an approved automatic sprinkler system. We have this covered

1.4 Where a required interior exit stairway and an exit access stairway serve the same floor level and terminate at the same level of exit discharge, the termination of the exit access and the exit discharge door of the interior exit stairway shall be separated by a distance of not less than 30 feet or not less than 1/4 of the length of the maximum overall diagonal dimension of the building, whichever is less. Our proposed interior exit stairway is not going to terminate at the same level of exit discharge as the exit access stairway.

IBC 1030.2 Assembly Main Exit
A building used for assembly purposes that has an occupant load of greater than 300 and is provided with a main exit, that main exit shall be of sufficient capacity to accommodate not less than one-half of the occupant load.
The existing building has approximately 227 occupants, so this does not apply. **If we are to consider our proposed building with various office spaces, it will reduce the occupant load even further.**

IBC 1017.2 Limitations and 1017.3 Measurement (Exit Access Travel Distance)
Exit access travel distance **shall not exceed 250 feet** for fully sprinklered occupancy A buildings.
Exit access travel distance shall be measured from the most remote point of each room, area or space along the natural and unobstructed path of horizontal and vertical egress travel to the entrance to an exit.
The existing building complies within 250 feet from any location using the main stair

IBC 1017.3.1 Exit Access Stairways (Exit Access Travel Distance)
Travel distance on exit access stairways shall be included in the exit access travel distance measurement. The measurement along stairways shall be made on a plane parallel and tangent to the stair tread nosings in the center of the stair and landings.
The existing building complies within 250 feet from any location using the main stair. The main stair length was included in the exit access travel distance

IBC 1017.3.2.2 Exit access travel distance **at the level** of exit discharge (Atriums)
Where the path of egress travel is through an atrium space, exit access travel distance at the level of exit discharge shall be determined in accordance with Section 1017.2.
The existing building complies within 250 feet from any location using the main stair

IBC 1017.3.2.3 Exit access travel distance **at other than the level** of exit discharge (Atriums)
Where the path of egress travel is not at the level of exit discharge from the atrium, **that portion of the total permitted exit access travel distance that occurs within the atrium** shall be not greater than 200 feet.
The travel distance portion that occurs within an atrium (main hall) is not greater than 200 feet.

IBC 1003.4 Slip Resistant Surface
Circulation paths of the means of egress shall have a slip-resistant surface and be securely attached.
The HSR notes that many areas of the floor are already covered by rugs, but there are many areas where the bare wood is exposed that could become slippery (especially the main stair). This would be especially true if a fire sprinkler system were activated and the floors became wet. It cannot be stated whether the existing wood floor surfaces of the building are considered "slip resistant".

IBC 1003.6 Means of Egress Continuity
Obstructions shall not be placed in the minimum width or required capacity of a means of egress component, except projections permitted by this chapter. The minimum width or required capacity of a means of egress system shall not be diminished along the path of egress travel.

IBC 1005.3.1 Other Components (Means of Egress Sizing)
The capacity, in inches, of the means of egress components other than stairways shall be calculated by multiplying the occupant load served by such component by a means of egress capacity factor of 0.2 inches per occupant.
1st Floor Occupancy = 93 occupants
(93 occupants)*(0.2 egress capacity factor) = 18.6"... This result triggers the minimum 44" width

IBC 1024.2 Exit Passageway Width and Capacity
The required minimum width of exit passageways shall be not less than 44 inches, except that exit passageways serving an occupant load of loss than 50 occupants shall not be less than 36 inches in width. The minimum width or required capacity of exit passageways shall be unobstructed. These exit passageway areas serve spaces with occupant loads of less then 50. They all comply with the minimum requirement of at least 36" clear width. **We should be careful about the one that we are locating our new staircase at, because that will likely serve an occupant load very close to 50 and require an exit passageway width modification to 44 inches. Most of these are currently 38 inches in clear width.**

IEBC 1203.3 Means of Egress
Existing door openings and corridor and stairway widths less than those specified elsewhere in this code may be approved, provided that, in the opinion of the code official, there is sufficient width and height for a person to pass through the opening or traverse the means of egress.

IBC 1008 Means of Egress Illumination
Illumination shall be provided in the means of egress in accordance with Section 1008.2. Under emergency power, means of egress illumination shall comply with Section 1008.3.
Henry Adams should advise if the following areas of the existing building have the required foot candles:
Main Hall on each floor (**Exit Access**)
Main Stair (**Exit**)
Vestibule & Front Porch (**Exit Discharge**)

This ramp was not yet surveyed, but should be reviewed with IBC Section 1012 Ramps

IBC 1105.1 Public Entrances
At least 60 percent of all public entrances shall be accessible. Exception: An accessible entrance is not required to areas not required to be accessible.
This existing building only has one public entrance, and we are not proposing another entrance (we are proposing a new means of egress). So unless we are considering the existing exterior basement doors as "public entrances", I think we are 1 for 1... 100% of the public entrances will be accessible.

IBC 1009.2.1 Elevators Required (Accessible Means of Egress)
In buildings where a required accessible floor is four or more stories above or below a level of exit discharge, not less than one required accessible means of egress shall be an elevator complying with Section 1009.4.
An elevator is not required for this building. Even if we were considering the Third Floor accessible, it is not four or more stories above the proposed level of exit discharge at Basement.

IBC 1010.1 Size of Doors (Means of Egress)
The required capacity of each door opening shall be sufficient for the occupant load thereof and shall provide a minimum clear opening of 32 inches (measured between the face of the door and the stop when open 90 degrees). **Where a door opening includes two door leaves without a mullion, one leaf shall provide a minimum clear opening of 32 inches.**
The existing double leaf door at front of building does not conform. Each leaf is less than 32 inches wide.

IBC 1005.3.2 Other Egress Components (Sizing)
The capacity, in inches, of means of egress components other than stairways shall be calculated by multiplying the occupant load served by such component by a means of egress capacity factor of 0.2 inch per occupant
1st Floor Occupancy = 93 occupants
(93 occupants)*(0.2 egress capacity factor) = 18.6"
This result triggers the minimum 32 inch clear width at (1) leaf, which we do not have here

IBC 1010.1.2.1 Direction of Swing (Egress Doors)
Side hinged swinging doors shall swing in the direction of egress travel where serving a room or area containing an occupant load of 50 or more persons.
1st Floor Occupancy = 93 occupants
Since this is the only egress door on the first floor, we should recommend that the door swings out (as well as the vestibule door). Even if we divide the occupants by 2 for our new 2nd stair going down to the basement exit, it would be prudent to consider this first floor door as the primary exit and expect an occupant load of 50 or more persons. NPS would have to coordinate the storm doors to open in the same direction.

IBC 1010.2.9 Panic and Fire Exit Hardware
Swinging doors serving rooms or spaces with an occupant load of 50 or more in a Group A occupancy shall not be provided with a latch or lock other than panic hardware or fire exit hardware.
Should we recommend panic and fire exit hardware on these doors, since we expect an occupant load of 50 or more persons? (see above)

IBC 1010.2.5 Bolt Locks (Door Hardware)
Manually operated flush bolts or surface bolts are not permitted
This main entrance door does not conform because it has a surface bolt. We should recommend that this hardware is removed.

IEBC 1203.3 Means of Egress
Existing door openings and corridor and stairway widths less than those specified elsewhere in this code may be approved, provided that, in the opinion of the code official, there is sufficient width and height for a person to pass through the opening or traverse the means of egress. **Where approved by the code official, the front or main exit doors need not swing in the direction of the path of exit travel, provided that other approved means of egress having sufficient capacity to serve the total occupant load are provided.**

Door Accessibility Noncompliance (Push/Pull)

FIRST FLOOR PLAN

FEET 1/4"=1'-0"

METERS 1:48

DRAWN BY: KATE
CLARA BARTON NHS
UNITED STATES

IBC 1011.2 Stairways Width and Capacity
The minimum width shall be not less than 44". Stairways serving an occupant load of less than 50 shall have a width of not less than 36".
This stair serves less than 50 occupants, but has a nonconforming width of 35".

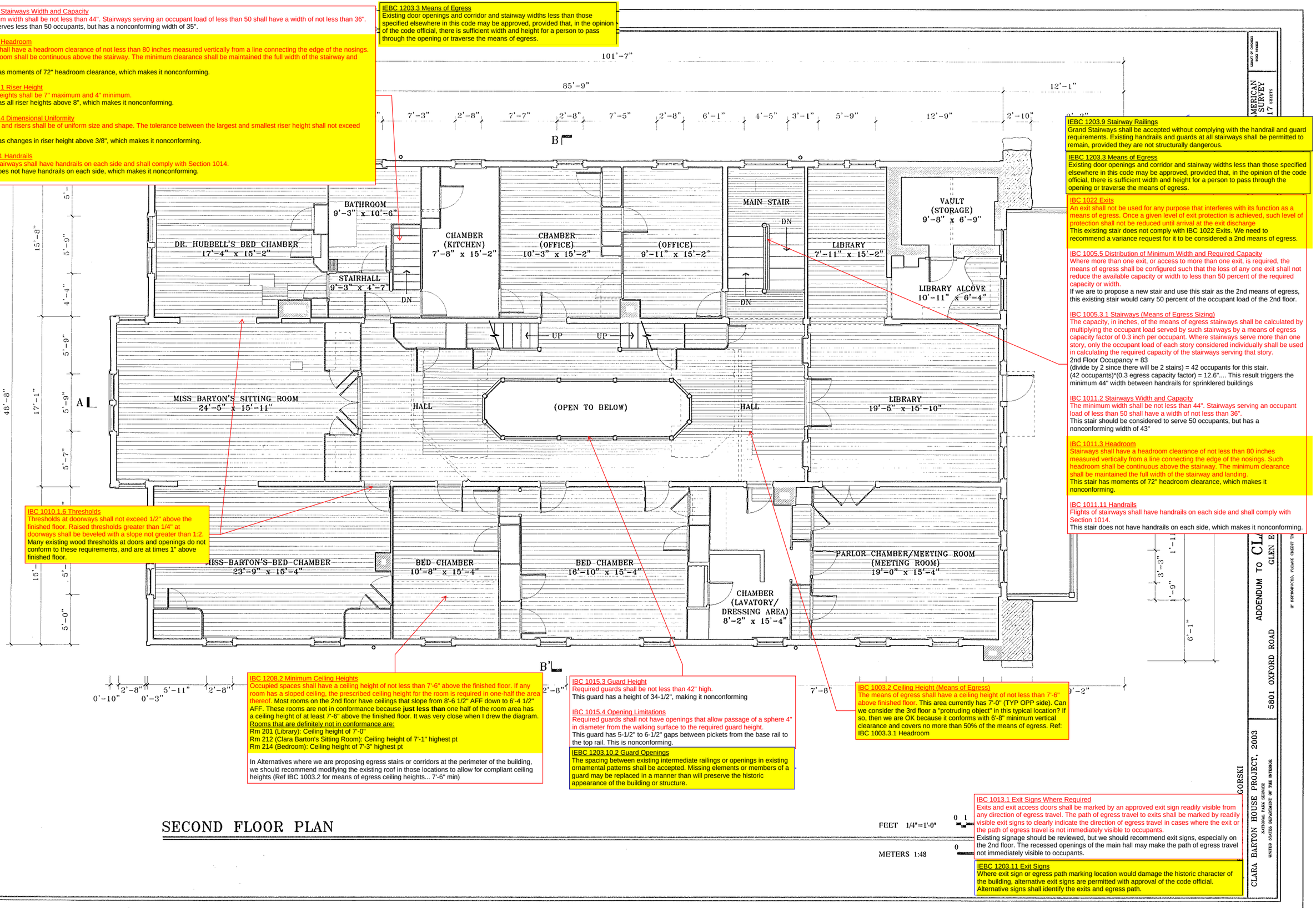
IBC 1011.3 Headroom
Stairways shall have a headroom clearance of not less than 80 inches measured vertically from a line connecting the edge of the nosings. Such headroom shall be continuous above the stairway. The minimum clearance shall be maintained the full width of the stairway and landing.
This stair has moments of 72" headroom clearance, which makes it nonconforming.

IBC 1011.5.1 Riser Height
Stair riser heights shall be 7" maximum and 4" minimum.
This stair has all riser heights above 8", which makes it nonconforming.

IBC 1011.5.4 Dimensional Uniformity
Stair treads and risers shall be of uniform size and shape. The tolerance between the largest and smallest riser height shall not exceed 3/8".
This stair has changes in riser height above 3/8", which makes it nonconforming.

IBC 1011.11 Handrails
Flights of stairways shall have handrails on each side and shall comply with Section 1014.
This stair does not have handrails on each side, which makes it nonconforming.

IEBC 1203.3 Means of Egress
Existing door openings and corridor and stairway widths less than those specified elsewhere in this code may be approved, provided that, in the opinion of the code official, there is sufficient width and height for a person to pass through the opening or traverse the means of egress.



IBC 1010.1.6 Thresholds
Thresholds at doorways shall not exceed 1/2" above the finished floor. Raised thresholds greater than 1/4" at doorways shall be beveled with a slope not greater than 1:2.
Many existing wood thresholds at doors and openings do not conform to these requirements, and are at times 1" above finished floor.

IBC 1208.2 Minimum Ceiling Heights
Occupied spaces shall have a ceiling height of not less than 7'-6" above the finished floor. If any room has a sloped ceiling, the prescribed ceiling height for the room is required in one-half the area thereof. Most rooms on the 2nd floor have ceilings that slope from 8'-6 1/2" AFF down to 6'-4 1/2" AFF. These rooms are not in conformance because **just less than** one half of the room area has a ceiling height of at least 7'-6" above the finished floor. It was very close when I drew the diagram.
Rooms that are definitely not in conformance are:
Rm 201 (Library): Ceiling height of 7'-0"
Rm 212 (Clara Barton's Sitting Room): Ceiling height of 7'-1" highest pt
Rm 214 (Bedroom): Ceiling height of 7'-3" highest pt

In Alternatives where we are proposing egress stairs or corridors at the perimeter of the building, we should recommend modifying the existing roof in those locations to allow for compliant ceiling heights (Ref IBC 1003.2 for means of egress ceiling heights... 7'-6" min)

IBC 1015.3 Guard Height
Required guards shall be not less than 42" high.
This guard has a height of 34-1/2", making it nonconforming

IBC 1015.4 Opening Limitations
Required guards shall not have openings that allow passage of a sphere 4" in diameter from the walking surface to the required guard height.
This guard has 5-1/2" to 6-1/2" gaps between pickets from the base rail to the top rail. This is nonconforming.

IEBC 1203.10.2 Guard Openings
The spacing between existing intermediate railings or openings in existing ornamental patterns shall be accepted. Missing elements or members of a guard may be replaced in a manner than will preserve the historic appearance of the building or structure.

IBC 1003.2 Ceiling Height (Means of Egress)
The means of egress shall have a ceiling height of not less than 7'-6" above finished floor. This area currently has 7'-0" (TYP OPP side). Can we consider the 3rd floor a "protruding object" in this typical location? If so, then we are OK because it conforms with 6'-8" minimum vertical clearance and covers no more than 50% of the means of egress. Ref: IBC 1003.3.1 Headroom

IEBC 1203.9 Stairway Railings
Grand Stairways shall be accepted without complying with the handrail and guard requirements. Existing handrails and guards at all stairways shall be permitted to remain, provided they are not structurally dangerous.

IEBC 1203.3 Means of Egress
Existing door openings and corridor and stairway widths less than those specified elsewhere in this code may be approved, provided that, in the opinion of the code official, there is sufficient width and height for a person to pass through the opening or traverse the means of egress.

IBC 1022 Exits
An exit shall not be used for any purpose that interferes with its function as a means of egress. Once a given level of exit protection is achieved, such level of protection shall not be reduced until arrival at the exit discharge
This existing stair does not comply with IBC 1022 Exits. We need to recommend a variance request for it to be considered a 2nd means of egress.

IBC 1005.5 Distribution of Minimum Width and Required Capacity
Where more than one exit, or access to more than one exit, is required, the means of egress shall be configured such that the loss of any one exit shall not reduce the available capacity or width to less than 50 percent of the required capacity or width.
If we are to propose a new stair and use this stair as the 2nd means of egress, this existing stair would carry 50 percent of the occupant load of the 2nd floor.

IBC 1005.3.1 Stairways (Means of Egress Sizing)
The capacity, in inches, of the means of egress stairways shall be calculated by multiplying the occupant load served by such stairways by a means of egress capacity factor of 0.3 inch per occupant. Where stairways serve more than one story, only the occupant load of each story considered individually shall be used in calculating the required capacity of the stairways serving that story.
2nd Floor Occupancy = 83
(divide by 2 since there will be 2 stairs) = 42 occupants for this stair.
(42 occupants)*(0.3 egress capacity factor) = 12.6".... This result triggers the minimum 44" width between handrails for sprinklered buildings

IBC 1011.2 Stairways Width and Capacity
The minimum width shall be not less than 44". Stairways serving an occupant load of less than 50 shall have a width of not less than 36".
This stair should be considered to serve 50 occupants, but has a nonconforming width of 43"

IBC 1011.3 Headroom
Stairways shall have a headroom clearance of not less than 80 inches measured vertically from a line connecting the edge of the nosings. Such headroom shall be continuous above the stairway. The minimum clearance shall be maintained the full width of the stairway and landing.
This stair has moments of 72" headroom clearance, which makes it nonconforming.

IBC 1011.11 Handrails
Flights of stairways shall have handrails on each side and shall comply with Section 1014.
This stair does not have handrails on each side, which makes it nonconforming.

IBC 1013.1 Exit Signs Where Required
Exits and exit access doors shall be marked by an approved exit sign readily visible from any direction of egress travel. The path of egress travel to exits shall be marked by readily visible exit signs to clearly indicate the direction of egress travel in cases where the exit or the path of egress travel is not immediately visible to occupants.
Existing signage should be reviewed, but we should recommend exit signs, especially on the 2nd floor. The recessed openings of the main hall may make the path of egress travel not immediately visible to occupants.

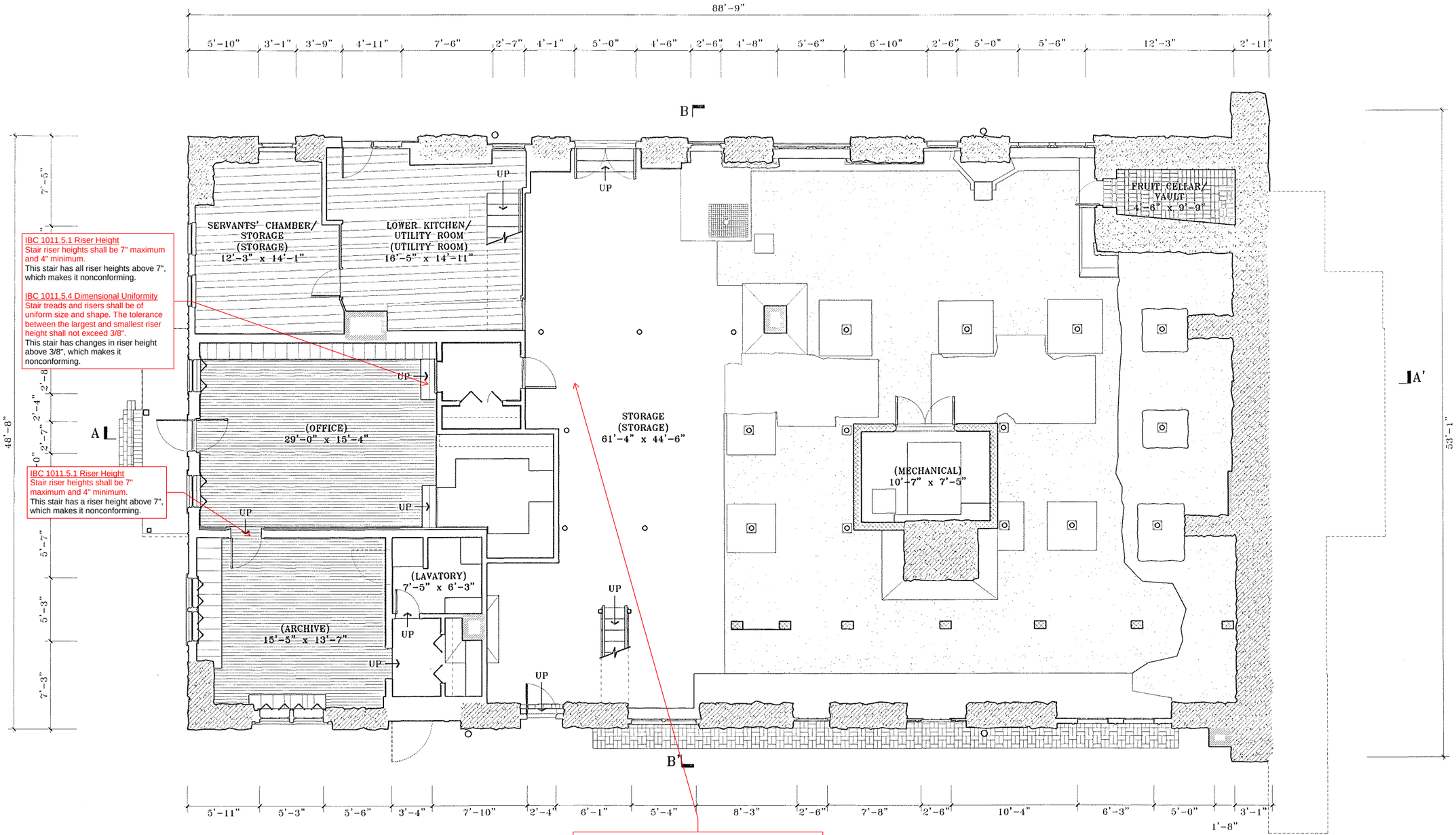
IEBC 1203.11 Exit Signs
Where exit sign or egress path marking location would damage the historic character of the building, alternative exit signs are permitted with approval of the code official.
Alternative signs shall identify the exits and egress path.

SECOND FLOOR PLAN

FEET 1/4"=1'-0" 0 1

METERS 1:48 0

ADDENDUM TO CLARA BARTON HOUSE PROJECT, 2003
5801 OXFORD ROAD
GLEN E
GORSKI
NATIONAL PARK SERVICE
UNITED STATES DEPARTMENT OF THE INTERIOR
AMERICAN SURVEY
17 SHEETS
IF REPRODUCED, PLEASE CREDIT TH



IBC 1011.5.1 Riser Height
Stair riser heights shall be 7" maximum and 4" minimum.
This stair has all riser heights above 7", which makes it nonconforming.

IBC 1011.5.4 Dimensional Uniformity
Stair treads and risers shall be of uniform size and shape. The tolerance between the largest and smallest riser height shall not exceed 3/8".
This stair has changes in riser height above 3/8", which makes it nonconforming.

IBC 1011.5.1 Riser Height
Stair riser heights shall be 7" maximum and 4" minimum.
This stair has a riser height above 7", which makes it nonconforming.

IBC 1003.3.1 Headroom
Protruding objects are permitted to extend below the minimum 7'-6 means of egress ceiling height, where a minimum of 6'-8" inches is provided over any circulation paths. Not more than 50 percent of the ceiling area of a means of egress shall be reduced in height by protruding objects. Most of our Alternatives propose this basement area to be part of the means of egress. Existing headroom is nonconforming: 7'-0" to bottom of wood deck, 6'-5" to bottom of wood floor joists, 6'-0" to bottom of steel beams, various HVAC components that protrude down even further.

BASEMENT PLAN

FEET 1/4"=1'-0" 0 1 2 3 4 5 10

METERS 1:48 0 1 2 3

N

HISTORIC AMERICAN BUILDINGS SURVEY
SHEET 3 OF 17 SHEETS

SURVEY NO. MD-300

MARYLAND

MONTGOMERY COUNTY

ADDENDUM TO CLARA BARTON HOUSE
GLEN ECHO
5801 OXFORD ROAD

DRAWN BY: DWAYNE POOVEY

CLARA BARTON HOUSE PROJECT, 2003
NATIONAL PARK SERVICE
UNITED STATES DEPARTMENT OF THE INTERIOR

M+Sa

Mills + Schnoering Architects, LLC