PRE-PLANNING FOR THE MAJOR RENOVATION OF BUILDING 210

ASSET CONDITIONS ASSESSMENT AND ANALYSIS

PMIS #310907A

NATIONAL PARK SERVICE
GATEWAY NATIONAL RECREATION AREA

December 1, 2021

GWWO ARCHITECTS

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PURPOSE OF REPORT

Scope of Work

After years of continued deterioration, the National Park Service (NPS) proposed a multi-year planning and modernization initiative for the administrative headquarters of Gateway National Recreation Area (GATE, Gateway) on Staten Island, New York. Due to a chronic lack of funding for facility maintenance, the headquarters building shows major signs of water infiltration and evidence of structural degradation establishing cause for immediate repair.

The NPS contracted GWWO and its consultants to develop a planning strategy that focuses on near-term rehabilitation needs of Building 210. The scope of this study and report involves a comprehensive assessment of the existing building and design recommendations for a future phase. The existing conditions assessment and analysis herein focus on the following priority areas:

- Overall Program and Building Layout
- Architectural Barriers Act (ABA) and Life Safety Compliance
- Building Systems and Utilities
- Building Envelope
- Sustainability
- Building Use and Programming

Summary of Findings

Building 210 suffers from a wide variety of issues, many of which stem from recurring water infiltration. The “Asset Conditions Assessment” section of this report details these issues at length, ultimately prioritizing them by the respective time frames appropriate for addressing them.

In brief, the following existing conditions are of the most concern:

- Major water infiltration through the building envelope (particularly the roof) causing failure at the concrete and reinforcing steel structural elements
- Masonry damage at the exterior brick walls and cast stone accents
- Water table/foundation wall damage
- Inadequate fire suppression system
- Obsolete building systems and/or systems nearing the end of their usefulness (site lighting, sanitary, stormwater, mechanical, and elevators)
- Non-code compliant and/or inaccessible egress stairs, elevators, corridors, and site pathways

- Non-compliant accessibility building features (appropriate clearances at doors, accessible work surfaces, and ambulatory toilets) and site elements
- Hazardous materials not encapsulated nor remediated

Limitations of this Effort

While the team endeavored to provide a comprehensive assessment of the existing conditions, observations were limited to building elements visible and apparent without destructive testing or methods. The assessment was performed during favorable weather conditions during the summer; therefore, active water infiltration during a rain event was not observed.

Assessments not performed, but recommended for future phases include a utility survey, a hazardous materials assessment, and structural materials sampling and testing. Both the hazardous materials assessment and additional structural testing represent possible life safety issues; observed conditions on site warrant further investigation. These items, in combination with this report, will be critical to understanding the breadth of rehabilitation needed at Building 210.

PROJECT TEAM

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INTEGRATED DESIGN NARRATIVE

The design team sees multiple opportunities for integration throughout the future design process. Beginning in this Pre-Planning phase, the design team is collaborating to discuss needs, questions, and potential issues as related to the scope of work, site, and project. Contributing members of the design team have a history of working together on NPS projects, so the foundation of an integrated design workflow is fully established.

As the project moves through upcoming phases, it is anticipated that this list will expand and be used as a continual reference.

Opportunities for Integration

- Existing location and orientation of building on NPS-preferred site:
  - Architectural and Mechanical: Identify passive ventilation strategies implemented during original use in 1929 that can be integrated into a modern HVAC design.
  - Architectural and Electrical: Utilize existing apertures and introduce glazing strategies to maximize daylight.
  - Architectural and Structural: Employ remedial techniques to repair existing and limit future damage to the concrete superstructure, while maintaining the building's historic character.
  - NPS/Gateway and Architectural: Compare remedial approaches for the existing historic property to site-specific, long-term risks as a means of finding the right balance of sustainability and security.
  - Civil and Landscape: Maximize use of existing resources and infrastructure for storm water management and low-impact site development.
- Existing uses and programming:
  - NPS/Gateway and Architectural: Assess current and planned operating conditions to identify areas for efficiency and optimization.
- Sustainability:
  - All: Recommend sustainable materials for the design of all building components, finishes, systems, and site work.
  - Architectural and Mechanical: Recommend modern, flexible building systems that emphasize user comfort and are easy to use and maintain. Identify building envelope commissioning strategies to mitigate moisture infiltration and subsequent damage.
  - Architectural and Electrical: Recommend the implementation of renewable energy sources such as photovoltaics (solar) and wind to reduce energy consumption.

- Construction phase planning and logistics:
  - NPS/Gateway and Architectural: Identify temporary changes to normal operating conditions due to ongoing or phased construction activities.
  - Architectural and Estimation: Establish a realistic goal for financial resources needed to modernize the building completely and correctly.

Trade-offs (to be) discussed and (potentially) made:

- Partial reconstruction of the exterior envelope with modern cavity construction versus existing to remain.
- Effects of on-site renewable energy sources (e.g. initial cost, return on investment, aesthetics) versus ongoing impact of purchasing energy generated off-site.
- Utilize space in adjacent buildings for temporary offices prior to and during construction versus shut-down or work-in-place approaches.
- Shared open office and hoteling versus individual offices and office suites.

Water and Energy Analyses

Baseline energy consumption data has been gathered from the 2003 Commercial Buildings Energy Consumption Survey (CBECS) and will be used to establish a reference model for the future design phase for this project. Building aspect ratio, building siting, and building orientation are set as this project will involve the modernization of an existing structure. Energy analyses will be performed during a future design phase.

PROJECT BACKGROUND

After years of occupation by the United States Army, Fort Wadsworth and surrounding areas were transferred to the National Park Service in 1972, becoming Gateway National Recreation Area (GATE). When established, GATE endeavored to bring a national park experience to the nation's largest metropolitan area and most important port.[1] GATE covers more than 40 square miles and is split between three different administrative units in New Jersey and New York: Sandy Hook, Staten Island, and Jamaica Bay.

Park Purpose

According to the GATE Foundation Document, the park "provides a national park experience in the country's largest metropolitan area. The park preserves a mosaic of coastal ecosystems and natural areas interwoven with historic coastal defense and maritime sites around New York's Outer Harbor. Beaches, marshes, waters, scenic views, and open space offer resource-based recreational opportunities to a diverse public, recognizing the importance to preserve these special places for future generations."[2]

Park Significance

In addition to providing each park's purpose, foundation documents define the park's significance through a series of statements. These significance statements describe why the area is important within the global, national, regional, and system-wide contexts. They also identify the distinctive nature of the park and inform management decisions that preserve and protect the most important resources and values of each park unit.

The following statements of significance from GATE's Foundation Document describe some of the unique aspects of the park:

1 Gateway National Recreation Area (GATE) General Management Plan (GMP) / Environmental Impact Statement (EIS), April 2014.
2 Foundation Document Overview, GATE GMP/EIS, April 2014.

Fort Tompkins, Staten Island, New York [B-1]

[B-2] Cannon at Battery Weed

[B-3] Jamaica Bay Wildlife Refuge

[B-4] Sandy Hook Lighthouse, New Jersey

Coastal Defense Fortifications and Military Areas

- Forts Hancock, Tilden, and Wadsworth comprise one of the largest sets of military installations and distinctive fortifications in the country, dating from pre-Civil War through the 20th century *[Figures B-1 and B-2]*. These installations represent a long period of military presence and served as the defense of New York City, the largest city in the United States.

Coastal Systems and Natural Areas

- Gateway contains an assemblage of coastal ecosystems formed by natural features, both physical and biological, that include barrier peninsulas, estuaries, oceans, and maritime uplands *[Figure B-3]*. The habitats that comprise these ecosystems, so rare in such highly developed areas, support a rich biota that includes migratory birds; marine fish and shellfish; plant communities; and rare, threatened, and endangered species. These features provide opportunities to restore, study, enhance, and experience coastal habitats and ecosystem processes.

Maritime Resources

- The maritime resources of Gateway include the oldest continuously operating lighthouse *[Figure B-4]* in the United States and one of the first federally sponsored lifesaving stations in the country. These resources served to protect ocean commerce and enhance the safety of the busiest U.S. seaport.

Diverse Recreation Opportunities

- The vast and diverse park resources at the gateway to the most densely populated region of the United States provide an abundance of outstanding recreational and educational opportunities.

Staten Island Unit

In its totality, the legislative boundary for GATE Is 27,025 acres, with the Staten Island unit comprising approximately 2,975 acres of that area. The unit extends into the bay waters along the eastern coastline of its namesake island and encompasses Great Kills Park, World War Veterans Park at Miller Field, Fort Wadsworth, Swinburne Island, and Hoffman Island.

Fort Wadsworth

Fort Wadsworth dates back to the Revolutionary War and was a primary coastal defense entity at New York Harbor. It sits just below the western end of the Verrazzano-Narrows Bridge connecting Staten Island to Brooklyn.

One of many cultural resources located within GATE, Fort Wadsworth is listed on the National Register of Historic Places as its own historic district. The nomination form for the Fort Wadsworth Historic District details its significance:

Fort Wadsworth is significant under National Register Criteria A, C, and D at the national level in the areas of military history, maritime history, engineering, and archeology (historic—non-aboriginal). This district is notable for its role in United States military history as one of the most important coastal defense installations in the country. New York Harbor, since its inception, has remained a vital asset in the commercial trade operations of the United States. Through the ebb-and-flow nature of coastal defense activity, Fort Wadsworth was adapted over time until it was decommissioned by the Congress.

The Battery Weed Light Station, or Fort Wadsworth Light, is significant in the area of maritime history for its associations with system of navigational aids in New York Harbor. When established in 1828, the first iteration at this position was one of the first federally constructed lighthouses for the harbor. Completion of the Verrazzano-Narrows Bridge rendered the lighthouse obsolete, so it was decommissioned the following year.

The primary buildings and structures at Fort Wadsworth contain examples of forts and gun batteries from the Third System, post-Civil War, Endicott Period, and World War II programs of fortification construction. Fort Tompkins, Battery Weed, Glacis Gun Battery, Battery Hudson, and other various batteries are, in some cases, rare, distinctive examples of these notable periods in coastal defense engineering. Also, the work of significant military engineers, Joseph C. Totten and John Gross Barnard, is scattered throughout the district.

Infantry Barracks, Fort Wadsworth [B-5]

Building 210

In 1929, after an influx of infantry men were stationed at Fort Wadsworth, the Army began an initiative of constructing permanent, on-site housing. One of two mass-housing buildings was the Infantry Battalion Barracks, better known as Building 210 (B210). Just before, or at the time of transfer to the

Infantry Barracks 210, Fort Wadsworth [B-6]

NPS, B210 was converted from barracks to offices.[3] Today, the building houses the NPS/GATE Headquarters, United States Park Police, and GATE's Visitor Protection and Dispatch Center, which operates 24/7. Building 210 is listed as a contributing building within the Fort Wadsworth Historic District on the National Register of Historic Places and is described as follows:

Building 210 – Infantry Battalion Barracks (built 1929, CRIS No. 41199, contributing building) is located at the approximate midpoint of the west side of New York Avenue and faces east toward Fort Tompkins. The three-story, Neo-Classical building has an approximately 400-ft-long by 40-ft-wide footprint with shallow ells extending from the rear (west) of the building. The building has a flat roof with a stepped parapet topped with cast stone coping, brick walls with a cast stone string course, and a raised concrete water table. The long façade is relieved by four projecting entry bays that are ornamented with cast stone blocks and wood panel aprons between the windows. Glass and aluminum entry doors are set within segmental arch, cut stone surrounds. The building is well maintained and in good condition.

Although the nomination form states the building is well-maintained and in good condition, deterioration and major issues related to deferred maintenance have been reported for several decades. In a conditions assessment provided within the 1995 Cultural Resources Report, the NPS noted that "...at first glance, the exterior gives the appearance of being in good condition, but this is not the case."[4] The report expresses concerns related to: parapet masonry repairs; mortar failure; masonry spalling and cracking; steel rust-jacking at window and door lintels; and window replacements that compromise the building's historic integrity.

These issues persist and have compounded since this existing conditions assessment was performed over twenty-five years ago. Despite deferred and/or inappropriate maintenance, Building 210 still stands as an important cultural resource for Gateway. The following "Asset Conditions Assessment" outlines specific deficiencies critical to the success of any future rehabilitation or modernization efforts.

[3] Cultural Resources Report (CRR), Fort Wadsworth, Staten Island, New York, 1995.
[4] CRR, 1995.

ASSET CONDITIONS ASSESSMENT

Prior to programmatic planning initiatives, the Design Team was tasked with providing an Asset Conditions Assessment of Building 210. The following assessment includes architectural, structural, mechanical, plumbing, electrical, fire protection and fire alarm characteristics as of July 2021. The observations herein are accompanied by recommendations for necessary repair or replacement, and are broken down by priority level.

American Society for Testing and Materials (ASTM International) E2018-15 "Standard Guide for Property Condition Assessments: Baseline Property Condition Assessment Process" was referenced as a standard for this report. The information contained herein provides the NPS with a representative sampling of deficiencies and conditions of the property at the point in time in which the walk-through survey was conducted. Changes in priority and overall condition may have occurred since that time.

The Design Team has provided observations of conditions and statements of possible longevity based on professional experience and industry standards. Longevity or life expectancy assumes the NPS provides continued regular maintenance and that repairs to deficiencies noted in this report are performed.

The following analysis includes information translated from the standard NPS Denver Service Center (DSC) Contextual Analysis template. Given the breadth of GATE's legislative boundary, the context immediately surrounding B210 was documented for reference. Supplementary photographs and diagrams are provided.

Definitions

Good condition—in working condition and does not require immediate or short term repairs to function properly

Fair condition—in working condition, but may require immediate or short-term repairs to function properly

Poor condition—not in working condition or requires substantial immediate or short term repairs to function properly

Expected useful life—the average amount of time in years that an item, component or system is estimated to function without material repair when installed new and assuming routine maintenance is practiced.

Technically exhaustive—describes the use of measurements, instruments, testing, calculations, exploratory probing or discovery, or other means to discover or troubleshoot physical deficiencies, or develop architectural or engineering findings, conclusions, and recommendations, or combination thereof.

On-Site Walk-through Survey

- Dates: July 21, 22, and 23, 2021
- Weather Conditions: Sunny, 80-90 degrees Fahrenheit; rain on July 21

[C-1] Typical weather conditions during the three-day walk-through survey

Items noted in this assessment are based on observations made during a three-day walk-through of the building. Observations consisted of non-intrusive visual observations, survey of readily accessible, easily visible components and systems of the subject property. The walk-through was not designed to be exhaustive and did not include a review of all conditions throughout the building or immediate grounds surrounding it.

Inspection of the building exterior was limited to what was readily observable from the ground, roof, or exterior balconies of the building. This includes adjacent property(ies), exterior site features, structure, exterior envelope, and building systems components. No sample collection, testing, calculations, or in-depth analysis of the existing structure was performed.

Inspection of the building interior included floors, walls, doors, ceilings, stairs, and elevators. Concealed physical deficiencies in areas or spaces behind walls, above ceilings, and/or within other non-accessible areas are considered

technically exhaustive and were not inspected. Mechanical, plumbing, electrical, fire suppression, and fire alarm systems were observed when and where accessible.

Gateway representatives were interviewed about conditions of various components. Any assumptions conveyed to the Design Team are noted as such.

Compliance Review

NPS-provided documents were reviewed to assist with this assessment; they included drawings, specifications, reports, and photographs.

Deficiencies observed as non-compliant with current life safety and accessibility standards adopted by New York City are identified. Codes and standards used by the United States Army for the original 1929 building construction are unknown. Additions and renovations over the last 90+ years were designed, constructed/installed and inspected against the adopted codes at the time of each project. Therefore, deficiencies noted in this report may be at variance with current requirements, yet recognized as compliant by the Federal Government and/or within the power of the Authority Having Jurisdiction (AHJ).

The commentary and recommendations herein are based on the following standards and codes, which were in effect at the time this assessment was completed:

- New York City (NYC) Construction Code
  - NYC General Administrative Provisions, 2014
  - NYC Building Code, 2014
  - NYC Mechanical Code, 2014
  - NYC Plumbing Code, 2014
  - NYC Electrical Code, 2011
  - NYC Fuel Gas Code, 2014
  - NYC Energy Conservation Code, 2016
  - NYC Fire Code
- Title 1: Rules of the City of New York
- New York City Board of Standards and Appeals (B.S.A.) and/or the New York City Building Department Materials and Equipment Acceptance (M.E.A.)
- Denver Service Center (DSC) Adopted Codes and Standards
  - International Building Code (IBC), 2021
  - National Fire Protection Association (NFPA) 101 Life Safety Code, 2021
  - Architectural Barriers Act Accessibility Standards (ABAAS), 2015
- National Fire Protection Association (NFPA)

  - NFPA 13 Standard for the Installation of Sprinkler Systems, 2019
  - NFPA 25 Standard for the Inspection, Testing and Maintenance of Water-Based Fire Protection Systems, 2017
  - NFPA 70 National Electric Code, 2020
  - NFPA 72 National Fire Alarm and Signaling Code, 2019
  - NFPA 80 Standard for Fire Doors and Other Opening Protectives, 2019
  - NFPA 110 Standard for Emergency and Standby Power Systems, 2019
  - NFPA 170 Standard for Fire Safety and Emergency Symbols, 2021
  - NFPA 914 Fire Protection in Historic Structures, 2019

- American Society of Mechanical Engineers (ASME) A17.1 2013 Safety Code for Elevators and Escalators

Building Code Analysis	
Original Construction	
Date	1929
Adopted Code	Unknown
Construction Type	Type VB* (most closely resembles)
Number of Stories	3 above grade; 1 below grade
Use & Occupancy	
Original	R-1 (Residential)
Current	Mixed Use: B (Business, Non-production Testing & Research Labs); A3 (Instructional Rooms > 75 occupants); S (Storage)
Occupant Load	Business: 100 GSF / 1 occupant Assembly: 15 NSF / 1 occupant Exhibit Gallery: 30 NSF / 1 occupant Accessory Storage: 300 GSF / 1 occupant
Occupancy Separation	Business-Assembly (Not required) Business-Storage (2-hour with sprinkler system); not provided Assembly-Storage (1-hour with sprinkler system); not provided
Typical Floor Area	~25,000 sq. ft. (above grade) ~21,500 sq. ft. (below grade)
Highest Occupied Level > 75’	No
Egress and Life Safety	
Sprinkler Protection	Yes, but with coverage deficiencies
Fire Pump	No
Standpipe(s)	Yes
Fire Alarm	Yes, but with coverage deficiencies
Number of Exit Stairs	4

** The rear “porches” are infilled with wood construction.*

Building Code Analysis	
Stair Width	> 44” (above grade and below grade at direct discharge to grade) < 44” (below grade at interior stairs)
Corridor Width	> 36”, but with several semi-permanent obstructions
Exit Signage	Yes
Fire Extinguishers	Yes
Emergency Lighting	Yes, via integral battery back-up
Emergency Power	Yes (provided for Dispatch & Park Police)

Transfer grille to corridor [C-2]

Obstructed means of egress [C-3]

Observations and Existing Conditions

Because there are coverage issues with the sprinkler system *[see “Fire Protection” on page 87]*, the building cannot be described as “protected throughout with an automatic sprinkler system.” There is no evidence of fireproofing and floors/roofs of the rear “porches” are of combustible materials. Therefore, the building is technically limited to 2 stories, 40 feet in total height, and 11,000 gross square feet (5,500 gross square feet per story).[1] An area increase of 75% can be applied because of the available frontage on public ways. With the frontage increase, the total allowable area per story is 9,625 gross square feet. Until the coverage issues present in the sprinkler system are resolved, inspected, and approved by the AHJ, Building 210’s area and height will be considered greater than permissible by code.

As a Group B (Business) occupancy, interior public corridors are required to be rated.[2] Many of the primary public corridors are separated by what were originally exterior walls between living space and the outdoor “porches.” Triple-wythe brick masonry walls have an inherent fire rating greater than 1 hour, but it is likely that the openings, whether they be doors, windows, or infill construction do not. Air transfer grilles penetrate and are dispersed throughout these particular walls and are not equipped with fire and/or smoke dampers *[see “Mechanical” on page 55 and Figure C-2]*.

Regardless of occupant type using corridors and hallways, all that are part of an accessible means of egress must be unobstructed and maintain a clear width of at least 44 inches *[Figure C-3]*.[3] An exception for corridors used by 50 or fewer occupants does exist, which allows a reduction to 36 inches, but this should only be applied when absolutely necessary.

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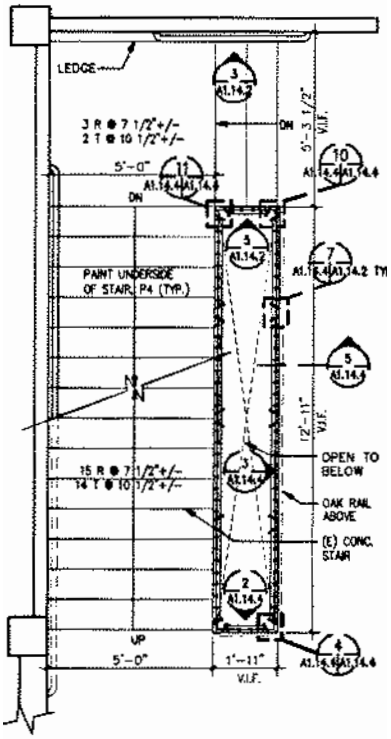
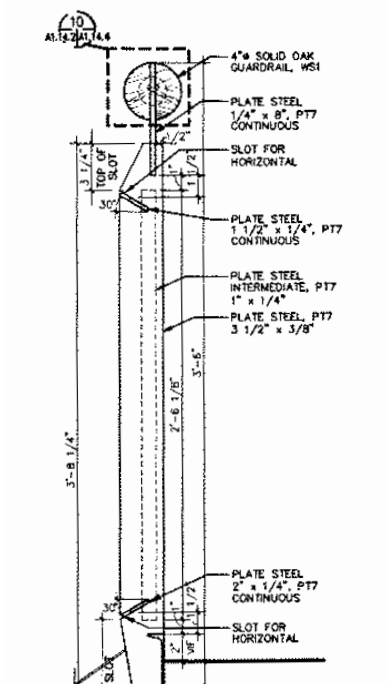
1 **NYC Building Code, Table 503.** Business occupancies in Type VB construction are limited to 5,500 SF per story.

2 **NYC Building Code, Tables 1018.1.1 and 1018.1.2.** In a Group B occupancy, corridors serving greater than 30 occupants or serving the general public require a fire resistance rating of 1-hour without an approved automatic sprinkler system.

3 **NYC Building Code, Sections 1018.2 and 1018.3.** The minimum corridor width shall be no less than 44 inches and unobstructed.



[C-4] Typical egress stair. Unknown author, 1995.



[C-5] Typical guard at egress stair

An occupancy load study of the existing building plans confirmed most areas to be adequately served for egress, with the exception of Level 3. When the interpretative exhibits were added, the occupancy classification for much of that floor became "A-3 Assembly," increasing the occupant metric to one (1) per 30 square feet of net floor area. A "Business" classification has historically allowed one (1) occupant per 100 square feet of gross floor area, but increased to 150 square feet in 2018 model codes. The "A-3" metric increases the calculated load significantly and result in the following for each stair:

- Stair A, 176 occupants
- Stair B, 196 occupants
- Stair C, 228 occupants
- Stair D, 34 occupants

Drawings provided by NPS indicate each stair run is 60" wide *[Figure C-4]*. Assuming this is accurate, the stairs can accommodate up to 200 exiting occupants.[4] So, as of the time of the survey, Stair C is not compliant and any programmatic changes could result in the same for Stairs A and B. Calculations for the lower floors produced no deficiencies.

Components of the interior stairs are mostly in compliance with adopted local and DSC codes. However, the age of the building and loose construction tolerances can affect the tread and riser dimensions. Drawings of the stairs from the mid-1990s note the risers as 7-1/2 inches (+/-) and the treads as 10-12 inches (+/-). Both of these dimensions can be flagged as code violations, but are likely permissible because they are original to the building.[5] Guardrails were designed and documented at 42 inches in the 1990s drawings, but some were observed to be slightly less during the survey *[Figures C-5 and C-6]*. While guardrails are provided at the landings, only handrails are installed along the stair runs; guards are also required.[6]

As of the time of the survey, the building is equipped with an adequate number of plumbing fixtures. Because there is a functioning laboratory in the Basement, the floor cannot be considered "non-occupied." The one (1) restroom on that level is in very poor condition and appears to be non-functional *[see "Plumbing" on page 63]*.

4 **NYC Building Code, Section 1005.1.** The total width of means of egress in inches shall not be less than the total occupant load served multiplied by 0.3 inches per occupant for stairways.

5 **NYC Building Code, Section 1009.4.2.** Stair riser heights shall be 7 inches maximum and rectangular tread depths shall be 11 inches minimum measured horizontally between the vertical planes of the foremost projection of adjacent treads and at a right angle to the tread's leading edge.

6 **NYC Building Code, Sections 1013.1 and 1013.2.** Guards shall be located along stairs, ramps, and landings that are more than 30 inches to the floor or grade, and shall be not less than 42 inches high, measured vertically above the adjacent walking surfaces or the line connecting the leading edges of the treads.

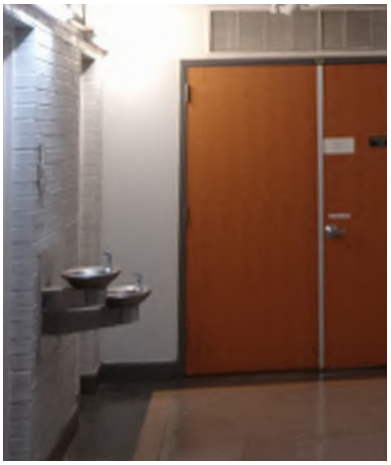
The drinking fountains in some locations project out into the circulation path, potentially causing a slow down of egress or injury to someone that is visually impaired *[Figure C-7]*.[7]

While not directly mandated by the codes applicable to the building, there is a limited amount of "wayfinding" signage installed to assist occupants in navigating to a destination. Room signage, typical of modern buildings, is installed next to doors in the recently renovated Dispatch suite. Other doors throughout the building either have no identification, a small placard on the head portion of the frame, or in the case of the stairwell doors, a printed sheet of paper applied to the exterior face of the door panel *[Figure C-8]*. Stair and elevator identification signage is required and must comply with tactile character requirements of the Architectural Barriers Act (ABA).[8]

Guard height at upper level landing [C-6]

Recommendations

Once the building is protected throughout with an automatic sprinkler system per NFPA 13, the maximum allowable height can increase by 20 feet and the maximum number of stories can increase by one (1). When amended, the resultant allowances will be 3 stories and 60 feet in total height. Also, the allowable area per story can increase by 200%, bringing the total allowable area to 20,625 gross square feet. Currently, each story above grade is approximately 25,000 gross square feet. Rather than reducing the area of each floor, the wood roof structure at the "porches" and anywhere else in the building would allow a reclassification of construction type to Type IIB. Under a IIB classification, the area of each floor is permitted to be 39,375 square feet.

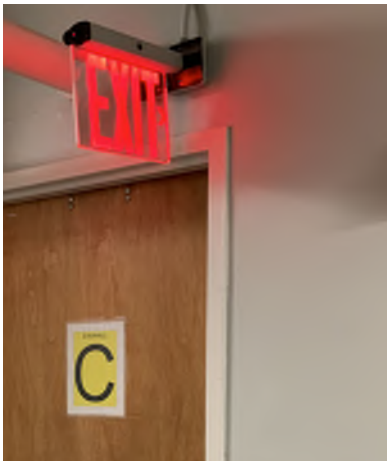


Drinking fountains acting as horizontal projections into egress path [C-7]

Additionally, reconciling issues with the sprinkler system will eliminate the requirement to fire-rate corridor walls. Regardless of programmatic changes or revisions to the architectural plan, the rating requirement is not applicable if the sprinkler system is addressed. This allows for a more open, flexible plan and reduces the need for expensive infill material rated by a third-party testing entity.

Any future program(s) for the building should consider additional storage space within close proximity of offices and labs to discourage placement of loose items and cabinets in corridors and hallways.

The undersized egress stairs could prove to be expensive to modify. Because the occupant loads are greatest at Level 3, all stair runs below that must be sized to accommodate the higher loads. As of this writing, Stair C is the only non-compliant path, so it would need to be enlarged or completely rebuilt from Level 3 down to Level 1. If this approach is taken, compliant guards need



Typical stair identification signage [C-8]

[7] **NYC Building Code, Section 1003.3.3.** Structural elements, fixtures or furnishings shall not project horizontally more than 4 inches over any walking surface between the heights of 27 inches and 80 inches above the walking surface.

[8] **NYC Building Code, Section 3002.3.1.** Stairway and elevator identification signs indicating each by alphabetic letter shall be posted on both sides of each stair door and at every landing, respectively.

[AC-1] Designated accessible parking spaces for private vehicles.

[AC-2] Accessible path obstruction

[AC-3] Park Police platform lift

to be added to all stair runs. A less invasive alternative would be to consider a programmatic change to the exhibits. If the exhibits are reduced in size, with portions turned back into office or storage, the occupant load for Level 3 would, in turn, decrease. Another consideration would be to locate the exhibits on Level 1 where there is no need to traverse an interior stair to reach one of many discharge-to-grade locations.

Accessibility

Observations and Existing Conditions

When devised and ultimately signed into the law in 1968, the Architectural Barriers Act (ABA) was intended to ensure equal and fair access to the built environment for people with disabilities. It is in the spirit of the law for facilities to provide comparable experiences to all that visit them, beginning from the moment individuals leave their chosen mode of transportation. For existing buildings, at least one (1) accessible route is to be provided from the occupant's preferred mode of transportation to an accessible entrance.[9] Visitors to Building 210 arrive from two (2) different locations:

- Parking for private vehicles is within a shared lot at the northwest corner of the site.
  - Four (4) spaces are striped for accessible use and appear to comply with slope requirements. Access aisles for the spaces are undersized *[Figure AC-1]*.[10]

[9] **ABA, Section F202.2.1.** At least one accessible route shall be provided within the site from accessible parking spaces and accessible passenger loading zones; public streets and sidewalks; and public transportation stops to an accessible entrance.

[10] **ABA, Section 502.3.1.** Access aisles serving parking spaces shall be a minimum of 60 inches wide measured from centerline of striping.

  - A striped access path across the vehicular way is provided to a curb cut, which connects to a concrete sidewalk leading to a rear entrance. A picnic table sits at the top of the curb ramp and obstructs the accessible path to the entrance *[Figure AC-2]*.

  - Handrails are provided at the steps leading to the entry door. The treads and risers are non-compliant.[11] A similar condition exists at the rear Park Police entrance.

  - A platform lift is installed adjacent to the concrete stairway but was not tested for operation during the survey.[12] The threshold at the grade level entry point is greater than 1/2 inch.[13] A similar condition exists at the rear Park Police entrance *[Figure AC-3]*. There is also a wood column support for the Park Police canopy that obstructs the exit gate at the upper landing.

- Three (3) public bus stops, noted as accessible, are within close proximity of the four (4) New York Avenue entrances. Sidewalks abutting the public way connect each stop to the designated entrances for the building.

  - Other than sporadic cracking and minimal heaving of the concrete in select locations, all appear to be within slope and threshold tolerances.

  - Curb ramps along New York Avenue are missing detectable warning surfaces. As of this writing, detectable warning surfaces are not

Loose and missing handrails [AC-4]

Handrail terminates above base landing [AC-5]

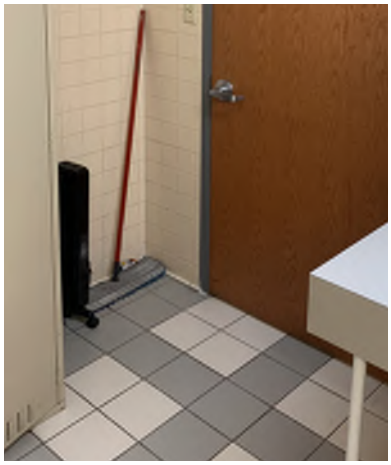
Landing edge at building threshold [AC-6]

[11] **ABA, Section 504.2.** All steps on a flight of stairs shall have uniform riser heights and uniform tread depths. Risers shall be 7 inches high maximum and treads shall be 11 inches deep minimum.

[12] **ABA, Section 410.1.** Federal civil rights laws require that accessible features be maintained in working order so that they are accessible to and usable by those people they are intended to benefit. ASME A18 Safety Standard for Platform Lifts and Stairway Chairlifts requires routine maintenance and inspections.

[13] **ABA, Section 404.2.5.** Thresholds shall be 1/2 inch high maximum.

[AC-8] Typical threshold at former existing wall to "porch" corridor



[AC-9] Obstructed door clearance

[AC-10] Obstructed door clearance

specifically required by the ABAAS at the curb ramp locations noted. However, the United States Access Board is in the process of developing guidelines for such along public rights-of-way.

- Stairs along the sidewalks appear to be compliant and are equipped with properly designed handrails.
- The steps leading up to Entrance "B" are missing one (1) handrail, and the other is loose *[Figure AC-4]*.

During the most recent major renovation of Building 210 in the mid-1990s, the stairs to Entrance "C" were modified to accommodate a sloped walking surface. The steps have compliant treads and risers but the handrails are not designed to extend to the base *[Figure AC-5]*.[14] Drawings for the addition, provided by the NPS, indicate the run closest to the building climbs 32 inches, which is greater than the maximum permitted for ramps.[15] However, the rise-to-run ratio is less than 5%, which classifies it as a "walking surface," and is therefore compliant. Differential settlement has occurred between the stairs and building as there was evidence of surface grinding at the threshold *[Figure AC-6]*.

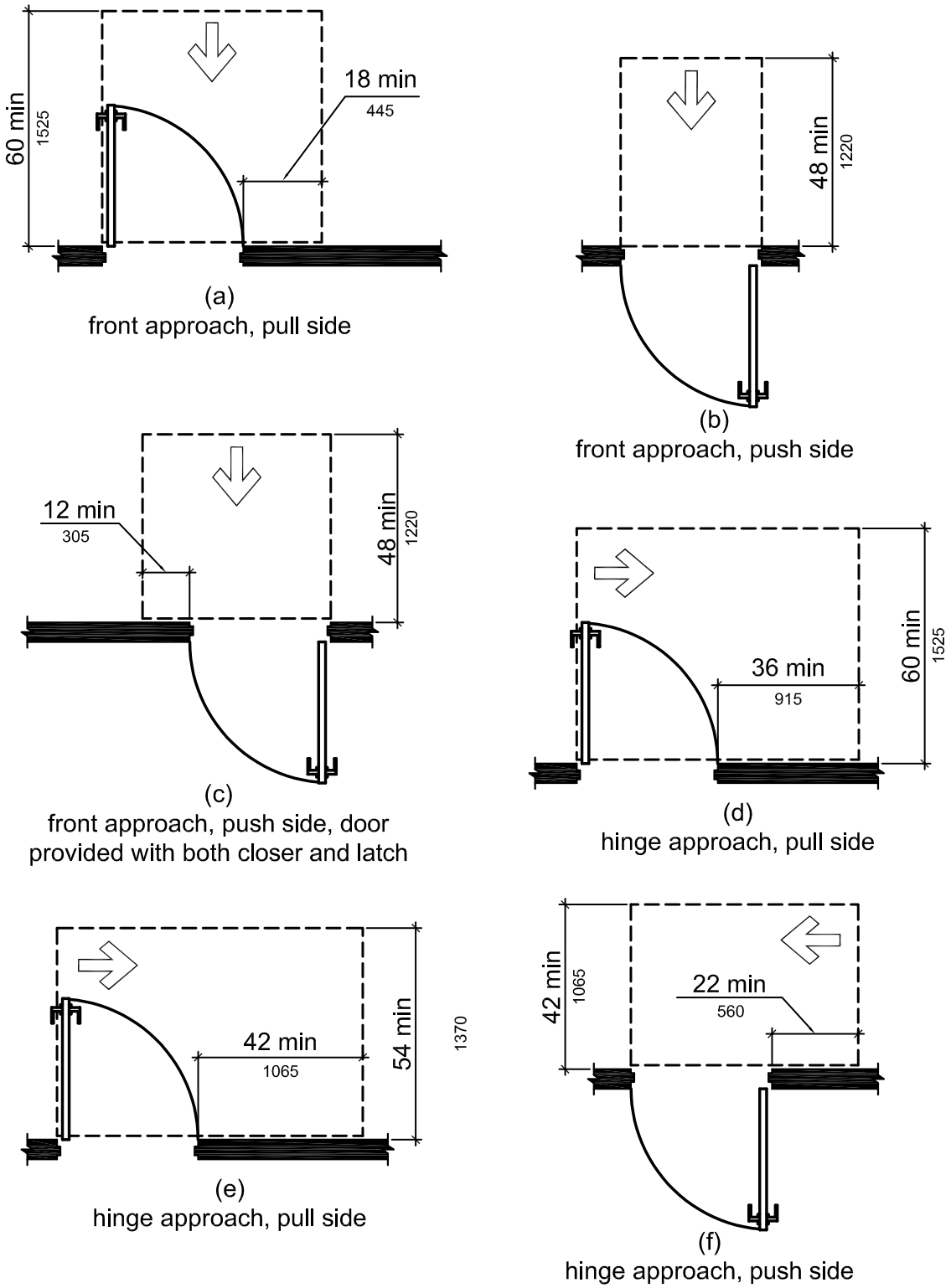
Given the age of the building, there was a plethora of deficiencies throughout the interior. Some of the most glaring issues include:

- Obstruction of the clear width required for accessible paths *[Figure AC-7]*.
  - Most hallways and corridors appear to be adequately sized, but are obstructed by semi-permanent or movable items stacked along the sides. None appear to be essential to the work being performed.[16]

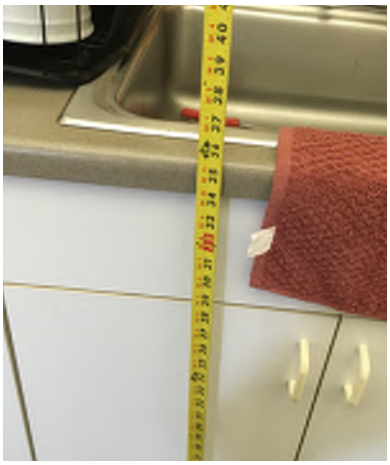
[14] **ABA, Section 505.3.** Handrails shall be continuous within the full length of each stair flight or ramp run.

[15] **ABA, Section 405.6.** The rise for any ramp run shall be 30 inches maximum.

[16] **ABA, Section 403.5, Exception (1).** Within employee work areas, the 36 inch minimum clearance for common use circulation paths shall be permitted to be decreased by work area equipment provided that the decrease is essential to the function of the work being performed.

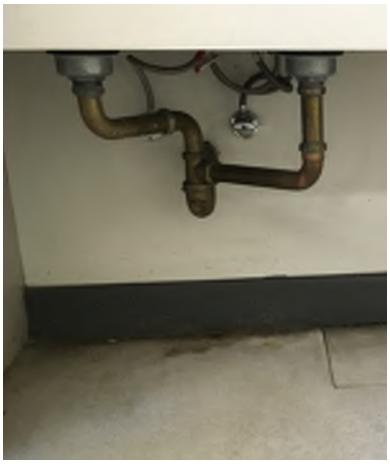


Swing door clearances required by the ABAAS [AC-11]



[AC-12] Non-compliant worksurface

[AC-13] Non-compliant kitchenette



[AC-14] Exposed drain pipes

- Higher than permissible door thresholds, some more than 1 inch.[17]
  - These conditions were consistently located along the doors from the main building to the "porches," which now make up a significant portion of the main corridors at each level *[Figure AC-8]*.
- Imposition on clearances at swinging doors *[Figures AC-9 to AC-11]*.
- Elevated work surface and storage level heights at kitchenettes.
  - Counter tops and storage, or a portion thereof, should be reachable and usable by individuals in wheelchairs *[Figures AC-11 to AC-12]*.[18] For simplicity, shorter runs of surfacing are set at the accessible height, but longer runs integrate an area at least 32 inches wide for a front approach.
- Missing drain pipe protection at sinks and lavatories *[Figure AC-13*.[19]
  - Where exposed, drain pipes can potentially burn or injure the legs of users in wheelchairs. Typically, pipes are either concealed by a removable panel or a form of insulation.
- Absence of ambulatory accessible toilet stalls at the Level 3 group restrooms.
  - The men's and women's group restrooms are the only locations where six (6) or more water closets are provided in a single facility. Therefore, one (1) of the stalls must be accessible to wheelchair-bound individuals and one (1) must be accessible to disabled individuals still capable of walking.[20] The only noticeable omission is the required grab bars on each side of the water closet.
- Elevator door widths less than 42 inches.[21]

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17 **ABA, Section 404.2.5.** Thresholds at doorways shall be 1/2 inch high maximum. Raised thresholds and changes in level between 1/4 inch high minimum and 1/2 inch high maximum shall be beveled with a slope not steeper than 1:2.

18 **ABA, Sections 804.3.2 and 804.5.** The work surface shall be 34 inches maximum above the finish floor or ground and at least 50% of shelf space shall be within 44" maximum (front reach) or 46" maximum (side reach) of the finish floor when a 24" horizontal obstruction (counter top) is present.

19 **ABA, Section 606.5.** Water supply and drain pipes under lavatories and sinks shall be insulated or otherwise configured to protect against contact. There shall be no sharp or abrasive surfaces under lavatories and sinks.

20 **ABA, Section F213.3.1.** At least one compartment shall comply with ambulatory requirements where six or more toilet compartments are provided, or where the combination of urinals and water closets totals six or more fixtures.

21 **ABA, Section 407.4.1.** Center opening elevator doors are to have a minimum clear width of 42 inches.

Recommendations

A modernization of the building will be extensive, therefore the new architectural design must comply with all applicable articles in the current version of the Architectural Barriers Act Accessibility Standards (ABAAS). Consider avoiding items that require consistent maintenance (e.g. platform lifts) in favor of static, constructed items. Also, a comprehensive exterior and interior signage package consistent with published NPS standards would help visitors and staff navigate the building and grounds.

NPS Management Policies, 2006 require facilities to be universally designed and accessible to all segments of the population. The future design shall endeavor to incorporate the Seven Principles of Universal Design developed by the Center for Universal Design at North Carolina State University:

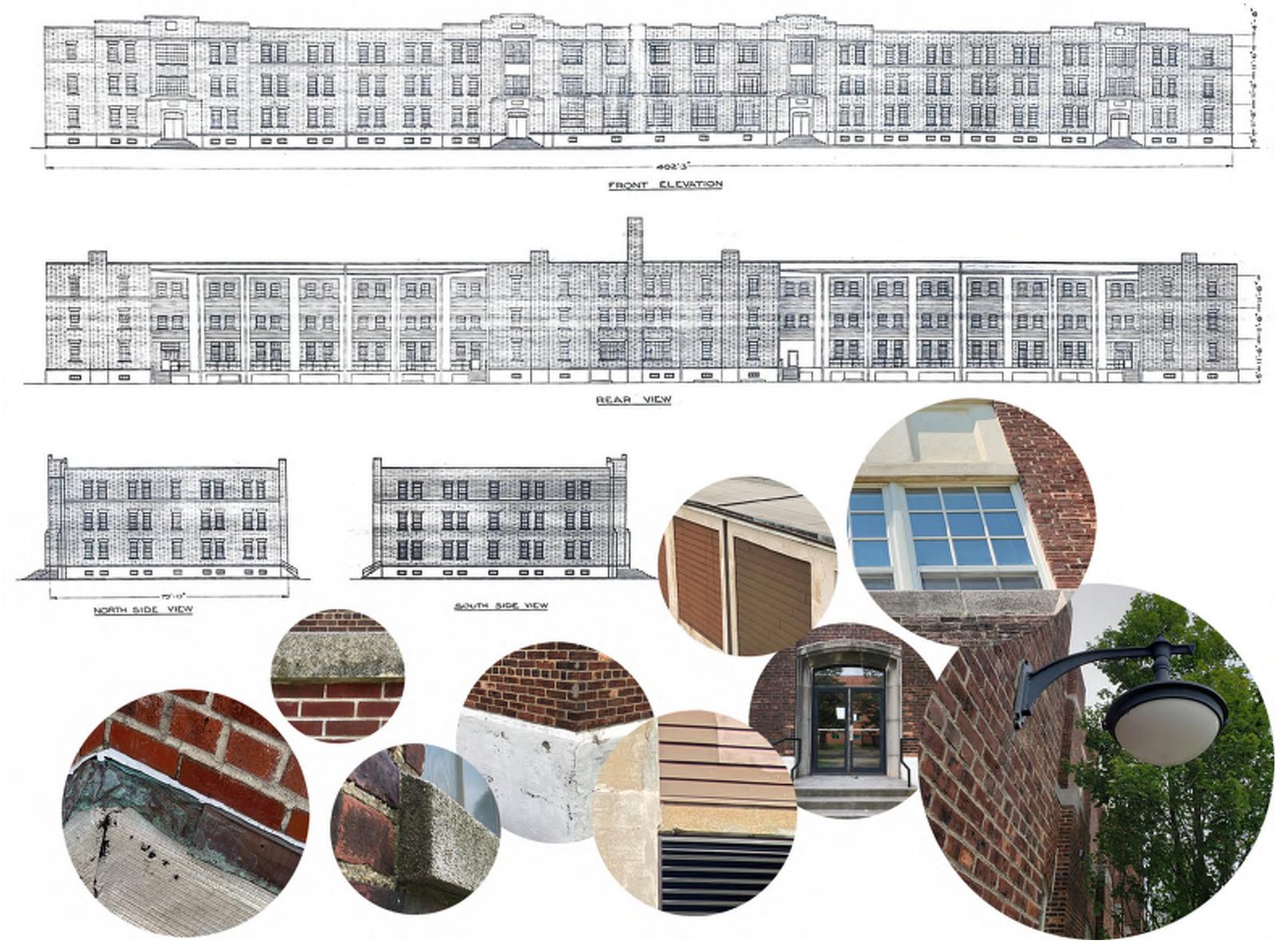
- Equitable Use
- Flexibility in Use
- Simple and Intuitive Use
- Perceptible Information
- Tolerance for Error
- Low Physical Effort
- Size and Space for Approach and Use

While exceptions exist for existing buildings, and additionally for those designated as historic, pursuing them solely to circumvent specific updates is not in the spirit of the ABA and Universal Design.[22]

Architectural

Description

Building 210 is simplistic in form and detail. The distinguishing features of the building are geometric, stylized, and streamlined *[Figure A-1]*. The primary exterior walls consist of triple-wythe brick masonry complimented by cast stone copings, sills, and architraves. Façades featured along public rights-of-way sit atop a heavy concrete stereobate, or base, that terminates with a chamfer approximately 16-20 inches above Level 1. Small, rectangular openings within the base, once containing windows, have been infilled with concrete and painted white.



Building Elevations, Infantry Battalion Barrack. Drawing by United States Army, 1927 [A-1]

[22] **ABA, Section F202.3.** In alterations, where compliance with applicable requirements is technically infeasible, the alteration shall comply with the requirements to the maximum extent feasible. There are exceptions for alterations to qualified historic buildings and facilities, however these apply only when the State Historic Preservation Officer or the Advisory Council on Historic Preservation agrees that compliance with requirements for the specific element would threaten or destroy the historic significance of the building or facility.

[A-2] Early photograph of Infantry Barrack 210

Beyond the base, a reddish-brown modular brick extends vertically in a "common bond" stacking arrangement. Bricks are rotated 90-degrees every sixth course to create a continuous row of headers. Repeating bays containing six (6) operable windows, two (2) per floor level, connect the four (4) feature entrances along the New York Avenue (east) façade. The windows, which are predominantly rectangular, are double-hung with grilles/muntins above and below the mid rail. Replaced since 1927, the windows have nine (9) panes of glass at the top and six (6) panes at the bottom. Drawings and photographs of the original design depict an integral three-pane transom and six-over-six windows. When operable, integral transoms were used to release warm air via the stack effect, a principle of natural ventilation.

The four (4) entrances along New York Avenue have similar character in that they project out from the primary walls, but the two (2) central locations have more exaggerated setbacks. Between these entrances is a small Juliet balcony at Level 2, which is only accessible by window and not intended to be traversed. The windows installed in the narrow projection below are noticeably more decorative and have an arched top *[Figure A-2]*.

At the west façade, four (4) wings extend out to form three (3) U-shaped courts. The two (2) larger courts at each end were once lined with verandas, or open air porches. Likely used as outdoor space for the infantry men housed within, the "porches" were framed by the concrete superstructure and likely roofed for weather protection. This space was quickly usurped based on the need for additional indoor space and infilled with wood framing. Today, a clapboard-type siding is applied to the face and is a comparable color to the native brick masonry.

The interiors are functional and utilitarian.

[A-3] Split and spalled exterior brick

Observations and Existing Conditions

Information provided by the NPS indicates that several, extensive remediation efforts have been undertaken to repair damage to the exterior brick walls and parapets.

The existing exterior walls are comprised of three (3) wythes of brick with no internal cavity. Trapped moisture, coupled with freeze-thaw cycles and years of exposure to salt air, caused the exterior faces of bricks original to the building to split and spall *[Figure A-3]*. This type of deterioration is common for under-fired, clay-based bricks and continues to occur today. The building was designed with an internal superstructure *[see "Structural" on page 45]*, so these severely affected exterior walls are non-load bearing, meaning that they only carry and distribute their own weight. Regardless of how the walls function, they still "move" in that they expand and contract with the changing microclimate. Typically, small expansion joints the thickness of a common mortar bed are placed vertically along façades to account for thermal movement of the masonry. While there are two (2) large building expansion joints for movement of the concrete superstructure, no façade expansion joints were observed during the survey.

Another byproduct of triple-wythe masonry walls without an internal cavity is a lack of adequate insulation. New York is prone to frigid winters and humid summers. An ideal exterior envelope would include some form of insulation and a continuous air/vapor barrier. Because of its age, Building 210 has neither. A spray-applied material, approximately 2-3 inches thick, was identified on the underside of the roof slab, but there was no clear indication as to when it was installed. If installed prior to 1990, the material could contain asbestos. While this is a help, a recurring water infiltration issue has caused portions of the material to delaminate and fall to the floor *[Figures A-4 and A-5]*.

At the onset of this assessment, GATE identified water infiltration as a severe, high-priority issue for the building. Significant water damage was observed along the perimeter walls at Level 3. The most extensive damage exists along the east façade and at both the southeast and northeast corners of the building. The interior cementitious parging has "bubbled," and in many cases, crumbled from the wall *[Figure A-6]*. Flaking paint associated with crumbled parging could indicate a lead-based formula and should be tested. The issues decrease dramatically as one moves down and inward. The interior structural bay, between column lines "C" and "D" shows little to no signs of infiltration or damage at all levels. Damage is mostly concentrated around the rear chimneys at Level 2 and the main entrances at Level 1.

To trace the infiltration path(s), the roof was assessed for several hours. The existing finish consists of built-up felt plies adhered with asphalt. The built-up plies sit directly above tapered cast-in-place concrete slabs. There appears to be no above-deck insulation and likely no vapor barrier. The date of installation could not be verified by facilities staff, but horizontal surfaces of the roof are in fair shape. Photographs taken during a 1999 assessment

Spray insulation at underside of roof [A-4]

Fallen insulation [A-5]

Damaged cementitious parging [A-6]

[A-7] Attempted repair at damaged through-wall scupper

[A-8] Damaged counterflashing

[A-9] Failed transition wrap at roof penetration flashing

[A-10] Damaged counterflashing

[A-11] Failed sealant joint atop counterflashing

show a ballast topping that no longer exists.[23] Assuming the roof was replaced soon after, the current roof would be approximately 15-20 years old. Internal roof drains were clear of debris and functioning, but flashings and associated sealants at overflow scuppers are failing *[Figure A-7]*.

Where the roof finish turns upward onto the interior side of the parapet walls, a copper counterflashing is provided as a termination. The counterflashing has a patina and is punctured at several outside corner conditions *[Figures A-8 to A-11]*. Details in the parapet reconstruction drawings from the 1990s show a through-wall flashing integrated into the counterflashing and extending to the exterior wall face. Unfortunately, because of the compromised counterflashing conditions, the through-wall piece is not preventing infiltration. Segments of flashing along the northeast, north, and northwest parapet walls have been replaced with what appears to be aluminum *[Figure A-12]*.

Aluminum counterflashing [A-12]

Further up the parapet walls sit cast stone copings. Where the parapets are still of original construction, there is no bond break or flashing below the caps. Flashing was added to those segments repaired in the 1990s. Because brick is clay-based and cast stone is cement-based, the two (2) materials have different expansion and contraction properties. The differential movement causes the bonding mortar to crack and delaminate. Sealant joints between cap segments have failed, so water is flowing into the failed joints, bypassing the cracked mortar, and then absorbing into the wall below *[Figure A-13]*. From here, the freeze/thaw cycles lead to the deterioration discussed previously.

Failed sealant at coping stones [A-13]

This process is further exacerbated at the caps abutting chimneys. Designed with a sloped top to shed water, liquid collects at the vertical interface with the chimney walls, and sits until it evaporates or migrates into the wall and spaces below *[Figure A-14]*. A similar scenario occurs at the elevator shafts and pitch pockets installed where structural steel penetrates the roofing. The elevator shaft roofs are flat and many of the pitch pockets "cup" instead of taper. Several of these conditions exhibited ponding water during all three (3) days of the survey.

Above the west-facing "porches," the roof structure switches to wood rafters and wood plank sheathing; the finish is the same built-up asphalt system installed elsewhere. A parapet separates the "porches" from the main building roof and is short enough to step over without a ladder or step. Because none of the four (4) egress stairways extend beyond Level 3, roof access is by hatch only. There are two (2) hatches, one at each end of the building (north/south) and are within the wood-framed "porch" roofs. No fall protection system or devices were observed.

Damaged cementitious parging [A-14]

At Levels 2 and 3, the wood-framed infill at the west-facing "porches" is failing in several locations. Two (2) specific locations at Level 2 are of primary concern:

[23] Tomka, Peter. Roof Assessment Report for Building 210, 1999.

[A-15] Visible daylight and wood-framed infill

[A-16] Typical window sash, exterior

[A-10] Typical window sash, interior

- Daylight was observed above the window head at the section between column lines “4” and “5” *[Figure A-15]*.
- The section housing a mechanical louver between column lines “23” and “24” could be pushed outward using modest force *[see “Structural” on page 45]*.

Doors and windows are not original to the building. Information provided by the NPS indicates that windows were replaced in the late 1980s and potentially again during the last major renovation in the mid-1990s. The windows appear to be extruded aluminum, with a thermal break, or vinyl with 1-inch insulated glass. Several units do not open properly and have missing or damaged screens, but visually, they are in fair condition *[Figures A-16 to A-17]*. Above each window is a steel loose lintel. In 1997, of the 199 units, 146 (over 70%) were severely or moderately rusted.[24] The corrosion was causing spalls and cracks similar to those observed during this survey.

Basement

Architecturally, the Basement is divided into three (3) separate areas. The central portion, between the two (2) structural expansion joints, has a similar deck-to-deck height as the above grade floors. The other portions, located at the north and south ends respectively, sit approximately 4 feet above the central bays. There are four (4) means of egress out the western side which are independent of the upper level egress stairs. Steps up to the egress stairwells exist, but are noticeably tight and completely separated by walls and a door at Level 1.

Adjustable steel support columns, more widely known as “lally columns,” were observed under a few concrete members that support the Level 1 floor slab. While not considered critical to the building structure, it was surmised

[24] OZ Architecture. Water Infiltration/Masonry Repair Study, 1997.

that they were added to alleviate stress under areas with heavy office machinery or equipment. A large storage device in the Park Police station sits directly above the columns at the south end of the Basement.

Functionally, the Basement is divided into two (2) areas. One (1), at the south end, is used for storage of aquatic equipment and laboratory materials. The north end is mostly open/vacant with sporadic storage areas containing architectural artifacts. Early drawings indicate that this area was once occupied and used for classrooms-type spaces. Building services enter below grade and along the east foundation walls.

Standing water was observed at the northwest corner of the basement, near the egress ramp. This is likely the result of a faulty threshold installed below the exit door at grade or migration of surface water through compromised portions of the foundation wall(s).

Level 1

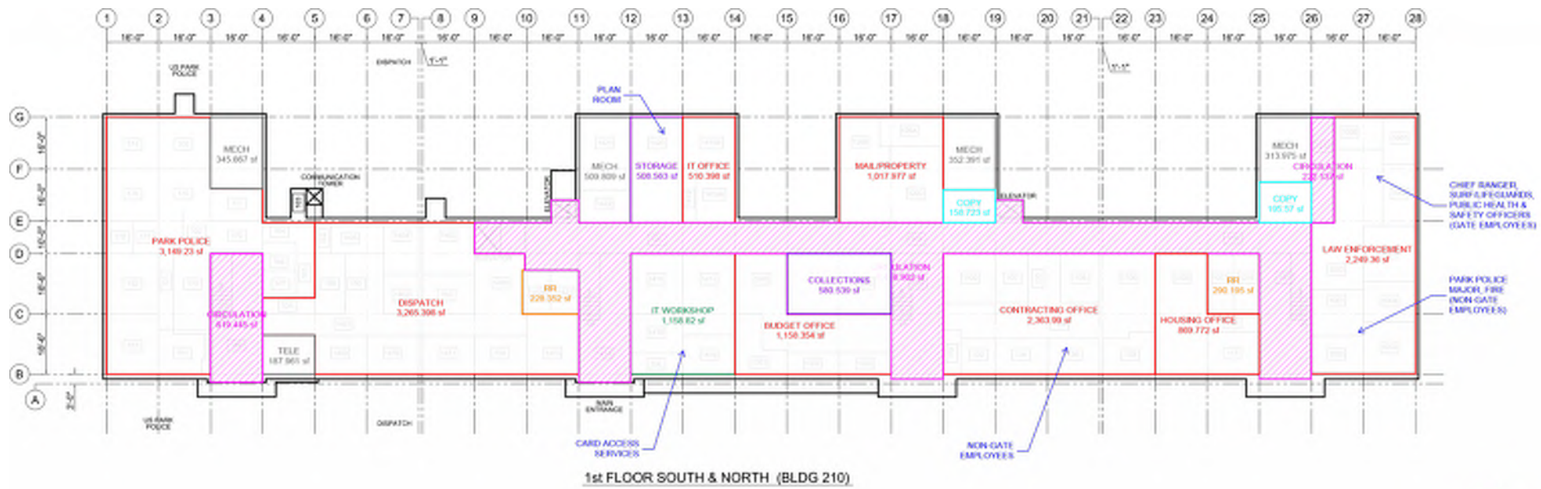
The finished floor elevation for Level 1 is several feet above grade and can be accessed via seven (7) different doors. However, only three (3) are used primarily for entry. The door to Stair C, along the east side and New York Avenue, is the primary “public” entrance for visitors and delivery personnel. Employees enter via a rear door between Stairs C and D, closest to the westward parking lot. All other doors are intended for either egress only or for entry to spaces not operated by GATE staff. All access doors are secured and require an electronic credential.

Level 1 is subdivided into two (2) areas just south of Stair B. The smaller area to the south houses the United States Park Police (USPP) office and the recently renovated GATE Dispatch Center. The USPP office is a separate function and is not readily accessible by GATE employees *[Figure A-18]*. Spaces north of the subdivision include:

- a plan room with flat file storage,
- a mail room,
- Information Technology (IT) offices and workshop,
- a Collections storage room,
- Budget, Contracting, and Housing offices, and
- Law Enforcement offices containing both GATE and non-GATE staff.

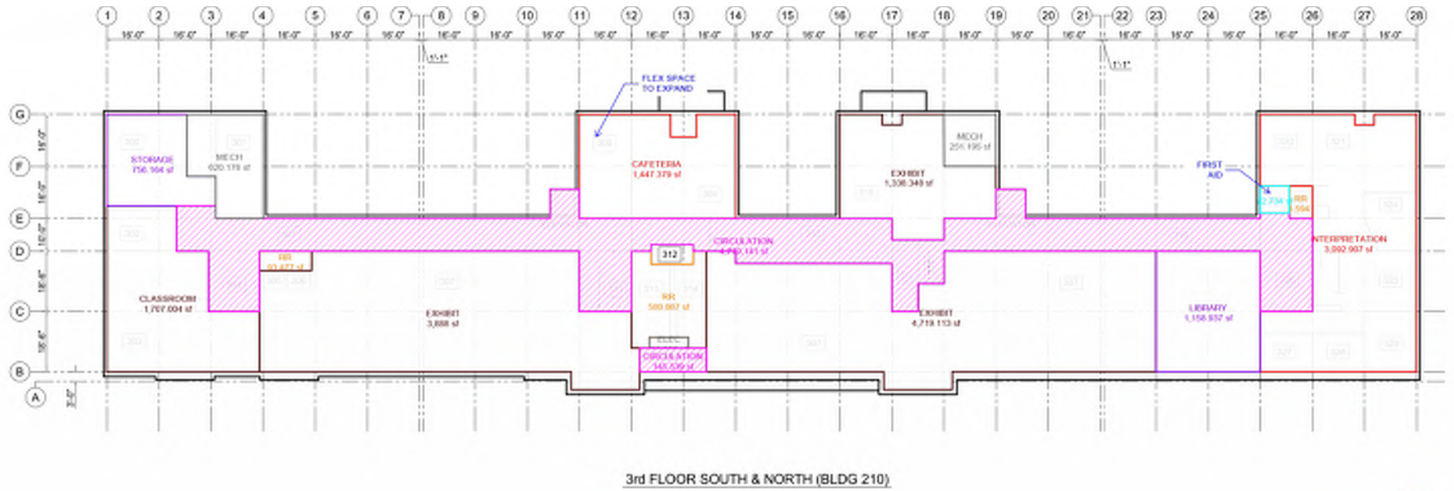
There are also four (4) mechanical rooms containing large equipment distributed along the west façade; one (1) room per westward wing.

Significant damage to the interior wall finish was observed at each of the four (4) entry points along the east façade. At Stairs A and D, damage was most evident at the threshold, while Stairs B and C still exhibit damage from past infiltration at the above “balcony” roof.[25]



Plan Diagrams, Levels 1 and 2 [A-18]

[25] OZ Architecture. Water Infiltration/Masonry Repair Study, 1997.



[A-19] Plan Diagram, Level 3, and Interior Finishes

<u>Levels 2 and 3</u>

Level 2 is largely office space dedicated to the bulk of GATE's administrative divisions:

- Superintendent and Deputy Superintendent
- Resources Stewardship
- Planning, Project, and Asset Management
- Facilities Management
- Administrative Services
- Business Services and Partnership Development
- Public Affairs

Like USPP and Dispatch below, Resources Stewardship occupies almost all of the south end of the floor. Directly above USPP is a laboratory with several casework stations and some offices. Work in this area is directly related to the materials and equipment stored in the Basement.

Due to the ongoing COVID-19 pandemic and several vacancies, both Levels 2 and 3 are predominantly unoccupied. Gateway's Interpretation and Education division is housed at the north end of Level 3 and has corresponding open exhibition and classrooms spaces. Smaller meeting rooms at the south end are used for storage.

The "balcony" roof at Level 2 has not been maintained likely due to the limited means for access. There is no man door or hatch, so maintenance staff must climb through a window or up a ladder from grade below. The built-up finish is compromised, and the one (1) primary drain is almost completely covered with debris *[Figures A-20 and A-21]*.

<u>Conveyance Systems</u>

There are two (2) passenger elevators, both manufactured by Otis and rated for 3,500 pounds *[Figure A-22]*. The units are housed in shafts independent of the original building and are approximately 140-feet apart. The north end unit

[A-20] Compromised built-up roof finish

does not function and there is evidence of hydraulic fluid leaking into the pit. The south end unit is operational as controls at Level 3 were tested during the survey. As located, the maximum travel distance to an elevator on any given floor is approximately 160 feet.

There is a freight elevator, original to the building, accessed via an exterior gate at the west façade and at the Basement. Its functionality was not tested but a 2019 survey describes the elevator as "functionally obsolete" and confirms that it has ceased to work.[26] Damage to the car and surrounding gates/shutters was observed *[Figure A-23]*.

Obstructed roof drain [A-21]

Amenities and Finishes

Occupant amenities are limited to essentials like restrooms and a group lunch room. The primary lunch room on Level 2 has no windows and dated casework and appliances. On Level 3, directly above the lunch room on Level 2, is a larger open space with kitchenette. This space has been used as a cafeteria for visiting school groups, as well as for larger gatherings like holiday and retirement parties. Absent are modern office amenities such as a privacy or lactation room; active, ergonomic furniture and workstations; communal pantries; wellness retreats; and dedicated quiet spaces.

Technology for collaboration is limited to standard office electronics like desktop computers and phones. A meeting room at Level 2 is equipped with virtual conferencing equipment and green screen filming is used by the Interpretation and Education division at Level 3.

Restrooms throughout are designed for group use, separated by gender, or as single-occupant, unisex use. The group facilities at Level 3 seems to have been recently renovated and are in good condition. However, they are designed to accommodate younger visitors, not necessarily adult staff. Like the exhibits at Level 3, this setup is likely a reflection of prior use. Group

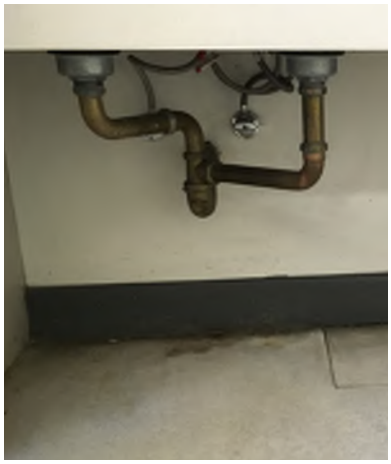
Elevator placard [A-22]

[26] 4Tell Solutions. Project Scoping Assessment, 2019.

Damaged elevator shutter [A-23]

[A-24] Asbestos floor tile

[A-25] Cork floor tile and wall base



[AC-14] Exposed drain pipes

restrooms at Levels 1 and 2 are outdated and provide limited accessibility features. Those facilities in the U.S. Park Police suite, which include lockers and showers, are in fair condition, while the one (1) single-occupant restroom in the recently renovated Dispatch Center is in very good condition.

There is a wide variety of finish treatments throughout and no real cohesive connection between them *[Figure A-19]*. For flooring, there is: carpet (both broadloom and tile) at corridors and offices; cork flooring and wall base at Level 2; sheet vinyl flooring at Level 3 exhibit spaces; vinyl composition tile (VCT) at laboratories and common areas; ceramic/porcelain tile at restrooms; and rubber treads at interior stairways. Though beyond the scope of this assessment, two (2) fields of exposed asbestos tile were observed in the basement, and Facilities staff indicated that the cork at Level 2 may have been utilized to contain a hazardous material in-place *[Figures A-24 and A-25]*. Regardless, these materials can compromise a safe, healthy work environment; they should be removed.

Wall surfaces are predominantly painted brick masonry, gypsum wall board, or cementitious parging with standard commercial wall base. There is ceramic/porcelain tile applied to wet walls in restrooms.

Most ceiling spaces are open with ductwork, pipes, conduits, and underside of structure painted white. There are drop ceilings at select corridor locations and acoustic panels in some offices to mitigate sound. Significant sound transmission was observed from the corridors due to transfer air grilles *[see "Mechanical" on page 55]*.

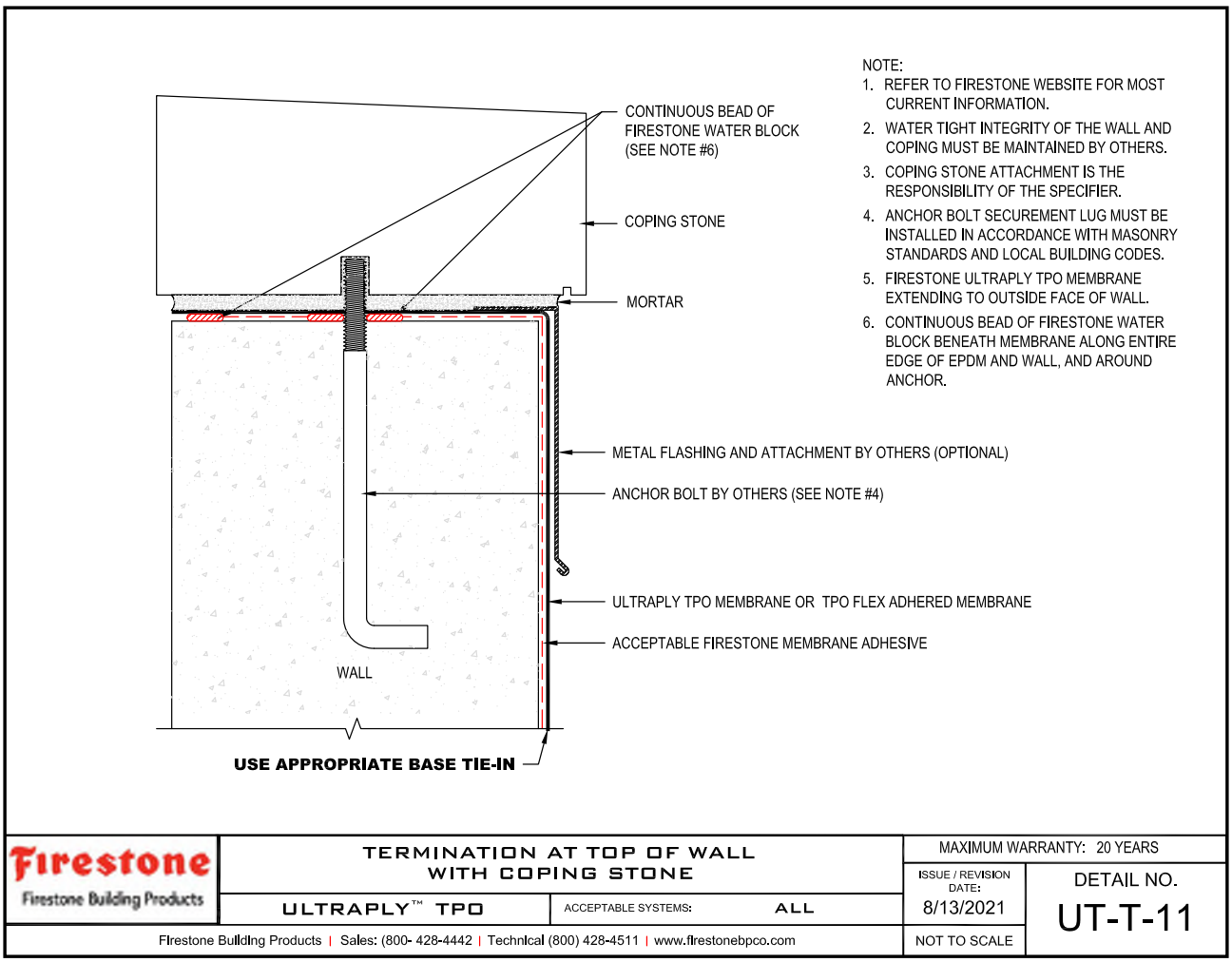
Remediation and Repairs

Because Fort Wadsworth is a recognized historic district by the National Register of Historic Places, modifications to the landscapes and structures within undergo added scrutiny. As a contributing structure, the rehabilitation of the Building 210 will need to reference and follow the "Standards for Rehabilitation" developed by the United States Secretary of the Interior. The process is described as "returning a property to a state of utility, through repair or alteration, which makes possible an efficient contemporary use while preserving those portions and features of the property which are significant to its historic, architectural, and cultural values."[27]

The recommendations outlined below consider the following principles:

- Distinctive features, finishes, and construction techniques or examples of craftsmanship that characterize a property shall be preserved.
- Deteriorated historic features shall be repaired rather than replaced. Where the severity of deterioration requires replacement of a distinctive feature, the new feature shall match the old in design, color, texture, and other visual qualities and, where possible, materials.

[27] The Secretary of the Interior's Standards for Rehabilitating Historic Buildings, 1992.



Recommended roofing detail for single-ply membrane at cast stone coping; Drawing by Firestone [A-26]

- Exterior alterations, or related new construction shall not destroy historic materials that characterize the property. The new work shall be differentiated from the old and shall be compatible with the massing, size, scale, and architectural features to protect the historic integrity of the property and its environment.

If implemented during the future design phase, these approaches to rehabilitation are subject to review and comment by the New York State Historic Preservation Officer (SHPO).

- High Priority
  - Replace roofing and all associated flashings *[Figure A-26]*
  - Remove and reconstruct parapets from roof slab to copings (consider cavity wall construction)
  - Modify coping conditions at chimneys

Dissimilar brick color [A-27]

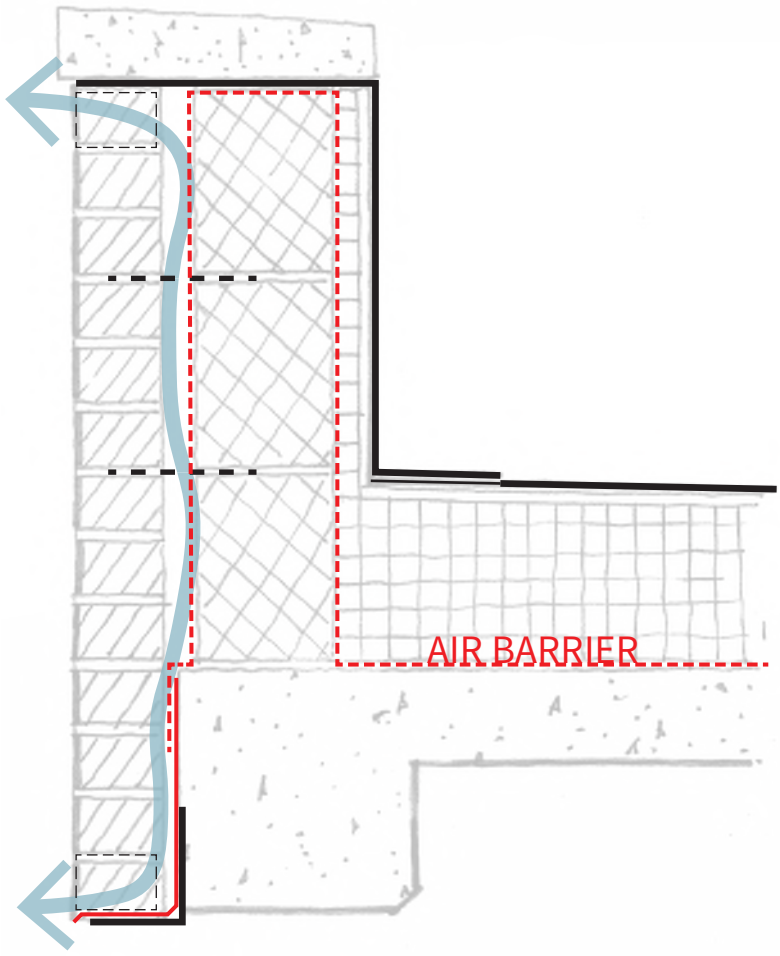
- Eliminate wood-framed infill; replace with non-combustible construction
- Install fall protection devices at areas without parapets

Built-up asphalt or modified bitumen roofing are popular because of their relatively low material and installation costs. However, over time, the binding agent of the various plies does break down and requires a full replacement every 10-15 years. Single-ply membrane systems, such as PVC and Thermoplastic Polyolefin (TPO), are now at the forefront of contemporary roofing. These membranes come in various thicknesses and are usually fully adhered to the roof deck. Individual sheets are heat welded together to form a chemical bond that renders the collective as a single, continuous membrane. The membrane sheets are workable enough to change plane at 90-degrees and wrap under coping caps *[Figure A-26]*. Doing so virtually eliminates the need for counterflashing at the interior side of parapet walls.

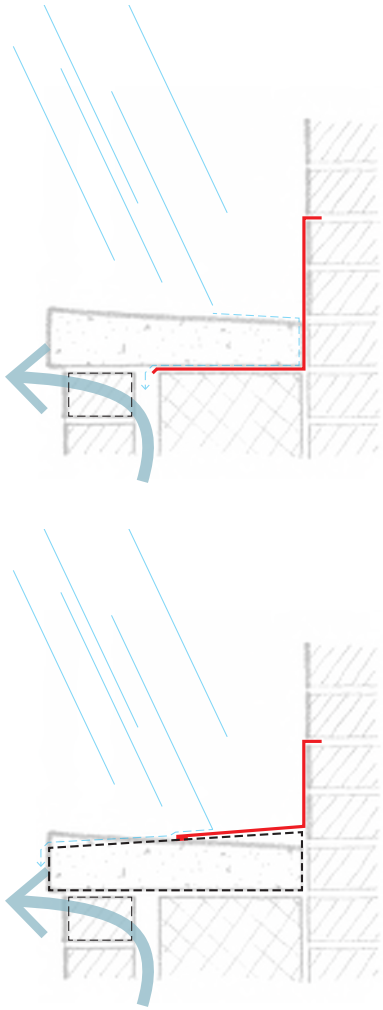
In the last thirty (30) years, portions of the exterior brick walls have been repaired numerous times, while others were fully replaced in kind. Brick masonry used for reconstruction is not original and can be readily identified as different *[Figure A-27]*. Unit masonry replacement, additional flashing, vertical asphaltic coatings, and repointing have all been tried, yet significant water infiltration issues persist. A report, dated 1999, was completed by the Denver Service Center to assess the condition of Building 210's roof. Peter Tomka, the DSC's Roofing and Waterproofing Technical Expert, recommended applying two (2) coats of a water-based Zonyl water repellent to the exterior brick, beginning and Level 3 up to the parapet cap stones. This approach, as is noted in the report, is relatively cost-effective but also requires reapplication every five (5) years. Mr. Tomka acknowledges that there are few, if any, options to prevent water infiltration other than to rebuild the parapet walls with a drainage cavity between the brick wythes.[28]

Due to the cost and disruption to the existing historic fabric, a full demolition of existing and rebuild of the exterior walls to include an internal cavity is neither reasonable or feasible. However, given the failed attempts at solving the water infiltration issues, now is a time to consider doing so at the parapets. Because of the building's historic classification, if rebuilt, the exterior wythe of brick, at a minimum, should be retained. Pending approval by the SHPO, salvaged bricks from the inner-most wythes could be used to replace defective or incompatible units in the outer-most wythe, while concrete masonry units could be used facing the roof. A 1-inch minimum cavity, equipped with drainage net, continuous through-wall flashing, and weep vents, is recommended between the outer brick wythe and internal masonry wythe *[Figure A-29]*. Upon removal of the existing parapets, any internal damage to the concrete structure or steel lintels could be identified and repaired.

[28] Tomka, Peter. Roof Assessment Report for Building 210, 1999.



Potential parapet cavity detail [A-29]



Potential coping modifications [A-30]

The cast stone coping caps atop the masonry parapet walls abutting chimneys should be modified or replaced with new units of a different profile to shed water forward instead of back. Another option is to flash below the cast stone units and up the face of the chimney approximately 4-inches or nearest course *[Figure A-30]*.

While this is considered an “if all else fails” solution, a “Choosing by Advantages” (CBA) effort during the future design phase will thoroughly analyze other potential approaches.

The wood framing and clapboard siding that exists as infill between the concrete frame along the west façade should be removed completely in favor of something more substantial and aesthetically-pleasing, such as a continuous curtain wall glazing system outboard of the concrete superstructure. The glazing system would protect the deteriorating concrete,

return the "porches" to their original state, and provide much needed access to natural daylight to the main corridors at each level. The style of curtain wall should accentuate the existing structure, not distract from it.

Though not prescribed by building codes, OSHA Regulation 1910.28 requires employers to provide protection from falling by the use of guardrail systems, safety net systems, or personal fall arrest systems (e.g. personal fall arrest, travel restraint, or positioning systems). Conditions of note at Building 210 include:

- walking/working surfaces (horizontal and vertical surface) with an unprotected side or edge which is 4 feet or more above a lower level.
- areas subject to maintenance work that are less than 6 feet from the roof edge

The NPS should work closely with an occupational safety consultant to develop a plan, if one does not currently exist, and provide a personal fall arrest system(s) at roof areas without parapets.

- Moderate Priority
  - Masonry restoration and repointing (Grade to Level 3) including repair, cleaning, and recoating of corroded steel lintels.
  - Clean and restore soiled and/or damaged cast stone
  - Replace the elevators
  - Replace all hung windows and doors to primary entrances along New York Avenue

Prior to design, the overall condition of the exterior masonry should be thoroughly evaluated, beyond visual observation, to determine whether repair or replacement will be necessary. Deterioration to masonry units and mortar joints not visible and caused by leaking roofs, capillary action, or extreme weather exposure must be confirmed. During a past remediation project, a mortar analysis was commissioned to determine appropriate replication mixes. The analysis, performed by Jablonski Berkowitz Conservation, utilized standard wet-chemical techniques to determine a binder color, "fines" color, and base mix. Per the study, an ASTM Type N base mix should be used for repointing.[29]

Restoration of cast stone details within the façades should follow Preservation Brief 42 as published by the National Park Service's Technical Preservation Service. For cast stone with marble or limestone aggregates, alkaline pre-wash/acid afterwash chemical cleaning systems used to clean limestone and other calcareous natural stones may be applicable. If marble or limestone aggregates are not present, acidic cleaners used for natural granites and sandstones may be used. Sand blasting or wet grit blasting can seriously damage the surface of the cast stone and should be avoided.

[29] Jablonski Berkowitz Conservation, Inc. Mortar Analyses and Recommended Replication Mixes, 1999.

Hydraulic elevators are considered outdated and are being phased out by most manufacturers. Low-rise, electric traction models are more efficient and do not require a dedicated machine room or hydraulic fluid for operation. The existing shafts can likely be reused, but because they are not original to the building, relocation to within the extents of the existing building should be evaluated during the future design phase.

Doors and windows are individually significant features that contribute to the character of significant façades. Now that Building 210 is listed on the National Register of Historic Places, replacement doors and windows should, to the greatest extent possible, reflect those originally installed in 1929. According to drawings from 1927 and photographs provided by the NPS, the four (4) entrances along New York Avenue were 2'-10" x 7'-0" double doors with a 6-panel design and an arched transom. The windows were a consistent double-hung design with six (6) lites per sash and an upper transom. The transoms had three (3) lites and appear to have been fixed. While original frame materials could not be determined, thermally-broken metal units are recommended for durability. Internal panes of bullet glass, independent of the windows, exist at Dispatch, therefore a blast or bullet rating for the units may not be applicable. A fully glazed, rather than opaque, door panel design may be best suited at one (1) designated entrance along New York Avenue for transparency and visual surveillance.

- Low Priority
  - Replace finishes throughout the building

Only after extensive remediation of the exterior envelope has been completed should the interior finishes be replaced. Any remaining cementitious parging should be removed in favor of a high-quality paint or sealer for the exterior masonry walls. Interior walls consisting of light gauge metal studs and gypsum board offer the greatest amount of flexibility and limit any added load to the aging superstructure. With gypsum board as a base, paint, tile, or decorative wall coverings can be added as desired. Demountable glazing wall systems are also an attractive application for collaborative, meeting, and commons spaces.

With the relatively low deck-to-deck height at each level, exposed ceilings tend to be the preferred approach in contemporary retrofits. Depending on the mechanical system, whether completely new or a replacement in kind, a drop ceiling low enough to accommodate ductwork can drastically affect the proportions of a space. If left exposed, carefully designed acoustic clouds or panel arrays can both hide unsightly equipment and prevent unwanted noise.

High-traffic areas such as main corridors, stairwells, and commons spaces are best suited to receive durable treatments that are easy to maintain. Resinous matrix terrazzo would be appropriate for main corridors and the stairwell associated with the primary entrance from New York Avenue. A more cost-effective, though less durable application would be standard vinyl composition tile (VCT) or "luxury" vinyl tile (LVT). While carpeting helps with acoustics and offers the greatest extent of aesthetic options, it can also

[L-1]

[L-2]

[L-3]

easily stain, conceal allergens, require periodic replacement, and be quite expensive. Therefore, tile carpet would be appropriate for open and private office areas.

Civil/Landscape

Description

The immediate site surrounding the building is reflective of its military history, made up of paths and connections aligned in an orderly and geometric fashion. There are two (2) primary north-south pathways on the east side of the building: an 8-foot-wide sidewalk that parallels New York Avenue and connects to the rest of the park; and a wider 10-foot sidewalk which runs from the north side of the building to the street crossing at Marshall Road.

The two (2) pathways descend to the south at varying rates, resulting in a grass-covered berm that can be traversed via flights of concrete steps *[Figure L-1]*. The steps coincide with sidewalk connections extending perpendicular from the four (4) building entries. Each, which face New York Avenue, are accessed by a dedicated sets of pyramidal concrete stairs. Because of the descending southward slope, each varies in height but do not exceed 5 feet in rise.

On the north side of the building, a 6-foot, east-west sidewalk connects New York Avenue to the Army Reserve Center and employee parking lot. Upon reaching the lot, a north-south sidewalk runs to a courtyard between formed by the U-shape of the building's westward wings. It is here that NPS staff enter the building *[Figure L-2]*. Seven (7) parking spaces are due west of the courtyard and abut a striped crosswalk and curb ramp to serve as an accessible route *[see "Accessibility" on page 18]*. These spaces are separated from the larger parking lot by a sidewalk and curbed planting bed; a notch in the planting bed curb allows storm water to flow to the inlet located between two (2) of the bed's four (4) shade trees.

Within the court and during the 1990s renovation, a concrete ramp and platform was constructed to serve a loading dock *[Figure L-3]*. The loading dock and associated door no longer exist, so the ramp now leads to a side door for Law Enforcement. The balance of space holds two (2) mature shade trees, picnic tables, and a smokers' shelter.

Beyond the courtyard there is no established walking path to the other courts, also formed by the westward wings of the building. The lawn between is littered with various utilities and associated protection screens or fencing.

On the south side of the building, a service drive branches off from Marshall Road and terminates at the southern court. Along the way is a nine-space parking lot reserved for Park Police vehicles and adjacent 6-foot sidewalk for foot traffic. Around the southwest corner of the building, the asphalt

[L-4]

[L-5]

[L-6]

[L-7]

[L-8]

drive forks, providing access to the freight elevator and Park Police entrance respectively. Within the "V" of the fork, there is a radio tower for Dispatch operations *[Figure L-4]*.

Utility infrastructure, such as storm water drainage systems, electrical services, and site lighting, are likely 50+ years old.

Observations and Existing Conditions

Pavement and Walking Paths

Wearing surfaces of on-site pavements are in good condition with no obvious potholes or pavement defects to impact drivers. Numerous cracks within the asphalt driving surfaces are not currently impacting the drivability, but potentially lead to future near- and medium-term issues caused by winter freeze-thaw cycles. Seasonal weeds have emerged in quite a few areas *[Figure L-5]*. Associated curbs and gutters adjacent to drive aisles are in good condition. Notable exceptions are at the Park Police and northwest parking lots. Damage incurred in these two (2) locations are different. At the Park Police lot, there is segmental displacement, while curved sections at the northwest lot are fractured *[Figures L-6 and L-7]*. Both are likely due to impact from vehicles.

[L-9]

Based on scoring patterns and surface wear, sidewalks around the building appear to have been constructed/reconstructed at various times. Those immediately adjacent to the building and along New York Avenue are in good to fair condition. There is evidence of cracking in several older portions, but are relatively minor, and do not present a major tripping hazard. These conditions are primarily noticeable next to utility hardware.

The small, cast-in-place concrete steps traversing the berm between the New York Avenue sidewalk and the building sidewalk are in fair condition. Erosion of the lawn and soil along the cheek walls has exposed the foundations

[L-10]

[L-11]

[L-12]

[L-13]

and initiated separation between the walking surface and stairs *[Figure L-8]*. Continued exposure will lead to destabilization of the hardscape.

There is visible deterioration at all four (4) pyramidal staircases on the east side of the building. The concrete is cracked and chipped, and the finish has worn off in various places making degradation noticeable from afar. Spot repairs have been made over time, but issues discussed throughout this report continue to exist. Associated handrails are in poor condition, as some are loose or even completely missing *[Figure L-9]*.

The sloped walking surfaces, enclosed by brick walls, make up the only path to an accessible entrance on the east side of the building. Attention was paid to the composition, as the small plaza atop the stairs makes the addition feel original. However, while close, the brick color chosen is clearly different when compared to the original. After 20+ years, there are various signs of deterioration including cracks in the concrete, spalling and chipping of the brick walls, and weeds growing from within the perimeter joints *[Figures L-10 and L-11]*. Cracks in the walking surface are significant and present a tripping hazard *[Figure L-12]*.

[L-14]

The concrete ramp/stair in the northwest courtyard is in very poor condition *[Figures L-13 and L-14]*. Deep cracks are visible in the support walls, and there are signs of separation at railing posts. Welded joints along the railings are corroded and ready to fail.

Planting and Storm Water

Variation in plant species and overall interest created by the vegetative landscape is minimal. The proposed plan from the last major renovation in the mid-1990s is more robust, so either the plants were removed from the scope, or were not properly maintained, died, and not replaced *[Figure L-16]*. The primary shrub species include Yew (non-native), Viburnum (non-native), Euonymus (non-native and partially invasive), and Juniper (non-native). There is no evidence of perennials left in the planted zones. Tree

[L-15]

[L-16]

[L-17]

[L-18]

species planted during the renovation include Sycamore (native), Honey Locust (native), Red Maple (native), and Redbud (native); all of which are still standing. Grates at the base of some trees are heaved and broken.

In the western parking lot, the Honey Locust trees selected were incorrect—the thornless variety was specified but not planted. As a result, there are trees with large, dangerous thorns located in a pedestrian area *[Figure L-15]*. The planting bed within the curbed island is eroded, likely because storm water flows from the asphalt to the inlet within via a curb notch. Soil has shifted from the bed to the sidewalk due to over-saturation during rain events *[Figure L-17]*. The Honey Locusts here do not appear to be thriving.

Based on the appearance of surface hardware (inlets, grates, and manhole covers), the existing drainage system appears to be in good condition. Several combination inlets have large curb openings that can allow the passage of large items into the drainage system *[Figure L-18]*. However, other than one (1) field inlet appearing clogged with debris, the drainage system seemed to be functioning well with little evidence of ponding water *[Figure L-20]*. Gateway staff did indicate that flooding is prevalent in areas of the northwest parking lot that are beyond the scope of this study.

Between the original building and the walking surface addition, a half-section of PVC pipe, concealed by capstones, was installed to convey captured rainwater. Over time, differential settlement has occurred, causing the mortar and caulk sealing the gap between the pipe and the building to deteriorate and dislodge. As is the case with the parapets, the open gaps allow water to infiltrate and collect in the cavity *[Figures L-21 and L-22]*.

<u>Utilities and Site Amenities</u>

Limited records were available pertaining to the installation of utility systems and their components. Several utilities were installed and/or upgraded during the 1990s: a new water line for fire service; additional site drainage infrastructure; and gas service. The gas service was installed circa 1993 when

[L-19]

[L-20]

the oil heating system was removed. Other utilities like domestic water service, electric, and telephone presumably predate 1993.

Electrical system components are scattered through the premises, including two (2) large transformers, a small transformer, and an emergency generator and switch gear, presumably powered by natural gas *[see "Electrical" on page 69]*. Other utility hardware castings appeared in good condition, but one (1) water service curb valve located just south of the lot line is located within the curb. While not damaged to date, this location could be by vehicle strike or winter plowing operations *[Figure L-19]*.

The entire eastern half of the building site offers stunning views of the Verrazanno-Narrows Bridge. The rear court at the northwest corner of the building is underutilized due to its arbitrary layout. The spattering of utility enclosures makes the space cold and unsightly.

[L-21]

Remediation and Repairs

- High Priority, 1 – 2 Years
  - Repair/Replace stairs and handrails along New York Avenue façade
  - Remove and replace the northwest ramp
  - Repair cracked and heaving sidewalks

[L-22]

Though currently functional, staircases leading to each of the four (4) primary entrances should be replaced in order to safely serve occupants. The proclivity of cracking and chipping suggests that the cause correlates directly with the original construction method. Spot repairs will remain unproductive. The new cast-in-place stairs should resemble the existing and include embedded handrails of a complementary design and durable material. Despite there being no requirement, it would be beneficial to add handrails to the adjacent accessible walking path as well so that an optimal experience for users with disabilities can be provided. In conjunction with

adding supplemental handrails, minor cracks in the walking surface, that if not repaired, will continue to expand. Joints between the brick walls and concrete need to be resealed to prevent further growth of stray weeds.

The northwest ramp and stair configuration is no longer functional. It no longer serves a loading door and space allotted between the ramp and the building no longer house utilities as intended. If the rear employee entrance is to remain as such, the existing structure should be demolished and reconfigured for access to the door. The wheelchair lift should be removed as mandatory testing and inspection is not routinely occurring. Depending on programmatic changes to the interior, a new staircase may be built for the secondary door to Law Enforcement.

Prior to any hardscape repairs, additional site investigation should occur to fully catalog all areas posing a trip hazard. This additional investigation will identify the limits of work and flag those segments which are displaced and/or undermined. For undermined areas, adjacent surfaces should be properly graded and landscaped to prevent recurrence.

- Moderate Priority, 2 – 3 Years
  - Seal parking lots and asphalt driveways
  - Address drainage and structural issues with New York Avenue access paths
  - Drainage at ADA Parking

Apply herbicide to kill any vegetation emerging from pavement cracks, and apply sealant to prevent intrusion of water and further deterioration due to winter freeze-thaw cycles.

The small staircases connecting the New York Avenue sidewalk to the primary building sidewalk are in relatively good condition, but the softscape abutting the cheek walls needs attention. Any cracks in the sidewalk or adjacent cheek walls must be repaired, and the slope stabilized. This can be achieved by replacing inches of topsoil and planting grasses with deep roots, as the slope is gentle and does not require intensive stabilization.

Planting beds that receive water erode, as observed on site, when only lawn is present. The bed beside the four (4) ADA parking spaces should be fully curbed in order to keep soil from washing onto the accessible paths. A reconfiguration of the bed with diversified plant species could function as a bio-retention garden and limit surface water accumulations.

- Low Priority, 4 – 5 Years
  - Clean all localized storm drain inlets
  - Repair and reset displaced and broken curbs
  - Devise a cohesive planting strategy

– Replace site furnishings to compliment architecture

Clean all drainage structures and pipes to remove accumulated sediment and debris. Replace all combined inlets with either a grate-only inlet or a new combined opening frame/grate/curb piece that has a curb opening with a smaller vertical clearance and intermediate ribs to prevent larger debris from entering the system.

Repair, replace, or reset broken and displaced curbs. Consider using steel-faced and/or reinforced curb to extend their life.

A new planting strategy should be designed using low-maintenance, native species that celebrate the ecology of the greater Gateway National Recreation Area. Healthy trees can be preserved but the Honey Locusts at the rear should be removed and replaced with a thornless variety. Removing these trees without replacement is discouraged as they provide the benefit of shading over the expansive hardscape. The majority of the perennial and shrub plantings have diminished over time without replacement. What is left is largely composed of non-native and invasive species, so they should be replaced.

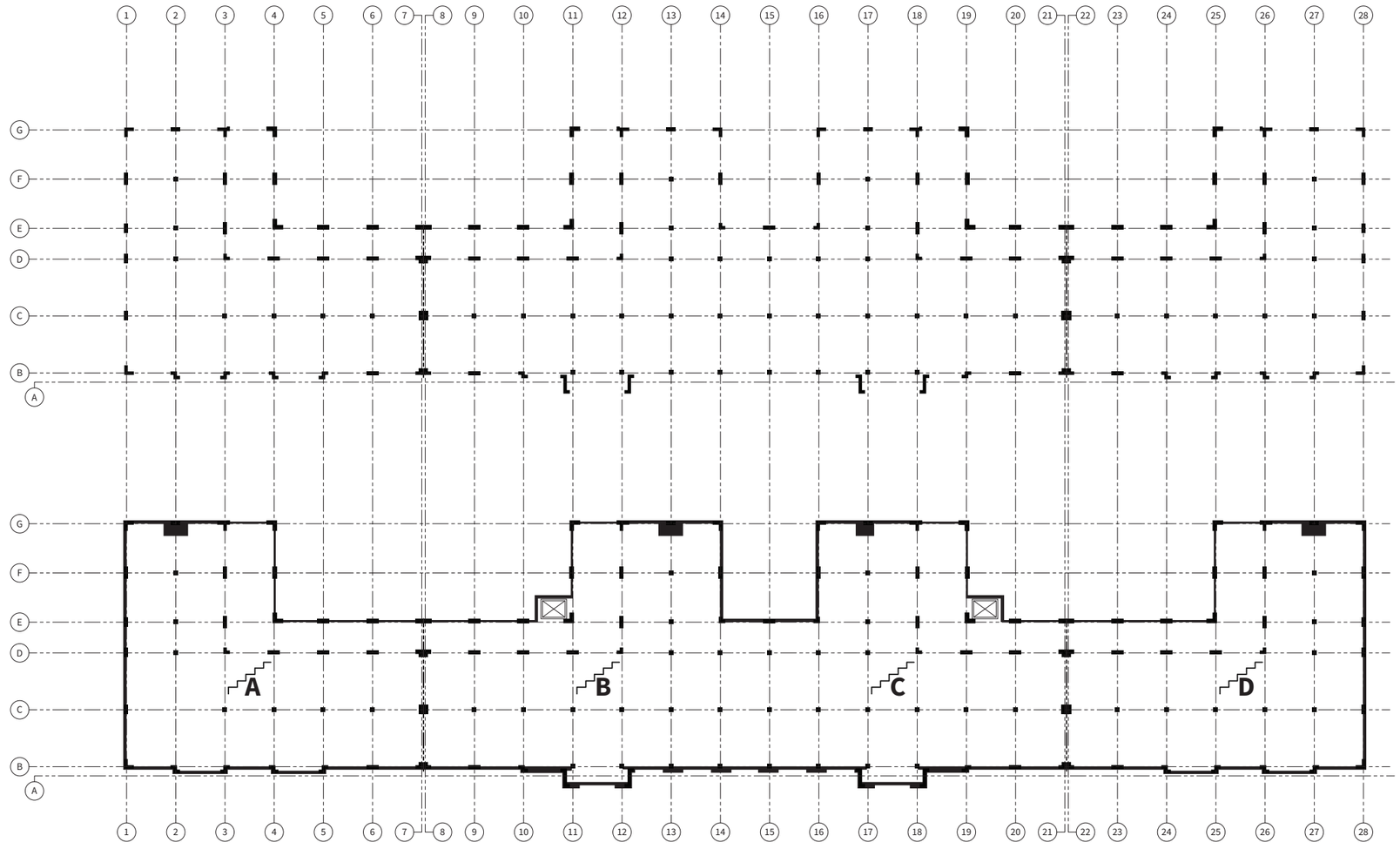
As the exterior congregation spaces evolve through future design, the existing furniture should be replaced with pieces that are more humane and reflect the character of the park. This would include benches, tables and chairs, picnic tables, litter and recycling receptacles, tree grates, bike racks, and any other desired furnishings. Style selections should have a cohesive design language that is complementary to the landscape and architectural style.

Though beyond the scope of this study, a larger storm water management strategy for the shared parking lot should be evaluated. Bio-retention is an approach that could alleviate documented flooding issues.

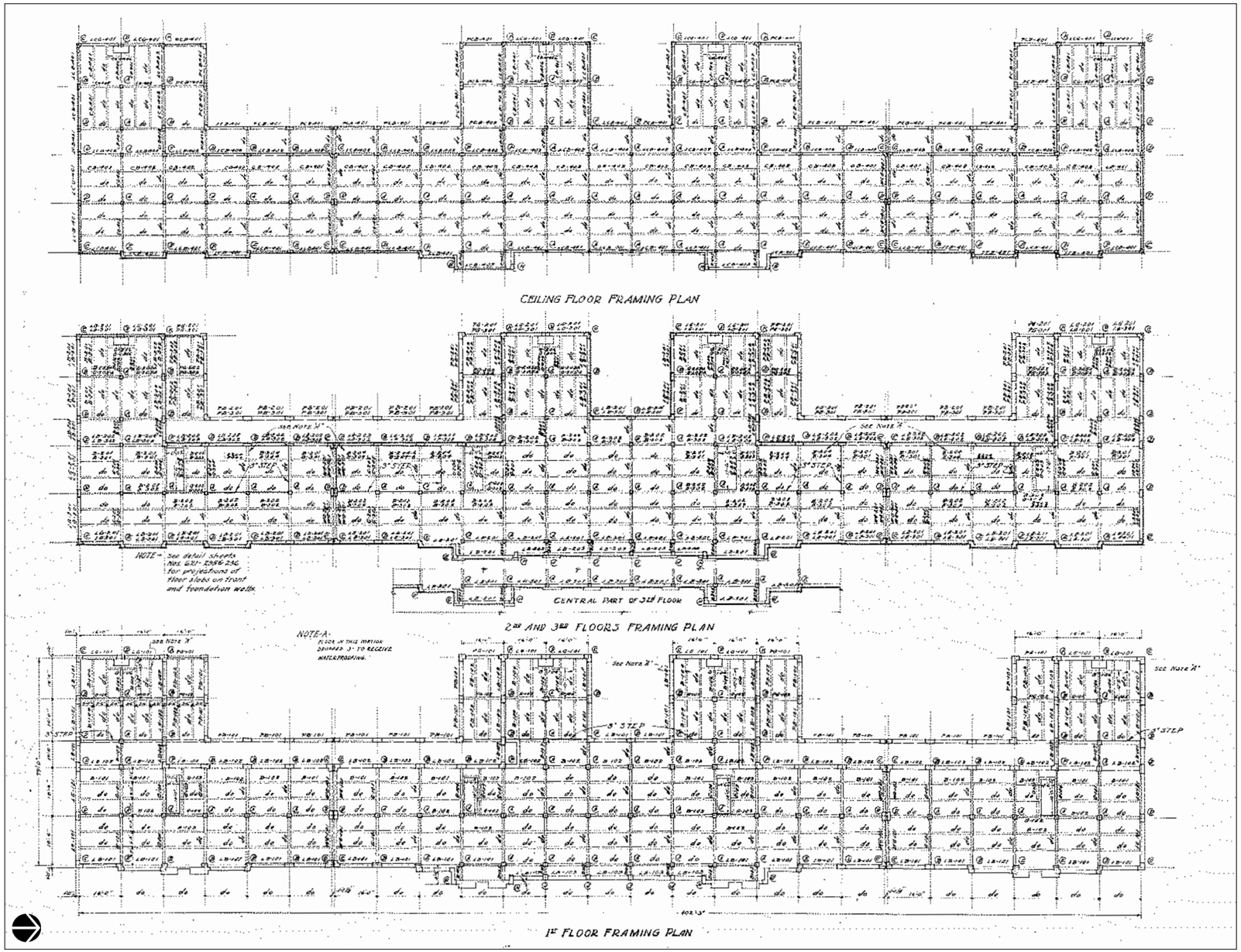
Structural

System Description

The structural system of the building is a cast-in-place concrete frame supporting one-way concrete floor and roof slabs. Column bay sizes vary between 16’-0” x 16’-0” and 16’-0” x 18’-6” with each bay subdivided into three panels by continuous beams *[Figure S-1]*. The beams support the floor and roof slabs. Girders located on the column grid lines provide support for the floor and roof beams and are, in turn, supported by square and rectangular columns. A 10’-0” wide corridor oriented in the north-south direction along the west wall extends for most of the building’s length at Levels 1, 2 and 3, and is supported by a one-way slab clear-spanning the corridor’s width in the east-west direction *[Figure S-2]*. With a few exceptions, the concrete building frame is exposed along the west elevation.

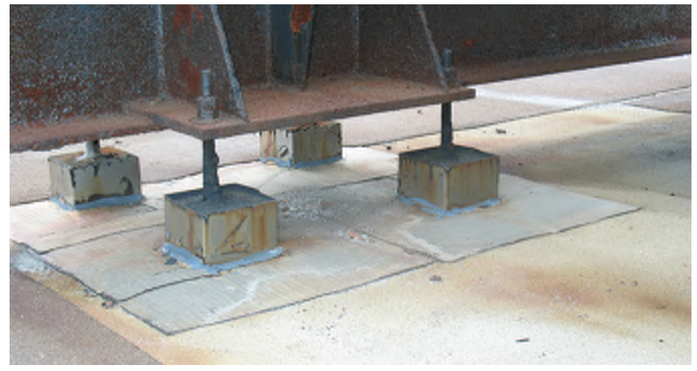


Structural grid diagram [S-1]



[S-2] Framing Plans, Infantry Battalion Barrack. Drawing by United States Army, 1927

[S-3] Steel girder supporting roof framing



[S-4] Steel girder hanger assembly

[S-5} Hanger assembly, Level 3

The building is divided into three sections by expansion joints oriented in the east-west direction and located approximately 98 feet inboard from the north and south walls. In referencing the column grid in *Figure S-1*, the joints rest between line “7” and “8,” and “22” and “23” respectively.

With the exception of the westward “porches,” the exterior walls are non-bearing, 12-inch-thick, triple-wythe brick masonry. The open bays of the “porches” are infilled with wood framing and clapboard sheathing. Metal louvers serve as infill at mechanical room locations. The roof structure above the Level 3 corridor and “porches,” is comprised of wood rafters supporting tongue-in-groove wood sheathing. Wood ceiling joists roughly align with the rafters.

The exterior foundation and basement walls are concrete with portions exposed above grade. They terminate at the main floor elevation (Level 1). The basement floor elevation varies, transitioning at the building expansion joint locations. There is a crawlspace below the westward “porches.” The original building drawings, dated 1927, indicate that the foundations are spread footing-type. It is assumed that the basement floor is a concrete slab-on-grade.

In 1977, eight (8) columns between Level 3 and the roof were removed. Structural steel wide-flange girders, exposed to the elements, were installed to support the roof from above. They are supported by bearings over existing columns, or bear directly on the exterior brick walls above perimeter columns. Threaded steel rod hangers attached to the bottom flanges of the girders extend down through pitch pockets and the roof slab to steel saddles which support the roof beams and girders where columns were removed. The girders are nominally 24 to 26-inches deep and their bottom flanges are approximately 8 to 16-inches above the roof surface. Supplementary wide-flange beam and steel angle framing provides lateral bracing for the girders *[Figures S-3 to S-7]*.

Steel bearing condition and corrosion [S-6]

Steel bearing condition and corrosion [S-7]

[S-8]

Equipment structure corrosion [S-9]

[S-10] Concrete girder deterioration

Exposed steel rooftop structures are dispersed throughout the roof and support mechanical equipment. At some locations, the previously mentioned steel girders also serve as equipment supports.

Observations and Existing Conditions

Rooftop Exterior Steel Structures

The original coating on the steel framing installed in 1977, and on the mechanical equipment platforms, has mostly or completely failed. Surface rust with moderate pitting and flaking was observed at all locations. The loss of coating and corrosion is most pronounced on the horizontal surfaces of member flanges where rainwater ponds *[Figures S-6 to S-9]*. Note that the corrosion process is active and ongoing.

[S-11] Concrete girder deterioration at C/D, grid 1

[S-12] Concrete beam deterioration at 5/6, grid B

Concrete roof slab spall, corroded reinforcement, and beam cracks [S-13]

Spall with exposed and corroded reinforcement [S-14]

Roof and Floor Structure

Deterioration of the concrete roof and floor structure was observed at many locations, and includes cracks, spalls, and exposed and corroded reinforcing steel. The deterioration is most severe at the interior faces of columns and beams located along the east and south building walls just below the roof, and at the exterior faces of exposed columns and spandrel beams along the west elevation at the roof and floor levels. The damage appears to have been caused by water penetration through the roof deck and parapet walls, and directly into the framing along the building's west elevation. In the case of the west elevation, the damage may be exacerbated by thermal changes to the exposed beams and columns.

Deterioration at the following locations has advanced to a stage that requires the installation of temporary shoring (Reference "Appendix B - Structural Assessment Memo" on page B1):

- Roof Girders along grid line "1," between grid lines "B" and "D"
  - Steel corrosion noted on the girder between lines "B" and "C" has advanced to the point of delamination and partial loss of cross section *[Figure S-10]*.
  - Cracks observed along the bottoms of these members may also indicate a partial loss of concrete bond along the reinforcing bars *[Figure S-11]*.
- Roof Beam along grid line "B," between grid lines "5" and "6" *[Figure S-12]*

The following are specific examples of severe deterioration and damage:

- Spalling with exposed and corroded reinforcing steel were noted at several locations
  - Roof slab *[Figure S-13]*

Spall with exposed and corroded reinforcement [S-15]

Concrete beam cracks at 2/3, grid G [S-16]

[S-17]

[S-18]

[S-19]

[S-20]

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  - Columns with eastward projecting bays between grid lines “11” and “12” *[Figure S-14]*
  - Columns with eastward projecting bays between grid lines “17” and “18”
  - Columns “B25” and “B27” *[Figures S-15]*

More moderate deterioration in the form of spalls and cracks was noted at several locations throughout the building. The following are specific examples of moderate deterioration and damage:

- Cracks, measuring approximately 1/8 to 1/4-inch in width.
  - Roof beams and girders along grid line “A”
  - Roof beams and girders along grid line “B”
  - Roof beams and girders along grid line “G” *[Figure S-16]*
- Large, vertical cracks, measuring 1/4-inch and greater in width.
  - Faces of several columns located between Level 3 and the roof, along grid lines “1” and “B” *[Figures S-17 and S-19]*.
- Evidence of roof water penetration (e.g. stained framing and sheathing, rotted sheathing)
  - Wood-framed roof areas above the main western corridor and portions of the westward projecting building wings *[Figures S-18 and S-20]*.
- Evidence of ground water penetration (e.g. standing water, concrete spalling, corroded reinforcement)
  - Basement, northwest corner
  - East foundation wall and floor slab, between grid lines “11” and “12” *(Figures S-21 and S-22)*
- Evidence of water penetration due to weathering (e.g. spalling, cracks,

exposed and corroded reinforcing steel, failure of previously repairs)

  - Concrete beams and columns along west elevation
  - Concrete beams and columns along north and west elevations of "porches" *(Figures S-23 to S-26)*

- Concrete and masonry failure (e.g. extensive cracking from infilled window openings, spalling, exposed and corroded reinforcement)

  - North, east, and south foundation walls (concrete)
  - West foundation walls (masonry) *(Figures S-27 to S-31)*

- Loose construction under moderately-applied pressure

  - Exterior west wall along grid line "E" at Level 2, between grid lines "23" and "24." This wall is non-original, wood-framed infill and contains a mechanical louver *[Figure S-32]*.

- Non-functioning or missing expansion joint covers and/or filled joints.

  - Building expansion joint between grid lines "7" and "8"
  - Building expansion joint between grid lines "21" and "22"

[S-33]

[S-34]

At the interior, building expansion joints have been filled with cementitious parging at column faces, or fabricated joint covers that do not appear to allow for adequate movement were installed. Besides visual observation, this issue is evidenced by out-of-plane differential wall movement at the east elevation parapet wall. Plus, there are east-west cracks observed at Levels 1 and 3 extending through the slabs and beams of the respective floors, crossing several building bays. Previously installed crack monitors were observed along the cracking at Level 3. It is also possible that the expansion joints, as originally located, and previous reconstruction of the east parapet wall, have contributed to the cracking and out-of-plane conditions *[Figures S-33 to S-34]*.

Remediation and Repairs

- High Priority, 1 – 2 Years

  - Concrete Frame

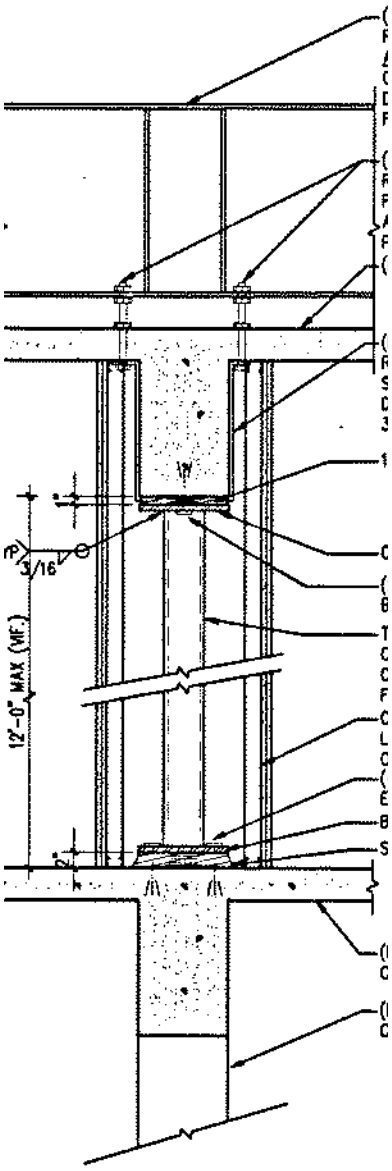
  - Rooftop Exterior Steel Structures

  - Foundation Wall Damage; Associated Exposed Reinforcing

  - Building Expansion Joints

  - Wood Infill at Grid Line "E," between "23" and "24"

Prior to the start of repair work, the concrete structure and rooftop steel structures should be inspected regularly for worsening conditions that may require temporary shoring and the removal of loose concrete that could become a hazard should it break free. This is especially true for the severely deteriorated roof framing and the exposed beams and columns along the west elevation. Because much of the concrete frame along the west elevation is exposed, deterioration caused by water penetration, salt air exposure, and



[S-35]

seasonal thermal changes is ongoing and can be expected to worsen at a faster pace.

Members that require remediation as determined by the survey of their visible surfaces should be further investigated for concealed deterioration by removing, fully or partially, masonry and finishes.

Concrete repair techniques will be driven by the level of severity of the deterioration, but in general, may include the following:

- For spalls and large cracks with corroded reinforcement and failed repairs:
  - remove all loose and delaminated concrete to sound material.
  - examine the exposed reinforcing steel for loss of section.
  - clean any steel deemed to have no or inconsequential section loss to sound metal and paint with an epoxy-based, corrosion-inhibiting coating.
  - patch the spalled areas with a compatible concrete repair material, restoring the member to its original cross-sectional dimensions.
  - supplement any steel determined to have cross-sectional loss or compromised member integrity with structural steel, carbon fiber sheets, or by another method to restore its load carrying capacity.
- For cracks without evidence of corroded reinforcement:
  - fill the cracks with an adhesive-based repair material using a pressure injection method.
- For foundation walls:
  - remove all remaining loose and delaminated concrete to sound material.
  - clean the reinforcing steel to sound metal and paint with an epoxy-based, corrosion-inhibiting coating
  - patch the spalled areas with a compatible concrete repair material.

It is anticipated that the rooftop steel repair work will mostly involve cleaning and repainting. Prior to that work, the framing must be inspected for additional corrosion that may require local reinforcement. This includes locations where portions of the members are concealed by flashing and pitch pockets. Mechanical equipment platforms that will not be reused should be removed. All steel framing to remain should be blast-cleaned to sound metal and repainted with a high-performance, rust-inhibiting coating.

If it is programmatically feasible, at locations where large steel girders support roof structure, new steel columns could be installed where the existing concrete columns were removed in 1977 and 1995 respectively *[Figure S-35]*. The girders could then be removed in lieu of repainting them.

At the building expansion joints, remove all parging and unsuitable material. For exterior locations, fill joints with a flexible joint compound or

prefabricated expansion joint material. For interior locations, replace joint covers that do not allow for movement, or bridge the joints with covers fastened to each side.

At Level 2, the exterior wood-framed infill wall along grid line "E," between "23" and "24," should be laterally stiffened with new framing below the louver and ductwork.

- Moderate Priority, 2 – 3 Years
  - Foundation Wall Damage without Exposed Rebar

This damage is limited to hairline concrete wall cracks and stairstep-type cracks in concrete masonry mortar joints. For concrete wall cracks, fill with an adhesive-based repair material using a pressure injection method. For masonry wall joint cracks, rake or chip mortar from the joints and repoint.

Mechanical

System Description

There are several different mechanical systems conditioning the various portions of the building. There is no cooling or ventilation for the Basement as all original ductwork has been removed.

Level 1, with the exception of Dispatch, and Level 2 are conditioned by variable air volume (VAV) air handling units (AHUs). Each AHU is equipped with a mixing box, filters, hot water heating coil, direct expansion (DX) cooling coil, and supply fan. Duct-mounted smoke detectors are located within the supply duct for each respective unit, but none are within the returns. There are also no preheat pumps for freeze protection. Each unit, and their associated return air fans, are properly mounted on housekeeping pads.

There are several, separate mechanical rooms, each dedicated to one (1) of the AHUs within the building. The rooms each have an outdoor air intake louver and relief air louver. The louvers for Level 1 and Level 2 (South) appear to be large enough to handle an economizer mode. The louvers at Level 2 (North), which are located along the exterior wall and above the corridor ceiling, appear to be small and may not be sized to handle a 100% outdoor air economizer mode.

[M-1]

In this system design, supply air is ducted to VAV boxes positioned throughout the floor being served, and then distributed to ceiling-mounted diffusers. The VAV boxes do not have reheat coils. All of the ductwork is exposed and none of the ductwork is insulated. Return air migrates through high transfer grilles in each space an into the corridor. So, as designed, the corridor is being used as a return air plenum. Though not specifically a code violation in the current

[M-2]

[M-3]

[M-4]

NYC Mechanical Code, it is per the latest IBC adopted by the DSC.[30,31] In the main corridor, there is a large, side wall return air grille for each AHU. Return air enters the grille and is then ducted back to the return air fan.

Each AHU at Level 1 and Level 2 (South) has an associated 20-ton, air-cooled condensing unit located on the roof and mounted on equipment rails. The condensing unit for Level 1 (North) is 15-ton and air-cooled.

None of the existing air-cooled condensing units associated with Level 1 are operational; most have been disconnected from their associated refrigerant piping *[Figure M-1]*. The air handling units for Level 1 are operating, but because the condensing units have malfunctioned, there is no active cooling. The units are simply recirculating ambient air. Due to a lack of cooling by the main system, window-mounted air conditioning units have been added. There is also a mini split system that appears to serve the Collections Room.

Dispatch, recently renovated and an outlier of Level 1, is conditioned by a variable refrigerant flow (VRF) system *[Figure M-2]*. In this system design, untreated outdoor air is brought in through a small louver above the ceiling at the west wall. The untreated outdoor air is ducted directly to each of six (6) fan coil units where it is conditioned locally *[Figure M-3]*. Refrigerant piping interconnects the fan coil units to two (2) large outdoor condensing units and is used for the localized cooling.

At Level 2, the AHUs and condensing units are operational and provide cooling. Staff indicated that cooling was not sufficient in the Cultural and Natural Resources offices. To supplement, several window-mounted air conditioning units are installed. There is also a dehumidification unit poorly ducted through a window. The Natural Resources Lab at the south end of the floor contains fume hoods exhausted by fans mounted on the roof.

Level 3 is conditioned by twelve (12) single-zone, constant volume, packaged rooftop units. Eleven (11) of the units are Carrier Series 48HJ and one (1) is Carrier 48TC Series. Each is equipped with filters, gas heat, DX cooling, and supply fan. Cooling capacities range from 3-ton to 15-ton.

In this system design, the packaged units are mounted on exposed steel dunnage just above the roof. Conditioned air is ducted and distributed to ceiling-mounted diffusers dispersed throughout the floor being served.

For heating, there are several hot water radiators along the exterior walls on Levels 1, 2, and 3. The radiators are in fair condition *[Figure M-4]*, but the system itself may be original to the building as it is diagrammed in drawings dated 1927. Hot water unit heaters are dispersed throughout the Basement, including the laboratory at the south end, and are in fair condition.

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30 **NYC Mechanical Code, Section 601.2.** Corridors shall not be used as a portion of a direct return air system serving adjoining areas, unless within Group B office buildings equipped throughout with an automatic sprinkler system.

31 **International Building Code, Section 1020.5.** Corridors shall not serve as supply, return, exhaust, relief or ventilation air ducts.

[M-5]

To heat the water for the radiators and AHUs, there are two (2) gas-fired, cast iron boilers in a mechanical room in the Basement. Six (6) constant volume heating water pumps distribute heated water throughout the building. Flues from each boiler combine into a single flue that runs straight up the building through a chimney. A small heating and ventilating unit, observed to be in poor condition, provides the combustion air for the boilers.

[M-6]

The restrooms on Level 1, Level 2 (South), and Level 3 are exhausted by roof mounted exhaust fans *[Figure M-6]*, while those on Level 2 (North) and in Dispatch are exhausted by side wall-mounted fans at the west side of the building. The lone restroom in the Basement has a ceiling-mounted exhaust fan that is not operational.

Observations and Existing Conditions

Air Handling Units

- AHU-1A, Level 1
  - 8,200 CFM of supply air; 1,000 CFM of outdoor air; external return air fan sized for 7,800 CFM
  - Located in a dedicated mechanical room on Level 1
  - Manufactured by Trane; Installed in 1996
  - Fair condition, but well past its expected life
  - Air intake louver is damaged *[Figure M-5]*
- AHU-1B, Level 1
  - 8,200 CFM of supply air; 1,000 CFM of outdoor air; external return air fan sized for 7,800 CFM
  - Located in a dedicated mechanical room on Level 1
  - Manufactured by Trane; Installed in 1996
  - Fair condition, but well past its expected life

[M-7]

[M-8]

[M-9]

[M-10]

- AHU-1C, Level 1 *[Figure M-7]*
  - 8,200 CFM of supply air; 1,000 CFM of outdoor air; external return air fan sized for 7,800 CFM *[Figure M-8]*
  - Located in a dedicated mechanical room on Level 1
  - Manufactured by Trane; Installed in 1996
  - Fair condition, but well past its expected life
- AHU-1D, Level 1
  - 8,200 CFM of supply air; 1,000 CFM of outdoor air; external return air fan sized for 7,800 CFM
  - Located in a dedicated mechanical room on Level 1
  - Manufactured by Trane; Installed in 1996
  - Fair condition, but well past its expected life
- AHU-2A, Level 2 (South)
  - 9,740 CFM of supply air; utility set type return air fan sized for 9,250 CFM
  - Located in a dedicated mechanical room on Level 2
  - Manufactured by Trane; Installed in 1996
  - Fair condition, but well past its expected life
- AHU-2B, Level 2 (South)
  - 8,200 CFM of supply air; utility set type return air fan sized for 7,800 CFM
  - Located in a dedicated mechanical room on Level 2
  - Manufactured by Trane; Installed in 1996
  - Fair condition, but well past its expected life
- Unnamed, Level 2 (North) *[Figure M-9]*
  - CFM undetermined
  - Located in a dedicated mechanical room on Level 2
  - Manufactured by Trane; Installed in 1996
  - Fair condition, but well past its expected life

<u>Condensing Units</u>

- CU-1A, Level 1
  - Air-cooled
  - Located on the roof; serves AHU-1A
  - Manufactured by Trane; Installed in 1996
  - Poor condition and non-operational
- CU-1B, Level 1
  - Air-cooled
  - Located on the roof; serves AHU-1B
  - Manufactured by Trane; Installed in 1996
  - Poor condition and non-operational

- CU-1C, Level 1
  - Air-cooled
  - Located on the roof; serves AHU-1C
  - Manufactured by Trane; Installed in 1996
  - Poor condition and non-operational
- CU-1D, Level 1
  - Air-cooled
  - Located on the roof; serves AHU-1D
  - Manufactured by Trane; Installed in 1996
  - Poor condition and non-operational
- CU-2A, Level 2 (South)
  - Air-cooled
  - Located on the roof; serves AHU-2A
  - Manufactured by Trane; Installed in 1996
  - Poor condition
- CU-2B, Level 2 (South)
  - Air-cooled
  - Located on the roof
  - Manufactured by Trane; Installed in 1996
  - Poor condition
- Unnamed, Level 2 (North)
  - Air-cooled *[Figure M-10]*
  - Located on the roof
  - Manufactured by York; Installed in 2010 (based on serial number)
  - Good condition

[M-11]

[M-12]

[M-13]

[M-14]

[M-15]

[M-16]

[M-17]

There are several VAV boxes that do not have the clearance required in front of their control panels *[Figures M-11 and M-12]*.[32] Some outdoor air intake louvers at Level 2 are immediately adjacent to relief louvers and/or exhaust fans *[Figure M-13]*. At least 10 feet between these elements will avoid recirculation of exhaust/relief air back into the building.[33]

Operable windows can wreak havoc on this type of mechanical system. Select windows on Level 2, including in the mechanical room for AHU-2A, were open. All windows in spaces served by this system should remain closed to prevent humidity, water infiltration, and pests.

Packaged Rooftop Units

- RTU-1 through 11, Roof
  - Serves Level 3
  - Manufactured by Carrier; installed in 1999
  - Poor condition, but well past its expected life
    - RTU-5 and RTU-7 were not operating
    - All units are rusted, particularly the base rails and gas piping *[Figure M-14]*
- Unnamed, Roof
  - Serves Level 3
  - Manufactured by Carrier; Installed in 2020
  - Good condition and operational

The outdoor air intake hood for RTU-7 is too close to the condensing unit for RTU-8. This can cause hot air discharge from the condenser to enter the intake, requiring additional cooling. The intake for RTU-4 has a large hole in the bird screen, and the cover panel for RTU-3 has been removed *[Figures M-15 and M-16]*.

Variable Refrigerant Flow (VRF) System

- Dispatch, Level 1
  - Two (2) 14-ton condensing units located outdoors at grade
  - Six (6) indoor horizontal ducted-type fan coil units
    - Undetermined capacity and airflow
    - Each is equipped with a filter rack on the back of the unit
  - Manufactured by Mitsubishi; Installed in 2016

[32] **NYC Mechanical Code, Section 306.1.** A level working space at least 30 inches deep and 30 inches wide shall be provided in front of the control side to service an appliance.

[33] **NYC Mechanical Code, Section 501.2.1(3).** The termination point of environmental air exhaust outlets and ducts discharging to the outdoors shall be located 10 feet from mechanical air intakes.

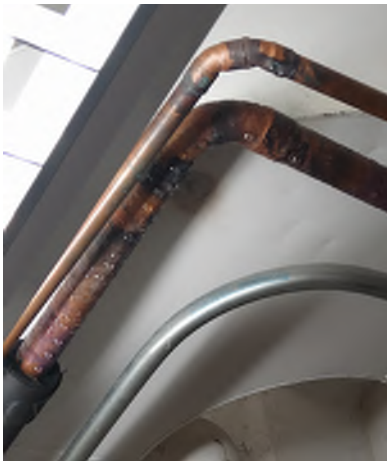
  - Good condition
  - Supply ductwork is not insulated

The supply ductwork for the system is not insulated. A lack of insulation on supply ductwork can lead to condensation forming on the exterior surfaces. While no condensation was observed on the actual ducts, it was present and dripping off of all of the diffusers in the conference room *[Figure M-17]*. It is possible that the condensation is forming because untreated outdoor air is provided to each fan coil unit. When observed, the outside conditions were hot and humid, so similar air was being mixed with the conditioned return air. The fan coil units likely cannot handle the latent load to properly dehumidify, so typically, a dedicated outdoor air unit is provided to precondition entering outside air.

[M-18]

General Components

- Refrigerant Piping *[Figure M-18]*
  - Poor condition
  - Associated insulation is deteriorated and in poor condition
  - Exposed lines at the Budget Office (Level 1); condensation is dripping due to the fallen insulation *[Figure M-19]*
- Ductwork & Diffusers
  - Good to fair condition
  - Neither supply or return air networks are insulated, including exterior ducts
  - Noisy; likely due to above normal air velocity
  - Cold air drafts in the laboratory on Level 2



[M-19]

Uninsulated supply air ductwork can lead to temperature loss, inefficiency, and condensation on the outside of the ductwork.

- Window Air Conditioning (A/C) Units
  - Vary from fair to poor condition
  - Dripping condensate down the face of the exterior wall.

There is significant vibration caused by the two (2) roof-mounted exhaust fans associated with the Level 2 laboratory *[Figure M-20]*. Vibration could be felt standing on the roof slab, so energy is traveling through the rooftop steel structures and through the concrete. Typically, vibration isolators are installed under these units, but none were observed. The fans themselves show signs of corrosion from the local salt-infused air.

[M-20]

Radiant Heating

- Boilers, Basement
  - Gas input of 4,763 MBH
  - Manufactured by Weil McLain (Series 88); installed 2009
  - Good condition

[M-21]

[M-22]

[M-23]

- Boiler Pumps, Basement
  - Four (4) 5-horsepower end suction type pumps, two (2) 3-horsepower pumps
  - Manufactured by Bell & Gosset; installed 2009 (assumed to be in conjunction with boiler installation)
  - Fair condition

Boiler 1 is installed in very close proximity to Boiler 2. There does not appear to be enough clearance to pull out the burners for service *[Figure M-21]*. An exterior opening exists in the Boiler Room, which likely handles the relief air for the space. The louver intended to cover the opening has fallen.

The boiler pumps do not have vibration isolators *[Figure M-22]*. These pumps produce a good amount of vibration, so without isolators, the vibration can be transferred to the building structure and either cause damage or affect occupant comfort.

The bird screen for the louver in the main electrical room has fallen. There is no screen on the relief air louver in the Boiler Room.

Heated water piping within the Boiler Room is covered with dirty fiberglass insulation. For the most part, the insulation is in fair condition, but there are areas where the insulation has fallen or is older and in poor condition *[Figure M-23]*. Outside the Boiler Room, the heated water piping is insulated with a combination of fiberglass and elastomeric insulation. Much of the elastomeric insulation is wrapped with layers of duct tape *[Figure M-24]*. Unlike in the Boiler Room, most of the insulation is in fair to poor condition. Where the insulation is still properly installed, the condition of the piping could not be verified. Some of it appears to have been installed in 2009 and is likely in good to fair condition.

Remediation and Repairs

- High Priority, 1 – 2 years
  - Replace fallen insulation on refrigerant piping
  - Fix/Replace the damaged louver in the Boiler Room
  - HVAC on Levels 1 and 3 (excluding Dispatch)
  - Install vibration isolators at rooftop exhaust fans
  - Relocate intake and exhaust louvers at Level 2
  - Provide intake louvers sized to handle 100% outdoor air during economizer mode
- Moderate Priority, 2 – 3 Years
  - Replace HVAC at Level 2 (South)
  - Provide ventilation for the Basement

  - Replace the Boiler Room heating and ventilating unit
  - Provide vibration isolators for heating water pumps
- Low Priority, 4 – 5 Years
  - Replace HVAC at Level 2 (North)
  - Replace toilet exhaust fans
  - Replace all heating water pipe insulation
  - Replace heating water piping in fair or poor condition

[M-24]

Loose or fallen insulation for refrigerant piping needs to be replaced as soon as possible. Condensation from exposed piping is and will continue to cause damage to furniture, fixtures, and finishes.

With the exception of the VRF system in Dispatch, all existing HVAC equipment should be completely replaced with a cohesive, energy-efficient system. This includes air handling units, air-cooled condensing units, rooftop units, refrigerant piping, component insulation, and ductwork. Levels 1 and 3 are of highest priority given there is currently no cooling other than by window air conditioning units. Window units should be completely removed as they are not an efficient or sustainable solution for the building. Despite being in good to fair condition, full replacement of all ductwork in conjunction with the other equipment is highly recommended. Doing so will ensure a properly sized and efficient system that limits unwanted noise and drafts.

Proper ventilation for the Basement is recommended to help control humidity and protect the items currently stored there. If it is to become occupiable, it must be naturally or mechanically ventilated by code.[34]

All toilet room exhaust fans, including those still functioning, should be replaced as they are nearing the end of their expected life. With replacement, the exhaust flow can sized according to the latest standards/codes, and account for heightened levels of concern pertaining to the spread of contagious viruses such as COVID-19.

Plumbing

Plumbing System Description

There are five (5) separate incoming 2” water services that all enter the Basement through east wall (New York Avenue). The reasoning for multiple incoming service locations could not be determined. Each location has a water meter, but no backflow preventer. There is a combination of steel and copper water piping that routes from the incoming service locations, through

[34] **NYC Mechanical Code, Section 401.2.** Every occupiable space shall be ventilated by natural means or by mechanical means.

the Basement, and on to the upper floors. Two (2) electric water heaters serve the entire building *[Figure P-1]*. Both units are 4.5 kW with 50 gallons of storage. Two (2) hot water recirculation pumps, one (1) for each heater, ensures that hot water is delivered to each plumbing fixture in a timely manner.

Sanitary piping from the upper floors collects in the Basement and then exits the building via two (2) separate 4" sanitary lines penetrating the west wall. One (1) serves the north half of the building, while the other serves the south. Exposed sanitary piping is a combination of cast iron and what appears to be terracotta. In the Basement, an acid neutralization tank collects acid waste from the building's laboratories, and a sump pump in the Boiler Room handles the relief valves associated with the boilers *[Figures P-2 and P-4]*. Any other ties to the sump pit could not be verified. No floor drains were observed in the Basement, including the Boiler Room. Vent stacks terminate above the roof *[Figure P-3]*.

Storm water collected on the roof of the building is captured by fourteen (14) roof drains connected to an internal network of piping *[Figure P-5]*. The below grade terminus of the storm water network could not be located. Secondary overflow drainage is via scuppers in the parapet walls. Those roofs over the westward "porches" are drained by gutters and downspouts. The downspouts are fitted with cast iron boots and hard piped to below grade.

Incoming gas service enters the Basement through the east wall (New York Avenue), and serves the radiant heat boilers and a small generator. A separate gas service and meter serve a larger generator. The gas meter assembly is located outside, at grade, next to the east entrance associated with Stair B. All associated piping is black steel and in fair condition.

[P-1]

[P-2]

[P-3]

Observations and Existing Conditions

[P-4]

Domestic Water

Domestic water piping in the Basement is wrapped with a combination of elastomeric and fiberglass insulation. In general, all of the insulation is in poor condition, and much of the elastomeric insulation is wrapped with layers of duct tape *[Figure P-6]*. Both domestic water heaters, and the hot water recirculating pumps were installed in 2014; they are in good condition. At Level 3, exposed domestic water piping is in fair condition with select locations where insulation has fallen.

Sanitary and Storm Water

The majority of the sanitary piping in the Basement is in poor condition. It appears as though some portions of piping have been replaced. The sump pump in the Boiler Room is also in very poor condition. The pit cover is completely corroded and the connected pipes need to be replaced. Several (approximately 20) sanitary vents, in poor condition, terminate just above the roof. Multiple restroom retrofits is a likely cause of the numerous vents.

[P-5]

Roof drains and downspouts are in fair condition. The dome strainers attached to the roof drains are relatively clean of debris. A couple of gutters are bent out of place and one (1) downspout is no longer attached to its cast iron boot *[Figure P-7]*. Parapet scuppers for secondary roof drainage appear to be undersized. Internal, exposed storm water piping at Level 3 is in poor condition *[Figure P-8]*.

Natural Gas

The gas meter assembly sits directly below a set of operable windows. Typically, gas meters are not installed in areas where off-gassing can enter the building. Relief vent pipes discharge over a sidewalk *[Figure P-9]*. By code, these vent pipes need to be at least 10 feet above grade if above a

[P-6]

[P-7]

[P-8]

sidewalk.[35] Like the meter assembly, there are also requirements for proximity of vent pipes to operable windows. They often need to terminate above the roof level. The local utility's requirements and local code ultimately decide whether the existing installation is permissible.

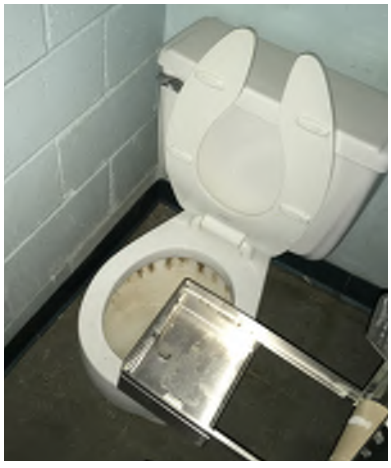
Fixtures

- Basement Restroom
  - One (1) floor-mounted water closet *[Figure P-10]*, one (1) lavatory
  - Located near the base of Stair C
  - Poor condition; appears to be unused
- Basement Laboratory
  - One (1) trough sink *[Figure P-11]*
  - Located at the base of Stair A
  - Fair condition

[P-9]

- Level 1 (South) Group Restrooms
  - One (1) Mens wall-mounted water closet, one (1) urinal, two (2) Womens water closets, two (2) total lavatories
  - Automatic flush valves and faucets
  - Two (2) total floor drains
  - Two (2) drinking fountains; bi-level *[Figure P-12]*
  - Located adjacent to Stair B
  - Good to fair condition

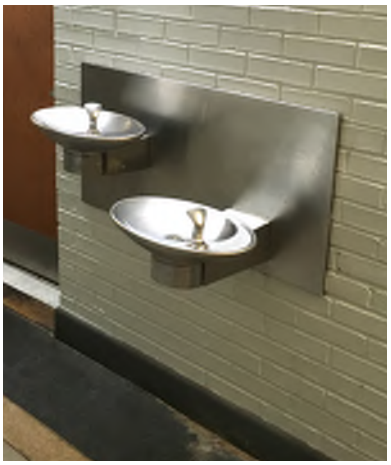
[35] **NYC Fuel Gas Code, Section 503.6.4.** Gas vents that are 12 inches or less in size and located not less than 8 feet from a vertical wall or similar obstruction shall terminate above the roof.



[P-10]

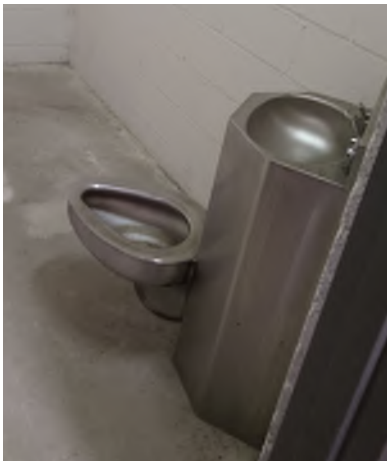
[P-11]

- Level 1 (North) Group Restrooms
  - One (1) Mens wall-mounted water closet, two (2) urinals, three (3) Womens water closets, four (4) lavatories
  - Automatic flush valves and faucets
  - Two (2) total floor drains
  - Two (2) drinking fountains; bi-level
  - Located adjacent to Stair D
  - Good to fair condition
- Park Police Mens Locker Room
  - Two (2) wall-mounted water closets, one (1) urinal, two (2) lavatories, two (2) showers
  - Automatic flush valves and manual faucets
  - One (1) floor drain
  - Good to fair condition



[P-12]

- Park Police Womens Locker Room
  - Two (2) wall-mounted water closets, two (2) lavatories, one (1) shower
  - Automatic flush valves and manual faucets
  - One (1) floor drain
  - Good to fair condition
- Park Police Holding Cells and Interview Room
  - Two (2) total stainless steel combination water closet/lavatory units *[Figure P-13]*, one (1) stainless steel two-compartment kitchen sink
  - Manual operation
  - Fair condition
- Dispatch Unisex Restroom
  - One (1) wall-mounted water closet, one (1) lavatory
  - Automatic flush valve and faucet
  - Good condition



[P-13]

- Level 2 (South) Group Restrooms
  - One (1) Mens wall-mounted water closet, one (1) urinal, two (2) Womens water closets, four (4) total lavatories
  - Automatic urinal flush valve, manual water closet flush valves and faucets
  - Two (2) total floor drains
  - Two (2) drinking fountains; bi-level
  - Located adjacent to Stair B
  - Good to fair condition
- Level 2 (North) Womens Restroom
  - Three (3) water closets, three (3) lavatories
  - Manual flush valves and automatic faucets
  - One (1) floor drain
  - Located near Stair D
  - Fair condition

[P-14]

[P-15]

[P-16]

[P-17]

- Superintendent's Unisex Restroom
  - Inaccessible during walk-through
- Level 2 Laboratory
  - Two (2) lab sinks *[Figure P-14]*, one (1) emergency shower/eyewash *[Figure P-15]*, several hose bibs
  - Fair condition
- Level 3 (South) Unisex Restrooms
  - Two (2) total floor-mounted water closets, two (2) total lavatories
  - Manual flush valves and faucets
  - Located adjacent to Stair A
  - Good condition
- Level 3 (North) Unisex Restroom
  - One (1) water closet, one (1) lavatory
  - Located near Stair D
  - Good condition
- Level 3 Group Restrooms
  - Three (3) Mens wall-mounted water closets, three (3) urinals, six (6) Womens wall-mounted water closets, two (2) trough lavatories with four (4) faucets *[Figure P-16]*
  - Manual flush valves and faucets
  - Two (2) total floor drains
  - Two (2) drinking fountains; bi-level
  - Located adjacent to Stair B
  - Good condition
- Level 3 Exhibits
  - Two (2) stainless steel single-compartment utility sinks *[Figure P-17]*
  - Two (2) cold water hose reels
  - One (1) floor drain
  - Good condition

There are multiple kitchenettes dispersed throughout the building. Each is equipped with a stainless steel single-compartment sink. All of which appear to be in good to fair condition. Only one (1) hose bib for exterior use was observed along the New York Avenue side of the building.

Remediation and Repairs

- High Priority, 1 – 2 years
  - Adjust windows above the gas meter
  - Relocate gas meter relief vents
  - Replace the sump pump, pit cover, and associated piping in the Boiler Room

  - Install backflow prevention on all incoming water service locations
  - Replace all sanitary and storm water piping

Regardless of local utility requirements, the windows directly above the gas meter should be rendered inoperable for the safety of the building's occupants. A licensed gas contractor should coordinate a safe, compliant relief vent termination with the local utility company and adopted codes.

- Moderate Priority, 2 – 3 Years
  - Repair/Replace faulty downspouts
  - Consolidate sanitary vents through the roof

Penetrations through the roof, especially cast concrete slabs, should be limited to the greatest extent possible. Multiple penetrations can compromise reinforcing and increase the chance the roofing membrane will fail.

- Low Priority, 4 – 5 Years
  - Replace manual flush valves and faucets with automatic
  - Replace insulation on domestic water piping
  - Enlarge scuppers for adequate secondary roof drainage

Automatic flush valves and faucets decrease the spread of germs and reduce the amount of potable water use per flush/rinse.

Pad-mounted S&C switch [E-1]

Pad-mounted transformer [E-2]

Electrical

System Description

The primary electric service is provided by Consolidated Edison, Inc. (ConEd) utility company. The existing service to the building is via a single underground feeder from a pad-mounted medium voltage switch (S&C Type PMH-9), located at the southeast corner of the building at the intersection of New York Avenue and Marshall Road *[Figure E-1]*. The underground feeder is routed to the rear of the building and connected to a 500kva (208Y/120V secondary) transformer within a small, fenced area near the west parking lot *[Figure E-2]*.

Secondary service to the building is routed underground from the transformer to a main switchboard (SWBD-Main) at a centrally-located electrical room in the Basement *[Figure E-4]*. The majority of the facility's electrical distribution equipment is located here. Other branch circuit panelboards are dispersed throughout the basement, and in mechanical rooms, lab spaces, and stairwells Levels 1, 2, and 3.

Dispatch, located at the south end of Level 1, received an electrical upgrade within the last five or six years. There is a service disconnect in the main

Dispatch electrical room [E-3]

[E-4] Basement electrical room

[E-5] Basement telecommunications room

electrical room, specifically for Dispatch, that feeds electrical equipment within a closet in the space *[Figure E-3]*. It is assumed that this equipment will require no work as part of a future modernization of the building.

Communications

The primary communications service enters the building at the east side and in the Basement. Two (2) conduits and a large junction box are located on the exterior of the building where the cabling passes through the wall.

The main communications equipment is located within a telephone room in the Basement. The room is secured and is across a hallway from the main electrical room *[Figure E-5]*. There are telephone punch down blocks, network interface boxes, fiber connections, and a data rack. The data rack has a series of service routers, network switches, computer servers, and uninterruptable power supplies that serve the various office spaces throughout the building.

Similar to the electrical system, Dispatch has its own communications systems. Two (2) conduits and cabling from the main telephone room travel through the open basement and up to a telephone room in the Dispatch space *[Figure E-6]*. The data rack has service routers, computer servers, network switches, and phone, security video, and radio equipment. A large, functioning radio tower is located outside the building at west side. It is assumed this equipment will require no work as part of a future modernization of the building.

Dispatch telecommunications room [E-6]

Observations and Existing Conditions

Existing Switchboards

- Main
  - 4000-amp, 208Y/120V, 3-phase, 4-wire switchboard
  - Located in the Basement electrical room
  - Main service disconnect and serves Switchboards 1 and 2
  - Installed before the 1995 renovation
  - Good condition, but has outlived its useful life

There are numerous water pipes running directly over the main switchboard *[Figure E-7]*. To alleviate this issue, a temporary drip pan and hose was installed in the event a pipe(s) was to leak. This is a code violation for dedicated working space for electrical equipment.[36] Since this is the main switchboard for the building, if water were ever to get in this equipment and cause a problem, there would be significant downtime to replace it. However, because Dispatch and Park Police are backed up by generators, those areas could still operate if such a failure was to occur.

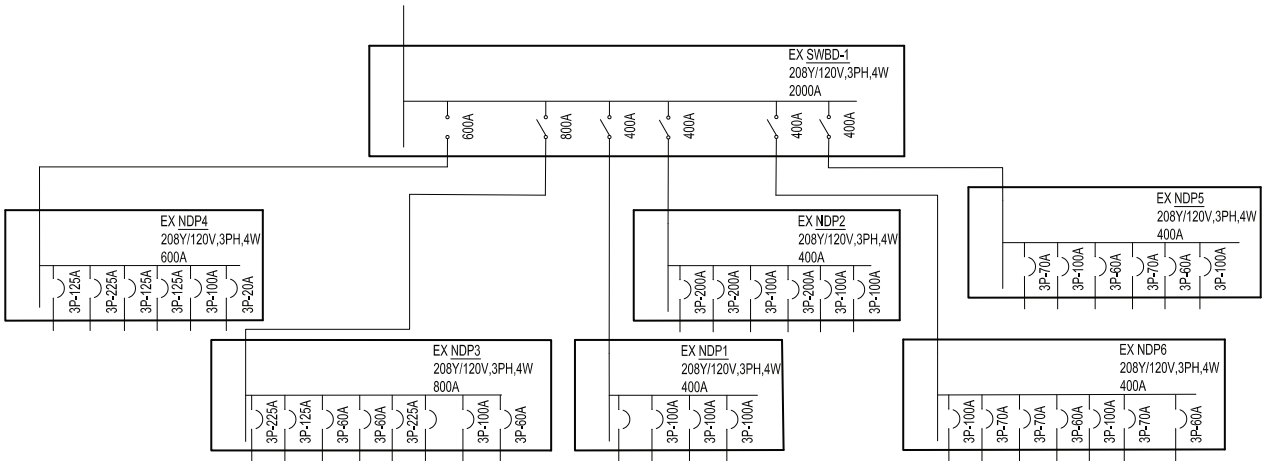
Pipes over Switchboard Main [E-7]

The metal wire way behind the switchboard that carries the main service conductors into the switchboard enclosure is in poor condition. The covers are loose or missing, exposing the wiring, subjecting it to physical damage and creating a hazardous condition *[Figure E-8]*.

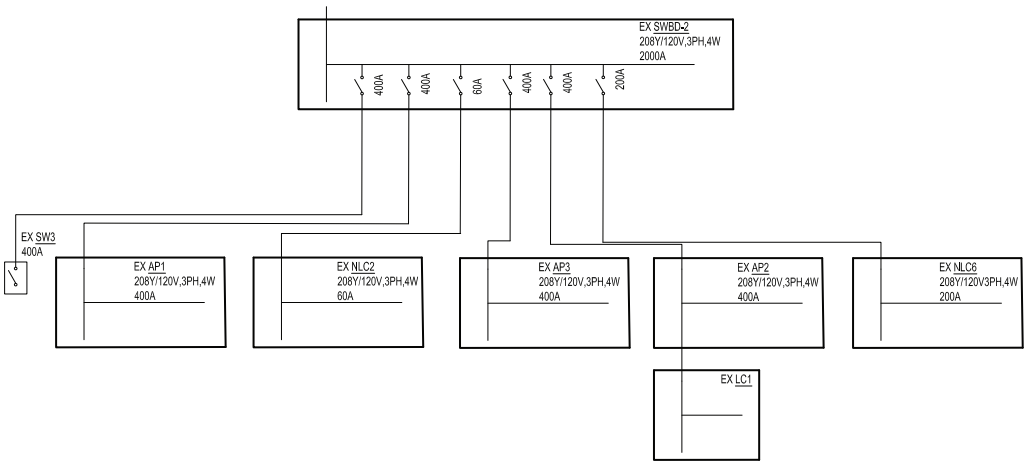
- Switchboard 1 *[Figure E-9]*
  - 2000-amp, 208Y/120V, 3-phase, 4-wire switchboard
  - Fed from a 2000-amp service disconnect in the Switchboard Main
  - Located in the Basement electrical room
  - Serves six (6) main panelboards also located in the Basement
  - Installed prior to the 1995 renovation
  - Good condition, but has outlived its useful life

Exposed service wiring [E-8]

[36] **NFPA 70 National Electric Code, Section 110.26(E)(1)(a).** All switchboards, switchgear, panelboards, and motor control centers shall be located in dedicated spaces and protected from damage. No piping, ducts, leak protection apparatus, or other equipment foreign to the electrical installation shall be located in this zone.



[E-9] Switchboard-1 one-line diagram



[E-10] Switchboard-2 one-line diagram

- Switchboard 2 *[Figure E-10]*
  - 2000-amp, 208Y/120V, 3-phase, 4-wire switchboard
  - Fed from a 2000-amp service disconnect in the Switchboard Main
  - Located in the Basement electrical room
  - Serves five (5) main panelboards and a safety switch also located in the Basement
  - Installed prior to the 1995 renovation
  - Good condition, but has outlived its useful life

Existing Panelboards

- Panelboard NDP1
  - 400-amp, 208Y/120V, 3-phase, 4-wire, distribution panelboard
  - Fed from a 400-amp switch in Switchboard 1

  - Located in the southwest mechanical area of the Basement
  - Serves three (3) panelboards (IP-1, NILC2, and NILC5), one (1) unlabeled load, and an elevator (assumed to be Elevator North)
  - Installed prior to the 1995 renovation
  - Fair condition, but has outlived its useful life

- Panelboard NDP2

  - 400-amp, 208Y/120V, 3-phase, 4-wire, distribution panelboard
  - Fed from a 400-amp switch in Switchboard 1
  - Located in the southwest mechanical area of the Basement
  - Serves five (5) panelboards (P2, P3, P4, IP-5, and TP1), and an existing load
  - Installed prior to the 1995 renovation
  - Fair condition, but has outlived its useful life

- Panelboard NDP3

  - 800-amp, 208Y/120V, 3-phase, 4-wire, distribution panelboard
  - Fed from a 800-amp switch in Switchboard 1
  - Located outside the Basement electrical room
  - Serves two (2) panelboards (IP-2 and IP-4), one (1) existing load, and two (2) south air handling units
  - Two (2) available spares
  - Installed prior to the 1995 renovation
  - Fair condition, but has outlived its useful life

- Panelboard NDP4

  - 600-amp, 208Y/120V, 3-phase, 4-wire, distribution panelboard
  - Fed from a 600-amp switch in Switchboard 1
  - Located outside the Basement electrical room
  - Serves four (4) panelboards (2P-Lab, 3P4, IP3, and 3P3), one (1) existing load, and one (1) automatic transfer switch
  - Transfer switch connects to a small outdoor generator and provides emergency backup for panel IP4, which serves Park Police on Level 1.
  - Installed prior to the 1995 renovation
  - Fair condition, but has outlived its useful life

- Panelboard NDP5

  - 400-amp, 208Y/120V, 3-phase, 4-wire, distribution panelboard
  - Fed from a 400-amp switch in Switchboard 1.
  - Located in the south/central mechanical area of the Basement
  - Serves one (1) panelboard, one (1) existing load, one (1) air handling unit, and one (1) elevator (assumed to be Elevator South)
  - Installed prior to the 1995 renovation
  - Fair condition, but has outlived its useful life

- Panelboard NDP6

  - 400-amp, 208Y/120V, 3-phase, 4-wire, distribution panelboard
  - Fed from a 400-amp switch in Switchboard 1.
  - Located in the south/central mechanical area of the Basement
  - Serves one (1) panelboard (NLC3), one (1) existing load, and the freight elevator

  - Installed prior to the 1995 renovation
  - Fair condition, but has outlived its useful life

- Panelboard AP1

  - 400-amp, 208Y/120V, 3-phase, 4-wire, 18-pole panelboard
  - Fed from a 400-amp switch in Switchboard 2
  - Located in the Basement electrical room.
  - Serves three (3) condensing units, and one (1) existing load that would need to be verified
  - Installed prior to the 1995 renovation
  - Fair condition, but has outlived its useful life

- Panelboard AP2

  - 400-amp, 208Y/120V, 3-phase, 4-wire, 18-pole panelboard
  - Fed from a 400-amp switch in Switchboard 2.
  - Located in the Basement electrical room.
  - Serves three (3) condensing units, one (1) panelboard, and one (1) existing load
  - Installed prior to the 1995 renovation
  - Fair condition, but has outlived its useful life

- Panelboard LC1

  - 100-amp, 208Y/120V, 3-phase, 4-wire, 12-pole panelboard
  - Fed from Panelboard AP2
  - Located in the Basement electrical room
  - Serves one (1) air handling unit, one (1) sump pump, and one (1) existing load
  - Installed prior to the 1995 renovation
  - Fair condition, but has outlived its useful life

- Panelboard AP3

  - 400-amp, 208Y/120V, 3-phase, 4-wire, 18-pole panelboard
  - Fed from a 400-amp switch in Switchboard 2
  - Located in the Basement electrical room
  - Serves three (3) condensing units
  - Installed prior to the 1995 renovation
  - Fair condition, but has outlived its useful life

- Panelboard NLC2

  - 60-amp, 208Y/120V, 3-phase, 4-wire, 12-pole panelboard
  - Fed from a 60-amp switch in Switchboard 2
  - Located in the Basement electrical room
  - Serves the main fire alarm, and eleven (11) existing loads
  - Installed during the 1995 renovation
  - Fair condition, but has outlived its useful life

- Panelboard NLC6

  - 200-amp, 208Y/120V, 3-phase, 4-wire, 42-pole panelboard
  - Fed from a 200-amp switch in Switchboard 2
  - Located in the Basement boiler room near the main electrical room

  - Serves circulator pumps, oil pump, two (2) boilers, exhaust fans, room lights and receptacles, welder receptacle, heat timer, and pump controls
  - Installed prior to the 1995 renovation
  - Fair condition, but has outlived its useful life

- Panelboard B-A-1

  - 150-amp, 208Y/120V, 3-phase, 4-wire, 18-pole panelboard
  - Fed from Panelboard NDP5
  - Located in the Basement laboratory
  - Serves the lights and receptacles in the laboratory
  - Good condition, but is nearing the end of its useful life

- Panelboard NP3

  - Amperage unknown, 208Y/120V, 3-phase, 4-wire, 30-pole panelboard
  - Main feed is undetermined
  - Located in the Basement near Elevator North
  - Serves the lights and receptacles in the elevator and the supply room lighting, receptacles, and air conditioning
  - Installed prior to the 1995 renovation
  - Fair condition, and has outlived its useful life

- Panelboard BP-4

  - 100-amp, 208Y/120V, 3-phase, 4-wire, 18-pole panelboard
  - Fed from a 100-amp circuit breaker in Panelboard DCP
  - Located in the northwest mechanical area of the Basement, and outside of the main telecom room
  - Serves receptacles, air conditioning units, a pump, the Park Police phone system, and six (6) existing loads
  - Installed in 1996
  - Fair condition, but has outlived its useful life

- Panelboard NLC3

  - 100-amp, 208Y/120V, 3-phase, 4-wire, 24-pole panelboard
  - Fed from Panelboard NDP6
  - Located near the freight elevator Basement landing, and beside Panelboard NDP5 and NDP6
  - Serves a sump pump, emergency lights, and some existing loads
  - Installed prior to the 1995 renovation
  - Poor condition, and has outlived its useful life

- Panelboard NP4

  - Amperage unknown, 208Y/120V, 3-phase, 4-wire, 30-pole panelboard
  - Fed from Panelboard NDP2
  - Located in the southwest mechanical area of the Basement
  - Serves lights, receptacles, and has existing loads
  - Installed prior to the 1995 renovation
  - Fair condition, but has outlived its useful life

- Panelboard BP-3
  - 225-amp, 208Y/120V, 3-phase, 4-wire, 30-pole panelboard
  - Fed from a 225-amp circuit breaker in Panelboard NDP-2
  - Located in the southwest mechanical area of the Basement
  - Serves three (3) air handler units, water heater, and numerous existing loads
  - Installed in 1996
  - Fair condition, but has outlived its useful life
- Panelboard NP1
  - Amperage unknown, 208Y/120V, 3-phase, 4-wire, 42-pole panelboard
  - Main feed is undetermined
  - Located in the northwest mechanical area of the Basement
  - Serves basement receptacles, air handler units, exit lights, and numerous existing loads
  - Installed prior to the 1995 renovation
  - Fair condition, but has outlived its useful life
- Panelboard NP2
  - Amperage unknown, 208Y/120V, 3-phase, 4-wire, 30-pole panelboard
  - Main feed is undetermined
  - Located in the northwest mechanical area of the Basement
  - Serves basement receptacles and lights
  - Installed prior to the 1995 renovation
  - Fair condition, but has outlived its useful life
- Panelboard NLC5
  - Amperage unknown, 208Y/120V, 3-phase, 4-wire, 24-pole panelboard
  - Main feed is undetermined
  - Located in the northwest mechanical area of the Basement
  - Serves office lights, and one (1) air conditioning unit
  - Installed prior to the 1995 renovation
  - Poor condition, and has outlived its useful life.
- Unnamed Panelboard
  - 100-amp rated, 208Y/120V, 3-phase, 4-wire, 6-pole panelboard
  - Main feed is undetermined, but assumed to come from Panelboard NDP5, which serves Elevator South, or Panelboard NDP6
  - Located in the outside machine room for Elevator South
  - Serves Elevator South lights, and receptacles
  - Fair condition, but has outlived its useful life.
- Panelboard DCP
  - 600-amp, 208Y/120V, 3-phase, 4-wire, distribution panelboard
  - Fed from a 600-amp disconnect switch that is connected to the main utility
  - Located in the Dispatch electrical closet on Level 1
  - Serves three (3) panelboards, and a transformer that feeds a panelboard

  - Three (3) available spaces
  - Installed within the last 5 years (confirmed by Gateway)
  - New condition

- Panelboard DCPM

  - 225-amp, 208Y/120V, 3-phase, 4-wire, 48-pole panelboard
  - Fed from a 225-amp circuit breaker in Panelboard DCP
  - Located in the Dispatch electrical closet on Level 1
  - Serves multiple air conditioning units, generator jacket heater and battery charger, transfer switch heater switch, and nine (9) existing loads
  - Thirteen (13) available spares
  - Installed in 2018
  - New condition

- Panelboard DCP1

  - 125-amp, 208Y/120V, 3-phase, 4-wire, 42-pole panelboard
  - Fed from a 100-amp circuit breaker in Panelboard DCP
  - Located in the Dispatch electrical closet on Level 1
  - Serves furniture consoles, room receptacles, kitchen equipment, lighting, fire alarm panel, and office equipment
  - Sixteen (16) available spares
  - Installed in 2018
  - New condition

- Panelboard DCPIG

  - 225-amp, 208Y/120V, 3-phase, 4-wire, 42-pole panelboard
  - Fed from Transformer T-S and Panelboard DCP
  - Located in the Dispatch electrical closet on Level 1
  - Serves furniture consoles, televisions, receptacles, telephone and IT racks, and security equipment
  - Eight (8) available spares
  - Installed in 2018
  - New condition

- Panelboard 1P-4

  - 225-amp rated, 208Y/120V, 3-phase, 4-wire, 48-pole panelboard
  - Fed from a 100-amp circuit breaker in Panelboard NDP4
  - Located in the Park Police area on Level 1
  - Serves lights, receptacles, bathroom fixtures, office equipment, HVAC equipment, intercom system, and camera system for Park Police.
  - Installed in 1996
  - Fair condition, but has outlived its useful life.

- Panelboard 1P-2

  - 225-amp rated with 100-amp main circuit breaker, 208Y/120V, 3-phase, 4-wire, 48-pole panelboard
  - Fed from a 225-amp circuit breaker in Panelboard NDP3
  - Located in the northwest mechanical room on Level 1
  - Serves receptacles, office equipment, a sub-panel, mechanical controls, and numerous existing loads

  - Installed in 1996
  - Good condition, but has outlived its useful life

- Unnamed Sub-Panelboard 1P-2

  - Amperage unknown, 208Y/120V, 3-phase, 4-wire, 20-pole panelboard
  - Fed from a 70-amp circuit breaker in Panelboard 1P-2
  - Located in the northwest mechanical room on Level 1
  - Serves lights and numerous existing loads
  - Installed in 1996
  - Good condition, but has outlived its useful life

- Panelboard N2P1

  - 125-amp, 208Y/120V, 3-phase, 4-wire, 42-pole panelboard
  - Main feed is undetermined
  - Located in Stair D on Level 2
  - Serves multiple existing loads
  - Installed prior to the 1995 renovation
  - Fair condition, but has outlived its useful life

- Panelboard N2P2

  - 125-amp, 208Y/120V, 3-phase, 4-wire, 42-pole panelboard
  - Main feed is undetermined
  - Located in Stair D on Level 2
  - Serves multiple existing loads
  - Installed prior to the 1995 renovation
  - Fair condition, but has outlived its useful life

- Panelboard 2P-4

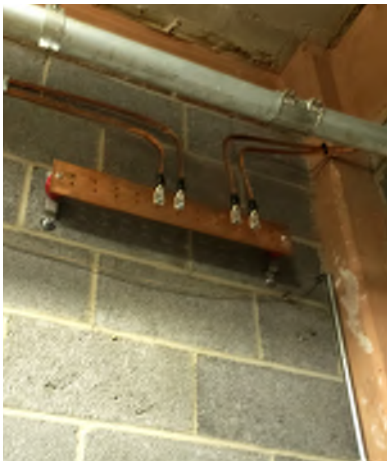
  - 225-amp rated, 100-amp main circuit breaker, 208Y/120V, 3-phase, 4-wire, 42-pole panelboard
  - Fed from Panelboard 1P-3
  - Located in the southwest mechanical room on Level 2
  - Serves lights, receptacles, bathroom and kitchen equipment, and office equipment
  - Installed in 1996
  - Good condition, but has outlived its useful life

    - The cover is sitting on the floor, exposing live wiring in the panelboard to occupants.

- Panelboard 2P-LAB-S1

  - 225-amp rated, 150-amp main circuit breaker, 208Y/120V, 3-phase, 4-wire, 48-pole panelboard
  - Fed from a 225-amp circuit breaker in Panelboard NDP-4
  - Located in the mechanical room within the laboratory on Level 2
  - Serves lab equipment, lights, receptacles, and some existing loads
  - Installed in 1996
  - Fair condition, but has outlived its useful life.

- Panelboard 2P-LAB-S2
  - 225-amp rated, 100-amp main circuit breaker, 208Y/120V, 3-phase, 4-wire, 36-pole panelboard
  - Fed from a 225-amp circuit breaker in Panelboard NDP-4
  - Located in the mechanical room within the laboratory on Level 2
  - Serves lab equipment, receptacles, and some existing loads
  - Installed in 1996
  - Fair condition, but has outlived its useful life.
- Panelboard 3P-3
  - Amperage unknown, 208Y/120V, 3-phase, 4-wire, 36-pole panelboard fed from a 125-amp circuit breaker in Panelboard NDP4
  - Located in the electrical closet on Level 3
  - Serves roof and Level 3 receptacles, lights, Aquaira equipment, a hot water heater, bathroom fixtures, and office equipment
  - Installed in 1996
  - Fair condition, but has outlived its useful life.
- Panelboard 3AC
  - 1200-amp, 208Y/120V, 3-phase, 4-wire, distribution panelboard
  - Fed from a 1200-amp disconnect switch, which is fed from the Switchboard Main
  - Located in the electrical closet on Level 3
  - Serves twelve (12) air conditioning units
  - Installed in 1999
  - Fair condition, but is nearing the end of its useful life
    - The 1995 renovation drawings initially planned for the HVAC units to be fed from the Basement. We assumed the design was changed to include a panelboard closer to the roof units.
- Panelboard N3P4
  - Amperage unknown, 208Y/120V, 3-phase, 4-wire, 30-pole panelboard
  - Main feed is undetermined
  - Located in the electrical closet on Level 3
  - Serves roof and Level 3 receptacles, lights, bathroom fixtures, roof receptacles, and an exhaust fan
  - Installed in 1996
  - Fair condition, but has outlived its useful life



Main grounding bar [E-11]

Dispatch grounding bar [E-12]

Grounding

The full extents of the grounding system could not be verified by visual inspection, but it appears to be adequate and code-compliant. The grounding from Switchboard Main to an exterior grounding triad could not be verified.

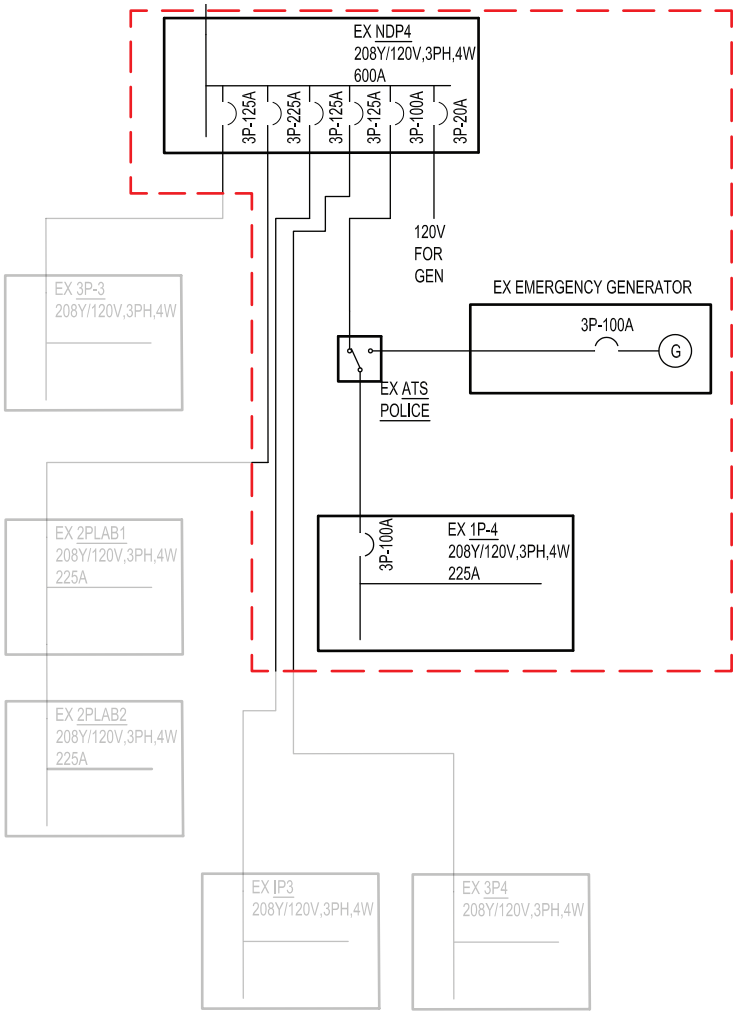
There is a main grounding bar within the main electrical room in the Basement *[Figure E-11]*. It is connected to Switchboard Main and the service disconnect for Dispatch. The other two connections route through the Basement and up to Dispatch where they terminate on a telecommuncations

system ground bar within the space's communications rooms *[Figure E-12]*. As described, this is a code-compliant intersystem bonding connection.

It is assumed all circuits are run with a grounding conductor. Staff provided no indication of any issues with ground faults or the grounding system in general.

Isolated Ground System

An isolated grounding system is installed separate from the regular building grounding system to reduce interference experienced by electronics from radio frequency (RF) noise. The Dispatch electrical equipment installed in 2016 has an isolated ground transformer and an associated panelboard. Select systems furniture, televisions, offices, and communications racks are connected to this system in an attempt to mitigate unwarranted interference



[E-13] Park Police emergency power one-line diagram

on such crucial systems. Orange receptacle devices or those marked with a small orange triangle are typically reserved for isolated grounding systems.

Various other NPS offices on Levels 1, 2, and 3 also have orange receptacles. However, no isolation transformers were found in the main electrical room or adjacent to any panelboards serving these loads that would indicate a true isolated ground system is in place. Given the age of the switchboards and the panelboards in these spaces, it is assumed there is no isolated grounding system and the orange receptacles are not as intended. This could not be verified by visual inspection, but should be confirmed by a licensed electrician.

Surge Protection

Surge protective devices are devices intended to protect electrical equipment from transient voltage spikes. When sensitive equipment is not protected, these voltage spikes can cause harm to electrical wiring, cause fires, and destroy electrical equipment. Correcting such can result in significant downtime.

Switchboard Main did not have a main surge protective device. Given the age of the switchboard, distribution panelboards, and branch panelboards, it makes sense that these would not be protected even though a device could have been added at a later time. The use of the building has changed over time, but the use of computers and equipment essential to NPS operations warrants the extra protection.

Existing Panelboard N2P2 has a small surge protective device mounted underneath the panel. This panel has no directory so it is unclear as to what receives the extra protection. A few other panels have similar devices but they were not widespread throughout the building.

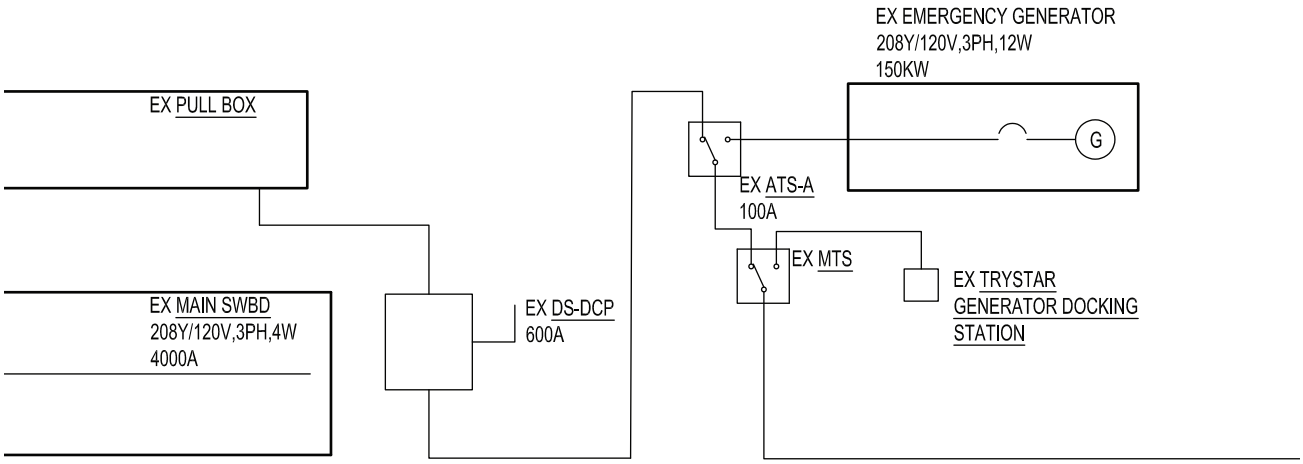
Dispatch, with its own service added six (6) years ago, does have a surge protective device connected to the main disconnect in the main electrical room. The device is located roughly ten (10) feet from the disconnect, which may be affecting its efficiency. Surge protective device efficiency is tied to their proximity to the equipment they are protecting. The closer the relationship, the quicker incident energy can be intercepted and dissipated. There is also a surge protective device connected to the main distribution panel in the electrical closet within Dispatch.

Emergency Power

Only the panelboard serving Park Police and Dispatch is backed up by emergency power *[Figure E-13]*. A small, natural gas-powered Generac generator is located at the west wide of the building *[Figure E-14]*. Conduits are routed inside through the Basement boiler room to a small automatic transfer switch located adjacent to Panelboard NDP4. The normal feed to Panel IP-4 was intercepted and connected to the transfer switch. Installation time frame for the generator is unknown, but it appears to be in fair condition.

Park Police generator [E-14]

Dispatch generator [E-15]



[E-16] Dispatch emergency power one-line diagram

[E-17] Chimney lightning protection

[E-18] Down conductor

When Dispatch was renovated six (6) years ago, a 150kw, natural gas-powered Caterpillar generator was installed to provide emergency backup for that service. It is located at the west side of the building and within a masonry enclosure for protection and security *[Figures E-15 to 16]*. The system has an automatic transfer switch, a manual transfer switch, and a docking station for connecting to a roll-up temporary generator in the event the main generator were to fail. This redundancy is vital given the importance of Dispatch operations. A remote generator status panel resides within the open office of Dispatch. The system appears to be in good working order. It is assumed this equipment will require no work as part of a future modernization of the building.

Lightning Protection

There is very little lightning protection for the building. What is provided is incomplete and does not provide full coverage. Two (2) air terminals are mounted at the peak of the tallest chimney *[Figure E-17]*. The down conductors on either side of the chimney are disconnected from the bonding connectors. However, the down conductor along the side of the building is properly mounted to the wall and bonded to a ground rod at grade *[Figure E-18]*.

Wiring Devices and Raceways

The receptacles throughout the building are either surface mounted or recessed in walls. All observed devices appeared to be in good working order and there were no instance of malfunction or nuisance tripping brought up by staff. Given the age of the devices, and widespread programmatic changes will likely require all wiring devices to be replaced.

Most rooms have an adequate number of receptacles. However, the laboratory on Level 2 does lack perimeter devices. Given the poor condition of the HVAC system overall, numerous spaces, including the lab, are using window air conditioning units. Without local receptacles to plug into, many

are connected via extensions cords. In some case, multiple extension cords are daisy-chained together. This is likely due to multiple units tripping circuits that were not designed for the increased load. Daisy-chaining multiple extension cords for this purpose is a code violation.[37] Without dedicated receptacles for the window units, their loading combined with others results in a total rating exceeding 50% of the branch circuit rating, which is also a code violation.[38] Overloading circuits must be avoided as it presents a major safety issue that can lead to fires.

Ground Fault Circuit Interruption (GFCI) receptacles on the roof are in boxes not rated for exterior exposure, and are in poor condition. Some have completely malfunctioned and have exposed wiring extending from associated conduits.

Raceways are primarily concealed with routing within walls and/or ceilings, but where exposed, appear to be in good condition. Observed raceways were primarily electrical metallic tubing (EMT) conduit and metal clad (MC) cable. EMT conduits exist on the roof; they are not suitable for outdoor environments, especially near salt water.

Elevators

Elevator North, located at the north end of the building, is out of operation. A sign on the door indicates that it has been out of service since April 2020. The controller cover, located in the Basement machine room, is off. It is assumed that parts for repair are not available. A disconnect switch for the elevator is located in the machine room, but there is no disconnect for the cab's lighting. Presence of a shunt trip module could not be verified. Overall, the elevator and its associated equipment is in poor condition and should be replaced.

Elevator South, located on the south side of the building, is operational. Its machine room is located adjacent to the shaft and accessed from the exterior of the building. A disconnect switch for the elevator is located in the machine room, but there is no disconnect for the cab's lighting. Presence of a shunt trip module could not be verified. Overall, the elevator and its associated equipment is in poor condition and should be replaced.

A freight elevator, located near Elevator South, serves Level 1 and the Basement. Though very old, it does not appear to be original to the building. Operational status could not be verified during the walk-through. There is a small disconnect and enclosed circuit breaker associated with the elevator, but they are not labeled. Overall, the elevator and its associated equipment is in poor condition and should be replaced.

[37] **NFPA 70 National Electric Code, Section 440.64.** Where a flexible cord is used to supply a room air conditioner, the length of such cord shall not exceed 10 feet for a nominal, 120-volt rating.

[38] **NFPA 70 National Electric Code, Section 440.62(C).** The total marked rating of a cord- and attachment-plug-connected room air conditioner shall not exceed 50% of the rating of a branch circuit where general use receptacles are also supplied.

Interior Lighting

There is a wide variety of light fixture types throughout the building. In the Basement, there is primarily 2-lamp industrial linear fixtures with T12 fluorescent lamps. There are some round fixtures, assumed to be LED, to supplement the linear fixtures. In general, several fixtures have malfunctioning lamp or controls so overall every space is relatively dark. Unoccupied spaces at the far north end are very poorly illuminated. Cause for the poor lighting could not be determined, but the lamps could faulty or there is may be a circuiting issue.

Fixtures on Level 1 are predominantly suspended linear fixtures with T8 or T5 fluorescent lamps. Exceptions include, the four (4) stairwells, which have recessed downlights, and the main hallway, which has wall-mounted linear fluorescent fixtures. Controls are basic toggle switches local to each room. Dispatch has newer recessed fluorescent luminaires that were added during the renovation six (6) years ago.

Fixtures on Level 2, at the south end, are similar to those on Level 1: suspended linear fluorescent fixtures with either T8 or T5 fluorescent lamps. Facilities Management has suspended linear strip luminaires with T12 or T8 fluorescent lamps. Public Affairs and the Overflow/Hoteling offices have recessed linear fluorescent luminaires. The north end of the main hallway appears to be recently renovated and is equipped with recessed 2x2 flat panel LED fixtures, likely due to limited clearance space in the ceiling plenum. Controls are basic toggle switches local to each room.

Fixtures on Level 3 are predominantly suspended linear strip luminaires and linear fixtures with T12 or T8 fluorescent lamps. Fixtures in Interpretation/ Education are T5 fluorescent lamps. Controls are basic toggle switches local to each room, or banks of toggle switches that control multiple zones in a designated area.

Fluorescent luminaires are less efficient than modern LED and are considered outdated technology. Other than those fixtures in Dispatch, most, if not all, fixtures throughout the building have surpassed their useful life. A hodge-podge of different fixtures and lamp types usually results in complicated maintenance. New commercial energy standards no longer permit the use of simple toggle switches.[39]

[E-19] Decorative exterior sconce

Exterior Lighting

Limited exterior lighting was observed around the perimeter of the building. At each of the four (4) main entrances along New York Avenue, there are two (2) decorative wall sconces *[Figure E-19]*. Both the northeast and northwest

[39] **International Energy Conservation Code, Section C405.2.1.** Occupancy sensor controls shall be installed to control lights in copy/print rooms, lounges/ breakrooms, enclosed offices, open plan office areas, restrooms, storage rooms, locker rooms, and any other spaces 300 square feet or less that are enclosed by floor-to-ceiling height partitions.

corners have two-headed security floodlights. Secondary entrances used by NPS staff also have wall-mounted, two-headed security floodlights *[Figure E-20]*. The Park Police entrance has two (2) large wall-mounted floodlights to illuminate the equipment yard, which includes mechanical units and a large antenna tower. There is no pole-mounted lighting for the Park Police parking lot (south end) or alley. A timeclock for exterior fixtures could not be located.

Exterior floodlights [E-20]

Emergency and Egress Lighting

Emergency and egress lighting is provided by integral batteries within select luminaires. There is no connection to the generator or a central battery inverter system.

Exit signs are either white thermoplastic or edge-lit LED. They have red lettering and integral battery backup. Most of the egress lighting is provided by emergency battery units (EBU), commonly referred to as "bug eyes," with two heads. Those located in the Basement are very old, have not been replaced, and simply do not operate. These require regular and adequate testing, which does not appear to have been undertaken. In addition to EBUs, some fixtures on Levels 1, 2, and 3 also have integral battery packs. A red dot on the lens indicates that a battery is present. Testing beyond general observation is required to determine if the spacing of EBUs and integral battery packs provide the illumination levels required by code to safely guide occupants out of the building.

Secure access at NY Avenue entrance [E-21]

Security

Security coverage for the north end of the building is limited. There is a keypad and camera/intercom station located at an entrance from New York Avenue, as well as one (1) at the secondary entrance used by NPS staff *[Figure E-21]*. No other exterior or interior cameras were observed.

As expected, security coverage for the south end of the building, which houses Park Police and Dispatch, is much more robust. There are numerous exterior cameras covering Park Police entrances and vehicles *[Figure E-22]*. These include the New York Avenue entrance, southwest corner, drive alley, and secondary staff entrance. The vestibule and two (2) holding cells just inside the secondary staff entrance also have cameras. A control station in reception includes a flat panel monitor that used to screen all cameras simultaneously. All of this equipment is new and should not require work as part of a future modernization of the building.

Park Police security cameras [E-22]

Communications

The main telecommunications equipment in the Basement is in very good condition. Items appear to have been updated as new technologies to improve working conditions, security, and internet speeds have emerged. Exposed data cable trays exhibit great workmanship, as cabling is routed in a neat and organized fashion. These trays can be reused when the building is modernized.

Remediation and Repairs

- High Priority, 1 – 2 Years
  - Reroute Water Piping Over Basement Equipment
  - Lightning Protection System
  - Eliminate Window A/C Units and Extension Cords

As previously mentioned, plumbing pipes cannot be routed directly over electrical panelboards, most importantly Switchboard Main. The drip pan and hose are a temporary solution that could fail if a leak were to happen. Any non-compliant piping runs must be directed away from the main electrical room.

Only select portions of the building are backed up by a generator. Lightning strikes can cause significant damage to a building's electrical distribution system. The building should be fitted with a complete perimeter lightning protection system on the roof. The system should include air terminals, down conductors, rooftop bonds, an other associated items for a complete and operable system that is in accordance with NFPA 780 – Standard for the Installation of Lighting Protection Systems. Connect the system to the main grounding bar and provide a surge protective device at the service entrance to achieve a UL Master Label for the system.

The extensive use of window air conditioning units is a temporary solution to a larger systemic problem. Reference the Mechanical and Architectural sections of this assessment for recommendations pertaining to the whole building mechanical system. In the interim, provide new receptacles at unit locations that connect to local panelboards to prevent overloading.

- Moderate Priority, 2 – 3 Years
  - Replace Electrical Distribution System
  - Replace all building lighting with LED
  - Replace Elevators

The typical lifespan for electrical equipment is 25-30 years. As of July 2021, most equipment in the building is at least 25-years-old or more. With no immediate problems or concerns noted by staff, this endeavor is not considered "High Priority," but should be addressed during any modernization effort. A full replacement would entail new electrical equipment (except in Dispatch), conduit, wiring, and devices designed to serve a cohesive architectural layout. Consider an additional generator if any other critical operations by NPS staff or outside organizations will be established.

A uniform maintenance plan for lighting is difficult to devise with a large variety of fixture and lamp types. New LED light fixtures and associated controls should be installed to serve a cohesive architectural plan, and satisfy current and future energy standards.

Reference the Architectural section of this assessment for recommendations pertaining to conveyance equipment.

- Low Priority, 4 – 5 Years
  - Establish Satellite Telecom Closets

New data cabling will need to be routed from the main telecommunications room in the Basement as part of any renovation work. For a more organized and evenly distributed system, satellite telecom closets can be worked into any new architectural plans.

Fire Protection

System Description - Fire Suppression

Based on information provided by the NPS, the existing fire suppression system was installed during the last major renovation of Building 210 in the mid-1990s. There is a dedicated 8-inch ductile iron incoming fire service that enters the Basement through the east wall (New York Avenue) via a 12-inch underground main. Upon entering the building, the service feeds a 6-inch double check detector backflow preventer *[Figure FP-1]*. The backflow discharge then feeds a 6-inch Star Sprinkler Corp Model F alarm check valve *[Figure FP-2]* and water flow switch. The backflow preventer and alarm check valve serve as the main sprinkler system valve assembly for the building.

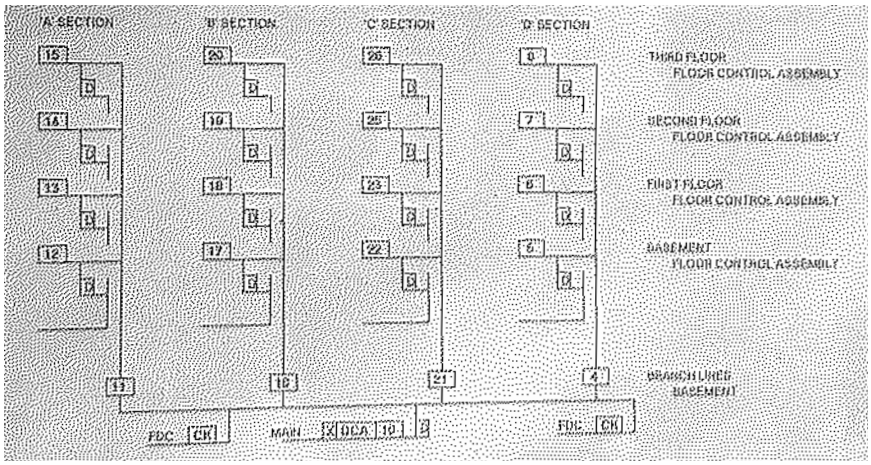
The main sprinkler system valve feeds into a 6-inch bulk main routed along the entire length of the Basement. The bulk main connects to two (2) fire department connections (FDCs) and feeds into four (4) sprinkler risers, one (1) per interior stairwell. The FDCs are located along the east façade (New York Avenue), one (1) to the north and one (1) to the south. The connections consist of a wall-mounted, linear flush 2-inlet connection at the exterior and a check valve with automatic ball drip at the interior.

Each stairwell riser is equipped with a 4-inch “outside screw and yoke” (OS&Y) control valve, which allows the riser to be isolated, and a floor control valve assembly. The control valve assembly consists of a supervised butterfly control valve, water flow switch, and test/drain at each floor level. Each floor level is divided into four (4) zones covering approximately 6,000-7,000 square feet. A schematic of the full system was observed during the walk-through *[Figure FP-3]*.

Given the configuration described above, the absence of a hydraulic placard, and no hydraulic-centric information in previous drawing sets, the system was likely installed via the pipe schedule method, common of the 2000s, as opposed to a hydraulically-calculated system. A pipe schedule system is one of which pipe sizing is selected from a schedule that is determined by the occupancy classification of the building. The schedule provides a given number of sprinklers allowed to be supplied from specific sizes of pipe. Alternatively, a hydraulically-calculated system uses a mathematical analysis of the water-carrying capacity of the pipe network to ensure that adequate

[FP-1] Incoming fire service and backflow prevention

[FP-2] Model F alarm check valve



[FP-3] System schematic diagram

water is distributed to control or suppress a fire. For new systems, the use of the pipe schedule is no longer permissible by code.[40]

System Description - Fire Alarm

Based on information provided by the NPS, the existing fire alarm system was installed during the last major renovation of Building 210 in the mid-1990s. The facility has an analog conventional system fire alarm system by Edwards. The IRC-3 system is initiated manually at the building exits, and consists of horns and strobes located sporadically throughout the building. The primary fire alarm control unit (FACU) is located on Level 1 within Stair D *[Figure FP-4]*. A sub-IRC-3 panel is located on Level 3 within Stair A *[Figure FP-5]*.

The existing system performs two (2) ancillary operations: Smoke Purge and Two-Way Warden Telephone Communication. The Smoke Purge system operates via manual switches at the FACU. The FACU has visual LED indicators to provide "On" status for return/exhaust fans at each air handling unit. A manual switch is provided for each respective sprinkler zone (typical of four) on each floor level. The Purge Enable key switch and Floor Area Purge activate necessary control relays to start all return/exhaust fans, and open all necessary dampers so that 100% of return air is exhausted to the outside during an incident.

The Two-Way Warden Communication system consists of a warden telephone handset, generally provided within mechanical rooms and adjacent to two (2) remote exit stairwells, that sounds an audible signal flashes an individual telephone LED light at the FACU upon pick up. The connection establishes a link between the Warden telephone circuit and the FACU. The FACU is able to connect the Warden telephones to those in other locations, typically up to six (6), via a patch in the telephone network.

During the recent renovation of Dispatch, an Edwards BPS10A remote booster power supply was added to support the new notification appliance circuits that were installed. Dispatch is a 24/7 manned central station for GATE's Law Enforcement entities. The reporting center that receives fire alarm signals from within Building 210, as well as other locations within the GATE legal boundary, could not be determined by the Design Team. On-duty dispatchers, identified as temporary staff, indicated that Dispatch is the terminus for fire alarm signals from Sandy Hook, NJ and Fort Wadsworth. They, nor GATE NPS facilities staff, could confirm the system types or where the head-end equipment is located. Localized displays indicate that Dispatch is a separate, campus-wide emergency reporting station receiving various signal types, not a central fire alarm reporting station.

IRC-3 FACU in Stair A, Level 1 [FP-4]

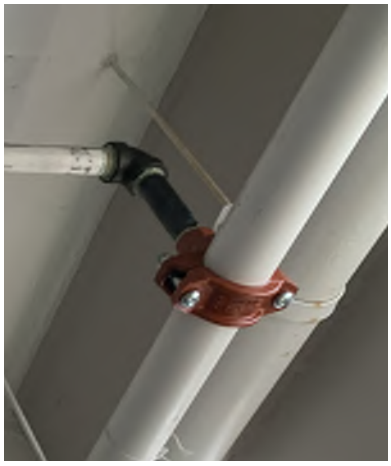
Sub-IRC-3 unit, Level 3 [FP-5]

Non-compliant sprinkler head location [FP-6]

[40] **NFPA 13, Section 27.5.1.2.** Sprinkler systems having sprinklers with K-factors other than 5.6 nominal, listed piping materials other than those noted within this code, extra hazard systems, and exposure protection systems shall be hydraulically calculated.

[FP-7] System obstruction

[FP-8] Surface corrosion



[FP-9] Retrofitted mechanical tee fitting

Observations and Existing Conditions

Fire Suppression

Because sprinkler coverage is provided for each zone, Building 210 can be considered a "fully sprinklered" existing building; however, there are some code deficiencies:

- Select sprinkler heads are more than 12 inches from the ceiling or exposed floor slab *[Figure FP-6]* or obstructed by mechanical ductwork, lighting, and other equipment.[41]
  - Based on observation, these heads were likely installed lower to provide a reasonable sprinkler discharge pattern underneath obstructions. At some locations, the sprinklers are totally obstructed and unable to protect their designated area *[Figure FP-7]*.
- There is no evidence of any recent or regular inspections.
  - Based on observation, it is almost certainly guaranteed that an internal pipe inspection has never been performed.[42] The purpose of this inspection is to check the internal condition of pipes and detect the presence of foreign organic and/or inorganic material.
  - Some pipes and fittings are newer, indicating that corroded or failed components have been replaced.
- The backflow prevention device is not being physically supported by a listed hanger or support.[43]
  - Currently, the equipment is resting on top of CMU blocks and other material.

Readings at the main sprinkler system valve assembly indicates a static pressure of approximately 50-52 pounds per square inch (psi). Typically, maintenance tags are provided at these valves during quarterly sprinkler system inspections. The tags indicate the static and residual pressures during the main drain test. At the time of this survey, no maintenance tags were observed. The relatively low pressure reading, coupled with small pipe sizes attributed to the design method, results in a severe hydraulic deficiency.

At the threaded joints of the alarm check valve, flanged joints of the backflow preventer, and multiple downstream piping locations, there is noticeable surface corrosion. While no visible leaks were observed, rust indicates threaded joints, where wall thickness is smallest, could soon fail. Painted

[41] **NFPA 13, Section 10.2.6.1.1.1.** Under obstructed construction, the distance between sprinkler deflector and the ceiling shall be a minimum of 1 inch and a maximum of 12 inches throughout the area of coverage.

[42] **NFPA 25, Section 14.2.1.1.** An assessment of the internal condition of piping shall be conducted at a minimum of every 5 years.

[43] **NFPA 13, Section 17.1.6.1.** Components of hanger assemblies that directly attached to the pipe, building structure, or racking structure shall be listed.

piping should not be experiencing surface corrosion *[Figure FP-8]*. The exact cause of localized corrosion on the painted piping is not known, but it appears that water may have been, or is still, leaking from adjacent grooved couplings. Exterior surface corrosion does not adversely affect the sprinkler system, but it is cause for concern that the interior may be compromised.

Other items of concern include:

- The water flow switch on the system appears to be a retrofit, as typically alarm check valves will employ water motor gongs and pressure switches for water flow notification.
- Numerous saddle tees, or mechanical tee fittings, exist throughout the system *[Figure FP-9]*. These fitting types are used in retrofits as they can save time and money. In general, they have a higher rate of failure and should only be used in spot conditions, not throughout an entire building.
  - Installation involves drilling a hole into an existing larger pipe, then wrapping the pipe with the fitting. A gasket is provided around the drilled hole. As the tee is tightened to the pipe, the gasket forms a seal to the existing pipe, and new threaded or grooved pipe can be connected. Over time, the gasket wears and breaks down, causing slow leaks from underneath the fitting.

Edwards #2452, missing strobe [FP-10]

Edwards #2452 appliance [FP-11]

Fire Alarm

During the survey, the IRC-3 panel had numerous alarm, supervisory, and trouble signals annunciated, which likely means that these signals are false (nuisance) alarms. If these nuisance alarms are common and recurring, then it is easy to speculate than they are ignored. It appears as though signals were acknowledged to stop the audibles being produced, however the underlying issues that generated the signals were not resolved.

Along with the potential risk of overlooking a serious incident, the system has several deficiencies:

- There is no evidence of any recent or regular inspections.[44] The last inspection tag is dated April 2016.
- Notification appliances installed no longer comply with current codes.
  - The existing appliances (Edwards #2452) are Underwriters Laboratory (UL) listed to Standard 1971, which complies with the ADA requirements, but they are not set to a candela setting capable of providing complete coverage throughout all public areas *[Figures FP-10 to 11]*.[45]

Non-compliant pull station location [FP-12]

[44] **NFPA 72, Sections 14.1.1 and 14.2.2.1.2.** The inspection, testing, and maintenance of systems, their initiating devices, and notification appliances shall verify correct operation.

[45] **NFPA 72, Section 18.5.1.1.** Public mode visual signaling shall meet requirements using visual notification appliances.

[FP-13] Unprotected free air wiring

[FP-14] "Out of Order" Warden telephone

  - Audible tone testing was not be measured, but existing strobes are either not installed at the correct elevation with respect to the finished floor, or there are not enough units to provide coverage for some spaces.

- Manual pull stations are located more than 5 feet exit doors *[Figure FP-12]*.[46]
- There is unprotected fire alarm wiring, or free air wiring, in mechanical rooms. The wiring observed specifically serves duct smoke detectors *[Figure FP-13]*.
  - While free air wiring is permitted per the National Electric Code, it is best practice to provide conduit for all wiring in order to prevent accidental mechanical damage.
- Some Warden telephone stations were tagged with "Out of Order" signs *[Figure FP-14]*. No testing was performed to confirm their status.

Remediation and Repairs

- High Priority, 1 – 2 years
  - Replace the fire alarm system
  - Add additional appliances to provide adequate audible and visual coverage

The industry standard for life expectancy of a fire alarm system is currently 10-15 years. While many systems can be in service much longer than that, maintenance and replacement parts do become more costly and difficult to acquire as time passes. In the case of Building 210, the manufacturer, Edwards, no longer supports the IRC-3 system. Specifically, the IRC-3 was discontinued as a result of UL updating its fire control standard, UL 864. If compromised, a contractor would have to either procure parts from a third-party source, which would be difficult if not impossible, or simply replace the control unit all together. With an estimated installation date of the mid-1990s, the existing system is at the end of its useful life. Therefore, the entire system should be removed and replaced. Upgrading the existing system via Edwards' migration process does not correct the numerous deficiencies noted and will continue to pose a threat to the safety of the building's occupants.

While not required per code, a full replacement would allow an upgrade to a voice evacuation system. Studies have shown that voice evacuation systems that provide audible instructions directing occupants out of the building, do so much faster than traditional tone messages. Voice signaling is particularly useful in assembly-type occupancies like the Level 3 exhibit spaces. Also, a non-proprietary fire alarm system could be specified. This would provide the freedom to choose from a variety of authorized fire alarm system service

[46] **NFPA 72, Section 17.15.9.4.** Manual fire alarm boxes shall be located within 5 feet of each exit doorway on each floor.

providers. Being tied to a specific vendor limits competitive pricing and availability of reputable service contractors.

- Moderate Priority, 2 – 3 Years
  - Replace the sprinkler systems

Unlike the fire alarm system, the sprinkler system does appear to be in working order. Recent studies show that wet-pipe sprinkler systems have a life expectancy of 15-25 years due to internal corrosion. Specifically, within wet-pipe systems, the studies discovered that air gets trapped within the system and at that location the corrosion process is expedited. As oxygen in the air dissolves into the water it immediately reacts with the first steel it contacts, forming iron oxide. So, the air/water interface represents the most active corrosion site within these systems. With an estimated installation date of the mid-1990s, all existing piping is at the end of its useful life. Therefore, the entire system should be removed and replaced. Reusing potentially damaged piping will only exacerbate deterioration and result in a non-cohesive system design.

The noted hydraulic deficiency of the system is such that any new work will likely require either large, 6-inch main/riser piping or a fire pump. A water flow test at the site and a full hydraulic analysis will be needed as a part of a future modernization of the building.

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PROGRAMMING ANALYSIS

Site Programming

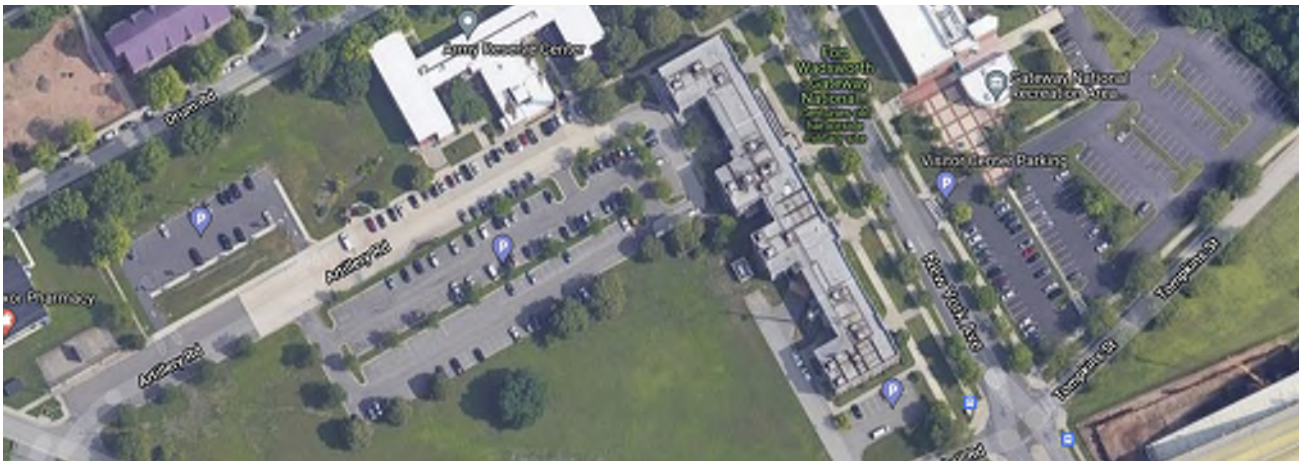
As referenced in the “Asset Conditions Assessment” of this report, the site conditions within the immediate surroundings of Building 210 are in good shape. The approach along New York Avenue is pedestrian friendly and within walking distance of two (2) public bus stops. Per discussion with Amy Sebring of the Planning, Project and Asset Management division, the surface parking lot west of Building 210 is adequate for current and future needs. The lot has approximately 150 spaces, supplemented by overflow spaces along Artillery Road and across New York Avenue at Building 120. The small surface lot at the south end of Building 210 is and will remain used by the U.S. Park Police.

The northwest court adjacent to the large surface lot is currently used for larger staff functions and as an outdoor communal space for lunch. This space is used quite often and would be best suited to remain as part of a future program. A reconfigured accessibility ramp, modernized furnishings and a re-imagined employee entry sequence should be considered. Decorative fencing, while not currently installed, may suit the desire to separate public and private functions.

Given the sensitive nature of the U.S. Park Police and Dispatch Center suites, dedicated entries should be retained.

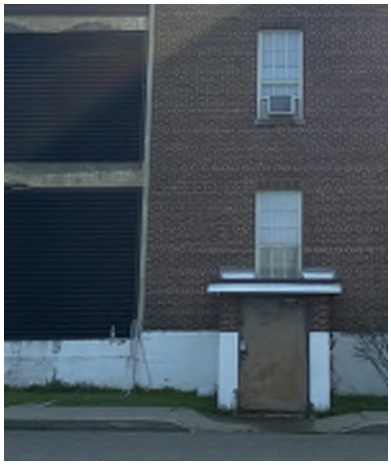
- Entrance “A” (Private)
  - This access point is the southern-most New York Avenue entrance.
  - If equipped with access control hardware, surveillance of and access through the door can be controlled by Dispatch Center employees, used as their primary entrance, and serve as egress for occupants of Levels 2 and 3.
  - A separate, dedicated access control partition for the U.S. Park Police would prevent non-credentialed staff from Levels 2 and 3 from entering the station at Level 1.

Typical New York Avenue Entrance



Existing surface parking lots, Image by Google.

Typical rear entrance



Basement access, south

Basement access, north

- Entrance “B” (Semi-Private)
  - This access point is the New York Avenue entrance immediately north of Entrance “A.”
  - This door could serve as egress only for occupants of all levels and/or a controlled public entrance for any non-NPS entities that may occupy interior space. If designated as a controlled, public entrance, a universally accessible path of travel may be required.
- Entrance “C” (Semi-Private)
  - This access point is the New York Avenue entrance served by a ramp and steps.
  - This door can serve as a controlled public entrance for any non-NPS entities that may occupy interior space or remain as a controlled entrance for visitors and delivery personnel. In either case, this door could serve as egress only for occupants of all levels.
- Entrance “D” (Private)
  - This access point is the northern-most New York Avenue entrance.
  - This door could serve as egress only for occupants of all levels and/or a controlled public entrance for any non-NPS entities that may occupy interior space.

Rear, or west-facing, access points are best suited to remain secondary “public” entrances and primary “private” entrances. Depending on how the Basement level below the U.S. Park Police station and Dispatch Center is used, the Basement and U.S. Park Police doors could be consolidated. If consolidated, the Basement access door at the north end could be used by Natural Resources to access a lower level laboratory(ies).

Building Programming

Throughout several discussions with supervisory staff, a handful of common themes for the future of Building 210 characterize the recommendations herein:

- Collaboration
- Service-oriented
- Opportunity
- Efficiency

Despite a relatively limited staffing footprint, GATE employees currently occupy space on all three (3) main levels of Building 210. Large scale plotters, outdated printers, and media storage are scattered throughout. By consolidating staff and service spaces, each employee can spend less time traveling and more time focused on their individual tasks.

Review of the working GATE Organizational Chart provided by the NPS indicates the following divisions:

- Administrative Services
- Business Services and Partnership Development
- Public Affairs
- Interpretation and Education
- Resources Stewardship
- Facility Management
- Planning, Project and Asset Management
- Resource and Visitor Protection
- Sandy Hook Operations (SAHO)
- Jamaica Bay Operations (JABA)
- Staten Island Operations (STIS)

Following discussion with Minka Sendich, Deputy Superintendent, this team was able to identify individuals from the respective GATE divisions housed within Building 210. The Operations units for Sandy Hook, Jamaica Bay, and Staten Island are located in their respective territories of the Park and are omitted from the analysis herein. Currently, Facility Management was one (1) representative in Building 210, of whom will remain. Also, given the commonalities between Administrative Services, Business Services and Partnership Development, and Public Affairs, these divisions will be consolidated as part of this exercise. Therefore, the following Park entities are referenced:

- Administration
  - Administrative Services
  - Business Services and Partnership Development
  - Public Affairs
  - Facility Management
- Resources Stewardship
  - Natural Resources
  - Cultural Resources
- Resource and Visitor Protection
  - United States Park Police
  - Dispatch
- Interpretation and Education
- Planning, Project and Asset Management

Below is a summary of the spaces for these divisions, as currently programmed, in Building 210. While the bulk of NPS staff is housed at Levels 1 and 2, Interpretation and Education resides at Level 3. Supervisory staff for Interpretation and Education indicates that this is not intentional and likely a product of how the building's use has evolved over time. Despite a widespread footprint, NPS staff only utilize a fraction of the facility's available area. The areas listed below are approximate and will need to be confirmed during a future design phase.

Existing Program				
Space Name/Type	**Quantity**	**Area (SF)**	**Total Area (SF)**	**Level**
Administration				
Superintendent's Suite			1,600	2
Public Affairs			900	2
Facility Management Office			190	2
Business Services			1,475	2
Chief Ranger Office			500	2
IT Office			500	1
IT Workshop			1,160	1
Contracting Office			2,365	1
Housing Office			870	1
Budget Office			1,160	1
Property Management/Mail Room			1,020	1
SUBTOTAL			**11,740**	
Resources Stewardship (RS)				
Private Office (Unoccupied)	9		1,750	2
Biologist Office	2	140	280	2
Chief Ranger's Office			580	2
Open Office			760	2
Conference Room			435	2
Work Room			270	2
Storage Closet			100	2
Corridor Storage			220	2
Laboratory			1,440	2
Laboratory (Natural Resources)			700	Basement
Laboratory Storage			100	2
Collections Storage			1,950*	1 / Basement
GIS Lab			580	1
Circulation			1,060	2
SUBTOTAL			**10,795**	
Resource and Visitor Protection (RVP)				
United States Park Police Station			3,150	1
Dispatch Center			3,265	1
Law Enforcement			2,250	1
SUBTOTAL			**8,665**	

** Cumulative area is based on spaces clearly identified by visual observation or as designated by RS staff. Other areas at the Basement level are used for storage, but appear to be general in nature.*

Existing Program				
Space Name/Type	**Quantity**	**Area (SF)**	**Total Area (SF)**	**Level**
Interpretation and Education (IE)				
Private Office	3		655	3
Open Office			1,345	3
Lunch Room			255	3
Work Room			95	3
Supply Closets	3		50	3
Unisex Restroom			65	3
First Aid			80	3
Library/Multipurpose			1,165	3
Circulation			980	3
SUBTOTAL			**4,690**	
Planning, Project and Asset Management (PPAM)				
Private Office	2	170	340	2
Private Cubicle Station	1	140	140	2
Open Office			590	2
Plan Room	1	480	480	1
Communal Table	1	135	135	2
Supply Closet	1	55	55	2
Circulation			455	2
SUBTOTAL			**2,195**	
General Use				
Media Storage (Print)	1	460	460	3
Unclaimed Storage	1	930	930	3
Unisex Restrooms	2	45	90	3
Media Storage (Electronics)	1		300	3
Cafeteria			975	3
Cafeteria Extension			485	3
Classroom (Open)			2,680	3
New York Harbor Educational Exhibits	3		6,675	3
Classroom (Isolated)	1		1,455	3
Classroom Observation	1		235	3
Hoteling Suite			1,200	2
Administrative Meeting Room			510	2
Lunch Room			510	2
SUBTOTAL			**16,505**	
TOTAL NET AREA (NSF)			**54,590**	

Existing Program				
Space Name/Type	**Quantity**	**Area (SF)**	**Total Area (SF)**	**Level**
Building Services & Circulation				
Primary Circulation			4,900	3
Primary Circulation			3,800	2
Primary Circulation			5,260	1
Mechanical Rooms	7		3,100	1 / 2
Walls / Structure / Unoccupied			30,420	1 / 2 / 3
SUBTOTAL			**47,480**	
TOTAL GROSS AREA (GSF)			**102,070**	

Metrics, at a Glance	
Building Efficiency	**53.5%**
Typical Efficiency for Building Type	70% - 90%
NPS Staff	112 (+/-)
Area per Occupant	**487.4 SF**
Typical Area per Occupant for Building Type	200 SF
Primary Circulation	13.7%

[T-1] Program characteristics of Building 210 as currently designed

With approximately 25,000 net square feet available per floor, there is latitude to house all of the necessary functions required by the NPS, and potentially lease surplus space to outside entities. With the amount of work and capital required to make Building 210 safe and sustainable for years to come, a chance to recoup expenditures over the future life of the building may be critical to its success. By utilizing existing anchor spaces (e.g. U.S. Park Police, Dispatch and the northwest staff entrance/court) strategically, it is not unreasonable to assume that 50% of the building could develop income.

Approaches to optimizing efficiency are within reach and should be considered:

- Consolidate spaces with common functions.
  - IT Office and IT Workshop
  - Property Management, Facility Management, and Housing Office
  - Natural Resources and Cultural Resources Laboratories
  - Law Enforcement and United States Park Police
- Co-locate spaces that can be shared.
  - Meeting Rooms and Library
  - Commons (e.g. restrooms, lunch room, printing and production)
- Eliminate discontinued or unnecessary program spaces.
  - Educational Exhibits (National Parks of New York Harbor Education Center)
  - Classroom/Lecture Spaces
  - School Group Cafeteria
- Scale down oversized spaces.
  - Resources Stewardship Laboratory (Level 2)
  - Plan Room
  - Private Offices

- Utilize open office concepts whenever possible.
  - Systems furniture; workstations of consistent size
  - Spaces of varying scales
  - Disperse hoteling spaces
  - Demountable wall systems

Projected Program				
Space Name/Type	**Quantity**	**Area (SF)**	**Total Area (SF)**	**Level**
Administration				
Private Office (Superintendent)			200	3
Private Office (Deputy Superintendent)			180	3
Private Office (Park/Project Planning)			160	3
Workstation (Secretary)			120	3
Workstation (Program Analyst)			120	3
Meeting Room			200	3
Private Office (Chief)			180	3
Workstation (Secretary)			100	3
Workstation (Admin Support)	5	120	600	3
Workstation (Program Analyst)			120	3
Information Technology				
Private Office (IT Supervisor)			180	3
Workstation (IT Specialist)	4	120	480	3
Workshop			800	3
Budget & Financial Management				
Private Office (Budget Officer)			180	3
Workstation (Budget Analyst)	4	140	560	3
Workstation (Budget Technician)	2	120	240	3
Housing & Property Management				
Private Office (Housing Manager)			180	1
Private Office (Property Mgmt Specialist)			180	1
Private Office (Facility Mgmt Chief)			180	1
Workstation (Supply Tech)			120	1
Workstation (Admin Support)	2	120	240	1
Storage Room			160	1
Business Services & Partnership Development				
Private Office (Chief)			180	3
Private Office (Supervisor)			180	3
Workstation (Business Mgmt Specialist)			120	3
Workstation (Special Park Uses)			120	3

Projected Program				
Space Name/Type	**Quantity**	**Area (SF)**	**Total Area (SF)**	**Level**
Workstation (Realty Specialist)	2	120	240	3
Workstation (PD & Agreements Specialist)			120	3
Workstation (Business Mgmt Analyst)			120	3
Storage Room			160	3
Pubic Affairs				
Private Office (Chief)			180	3
Workstation (PA Specialist)			120	3
Workstation (VI Specialist)			120	3
Workstation (Volunteer Coordinator)			120	3
Open Office			400	3
Storage Room			160	3
SUBTOTAL			**7,820**	
Resources Stewardship (RS)				
Private Office (Chief)			180	3
Workstation (Admin Officer)			120	3
Private Office (GIS Specialist)			160	3
GIS Lab & Hoteling Station			200	3
Private Office (NEPA Specialist)			160	3
Research Learning Center	2	160	320	3
Storage Room			160	3
Cultural Resources				
Private Office (Supervisor)			160	3
Private Office (Archaeologist)			160	3
Private Office (Historic Architect)			160	3
Private Office (Museum Curator)			160	3
Workstation (Season Museum Tech)	3	120	360	3
Curatorial Storage			1,440	3
Laboratory			700	3
Laboratory Storage			100	3
Natural Resources				
Private Office (Supervisor)			160	3
Biologist	2	120	240	3
Workstation (Bio Tech)			120	3
Laboratory			700	3
SUBTOTAL			**5,760**	

Projected Program				
Space Name/Type	**Quantity**	**Area (SF)**	**Total Area (SF)**	**Level**
Resource and Visitor Protection (RVP)				
Dispatch Center			3,455	1
Private Office (Chief)			180	3
Private Office (Safety Officer)			160	3
Private Office (Env. Protection Specialist)			160	3
Private Office (Water Safety)			160	3
Workstation (Admin Support)			120	3
Storage Room			160	3
United States Park Police Station				
Private Office (Lieutenant)			180	1
Workstation (Officer)	2	120	240	1
Surveillance Desk			80	1
Open Office			250	1
Holding Cell	2	80	160	1
Weapons Storage			100	1
Seizures/Narcotics Storage			80	1
General Storage			100	1
Break Room			180	1
Single-Occupant Toilet			80	1
Locker Rooms	2	260	520	1
SUBTOTAL			**6,365**	
Interpretation and Education (IE)				
Private Office (Chief)			180	3
Private Office (Deputy Chief)			160	3
Private Office (Youth Engagement Super.)			160	3
Workstation (Ranger)	11	120	1,320	3
Storage Room			480	3
Workroom			250	3
SUBTOTAL			**2,550**	
Planning, Project and Asset Management (PPAM)				
Private Office (Chief)	1		180	3
Private Office (Supervisor)	2	160	320	3
Workstation (Project Manager)	12	120	1,440	3
Open Office			400	3
Conference Table			140	3
Storage Room			160	3

Projected Program				
Space Name/Type	**Quantity**	**Area (SF)**	**Total Area (SF)**	**Level**
Plan Room			400	3
SUBTOTAL			**3,040**	
General Use & Utilities				
Workstation (Hoteling)	7	120	840	3
Lunch Room			400	3
Meeting Hub			1,400	3
Printing Hub			300	3
Media Storage	2	300	600	3
Single-Occupant Toilet	6	80	480	3
Privacy/Lactation Room	2	80	160	1/3
Mechanical Room	6	200	1,200	Basement/1/3
Electrical Closet	3	80	240	1/3
Custodial Closet	3	50	150	3
SUBTOTAL			**5,610**	
TOTAL NET AREA (NSF)			**31,145**	
Grossing Factor for Primary Circulation, Existing Structure, and Partition Walls	1.3			
TOTAL GROSS AREA (GSF)			**40,490**	

Whether leasing is considered or not, this team recommends that the NPS consider the following:

Single-Occupancy Restrooms

Considering multiple factors, this team recommends a single-occupancy restroom layout be considered for Building 210. This approach meets federal requirements, universal design standards, and current public health guidelines. Single-occupancy facilities are being implemented across the National Park Service at a variety of urban and rural parks in both new construction and historic rehabilitations.

A single-occupant restroom can be described as a self-contained room with full-height walls and a locking door that contains one (1) flush toilet, a toilet paper dispenser, a sink, a soap dispenser, a paper towel dispenser and/or hand dryer, a mirror, a trash receptacle, a sanitary napkin receptacle, and a changing table. They can exist independently or they can be grouped together depending on available space.

Single-occupancy restrooms offer many advantages over grouped stalls. Functionally, they address public health concerns related to social distancing, physical separation, and cross-contamination at high-touch surfaces. They

are easily isolated and cleaned since they are physically separated from common spaces and other restrooms.

Similarly, single-occupancy restrooms offer ease of maintenance. Rather than closing an entire restroom of grouped stalls because of an issue, single-occupancy restrooms can be closed individually, on an as needed basis.

Single-occupancy restrooms provide unbiased and non-discriminatory facilities for all tenants. The removal of gender designations from restrooms aligns with both the Department of Labor's Occupational Safety and Health Administration and United States Equal Employment Opportunity Commission requirements for providing sanitary and available toilet facilities that do not discriminate on the basis of gender identity. Note: The New York City Human Rights Law requires covered entities that have single-occupancy restrooms make clear that they can be used by people of all genders.

Lactation Rooms

The Patient Protection and Affordable Care Act, signed into federal law in 2010, requires employers to provide "reasonable break time for an employee to express breast milk for her nursing child for one (1) year after the child's birth each time such employee has need to express the milk."

Employers are also required to provide "a place, other than a bathroom, that is shielded from view and free from intrusion from coworkers and the public, which may be used by an employee to express breast milk. A bathroom, even if private, is not a permissible location under the Act."

This team recommends at least one (1) private, lactation room per level with adjacency to the restrooms. The lactation room should include plumbing.

Minimum Standards for Federally-Owned Museum Collections

The Secretary of the Interior, and in-turn the National Park Service, recognizes the importance of ensuring cultural and natural resources are available for future generations. To guide museum and curatorial staff across the many federally-owned properties and facilities throughout the country, a Museum Property Handbook, designated as DM 411, was crafted. The document identifies successful management of resources as "a broadly interdisciplinary activity that requires access to diverse professional resources." While architectural and spatial requirements are listed below, effective collections storage relies on the judgments of local curatorial staff, discipline experts, and conservators.

Environmental

- Specimens must be stored with appropriate environmental controls, including temperature and humidity *[Figure T-2]*, in order to prevent deterioration and minimize the need for conservation treatment.

To control temperature and humidity, a dedicated direct expansion (DX) split system with an electric humidifier and electric reheat for dehumidification

	Humidity Range
Climate Sensitive Materials	30% - 55%
Significantly Climate Sensitive Materials	30% - 40%
Natural History Materials	40% - 60%
Paintings	40% - 65%
Paper	45% - 55%
Wood, Leather, Textiles, Ivory, Bone	45% - 60%
Photographs/Films	30% - 40%
Metals	0% - 35%
Ceramics, Glass, Stone	40% - 60%

[T-2] Humidity Thresholds per Collections Storage Standards

should be considered. Packaged DX cooling units with an integral humidifier and electric reheat are available. To ensure precise humidity control, the walls and ceiling of any such space would need to be designed accordingly with insulation and a vapor barrier.

Any associated laboratory spaces can be fed from the building air handling unit system. The primary concern is to provide adequate make-up air to offset that dispensed by exhaust hoods. These spaces should also be negatively pressurized relative to adjacent spaces. Controls and/or vestibules can maintain negative pressure.

- Steps should be taken to minimize ultraviolet (UV) light in collections areas. Windows should be shuttered or covered with UV filters. Lighting should be designed to minimize UV radiation.

If not managed appropriately, long-term UV radiation from sunlight and fluorescent lighting can result in fading and decolorization. Artificial lighting provided by LED fixtures will suffice as it does not contain UV radiation.

- An Integrated Pest Management Plan should be established to keep the facility free of insects, vermin, mold, and mildew.
- Food and drink must not be consumed or stored in the same rooms that collections are stored.

Security

- All collections areas should be protected by both locks and alarm systems that track all keys and security codes, and identifies who is authorized to be in collections storage areas.
- A fire prevention/suppression plan and associated equipment should be in place.
- A visitor log or sign-in/sign-out sheet should be maintained in order to track the use of collections by staff.

Storage

- Collections facilities should be situated outside 100-year hazard zones, including flood zones, earthquake faults, railroad tracks, and other potential geologic and environmental hazards.
- Collections storage areas should be separate from offices, employee gathering areas, preparation and conservation laboratories, and have as few doors and windows as possible.
- Collections should be stored away from utility service panels and water/sewer pipes. These should be located outside of collections storage areas and procedures should be in place to minimize the necessity to access conduits and utility corridors from collections storage areas.
- Collections should be stored in stable and secure cabinetry with smooth moving drawers and adequate clearance above each specimen.

Oversized specimens may be stored on open shelving, but dust and UV covering should be considered in order to supplement protection.

- Each object must be stored properly. Archives should be in archival (acid-free) boxes and folders. Objects and artifacts should be in ethafoam-lined boxes, non-gassing polyethylene reclosable bags, glass vials, or other "state of the art" containers. Each object or artifact should be cradled, supported, or positioned, so that damage will not occur by its own weight over time or by the movement of sliding drawers open and closed.
- A custodial plan that addresses daily waste collection, periodic cleaning, and sanitation procedures should be implemented.
- Flammable liquids must be safely stored and kept away from all archival materials.

Integrated Pest Management

Integrated Pest Management (IPM), as defined in Chapter 6 of the Secretary of the Interior's Museum Property Handbook, is an ecosystem approach to the control of pests. Traditional control measures that utilize hazardous chemicals and pesticides compromise the safety of the collections and staff. IPM plans are based on information about pests, their habits and ecology, and the environments that support them.

Prevention strategies to mitigate pests gaining and access to and surviving within collections spaces include:

- Utilizing the physical structure (Building 210) as a barrier.
  - Gaps, cracks, and other crevices susceptible to infiltration should be treated with weatherstripping, caulking, and screens. Devices installed require routine maintenance in order to ensure adequate performance.
  - Limit ivy and other plants growing on the structure. Since branches can be used as access points to the roof of the structure, trees and shrubs should be routinely trimmed to prevent them from touching the building.
  - Other regular maintenance include, but are note limited to, periodic cleaning and repair of gutters, negative drainage channels, and removal of bird and wasp nests.
- Establishing and maintaining barriers within the primary structure.
  - Enclosure of materials within storage cabinets and exhibit cases is the first defense against pests. Cabinets and cases should be well sealed and any holes cut for ventilation should be screened.
  - Separate public spaces (exhibit areas, information and sales areas, and office areas) from the museum collection storage areas with solid, sealed partitions. Install doors only where necessary and include weatherstripping to prevent migration from one section of the building to another.

- Abiding by stringent housekeeping and sanitation protocols.
  - Limit food and moisture sources by sealing cracks and crevices with steel wool and silicone sealant, removing clutter, and consistently removing dust.
- Utilizing a quarantine space(s) to thoroughly inspect new material entering collections storage for the first time or after returning from loan.

Construction Cost and Alternatives

The effort to attribute costs to the improvements presented in this report required this team to make a number of assumptions. These assumptions established a framework for a Class C-level Cost Estimate for construction and are not intended to represent comprehensive project costs that include design. Materials and labor were tabulated using unit costs based on current and historic metrics derived from a proprietary cost database formulated by this team's cost estimation consultant. Unit prices are based on the Washington D.C. market. The RSMeans City Cost index, adjusted to Q4 2021, projects a 30% cost premium for construction projects in Staten Island, NY (143.99) versus Washington, D.C. (110.60).

Quantities are derived from drawings provided by the NPS, this report, and input from the architectural and engineering disciplines. A baseline limit-of-disturbance (LOD) area for this project is estimated to be 90,020 square feet. This metric includes the Basement, Level 2, and Level 3 in their entirety, as well as Level 1 with the Dispatch Center excluded.

Prices herein are in Fourth Quarter (Q4) 2021 dollars. In today's climate with the ongoing COVID-19 pandemic, inflation escalation is at a notable high, approximately 7.5% annually. While the hope is everything will inevitably normalize, it is difficult to make informed projections beyond a year or two. So, costs could rise anywhere from $4 to $13 million.

Rough Order of Magnitude Cost Estimates

There are two (2) estimate tiers: Baseline and Enhanced. The Baseline tasks are those critical to maintaining basic NPS operations in Building 210 for years to come. These tasks account for things considered beyond useful life, detrimental to life safety, and/or non-compliant per current building codes or accessibility standards. This tier also includes special requests highlighted by NPS staff during this Pre-Planning effort. An example is museum-standard curatorial space for the Resources Stewardship division.

The Enhanced tier assumes all Baseline items are accepted and incorporates design recommendations that could minimize routine maintenance and further extend the building's life and functionality. One (1) such recommendation is an outboard curtain wall glazing system in lieu of replacing the clapboard infill at the rear "porches." While more expensive up front, this approach would encapsulate the concrete structure from the

	Area (NSF)
Basement	**21,880**
50%	10,940
Level 1	**24,195**
Dispatch Center	3,150
U.S. Park Police	3,265
Level 2	**24,195**
Level 3	**24,195**
TOTAL	**90,020**

[T-3] Net Area Metrics for Building 210

BASELINE

Line Item	Increase (%)	Cost	Notes
New Roof		$ 942,585	Fully-adhered, single-ply membrane; fall protection system
Parapet Modifications		$ 475,336	Rebuilt with cavity for drainage
Structural Restoration		$ 520,732	Existing to remain and to be repaired as needed
Exterior Wall (Brick) Restoration		$ 1,865,110	Existing to remain and to be repaired as needed
"Porch" Modifications		$ 198,561	Metal-framed infill with exterior siding; structure remains exposed
Exterior Doors and Windows		$ 1,136,400	Thermally-broken, metal "replica" windows to match historic photos
Building Systems		$ 5,685,042	Replace in-kind (modernized) to meet current codes; NPS-occupied areas only
Interior Upgrades		$ 2,928,775	Gut to structure; NPS-occupied areas only; full hazardous materials abatement; new elevators
Exterior Accessibility Upgrades		$ 233,240	Assumed 20% of hardscape; secondary accessible paths (west side of building)
Dumpster & Utility Allowances		$ 440,951	
SUBTOTAL DIRECT CONSTRUCTION COSTS		**$ 14,426,732**	Material and Labor
Location Factor	30%	$ 4,328,020	Staten Island, NY
Design Contingency*	15%	$ 2,164,010	Per NPS direction
TOTAL DIRECT CONSTRUCTION COSTS		**$ 20,918,761**	
General Conditions			
Standard*	10%	$ 2,091,876	Per NPS direction
Government	10%	$ 2,091,876	
Historic Preservation	5%	$ 1,045,938	
SUBTOTAL NET CONSTRUCTION COST		**$ 26,148,452**	
Overhead	10%	$ 2,614,845	
Profit	8%	$ 2,091,876	
ESTIMATED NEW CONSTRUCTION COST		**$ 30,855,173**	
Bonds & Permits	2.5%	$ 771,379	
Contracting Method Adjustment	5%	$ 1,542,759	
Inflation/Escalation	0%		Per NPS direction
TOTAL		**$ 33,169,311**	

* *The Design Contingency of 15%, as requested by GATE, is the minimum identified by the NPS for this phase. Based on experience from previous projects, GATE requested a Standard General Conditions factor of 10%.*

elements, highlight the "porches" in their original form, and provide views and natural lighting to the west lawn. Other recommendations include:

- Higher quality, more sustainable finishes such as restroom tile, wallcoverings, and/or terrazzo flooring in high-traffic areas.
- The accessible walkway to Entrance "C" could be relocated to provide access to both Entrance "C" as well as "B."
- Allowances for updated landscaping, signage, and furnishings in the exterior courtyard adjacent to the staff parking lot.
- Remediation of 50% of the Basement slab-on-grade for floodproofing.
- Opening 50% of infilled windows to provide natural light to occupied spaces in the Basement.

An "all-in" approach is attractive for several reasons, but if the NPS prefers an "a la carte" approach, costs are broken down by task. The most notable challenge of undertaking these tasks individually is a lack of efficiency in scale and timeline. This report identifies Baseline tasks as critical over the next five (5) years. Inflation, redundant general conditions, and on-again-off-again mobilization, to name a few, are things that could add unnecessary cost. Assuming a "worst case scenario" where all tasks commence individually, the Total Estimated NET Cost to the NPS could increase by nearly $6 million. Individual line items associated with each task are listed in "Appendix C - Class C Cost Estimates" on page C1.

Programming Alternatives

The alternatives depicted on the forthcoming pages account for existing conditions to remain, efficiency recommendations, and the desire to maximize rental area.

This analysis assumes that the Basement will remain under NPS control and not be leased to any outside entities. If the Basement is maximized by the NPS, the percentage of area available for lease could be in excess of 50% of the building. Leased areas could be provided as a "warm, gray shell" or left as-is for future tenants to fit out completely with their own dedicated utility equipment (e.g. HVAC, hot/cold water, electric panels). Leaving the area(s) "as-is" is preferred and will limit up front costs for the NPS.

During meetings with Gateway personnel, relocation of the primary parking lot for the building was considered and dismissed. It will remain in its current location. This can present both advantages and disadvantages, depending on the how Level 1 is delineated between NPS and Lessee(s). Law Enforcement emphasized the importance of having a dedicated, back-of-house entrance to the U.S. Park Police station. Given this information, all three (3) alternatives keep the station at its current location, but consider opportunities to locate some spaces either above or below.

The advantages and challenges for each alternative were presented to Gateway leadership prior to the release of this report. Following internal

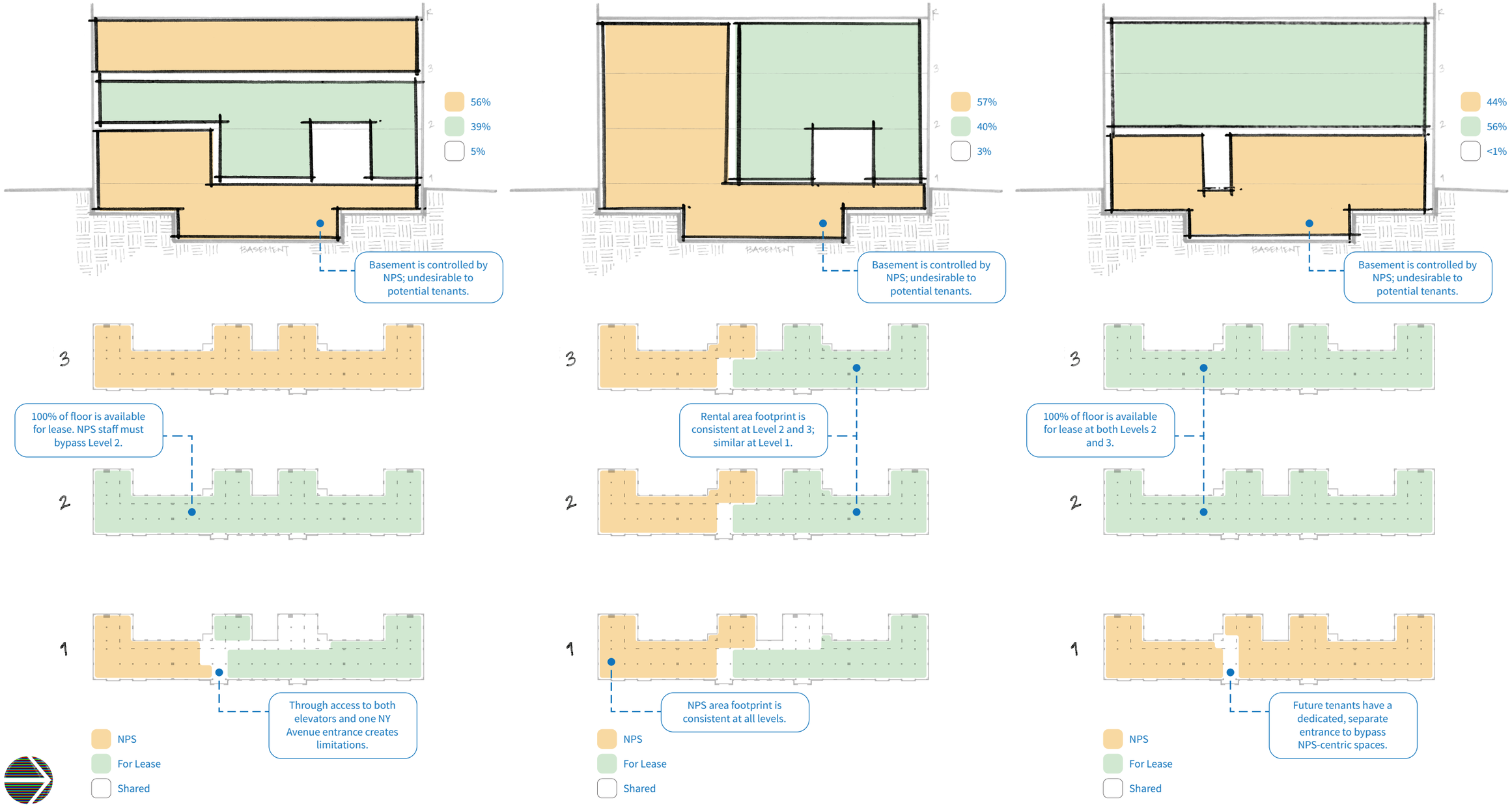
	Line Item	Increase (%)	Cost	Notes
ENHANCED	New Roof		$ 942,585	Baseline
	Parapet Modifications		$ 475,336	Baseline
	Structural Restoration		$ 552,568	Baseline + Basement slab floodproofing
	Exterior Wall (Brick) Restoration		$ 1,865,110	Baseline
	“Porch” Modifications		$ 1,659,336	Structure remains exposed, encapsulated by glazed curtain wall
	Exterior Doors and Windows		$ 1,182,023	Baseline + select Basement windows
	Building Systems		$ 7,553,038	Baseline + 50% of Basement
	Interior Upgrades		$ 3,108,611	Baseline + 50% of Basement
	Exterior Accessibility Upgrades		$ 419,066	Baseline + new primary accessible path at Entrances “B” and “C”
	Dumpster & Utility Allowances		$ 440,951	
	SUBTOTAL DIRECT CONSTRUCTION COSTS		**$ 18,198,623**	Material and Labor
	Location Factor	30%	$ 5,459,587	Staten Island, NY
	Design Contingency	15%	$ 2,729,793	Per NPS direction
	TOTAL DIRECT CONSTRUCTION COSTS		**$ 26,388,003**	
	General Conditions			
	Standard	10%	$ 2,638,800	Per NPS direction
	Government	10%	$ 2,638,800	
	Historic Preservation	5%	$ 1,319,400	
	SUBTOTAL NET CONSTRUCTION COST		**$ 32,985,004**	
	Overhead	10%	$ 3,298,500	
	Profit	8%	$ 2,638,800	
	ESTIMATED NEW CONSTRUCTION COST		**$ 38,922,305**	
	Bonds & Permits	2.5%	$ 973,058	
	Contracting Method Adjustment	5%	$ 1,946,115	
	Inflation/Escalation	0%		Per NPS direction
	TOTAL		**$ 41,841,478**	

deliberation, Alternative 1 was identified as a preferred path to explore during a future design phase, with the following in mind:

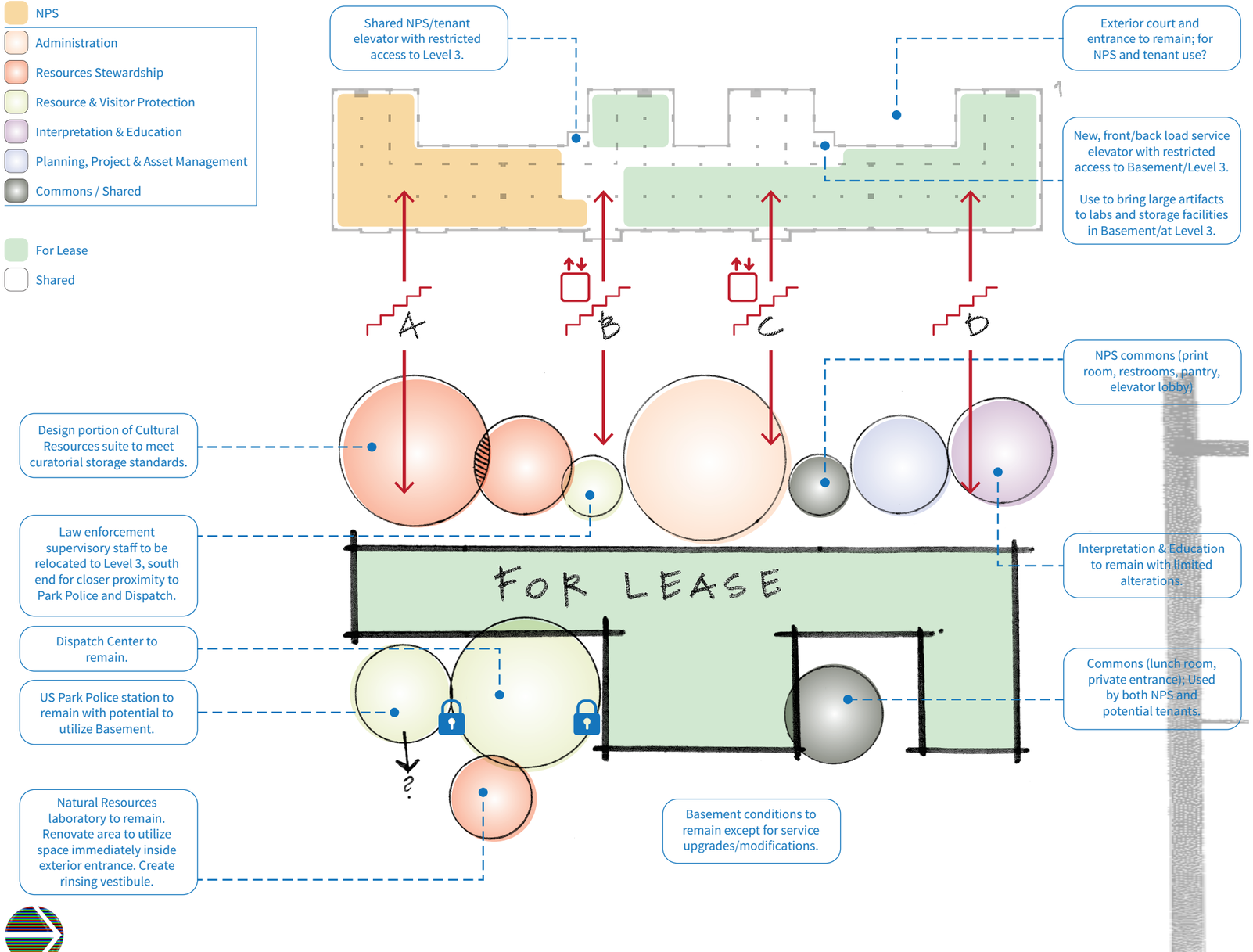
- Gateway would retain occupancy and oversight of the Basement, Level 1, and Level 3. Only Level 2 would be designated as available for lease to an outside entity(ies).
- Level 2 will receive only limited work necessary to facilitate the modernization of NPS spaces on Levels 1 and 3. Existing conditions at Level 2 will remain and be removed as part of fit-out for a future tenant(s).

- Occupiable area on Level 1 not used for the U.S. Park Police station or Dispatch Center, which totals approximately 15,500 NSF, will be designated for future use by the NPS.

For reference, a summary diagram for each alternative presented is included here. Each identifies where GATE's primary administrative divisions could be located. Because all occupants, both NPS and lessees, will enter at Level 1, a clear, logical separation must exist between the entities. Therefore, each alternative is explored by comparing overall building section to Level 1 plan. The visuals used during the presentation to the NPS can be referenced in "Appendix D - Findings Presentation" on page D1.



Leasing Comparison Diagram



Alternative 1 Programming Diagram

Alternative 1

Alternative 1 locates as many primary spaces for NPS staff at Level 3 of Building 210. The United States Park Police station and Dispatch Center remain at Level 1.

Advantages include:

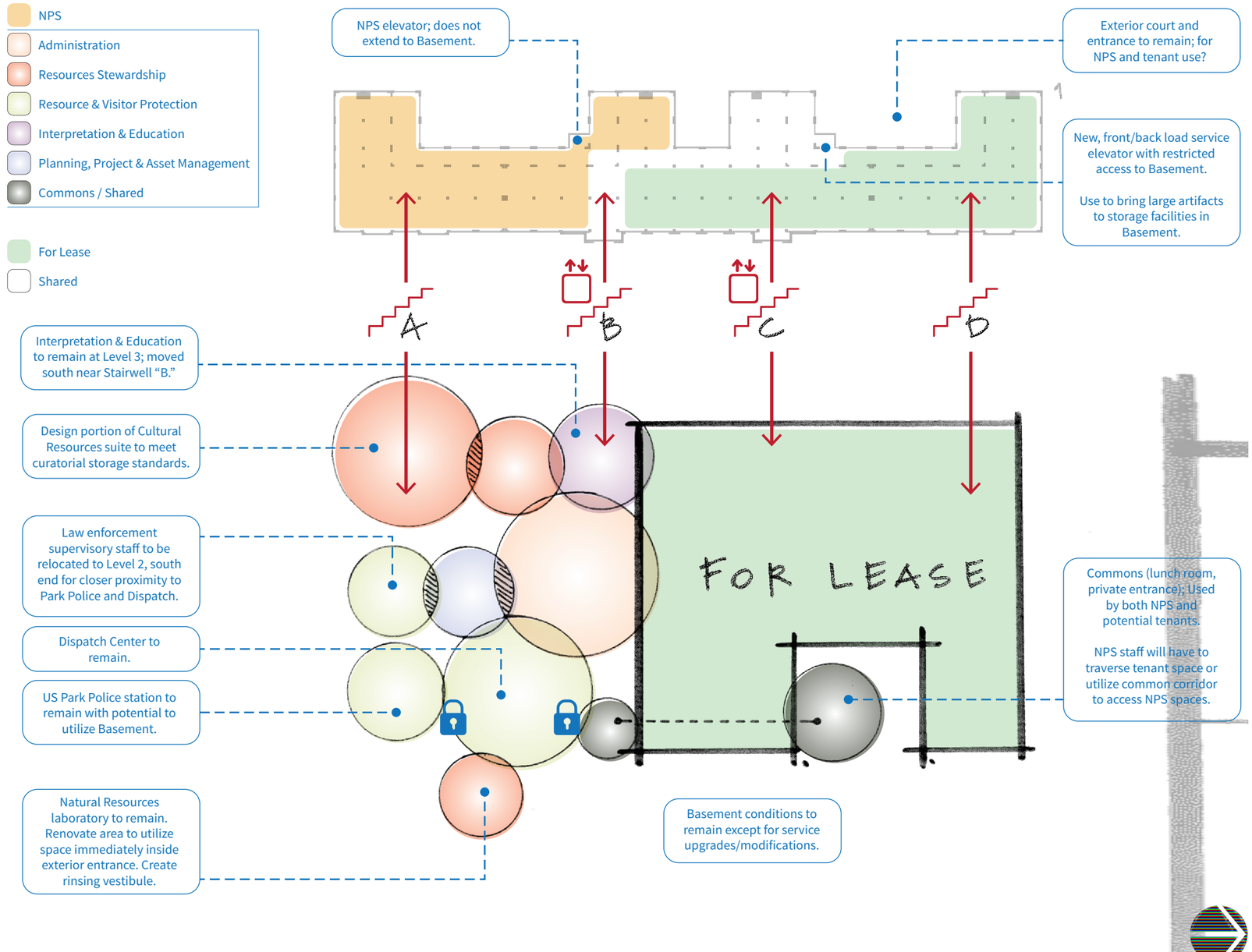
- **Opens Level 2 and portions of Level 1 for leasing.**
- Consolidates most NPS-centric functions to Level 3.
  - Takes advantage of the limited existing fit-out of Level 3 and retains the Interpretation and Education office suite.
- Retains the current locations of the U.S. Park Police station and Dispatch Center without modification.
- Maximizes use of prime views and borrowed natural light exclusive to Level 3 for NPS staff.
- Reopening of basement fenestration can be considered optional.

- Challenges include:
  - Maintains segregation of the U.S. Park Police Station and Dispatch Center from other departmental offices.
  - Eliminates direct access from the exterior if the Natural Resources laboratory is relocated. Alternatively, if location is retained, lab remains separated from department offices by multiple floors.
  - Limited ability to incrementally expand without drastically reducing efficiency and leasing space.
  - The northwest corner entrance and outdoor court would no longer be directly accessible to/from NPS-centric interior spaces.
    - Locates some NPS staff far from current entrance and parking.
    - Greater chance of intermingling between NPS and lessees.
  - Limits flexibility for tenant heating and cooling systems as taps will be within permanently occupied NPS space.

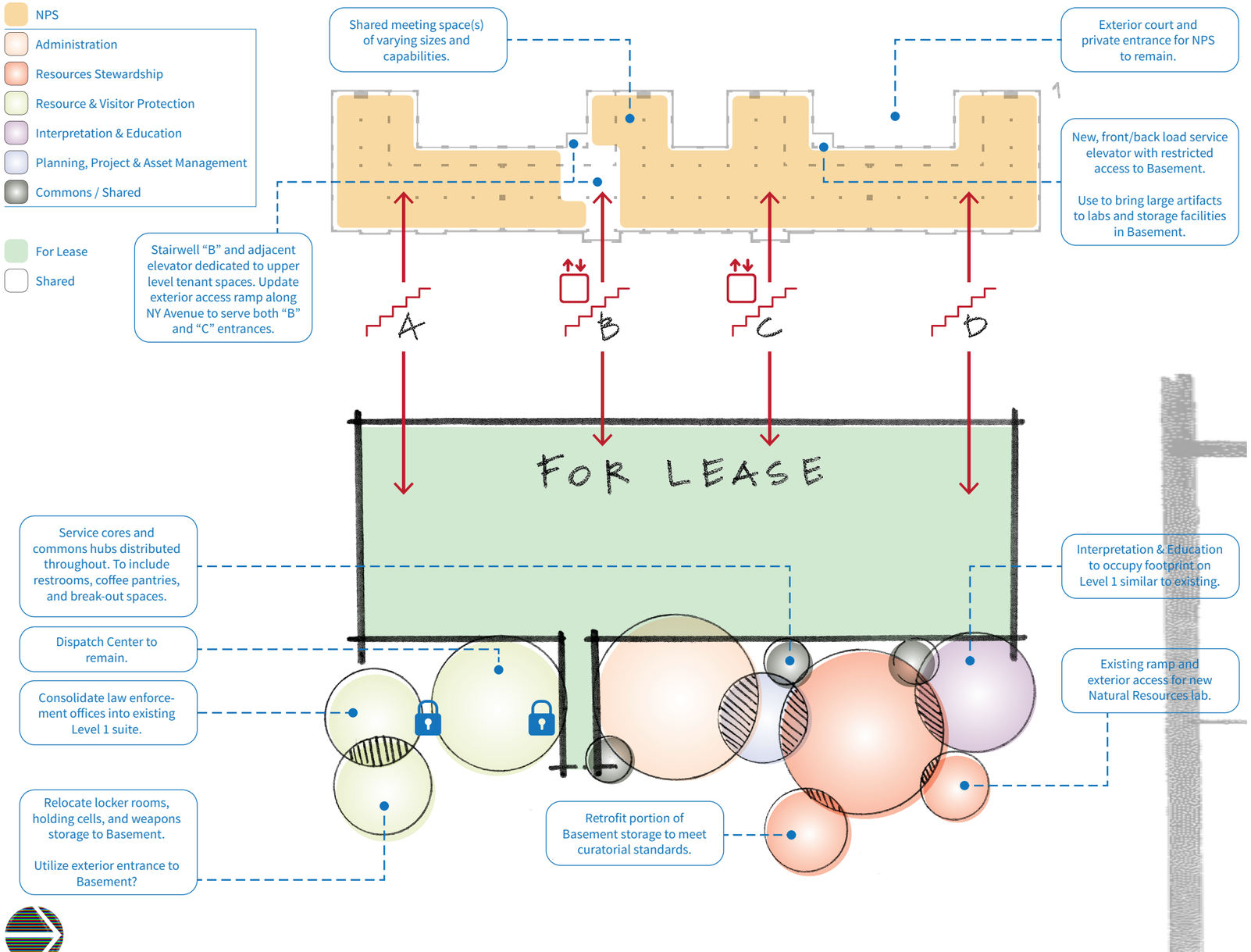
Alternative 2

Alternative 2 builds around the established locations of the United States Park Police station and Dispatch Center to stack primary and secondary spaces for NPS staff at the south end of Building 210.

- Advantages include:
  - **Opens approximately half of Levels 1, 2, and 3 to be available for leasing.**
    - Emphasizes both prime views and street access as selling points to potential tenants.
  - Provides the NPS full oversight of individuals entering the south end of the building.
    - Potential to utilize two (2) New York Avenue entrances as a separate, dedicated entrances for tenants leasing the upper levels.
  - Allows for some separation between departments while providing efficient circulation and access via a centralized stair(s).
  - Maximizes use of the Basement level for ancillary laboratory space, bulk storage, and secured storage.
  - Requires little, if any, change to the recently renovated Dispatch Center.
  - Retains immediate access to the Natural Resources laboratory from the exterior.
  - Allows for incremental expansion at each floor if/when required.
  - Provides opportunity to zone heating and cooling systems by floor and area (north/south).
- Challenges include:
  - The northwest corner entrance and outdoor court would no longer be directly accessible to/from NPS-centric interior spaces.
    - Locates NPS staff furthest from current entrance and parking.
    - Greater chance of intermingling between NPS and lessees.
  - May require reopening of basement fenestration previously closed to provide code-compliant daylighting for occupants.
  - Will be difficult to provide an easily accessible, centralized printing hub.



Alternative 2 Programming Diagram



Alternative 3 Programming Diagram

Alternative 3

Alternative 3 builds around the established locations of the United States Park Police station and Dispatch Center to locate all primary spaces for NPS staff at Level 1 of Building 210.

- Advantages include:
  - **Opens Levels 2 and 3 to be wholly available for leasing.**
    - Emphasizes prime views as a selling point to potential tenants.
  - Provides the NPS full oversight of individuals entering the building.
    - Visitors to the NPS offices, both internal and external, can easily navigate to their destination without traversing stairs or riding an elevator.
    - Utilizes one (1) New York Avenue entrance as a separate, dedicated entrance for tenants leasing the upper levels.
    - Maintains private entrance at northwest corner for NPS employees. Outdoor court serves as a direct extension of interior staff spaces at the same level.
  - Consolidates all NPS-centric functions to two (2) levels, one of which would be very difficult to lease (Basement).
  - Maximizes use of the Basement level for ancillary laboratory space, bulk storage, and secured storage.
  - Requires little, if any, change to the recently renovated Dispatch Center.
  - Retains immediate access to the Natural Resources laboratory from the exterior.
  - Allows for incremental expansion to upper floors if/when required.
  - Provides opportunity to zone heating and cooling systems by floor.
- Challenges include:
  - May require reopening of basement fenestration previously closed to provide code-compliant daylighting for occupants.
  - If the roof is not fully remediated, Level 3 will remain a liability and could affect leasing opportunities.

APPENDICES

Appendix A - Cultural Resources Report Excerpt A1
Appendix B - Structural Assessment Memo B1
Appendix C - Class C Cost Estimates C1
Appendix D - Findings Presentation D1

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APPENDIX A - CULTURAL RESOURCES REPORT EXCERPT

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Infantry Battalion Barracks (Building 210)

Development

Building 210 was constructed ca. 1929, is approximately 400 feet long by 40 feet deep, and contains 95,364 gross square feet.[1] A set of utility drawings dating to 1927 and labeled as Infantry Battalion Barracks, Building 210, are actually for the extant building's companion structure that was erected directly adjacent to it south along New York Avenue.[2] This latter building was probably demolished when the Verrazano Narrows Bridge was constructed. The current Building 210 and its companion structure were both erected as three-story brick barracks, with four main entrances and simple Art Deco detailing along the east facade (figure 6:138). The rear, west elevation had two pairs of ells projecting from it, one pair at each end. This created a small courtyard inside each pair of ells, and a larger courtyard between the two pairs. Open porches were built along the west elevation between the ells, at least at the first-story level, and perhaps at all three levels.[3] These porches were enclosed in January in 1941 to increase the barracks' capacity.

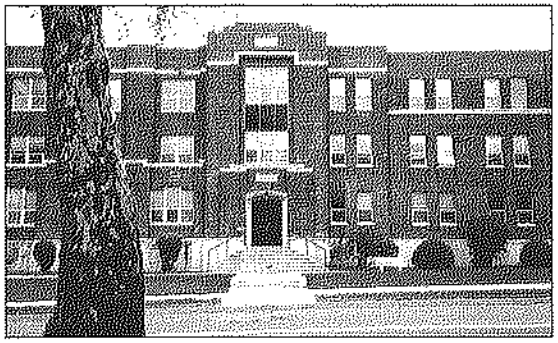

Figure 6:138
Building 210, facade.

A master plan for development dating to 1960 records Building 210 as the EM (Enlisted Men's) Barracks, housing 735 men.[4] A map revised to 1962, showing the Verrazano Narrows Bridge, lists several functions in Building 210, including Civilian Personnel (Section D), Comptroller, Fixed Plant Fac. 1st USA SSU1267th (Section D), Library (Section A), Medical Administration (Section D), Military Police Desk (Section A), Publications (Section D), Post Office (Section A), and Post S-4 (Section D).[5] The exact date of conversion from barracks to offices is unknown, but ca. 1961 appears to be an intelligent estimate.

Drawings were prepared in 1962 for alterations to Building 210, and the as-built notes are dated July 24, 1963.[6] The alterations at this time seem to include only some partition changes, the installation of new doors, new toilets, new electrical and lighting work, and a new air-conditioning system. Window sashes were not replaced at this time. The porches had been enclosed prior to 1962 or 1963, but again, the date of that alteration is unknown. The physical evidence for the porch enclosures is evident, discerned from the obvious changes in brick and use of vinyl siding on the rear elevation (figure 6:139).

A 1974 drawing chronicles the relocation of signs for the U.S. Army Chaplain Center and School to Building 210.[7] Whether the whole building was used for this purpose at this time is not known, nor is the date that the school relocated to another location.

Character-defining Features

Exterior character-defining features include the materials used in the building envelope, i.e. brick and concrete, which are especially cohesive on the east facade and north and south elevations. The building parapet has been rebuilt in several places using slightly different brick and certainly different mortar joints. This obvious wrong use of materials (figure 6:138) distracts from an important character-defining feature. Other major character-defining features are the repetitive sections of the facade with slight indentations and projections along the plane of the elevation (figure 6:140), and the fenestration and solid-to-void ratio (figure

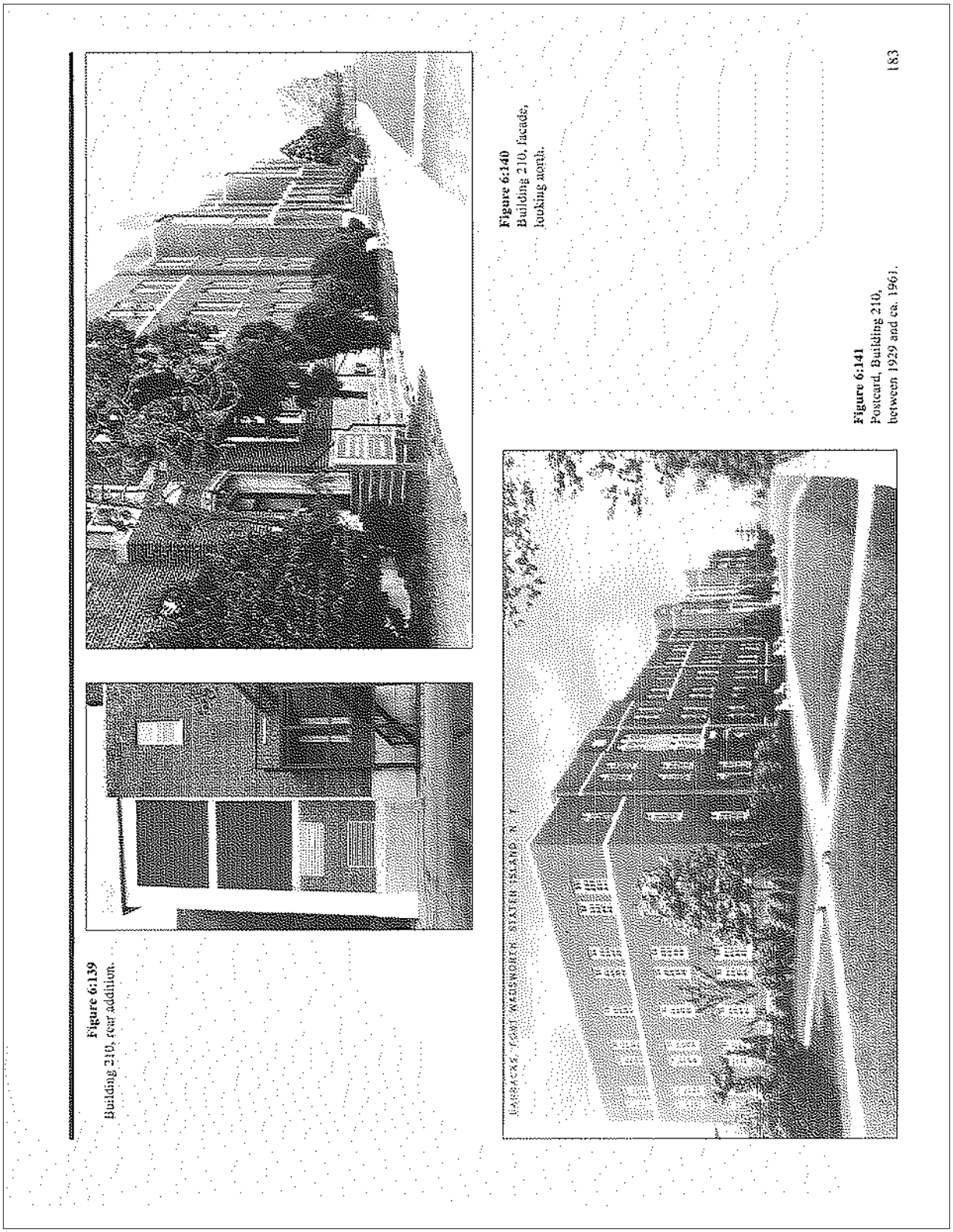

Figure 6:139
Building 210, rear addition.

Figure 6:140
Building 210, facade, looking north.

Figure 6:141
Postcard, Building 210, between 1929 and ca. 1961.

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6:139). A comparison of the original windows (figure 6:141), with the replacement windows shows that the same solid-to-void ratio is maintained, but that the character of the building has been changed because of the window replacement. The overall plan of the structure, with special emphasis on its length is also a significant feature.

The interior character-defining features include the progressions of continuous spaces on every story from north to south, with no clear hierarchy in the plan, and a uniform paint scheme throughout the building. The first-mentioned feature has a negative impact on the interior as a working environment, while the second rates as character-defining only in the sense that it is a constant.

Condition Assessment

Exterior

Building 210 is constructed of concrete masonry units with brick veneer. It is three stories in height with full basement. The footprint is rectangular with wings, perpendicular to the core, extending off the west (rear) elevation.

At first glance, the exterior gives the appearance of being in good condition, but this is not the case. The brick parapet has undergone numerous remedial repair campaigns but continues to exhibit serious deterioration. At the time of this field inspection, parapet rebuilding was again being conducted. Detailed inspection of this recent parapet work has revealed inadequate allowances for contraction and expansion in the form of expansion joints. Aesthetically, the new brickwork is noticeably different in color from the existing.

The south parapet has been patched with bituminous mastic, concealing severe deterioration and crumbling condition of the underlying brickwork. Coping-stone caps have been improperly sealed with bitu-mastic.

Another serious exterior problem is the rust-jacking of all steel window and doorway lintels. As the ferrous metal corrodes, due to paint failure and exposure of steel to water and oxygen, the rusting lintel expands in size and exerts pressure on the adjacent brick masonry and mortar joints. As a result, joint cracking and spalling of bricks are occurring throughout the structure. Lintel corrosion is advanced enough to require total replacement at all openings.

Numerous aesthetic changes have been made that have resulted in the reduction of original integrity. Basement windows have all been permanently sealed with cement. Improper retrofitting of smaller window units into original openings also detracts from the original appearance of the building. The west three-story porches have been filled with brick, clapboard siding, and windows. Mechanical equipment is randomly scattered around the perimeter of the building.

Interior

Recent interior alterations and conversion into offices have obliterated the original space planning and finishes of the barracks building. Even though the existing finishes lack historic integrity, they appear to be in generally good condition.

A future concern involves the Americans with Disabilities Act (ADA) requirements, and specifically the introduction of handicap access into the building.

Condition Assessment Inventory and Recommendations

1. Problem: Corroding of steel lintels (rust jacking), leading to the expansion of lintels and subsequent cracking, fracturing, and weakening of the wall system.

   Solution: Corrosion of lintels is advanced enough to require total replacement of all lintels and subsequent repair to damaged brick and mortar joints.

2. Problem: Infilling of all basement windows blocks natural light and ventilation, and alters the original exterior character of 210.

Solution: Restoration of the basement fenestration is recommended to restore natural light and ventilation into the interior but should only be undertaken if it supports adaptive use for this area.

3. Problem: Energy efficiency of nonoriginal windows and doors must be determined. Retrofitting of windows and doors has compromised original integrity.

   Solution: Conduct an energy audit to determine efficiency of windows and doors. If replacement is recommended, restore altered openings to their original sizes and replace windows and doors with historically appropriate units.

4. Problem: Improper, and potentially dangerous, placement of utility systems around the building perimeter and west side.

   Solution: Relocate utilities on the front (east) facade to the rear of the building. Air-conditioning unit above a west entrance door is leaking onto the masonry and should be relocated.

5. Problem: Freight door on the west elevation has improper drainage and currently allows water to run into the interior.

   Solution: Regrade entrance ramp at entrance and incorporate new internal drainage at landing.

6. Problem: Original copper downspouts for overflow scuppers removed from the building. Hanger straps still remaining in some locations. Drainage pipes filled with debris.

   Solution: Since this drainage system has been replaced by an alternate system, remove hanger straps from the building and downspouts from around the perimeter of the building. Cap ground drainage pipes to prevent further infiltration of debris and water.

7. Problem: Mortar loss occurring randomly throughout the facades.

   Solution: Rake and repoint with mortar that matches original in performance, installation, texture, and color.

8. Problem: Areas of sloppy repointing occurring randomly throughout the walls.

   Solution: Rake and repoint with mortar that matches original in performance, installation, texture, and color.

9. Problem: Vertical cracking in masonry walls caused by lack of expansion joints. Newly created expansion joints should relieve pressure in the wall, but cracks will still need to be filled.

   Solution: Fill cracks to protect the wall from water infiltration. Use mortar that is the same strength or weaker than existing masonry to prevent further destruction.

10. Problem: Lack of direct access for the physically challenged. One wheelchair ramp exists on the rear of the building. Equal access calls for a ramp on the front of the building.

    Solution: Provide ramp access on the front (east) of the building. New ramp should be sensitive to the existing building.

Roof

1. Problem: Evidence of repeated parapet failure and repair. Parapet is currently being rebuilt, although brickwork differs in color from original brick.

   Solution: Parapet is currently being rebuilt, which should help to correct current poor conditions. New parapet brickwork is noticeably different in color from existing.

2. Problem: Poor repair of coping-stone joints and interior of parapet wall with bitu-mastic. Interior wall brickwork at the parapet is saturated with water and crumbling. Recently installed new coping stones are lifting at areas of expansion

joints; this is caused by insufficient allowance for expansion and contraction.

Solution: Incorporate additional soft joints into the coping stonework to provide for expansion and contraction. Faulty mortar work should be removed and corrected using proper materials and techniques.

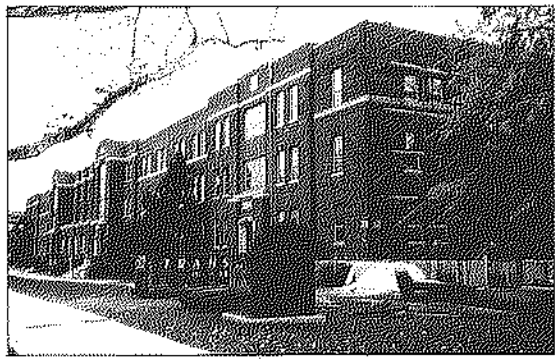

Figure 6:142
General view of building 210 showing north and east (main) elevations.

Figure 6:143
Building 210, west elevation showing enclosure of three-story open porch.

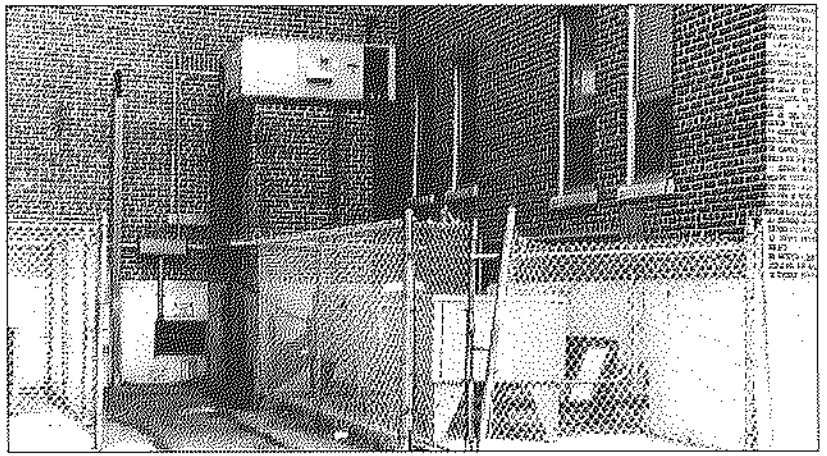

Figure 6:144
Poor placement of mechanical systems. Note water damage to masonry caused by leaking machinery.

Figure 6:145
Building 210, south side showing difference in replacement brick at the parapet and the infill of basement windows. Arrows identify structural cracking and rust jacking of lintels.

Figure 6:146
Detail at inside face of south parapet, showing poor repair and continued failure. Brickwork is crumbling due to moisture saturation and freeze-thaw conditions.

Figure 6:147
Parapet detail at northeast corner, showing 100% replacement of brickwork and coping stones.

Figure 6:148
Detail of southwest corner, showing earlier rebuilt parapet with bitu-mastic repairs made to coping stone joints. Arrows identify structural cracking and subsequent filling.

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Figure 6:149
Failure of expansion joint in recently rebuilt east parapet. Note poor bond between mortar and coping stone, as evidenced by separation.

Figure 6:150
Detail of northeast corner, showing major cracking (arrow). Brickwork is beginning to spall.

Figure 6:151
Detail of rusting lintel, showing "rust jacking" damage to the surrounding brick and mortar.

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APPENDIX B - STRUCTURAL ASSESSMENT MEMO

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ARCHITECTS GWWO

MEMORANDUM

To:	Tonya Edwards, National Park Service
CC:	Amy Sebring, Gateway National Recreation Area
	Mark Lapointe, GWWO Architects
From:	Jason Hearn, GWWO Architects
	Ed Foy, GWWO Architects
Date:	September 13, 2021
Subject:	GATE 310907A – Pre-Planning Design for the Major Renovation of Building 210 Structural Conditions Assessment Follow-up

Following our phone conversation on September 8, 2021, the Design Team offers the following as further guidance for monitoring the continued deterioration of Building 210's superstructure:

- We maintain the opinion that the conditions noted in the *Structural Conditions Assessment* memorandum, dated July 28, 2021, warrant immediate attention. Recommendations outlined therein remain a high priority.

- Because renovation efforts for the entire building may not commence for several years, we recommend regular inspection of the concrete frame, both interior and exterior, as well as the corroded roof-top steel. At a minimum, a licensed engineer should inspect the conditions for worsening deterioration every 2-3 months beginning with the Design Team's 3-day assessment completed on July 23, 2021.

Respectfully submitted,
GWWO, Inc.

Jason Hearn, AIA, LEED AP BD+C
Project Manager

Attachments: Structural Conditions Assessment Memorandum, dated July 28, 2021

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GWWO, INC. | 800 WYMAN PARK DRIVE SUITE 300 | BALTIMORE MD 21211 | 410.332.1009 | ARCHITECTS@GWWOINC.COM
ALAN REED, FAIA • PAUL HUME, AIA • MARK LAPOINTE, AIA • TERRY SQUYRES, AIA • LAURA WERTHER, CPSM • JOHN GREGG, AIA
ERIC FEISS, AIA • DAVID WRIGHT, FAIA, EMERITUS • PHILLIP WORRALL, AIA, EMERITUS • ROBERT O'HATNICK, AIA, EMERITUS

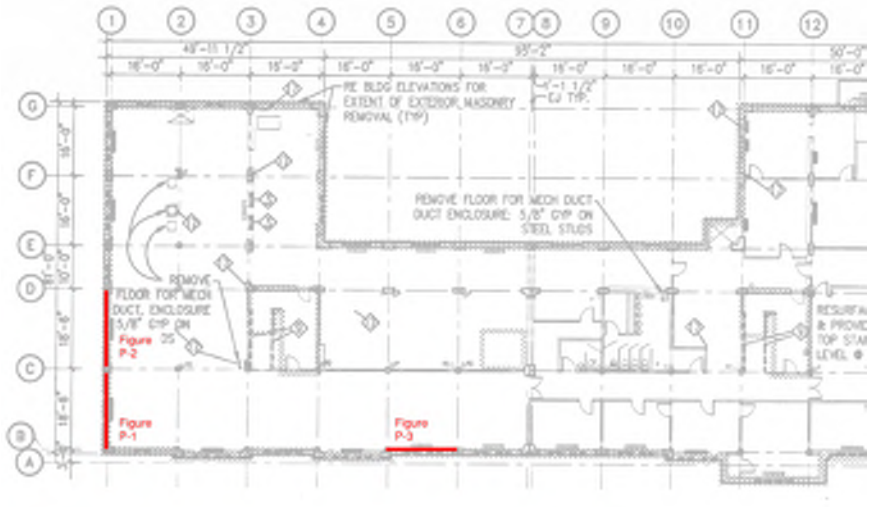
ARCHITECTS GWWO

MEMORANDUM

To:	Tonya Edwards, National Park Service
CC:	Jeff Marrazzo, Gateway National Recreation Area
	Mark Lapointe, GWWO Architects
From:	Jason Hearn, GWWO Architects
	Ed Foy, GWWO Architects
Date:	July 28, 2021
Subject:	GATE 310907A – Pre-Planning Design for the Major Renovation of Building 210 Structural Conditions Assessment

During the on-site building conditions assessment performed by GWWO and its consultants July 21-23, 2021, severe deterioration was observed on two concrete roof girders and one roof beam. The specific locations are as follows:

- Level 3, Along grid line "1" and spanning between grid lines "B" and "D"
- Level 3, Along grid line "B" and spanning between grid lines "5" and "6"



Plan 1: Building 210, Level 3, South End

The deterioration includes cracking and spalling of the concrete, as well as corroded reinforcing steel (reference Figures P-1, P-2 and P-3 below). The steel corrosion noted on the grid line "1" girder, between lines "B" and "C" has advanced to the point of delamination and partial loss of cross section. Cracks observed along the bottoms of the members may also indicate a partial loss of bond along the reinforcing bars.

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ERIC FEISS, AIA • DAVID WRIGHT, FAIA, EMERITUS • PHILLIP WORRALL, AIA, EMERITUS • ROBERT O'HATNICK, AIA, EMERITUS

It is our opinion that the observed conditions warrant the immediate installation of temporary shoring for these members, which should remain in place until after repairs have been completed. We recommend that occupancy in spaces below these areas be restricted to maintenance access only. The NPS should contract a shoring specialist with specific expertise in addressing the observed conditions and be experienced with the shoring of historic structures. In addition to installation, the shoring specialist must include all technical and engineering support within their scope.

A conservative estimate for this shoring work is in the $30,000 to $40,000 range, which incorporates assumptions regarding general conditions, availability of contractors and materials, contractor's access to the building, contracting method, historic building factors and overhead and profit.

Respectfully submitted,
GWWO, Inc.

Jason Hearn, AIA, LEED AP BD+C
Project Manager

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Figure P-1: *Concrete girder along grid line "1," spanning between grid lines "B" and "C"*

Figure P-2: *Concrete girder along grid line "1," spanning between grid lines "C" and "D"*

Figure P-3: *Concrete girder along grid line "B," spanning between grid lines "5" and "6"*

APPENDIX C - CLASS C COST ESTIMATES

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United States Department of the Interior
National Park Service
Class C Construction Cost Estimate

BASIS OF ESTIMATE

Class C Construction Cost Estimate Template

National Park Service (NPS) - Denver Service Center (DSC) | 5-27-21

PROJECT INFORMATION

Project:	Pre-Planning for the Major Renovation of Building 210
Park:	Gateway National Recreation Area
Park Alpha:	GATE
PMIS Number:	310907A
Estimate Date:	12/1/2021
Prepared By:	R. Israel Aguero, Joe Michel
Company:	Forella Group
Address:	5180 Parkstone Drive, Suite 250
City, State Zip:	Chantilly, VA 20151-3812
Phone:	(703) 560-2200

BACKGROUND SUPPORTING MATERIAL (Scope of Work):

This project includes renovation/replacement of architectural and MEP elements of the existing masonry and concrete structure. With the exception of the recently renovated Dispatch Center, the building will be gutted of all existing systems and services that have malfunctioned or are deemed beyond their useful life. Existing interior conditions will be removed completely and exterior envelope conditions will be selectively demolished, where necessary, to repair damage to the concrete superstructure. Characteristics considered historic and/or in satisfactory condition will remain, if code compliant. Brick and cast stone masonry visible to view will be repaired and repointed, while new, energy efficient glazing and MEP systems will be added. Site conditions will be updated/repaired only where needed. For further detail, reference "Asset Conditions Assessment and Analysis," dated December 1, 2021 by GWWO Architects.

SOURCE OF COST DATA:

The unit costs included within this estimate are based on Forella Group's current and historic, proprietary cost database. Regional vendors, local trade contractors, and General Contractors/Construction Managers are contacted on a routine basis to confirm current market conditions are accurately reflected. The Forella Group's cost database is based on the Washington D.C. market. The RSMeans City Cost Indexes, adjusted to Quarter 4 2021, indicates a 30% cost premium for construction projects in Staten Island, NY (143.99) vs Washington, DC (110.60). The RSMeans indexes are derived using material, labor, tax, and union wages from city centers across the United States.

ESTIMATE ASSUMPTIONS:

Using electronic drawings provided by the NPS, the aggregated gross floor area for renovation is 90,020 GSF. This metric assumes the NPS will occupy all available floor area. Leasing options presented in the master report apply percentages to these unit costs and quantities established in this baseline tabulation. A breakdown by floor is as follows:

- Basement: 21,880 SF
- Level 1: 19,750 SF (excludes Dispatch Center)
- Level 2: 24,195 SF
- Level 3: 24,195 SF

Quantities are derived from the available drawings and reports provided by the NPS and refined with A/E input.

MAJOR CHANGES FROM PREVIOUS ESTIMATE:

This is the intial cost estimate for the project.

United States Department of the Interior
National Park Service
Class C Construction Cost Estimate

BASIS OF ESTIMATE

Class C Construction Cost Estimate Template

National Park Service (NPS) - Denver Service Center (DSC) | 5-27-21

PROJECT INFORMATION

Project:	Pre-Planning for the Major Renovation of Building 210
Park:	Gateway National Recreation Area
Park Alpha:	GATE
PMIS Number:	310907A
Estimate Date:	12/1/2021

DESCRIPTION OF MARK-UP & ADD-ONS:

Location Factor:	30.00%	Baseline unit prices are from the Washington DC market. The RSMeans City Cost Indexes identify a difference of 30% between Washington DC (110.60) and Staten Island, NY (143.99).
Remoteness Factor:	0.00%	Site is located within a published commercial center. Percentage is per the NPS Estimating Handbook.
Wage Rate Factor:	0.00%	Markup indicates 0% because Davis-Bacon rates are included in the baseline Washington DC labor unit costs. Adjustments in these rates for the Staten Island, NY market are included in the Location factor.
State & Local Taxes:	0.00%	Markup indicates 0% because a 6% sales tax is included in the baseline Washington DC material and equipment unit costs. The 2% adjustment to the tax rate for the Staten Island, NY market (8% sales tax) is included in the Location factor.
Design Contingency:	15.00%	Repair/rehab work is estimated based on "visual observation" and interviews with GATE maintenance staff. Greater scope may be applicable once selective demolition is performed. The 15% factor was requested by GATE and is the minimum identified by the NPS for this phase.
Standard. General Conditions:	10.00%	Per the NPS, Standard General Conditions can run from 4% to 20%; 15% includes on-site temporary utilities, field offices, fencing, bonds, and permits. Based on previous experience, GATE requested 10%.
Government General Conditions:	10.00%	This percentage is historically typical for projects of common size and scope.
Historic Preservation Factor:	5.00%	Building 210 is a "contributing structure" to a national historic district. A 5% factor covers unidentified costs associated with protecting and/or matching historic elements at the exterior (e.g. brick, cast stone, doors, windows, light fixtures, etc.)
Contractor Overhead:	10.00%	This factor accounts for variable overhead (main office operations) and fixed overhead (Unemployment, Social Security Tax, Builder's Risk Insurance, etc.) for Prime Contractors.
Contractor Profit:	8.00%	This percentage is historically typical for projects of common size and scope.
Bonds and Permits:	2.50%	Included in the Standard General Conditions factor.
Contracting Method Adjustment:	5.00%	The primary procurement method used by the NPS is assumed. Per the NPS Estimating Handbook, ths method is competitive negotiation where award is based on negotiating a price with the best technically-qualified contractor.
Annual Inflation Escalation Factor:	0.00%	As of September 2021, the Bureau of Labor Statistics (BLS) Producer Price Index (PPI) for construction is 7.5%. See: Other Comments
Time Until Project Midpoint (Months)	0	The assumed start date of construction is January 2024. A schedule of approximately 24 months would make January 2025 the midpoint of construction

United States Department of the Interior
National Park Service
Class C Construction Cost Estimate

BASIS OF ESTIMATE

Class C Construction Cost Estimate Template

National Park Service (NPS) - Denver Service Center (DSC) | 5-27-21

PROJECT INFORMATION

Project:	Pre-Planning for the Major Renovation of Building 210
Park:	Gateway National Recreation Area
Park Alpha:	GATE
PMIS Number:	310907A
Estimate Date:	12/1/2021

OTHER COMMENTS:

The Annual Inflation Escalation Factor will be applied by the NPS Project Specialist during submission for funding. All values are in Q4 2021 dollars.

United States Department of the Interior
National Park Service
Class C Construction Cost Estimate

PROJECT COST SUMMARY

Project: Pre-Planning for the Major Renovation of Building 210
Park: Gateway National Recreation Area
Alpha: GATE
PMIS: 310907A

Baseline Modifications to Building 210

Estimate By: R. Israel Aguero, Joe Michel
Date: 12/01/21

Reviewed By: Mark Lapointe, Jason Hearn
Date: 01/10/22

Item No.	Description	Quantity	Unit	Cost/Unit	Total
1	New Roof				$942,585
2	Parapet Modifications				$475,336
3	Structural Restoration				$520,732
4	Exterior Wall (Brick) Restoration				$1,865,110
5	|Porch| Modifications				$198,561
6	Exterior Doors and Windows				$1,136,400
7	Building Systems				$5,685,042
8	Interior Upgrades				$2,928,775
9	Exterior Accessibility Upgrades				$233,240
	Dumpster Hauls & Utility Modification Allowances				$440,951
	Subtotal Direct Construction Costs				**$14,426,732**
	Value of Government Furnished Property (GFP) Included in Direct Cost (see footnote)*				**$0**
				Direct Cost Subtotal without GFP	**$14,426,732**
	Published Location Factor	30.00%			$4,328,020
	Remoteness Factor	0.00%			$0
	Federal Wage Rate Factor	0.00%			$0
	State & Local Taxes	0.00%			$0
	Design Contingency	15.00%			$2,164,010
	Total Direct Construction Costs				**$20,918,761**
	Standard General Conditions	10.00%			$2,091,876
	Government General Conditions	10.00%			$2,091,876
	Historic Preservation Factor	5.00%			$1,045,938
	Subtotal NET Construction Cost				**$26,148,452**
	Overhead	10.00%			$2,614,845
	Profit	8.00%			$2,091,876
	Estimated NET Construction Cost				**$30,855,173**
	Bonds & Permits	2.50%			$771,379
	Contracting Method Adjustment	5.00%			$1,542,759
	Inflation Escalation (see footnote)**	0	Months	0.00%	$0
	Total Estimated NET Cost of Construction				**$33,169,311**

* GFP costs are only used when the Government pre-purchases items, or provides other materials out of Government inventory, to be installed by contractor. Adjustments and Markup on GFP only include Inflation Escalation; No other adjustment factors or O&P markup have been applied.

** The Annual Inflation Escalation Factor will be applied by the NPS Project Specialist during submission for funding. All values are in Q4 2021 dollars.

*** **Reference the break down of costs on the following sheets for scope of work of each Summary Item.**

United States Department of the Interior
National Park Service
Class C Construction Cost Estimate

LINE ITEM COST SUMMARY

Project: Pre-Planning for the Major Renovation of Building 210
Park: Gateway National Recreation Area
Park Alpha: GATE
PMIS Number: 310907A

Baseline Modifications to Building 210

Estimate By: R. Israel Aguero, Joe Mic
Date: 12/01/21
Reviewed By: Mark Lapointe, Jason Hearn
Date: 01/10/22

Total Cost: $14,426,732

Summary Item Description	Uniformat II WBS Code	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
	B10	SUPERSTRUCTURE					
Structural Restoration	B1010	Repair, restore concrete structure	14000	SF	$ 21.15	$296,100	columns, beams, slabs
Structural Restoration	B1010	Repair cracks in elevated concrete slabs	800	LF	$ 24.85	$19,880	
Structural Restoration	B1020	Refurbish, prep, paint rooftop steel members	2500	LF	$ 48.42	$121,050	
Structural Restoration	B1020	Repair existing roof deck	12663	SF	$ 6.61	$83,702	assumed 50%
		SUBTOTAL SUPESTRUCTURE				**$520,732**	

Summary Item Description	Uniformat II WBS Code	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
	B20	EXTERIOR CLOSURE					
Exterior Wall (Brick) Restoration	B2010	Scaffold, erect and dismantle, freight, engineering	48000	SF	$ 5.55	$266,400	
Exterior Wall (Brick) Restoration	B2010	Scaffold, rental	12	Months	$ 32,181.60	$386,179	
Exterior Wall (Brick) Restoration	B2010	Scaffold, winter heating	4	Months	$ 40,227.00	$160,908	
Parapet Modifications	B2010	Reconstruct parapet walls, CMU and salavaged brick, coping	6500	SF	$ 57.31	$372,515	
Exterior Wall (Brick) Restoration	B2010	Rake and repoint masonry façade	31395	SF	$ 28.88	$906,688	assumed 100%
Exterior Wall (Brick) Restoration	B2010	Clean, restore cast stone elements	1811	SF	$ 14.50	$26,260	
Exterior Wall (Brick) Restoration	B2010	Repair concrete water table/foundation walls	1500	SF	$ 34.37	$51,555	
Parapet Modifications	B2010	Modify coping at chimneys	4	Locations	$ 3,345.22	$13,381	
|Porch| Modifications	B2010	Infill walls where wood framing removed	3400	SF	$ 53.14	$180,676	metal framing and exterior finish in-kind (siding)
Exterior Doors and Windows	B2020	Replica historic doors & windows; metal, thermally-broken	5822	SF	$ 192.08	$1,118,290	"porches" excluded
Exterior Wall (Brick) Restoration	B2020	Refurbish, repair steel lintels	230	EA	$ 291.83	$67,121	
		SUBTOTAL EXTERIOR CLOSURE				**$3,549,972**	

United States Department of the Interior
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Class C Construction Cost Estimate

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Baseline Modifications to Building 210

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Date: 12/01/21
Reviewed By: Mark Lapointe, Jason Hearn
Date: 01/10/22

Total Cost: $14,426,732

Summary Item Description	Uniformat II WBS Code	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
	B30	ROOFING					
New Roof	B3010	New single-ply membrane roof assembly (TPO/PVC, cover board, 6" rigid insulation, air barrier membrane)	25592	SF	$ 32.59	$834,043	includes back of parapet walls
		SUBTOTAL ROOFING				$834,043	

Summary Item Description	Uniformat II WBS Code	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
	C10	INTERIOR CONSTRUCTION					
Interior Upgrades	C1010	Partitions (metal stud, 5/8" GWB); glazing (HM frame)	25645	SF	$ 21.64	$554,958	Level 3 + US Park Police
Interior Upgrades	C1010	Partitions (curatorial standards)	1400	SF	$ 75.00	$105,000	
Interior Upgrades	C1010	Partitions (laboratories)	1400	SF	$ 70.00	$98,000	
Interior Upgrades	C1020	Interior doors, frames, hardware	28445	SF	$ 5.21	$148,198	Level 3 + US Park Police
		SUBTOTAL INTERIOR CONSTRUCTION				$906,156	

Summary Item Description	Uniformat II WBS Code	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
	C20	STAIRCASES					
Interior Upgrades	C2010	Refurbish existing stairs, railings, and finishes	15	Flights	$ 21,560.35	$323,405	new tread/riser finish (rubber); painted metal stringers and railings
		SUBTOTAL STAIRCASES				$323,405	

United States Department of the Interior
National Park Service
Class C Construction Cost Estimate

LINE ITEM COST SUMMARY

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PMIS Number: 310907A

Baseline Modifications to Building 210

Estimate By: R. Israel Aguero, Joe Mic
Date: 12/01/21
Reviewed By: Mark Lapointe, Jason Hearn
Date: 01/10/22

Total Cost: $14,426,732

Summary Item Description	Uniformat II WBS Code	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
	C30	INTERIOR FINISHES					
Interior Upgrades	C3010	Paint walls	28445	SF	$ 1.04	$29,583	Level 3 + US Park Police
Interior Upgrades	C3020	Flooring	28445	SF	$ 9.33	$265,392	Level 3 + US Park Police
Interior Upgrades	C3030	Ceilings	14222.5	SF	$ 5.00	$71,113	assumed 50% of NPS spaces
Interior Upgrades	C3030	Paint exposed ceilings/structure	14222.5	SF	$ 0.99	$14,080	assumed 50% of NPS spaces
		SUBTOTAL INTERIOR FINISHES				**$380,167**	

Summary Item Description	Uniformat II WBS Code	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
	D10	CONVEYING SYSTEMS					
Interior Upgrades	D1010	Remove and replace passenger elevator, electric traction	3	Stops	$ 57,489.97	$172,470	
Interior Upgrades	D1010	Remove old freight elevator and adjacent passenger elevator; replace passenger elevator, electric traction service	4	Stops	$ 64,194.47	$256,778	
		SUBTOTAL CONVEYING SYSTEMS				**$429,248**	

United States Department of the Interior
National Park Service
Class C Construction Cost Estimate

LINE ITEM COST SUMMARY

Project: Pre-Planning for the Major Renovation of Building 210
Park: Gateway National Recreation Area
Park Alpha: GATE
PMIS Number: 310907A

Baseline Modifications to Building 210

Estimate By: R. Israel Aguero, Joe Mic
Date: 12/01/21
Reviewed By: Mark Lapointe, Jason Hearn
Date: 01/10/22

Total Cost: $14,426,732

Summary Item Description	Uniformat II WBS Code	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
	D20	PLUMBING					
Building Systems	D2010	Demolition	45010	SF	$ 1.39	$62,564	assumed 50% of GSF
Building Systems	D2010	Plumbing system, NPS areas only with tie-in	45010	SF	$ 11.78	$530,218	assumed 55% of GSF
		SUBTOTAL PLUMBING				**$592,782**	

Summary Item Description	Uniformat II WBS Code	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
	D30	HVAC					
Building Systems	D3040	Demolition	45010	SF	$ 1.39	$62,564	assumed 50% of GSF
Building Systems	D3040	HVAC system complete, Variable Air Volume (VAV); essential distribution at unused area	28445	SF	$ 63.75	$1,813,369	Level 3 + US Park Police
		SUBTOTAL HVAC				**$1,875,933**	

United States Department of the Interior
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Date: 12/01/21
Reviewed By: Mark Lapointe, Jason Hearn
Date: 01/10/22

Total Cost: $14,426,732

Summary Item Description	Uniformat II WBS Code	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
	D40	FIRE PROTECTION					
Building Systems	D4010	Demolition	90020	SF	$ 0.87	$78,317	
Building Systems	D4010	New wet pipe sprinkler system, complete	90020	SF	$ 4.22	$379,884	
		SUBTOTAL FIRE PROTECTION				$458,202	

Summary Item Description	Uniformat II WBS Code	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
	D50	ELECTRICAL					
Building Systems	D5010	Demolition	45010	SF	$ 1.39	$62,564	assumed 50% of GSF
Building Systems	D5010	New electrical system; lightning protection	45010	SF	$ 39.01	$1,755,840	assumed 75% of GSF
Building Systems	D5030	New telecommunications system, NPS space only	28445	SF	$ 5.82	$165,550	Level 3 + US Park Police
Building Systems	D5030	New audio/visual infrastructure	45010	SF	$ 4.03	$181,390	assumed 50% of GSF
Building Systems	D5030	New security system infrastructure	67515	SF	$ 3.70	$249,806	assumed 75% of GSF
Building Systems	D5030	New fire alarm system, complete	90020	SF	$ 3.81	$342,976	
		SUBTOTAL ELECTRICAL				$2,758,126	

United States Department of the Interior
National Park Service
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Baseline Modifications to Building 210

Estimate By: R. Israel Aguero, Joe Mic
Date: 12/01/21
Reviewed By: Mark Lapointe, Jason Hearn
Date: 01/10/22

Total Cost: $14,426,732

Summary Item Description	Uniformat II WBS Code	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
	E10	EQUIPMENT					
New Roof	E1090	Fall protection (roof)	350	LF	$ 35.15	$12,303	
		SUBTOTAL EQUIPMENT				**$12,303**	

Summary Item Description	Uniformat II WBS Code	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
	E20	FURNISHINGS					
Interior Upgrades	E2010	Fixed casework & window treatments; NPS spaces only	28445	SF	$ 1.71	$48,641	Level 3 + US Park Police
		SUBTOTAL FURNISHINGS				**$48,641**	

United States Department of the Interior
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Baseline Modifications to Building 210

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Date: 12/01/21
Reviewed By: Mark Lapointe, Jason Hearn
Date: 01/10/22

Total Cost: $14,426,732

Summary Item Description	Uniformat II WBS Code	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
	F20	SELECTIVE BUILDING DEMOLITION					
Interior Upgrades	F2010	Remove interior partitions, ceilings, and flooring	43945	SF	$ 9.27	$407,370	Levels 1 & 3; omit Dispatch
New Roof	F2010	Remove existing roofing to concrete deck	25,326	SF	$ 3.80	$96,239	
Parapet Modifications	F2010	Remove masonry parapets; salvage brick	6500	SF	$ 13.76	$89,440	
|Porch| Modifications	F2010	Remove wood framing and exterior finish; west porches	3400	SF	$ 4.86	$16,524	
Exterior Doors and Windows	F2010	Remove existing windows	234	EA	$ 69.79	$16,331	
Exterior Doors and Windows	F2010	Remove existing exterior doors, frames, hardware	17	EA	$ 104.68	$1,780	
|Porch| Modifications	F2010	Remove existing louvers	13	EA	$ 104.68	$1,361	
	F2010	Dumpster	111	Pulls	$ 710.20	$78,832	includes hauling & dump fees
Interior Upgrades	F2020	Hazardous Materials Abatement	65825	SF	$ 6.59	$433,787	Basement + Levels 1 & 3
		SUBTOTAL SELECTIVE BUILDING DEMOLITION				**$1,141,663**	

Summary Item Description	Uniformat II WBS Code	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
	G10	SITE PREPARATION					
Exterior Accessibility Upgrades	G1020	Remove concrete paving	4000	SF	$ 2.20	$8,800	assumed 20%
Exterior Accessibility Upgrades	G1020	Remove exterior stairs, ramps, and railings	1,360	SF	$ 7.29	$9,914	assumed 50%
Exterior Accessibility Upgrades	G1020	Remove concrete curbing	480	LF	$ 6.24	$2,995	assumed 20%
Exterior Accessibility Upgrades	G1070	Erosion controls, limited	3	Acre	$ 4,859.69	$14,579	
Exterior Accessibility Upgrades	G1070	Earthwork, grading, limited	3	Acre	$ 8,207.66	$24,623	
		SUBTOTAL SITE PREPARATION				**$60,912**	

United States Department of the Interior
National Park Service
Class C Construction Cost Estimate

LINE ITEM COST SUMMARY

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PMIS Number: 310907A

Baseline Modifications to Building 210

Estimate By: R. Israel Aguero, Joe Mic
Date: 12/01/21
Reviewed By: Mark Lapointe, Jason Hearn
Date: 01/10/22

Total Cost: $14,426,732

Summary Item Description	Uniformat II WBS Code	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
	G20	SITE IMPROVEMENTS					
Exterior Accessibility Upgrades	G2030	Replace concrete paving	4000	SF	$ 18.93	$75,720	assumed 20%
Exterior Accessibility Upgrades	G2030	Replace exterior stairs, ramps, and railings	1,360	SF	$ 60.07	$81,695	assumed 50%
Exterior Accessibility Upgrades	G2030	Replace concrete curbing	480	LF	$ 31.07	$14,914	assumed 20%
		SUBTOTAL SITE IMPROVEMENTS				**$172,329**	

Uniformat II WBS Code	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
G30	SITE CIVIL/MECHANICAL UTILITIES					
G3010	Water supply	1	LS	$ 55,950.48	$55,950	
G3020	Sanitary sewer	1	LS	$ 42,809.66	$42,810	
G3030	Storm sewer	1	LS	$ 109,219.17	$109,219	
	SUBTOTAL SITE CIVIL/MECHANICAL UTILITES				**$207,979**	

Uniformat II WBS Code	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
G 40	SITE ELECTRICAL UTILITIES					
G4020	Site electrical	1	LS	$ 154,139.32	$154,139	
	SUBTOTAL SITE ELECTRICAL UTILITIES				**$154,139**	

United States Department of the Interior
National Park Service
Class C Construction Cost Estimate

LINE ITEM COST SUMMARY

Project: Pre-Planning for the Major Renovation of Building 210
Park: Gateway National Recreation Area
Park Alpha: GATE
PMIS Number: 310907A

Estimate By: R. Israel Aguero, Joe Mic
Date: 12/01/21
Reviewed By: Mark Lapointe, Jason Hearn
Date: 01/10/22

Baseline Modifications to Building 210

Total Cost: $14,426,732

Uniformat II WBS Code	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
TOTAL COST - Baseline Modifications to Building 210					**$14,426,732**	

United States Department of the Interior
National Park Service
Class C Construction Cost Estimate

PROJECT COST SUMMARY

Project: Pre-Planning for the Major Renovation of Building 210
Park: Gateway National Recreation Area
Alpha: GATE
PMIS: 310907A

Enhanced Modifications to Building 210

Estimate By: R. Israel Aguero, Joe Michel
Date: 12/01/21

Reviewed By: Mark Lapointe, Jason Hearn
Date: 01/10/22

Item No.	Description	Quantity	Unit	Cost/Unit	Total
1	New Roof				$942,585
2	Parapet Modifications				$475,336
3	Structural Restoration				$552,568
4	Exterior Wall (Brick) Restoration				$1,865,110
5	|Porch| Modifications				$1,659,336
6	Exterior Doors and Windows				$1,182,023
7	Building Systems				$7,553,038
8	Interior Upgrades				$3,108,611
9	Exterior Accessibility Upgrades				$419,066
	Dumpster Hauls & Utility Modification Allowances				$440,951
	Subtotal Direct Construction Costs				**$18,198,623**
	Value of Government Furnished Property (GFP) Included in Direct Cost (see footnote)*				**$0**
				Direct Cost Subtotal without GFP	**$18,198,623**
	Published Location Factor	30.00%			$5,459,587
	Remoteness Factor	0.00%			$0
	Federal Wage Rate Factor	0.00%			$0
	State & Local Taxes	0.00%			$0
	Design Contingency	15.00%			$2,729,793
	Total Direct Construction Costs				**$26,388,003**
	Standard General Conditions	10.00%			$2,638,800
	Government General Conditions	10.00%			$2,638,800
	Historic Preservation Factor	5.00%			$1,319,400
	Subtotal NET Construction Cost				**$32,985,004**
	Overhead	10.00%			$3,298,500
	Profit	8.00%			$2,638,800
	Estimated NET Construction Cost				**$38,922,305**
	Bonds & Permits	2.50%			$973,058
	Contracting Method Adjustment	5.00%			$1,946,115
	Inflation Escalation (see footnote)**	0	Months	0.00%	$0
	Total Estimated NET Cost of Construction				**$41,841,478**

* GFP costs are only used when the Government pre-purchases items, or provides other materials out of Government inventory, to be installed by contractor. Adjustments and Markup on GFP only include Inflation Escalation; No other adjustment factors or O&P markup have been applied.

** The Annual Inflation Escalation Factor will be applied by the NPS Project Specialist during submission for funding. All values are in Q4 2021 dollars.

*** **Reference the break down of costs on the following sheets for scope of work of each Summary Item.**

United States Department of the Interior
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Class C Construction Cost Estimate

LINE ITEM COST SUMMARY

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Enhanced Modifications to Building 210

Estimate By: R. Israel Aguero, Joe Mic
Date: 12/01/21
Reviewed By: Mark Lapointe, Jason Hearn
Date: 01/10/22

Total Cost: $18,198,623

Summary Item Description	Uniformat II WBS Code	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
	A10	FOUNDATIONS					
Structural Restoration	A1030	Repair/patch existing slab on grade as needed	10,940	SF	$ 2.91	$31,835	assume 50% for floodproofing Basement
		SUBTOTAL FOUNDATIONS				$31,835	

Summary Item Description	Uniformat II WBS Code	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
	B10	SUPERSTRUCTURE					
Structural Restoration	B1010	Repair, restore concrete structure	14000	SF	$ 21.15	$296,100	columns, beams, slabs
Structural Restoration	B1010	Repair cracks in elevated concrete slabs	800	LF	$ 24.85	$19,880	
Structural Restoration	B1020	Refurbish, prep, paint rooftop steel members	2500	LF	$ 48.42	$121,050	
Structural Restoration	B1020	Repair existing roof deck	12663	SF	$ 6.61	$83,702	assumed 50%
		SUBTOTAL SUPESTRUCTURE				$520,732	

United States Department of the Interior
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Total Cost: $18,198,623

Summary Item Description	Uniformat II WBS Code	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
	B20	EXTERIOR CLOSURE					
Exterior Wall (Brick) Restoration	B2010	Scaffold, erect and dismantle, freight, engineering	48000	SF	$ 5.55	$266,400	
Exterior Wall (Brick) Restoration	B2010	Scaffold, rental	12	Months	$ 32,181.60	$386,179	
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Parapet Modifications	B2010	Reconstruct parapet walls, CMU and salavaged brick, coping	6500	SF	$ 57.31	$372,515	
Exterior Wall (Brick) Restoration	B2010	Rake and repoint masonry façade	31395	SF	$ 28.88	$906,688	assumed 100%
Exterior Wall (Brick) Restoration	B2010	Clean, restore cast stone elements	1811	SF	$ 14.50	$26,260	
Exterior Wall (Brick) Restoration	B2010	Repair concrete water table/foundation walls	1500	SF	$ 34.37	$51,555	
Parapet Modifications	B2010	Modify coping at chimneys	4	Locations	$ 3,345.22	$13,381	
|Porch| Modifications	B2020	Exterior curtainwall where wood framing removed	12225	SF	$ 134.27	$1,641,451	
Exterior Doors and Windows	B2020	New basement windows (24"H x 42"L)	25	EA	$ 1,166.82	$29,171	assumed 50% of openings
Exterior Doors and Windows	B2020	Replica historic windows; metal, thermally-broken	5822	SF	$ 192.08	$1,118,290	
Exterior Wall (Brick) Restoration	B2020	Refurbish, repair steel lintels	230	EA	$ 291.83	$67,121	
		SUBTOTAL EXTERIOR CLOSURE				**$5,039,917**	

Summary Item Description	Uniformat II WBS Code	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
	B30	ROOFING					
New Roof	B3010	New single-ply membrane roof assembly (TPO/PVC, cover board, 6" rigid insulation, air barrier membrane)	25592	SF	$ 32.59	$834,043	includes back of parapet walls
		SUBTOTAL ROOFING				**$834,043**	

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Date: 01/10/22

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Summary Item Description	Uniformat II WBS Code	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
	C10	INTERIOR CONSTRUCTION					
Interior Upgrades	C1010	Partitions (metal stud, 5/8" GWB); glazing (HM frame)	25645	SF	$ 21.64	$554,958	Level 3 + US Park Police
Interior Upgrades	C1010	Partitions (curatorial standards)	1400	SF	$ 75.00	$105,000	
Interior Upgrades	C1010	Partitions (laboratories)	1400	SF	$ 70.00	$98,000	
Interior Upgrades	C1020	Interior doors, frames, hardware	28445	SF	$ 5.21	$148,198	Level 3 + US Park Police
		SUBTOTAL INTERIOR CONSTRUCTION				**$906,156**	

Summary Item Description	Uniformat II WBS Code	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
	C20	STAIRCASES					
Interior Upgrades	C2010	Refurbish existing stairs, railings, and finishes	15	Flights	$ 21,560.35	$323,405	new tread/riser finish (rubber); painted metal stringers and railings
		SUBTOTAL STAIRCASES				**$323,405**	

United States Department of the Interior
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Date: 12/01/21
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Date: 01/10/22

Total Cost: $18,198,623

Summary Item Description	Uniformat II WBS Code	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
	C30	INTERIOR FINISHES					
Interior Upgrades	C3010	Wall finishes	14222.5	SF	$ 2.44	$34,703	assumed 50% of NPS spaces at Levels 1 & 3
Interior Upgrades	C3010	Paint walls	28445	SF	$ 1.04	$29,583	Level 3 + US Park Police
Interior Upgrades	C3020	Flooring	28445	SF	$ 9.33	$265,392	Level 3 + US Park Police
Interior Upgrades	C3030	Ceilings	14222.5	SF	$ 5.00	$71,113	assumed 50% of NPS spaces
Interior Upgrades	C3030	Paint exposed ceilings/structure	14222.5	SF	$ 0.99	$14,080	assumed 50% of NPS spaces
		SUBTOTAL INTERIOR FINISHES				**$414,870**	

Summary Item Description	Uniformat II WBS Code	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
	D10	CONVEYING SYSTEMS					
Interior Upgrades	D1010	Remove and replace passenger elevator, electric traction	3	Stops	$ 57,489.97	$172,470	
Interior Upgrades	D1010	Remove old freight elevator and adjacent passenger elevator; replace passenger elevator, electric traction service	4	Stops	$ 64,194.47	$256,778	
		SUBTOTAL CONVEYING SYSTEMS				**$429,248**	

United States Department of the Interior
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Class C Construction Cost Estimate

LINE ITEM COST SUMMARY

Project: Pre-Planning for the Major Renovation of Building 210
Park: Gateway National Recreation Area
Park Alpha: GATE
PMIS Number: 310907A

Enhanced Modifications to Building 210

Estimate By: R. Israel Aguero, Joe Mic
Date: 12/01/21
Reviewed By: Mark Lapointe, Jason Hearn
Date: 01/10/22

Total Cost: $18,198,623

Summary Item Description	Uniformat II WBS Code	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
	D20	PLUMBING					
Building Systems	D2010	Demolition	45010	SF	$ 1.39	$62,564	assumed 50% of GSF
Building Systems	D2010	Plumbing system, service capped at unused areas	49511	SF	$ 11.78	$583,240	assumed 55% of GSF; restrooms for occupiable spaces in Basement
		SUBTOTAL PLUMBING				$645,803	

Summary Item Description	Uniformat II WBS Code	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
	D30	HVAC					
Building Systems	D3040	Demolition	45010	SF	$ 1.39	$62,564	assumed 50% of GSF
Building Systems	D3040	HVAC system complete, Variable Air Volume (VAV); essential distribution at unused area	54012	SF	$ 63.75	$3,443,265	assumed 60% of GSF; occupiable spaces in Basement
		SUBTOTAL HVAC				$3,505,829	

United States Department of the Interior
National Park Service
Class C Construction Cost Estimate

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Summary Item Description	Uniformat II WBS Code	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
	D40	FIRE PROTECTION					
Building Systems	D4010	Demolition	90020	SF	$ 0.87	$78,317	
Building Systems	D4010	New wet pipe sprinkler system, complete	90020	SF	$ 4.22	$379,884	
		SUBTOTAL FIRE PROTECTION				**$458,202**	

Summary Item Description	Uniformat II WBS Code	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
	D50	ELECTRICAL					
Building Systems	D5010	Demolition	45010	SF	$ 1.39	$62,564	assumed 50% of GSF
Building Systems	D5010	New electrical system; lightning protection	45010	SF	$ 39.01	$1,755,840	assumed 75% of GSF
Building Systems	D5030	New telecommunications system, NPS space only	54012	SF	$ 5.82	$314,350	assumed 60% of GSF; occupiable spaces in Basement
Building Systems	D5030	New audio/visual infrastructure	54012	SF	$ 4.03	$217,668	assumed 60% of GSF; occupiable spaces in Basement
Building Systems	D5030	New security system infrastructure	67515	SF	$ 3.70	$249,806	assumed 75% of GSF
Building Systems	D5030	New fire alarm system, complete	90020	SF	$ 3.81	$342,976	
		SUBTOTAL ELECTRICAL				**$2,943,204**	

United States Department of the Interior
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Summary Item Description	Uniformat II WBS Code	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
	E10	EQUIPMENT					
New Roof	E1090	Fall protection (roof)	350	LF	$ 35.15	$12,303	
		SUBTOTAL EQUIPMENT				$12,303	

Summary Item Description	Uniformat II WBS Code	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
	E20	FURNISHINGS					
Interior Upgrades	E2010	Fixed casework & window treatments; NPS spaces only	54012	SF	$ 1.71	$92,361	assumed 60% of GSF; occupiable spaces in Basement
		SUBTOTAL FURNISHINGS				$92,361	

United States Department of the Interior
National Park Service
Class C Construction Cost Estimate

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Total Cost: $18,198,623

Summary Item Description	Uniformat II WBS Code	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
	F20	SELECTIVE BUILDING DEMOLITION					
Interior Upgrades	F2010	Remove interior partitions, ceilings, and flooring	54885	SF	$ 9.27	$508,784	Levels 1, 3, and 50% of Basement; omit Dispatch
New Roof	F2010	Remove existing roofing to concrete deck	25,326	SF	$ 3.80	$96,239	
Parapet Modifications	F2010	Remove masonry parapets; salvage brick	6500	SF	$ 13.76	$89,440	
|Porch| Modifications	F2010	Remove wood framing and exterior finish; west porches	3400	SF	$ 4.86	$16,524	
Exterior Doors and Windows	F2010	Remove existing windows	234	EA	$ 69.79	$16,331	
Exterior Doors and Windows	F2010	Remove existing exterior doors, frames, hardware	17	EA	$ 104.68	$1,780	
|Porch| Modifications	F2010	Remove existing louvers	13	EA	$ 104.68	$1,361	
Exterior Doors and Windows	F2010	Remove infill and basement window openings, patch & prep opening for new window	25	Locations	$ 658.10	$16,453	assumed 50% of openings
	F2010	Dumpster	111	Pulls	$ 710.20	$78,832	includes hauling & dump fees
Interior Upgrades	F2020	Hazardous Materials Abatement	65825	SF	$ 6.59	$433,787	Basement + Levels 1 & 3
		SUBTOTAL SELECTIVE BUILDING DEMOLITION				$1,259,529	

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Total Cost: $18,198,623

Summary Item Description	Uniformat II WBS Code	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
	G10	SITE PREPARATION					
Exterior Accessibility Upgrades	G1020	Remove concrete paving	4000	SF	$ 2.20	$8,800	assumed 20%
Exterior Accessibility Upgrades	G1020	Remove exterior stairs, ramps, and railings	2,720	SF	$ 7.29	$19,829	includes NY Ave sloped walkway
Exterior Accessibility Upgrades	G1020	Remove concrete curbing	480	LF	$ 6.24	$2,995	assumed 20%
Exterior Accessibility Upgrades	G1070	Erosion controls, limited	3	Acre	$ 4,859.69	$14,579	
Exterior Accessibility Upgrades	G1070	Earthwork, grading, limited	3	Acre	$ 8,207.66	$24,623	
		SUBTOTAL SITE PREPARATION				**$70,826**	

Summary Item Description	Uniformat II WBS Code	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
	G20	SITE IMPROVEMENTS					
Exterior Accessibility Upgrades	G2030	Replace concrete paving	4000	SF	$ 18.93	$75,720	assumed 20%
Exterior Accessibility Upgrades	G2030	Replace exterior stairs, ramps, and railings	2,720	SF	$ 60.07	$163,390	includes new NY Ave ramp(s)
Exterior Accessibility Upgrades	G2030	Replace concrete curbing	480	LF	$ 31.07	$14,914	assumed 20%
Exterior Accessibility Upgrades	G2040	Signage and furnishings	1	LS	$ 32,733.18	$32,733	
Exterior Accessibility Upgrades	G2050	Landscaping allowance	1	LS	$ 17,092.20	$17,092	
		SUBTOTAL SITE IMPROVEMENTS				**$303,849**	

United States Department of the Interior
National Park Service
Class C Construction Cost Estimate

LINE ITEM COST SUMMARY

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Enhanced Modifications to Building 210

Estimate By: R. Israel Aguero, Joe Mic
Date: 12/01/21
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Date: 01/10/22

Total Cost: $18,198,623

Summary Item Description	Uniformat II WBS Code	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
	G30	SITE CIVIL/MECHANICAL UTILITIES					
	G3010	Water supply	1	LS	$ 55,950.48	$55,950	
	G3020	Sanitary sewer	1	LS	$ 42,809.66	$42,810	
	G3030	Storm sewer	1	LS	$ 109,219.17	$109,219	
Exterior Accessibility Upgrades	G3030	Natural gas, relocate service	1	LS	$ 44,390.57	$44,391	to connect Entrance "B" to accessible path
		SUBTOTAL SITE CIVIL/MECHANICAL UTILITES				**$252,370**	

Uniformat II WBS Code	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
G 40	SITE ELECTRICAL UTILITIES					
G4020	Site electrical	1	LS	$ 154,139.32	$154,139	
	SUBTOTAL SITE ELECTRICAL UTILITIES				**$154,139**	

Uniformat II WBS Code	Description	Quantity	Unit	Cost/Unit	Total Cost	Remarks
TOTAL COST - Enhanced Modifications to Building 210					**$18,198,623**	

APPENDIX D - FINDINGS PRESENTATION

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NATIONAL PARK SERVICE

GATEWAY NATIONAL RECREATION AREA
BUILDING 210:

PRE-PLANNING ANALYSIS

December 14, 2021

ARCHITECTS GWWO

AGENDA

- Program Alternatives
- Construction Cost Estimates
- Questions

NPS-GATE-BUILDING 210: PRE-PLANNING ANALYSIS
December 14, 2021

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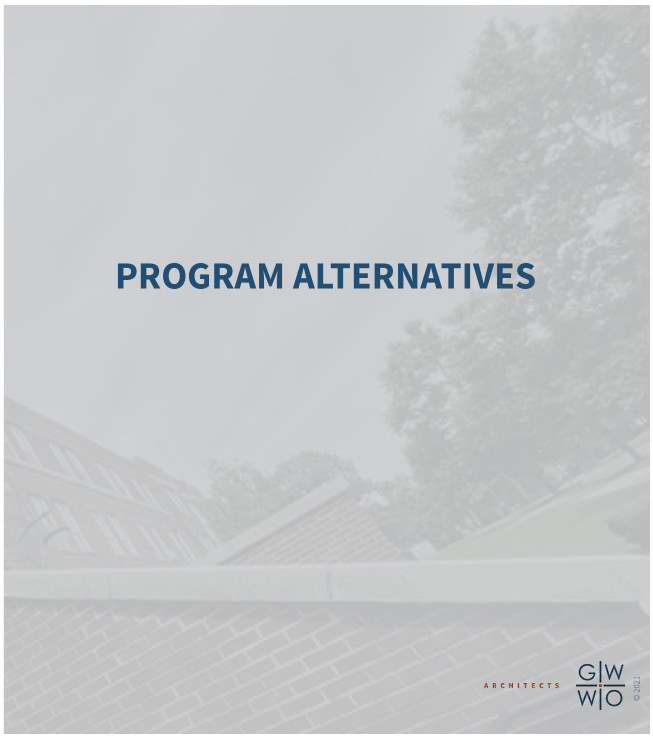


PROGRAM ALTERNATIVES

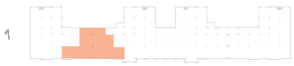
- **Constraints & Assumptions**
  - Approximate NET Area
    - Basement: 21,880 SF *

* The entire basement will remain NPS space and not be leased.

PROGRAM ALTERNATIVES

- **Constraints & Assumptions**
  - Approximate NET Area
    - Basement: 21,880 SF
    - Level 1: 19,750 SF (excludes Dispatch Center) *

  * The Dispatch Center was recently renovated and will not need extensive work.



NPS-GATE-BUILDING 210: PRE-PLANNING ANALYSIS
December 14, 2021

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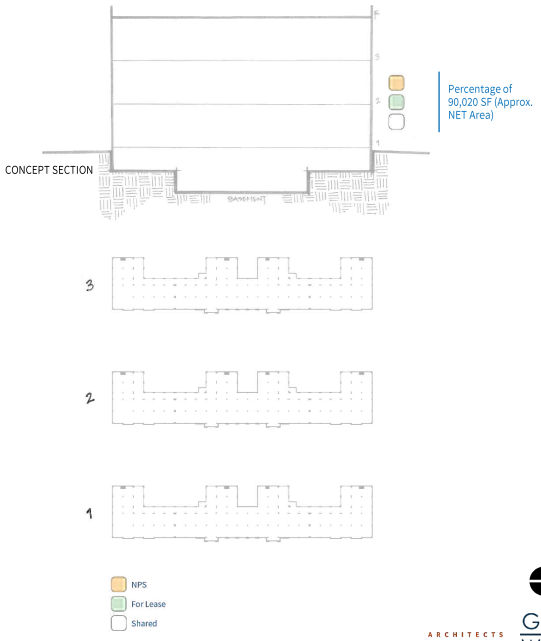
PROGRAM ALTERNATIVES

- **Constraints & Assumptions**
  - Approximate NET Area
    - Basement: 21,880 SF
    - Level 1: 19,750 SF (excludes Dispatch Center)
    - Level 2: 24,195 SF
    - Level 3: 24,195 SF
    - **TOTAL: 90,020 SF**
  - The NPS would like to explore leasing options for unused space.
  - Primary parking will remain at the rear/northwest corner of Building 210.
  - The United State Park Police (USPP) station must have an easily accessible, back-of-house entrance for prisoner intake.



NPS-GATE-BUILDING 210: PRE-PLANNING ANALYSIS
December 14, 2021

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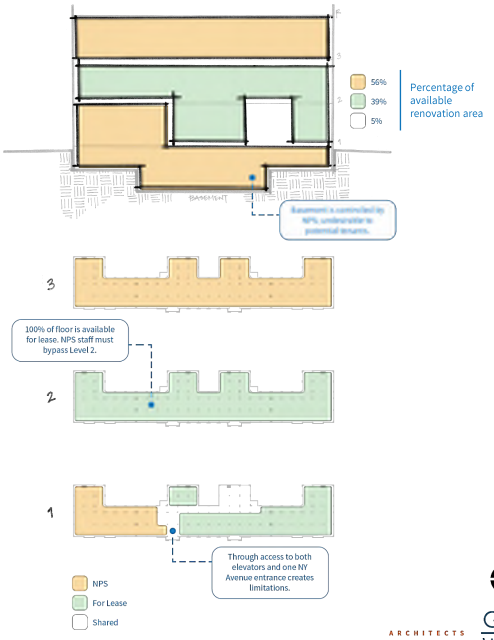
PROGRAM ALTERNATIVE 1

- **Locates most primary spaces for NPS staff at Level 3**
- **U.S. Park Police station and Dispatch Center remain at Level 1**
  - ADVANTAGES
    - Opens Level 2 and portions of Level 1 for leasing
    - Takes advantage of limited existing fit-out of Level 3 and retains Interpretation and Education space
    - Maximizes prime views and borrowed natural light for NPS staff
  - CHALLENGES
    - Segregation between USPP, Dispatch, and other divisions remains.
    - Natural Resources lab either remains separate from offices or loses direct access from exterior.
    - Employee entrance/courtyard not directly accessible to offices.



NPS-GATE-BUILDING 210: PRE-PLANNING ANALYSIS
December 14, 2021

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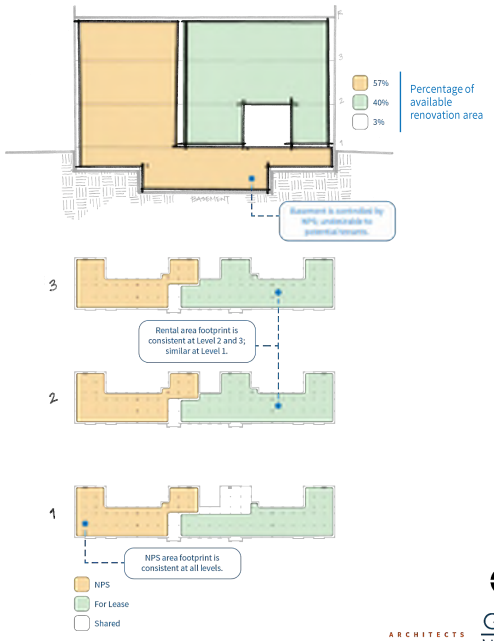
PROGRAM ALTERNATIVE 2

- **Stacks NPS staff at sound ends of Levels 1, 2, and 3**
- **U.S. Park Police station and Dispatch Center remain at Level 1**
  - ADVANTAGES
    - Opens approximately ½ of all above-grade levels for leasing
    - Emphasizes both prime views at Level 3 and street level access at Level 1 as selling points for potential tenants
    - Provides consistent, clear separation between NPS and tenant spaces
  - CHALLENGES
    - Will be difficult to provide one centralized printing hub
    - Natural Resources lab either remains separate from offices or loses direct access from exterior.
    - Employee entrance/courtyard not directly accessible to offices; would likely require commons/lobby open to both NPS and tenants



NPS-GATE-BUILDING 210: PRE-PLANNING ANALYSIS
December 14, 2021

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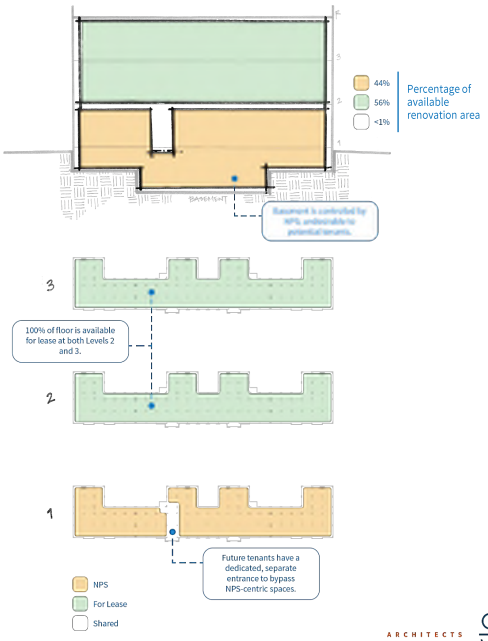
PROGRAM ALTERNATIVE 3

- **Locates primary spaces for NPS staff at Level 1 and Basement**
- **U.S. Park Police station and Dispatch Center remain at Level 1**
  - ADVANTAGES
    - Opens Levels 2 and 3 wholly for leasing
    - Emphasizes prime views at Level 3 as selling point for potential tenants
    - Retains immediate access to Natural Resources lab from exterior
    - Allows for incremental expansion of NPS if every necessary.
  - CHALLENGES
    - May require utilizing infilled basement windows for natural lighting
    - Will require NY Avenue Entrance "B" to be wheelchair accessible
    - If not fully remediated, roof will remain a liability when leasing Level 3



NPS-GATE-BUILDING 210: PRE-PLANNING ANALYSIS
December 14, 2021

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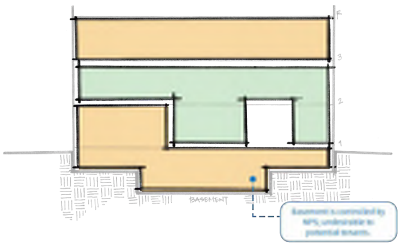
PROGRAM ALTERNATIVES

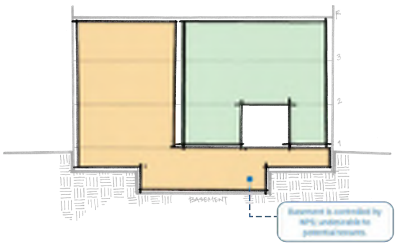
ALTERNATIVE 1



Occupancy		%*
NPS		56
For Lease		39
Shared		5

** of 90,020 SF (approximate NET area)*

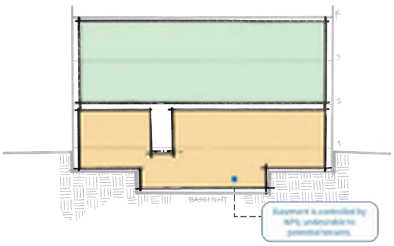
ALTERNATIVE 2



Occupancy		%*
NPS		57
For Lease		40
Shared		3

** of 90,020 SF (approximate NET area)*

ALTERNATIVE 3



Occupancy		%*
NPS		44
For Lease		56
Shared		< 1

** of 90,020 SF (approximate NET area)*

NPS-GATE-BUILDING 210: PRE-PLANNING ANALYSIS
December 14, 2021

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CONSTRUCTION COST ESTIMATES

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COST ESTIMATES

- **Based on Unit Costs**
  - Area Available for Renovation
    - Basement: 21,880 SF
    - Level 1: 19,750 SF (excludes Dispatch Center)
    - Level 2: 24,195 SF
    - Level 3: 24,195 SF
    - **TOTAL: 90,020 SF**
- **NPS Space v. Tenant(s) Space**
  - Average 50/50 distribution among Program Alternatives
  - Assumed NPS will occupy 50% of building
    - This can decrease if Basement is maximized

NPS-GATE-BUILDING 210: PRE-PLANNING ANALYSIS
December 14, 2021

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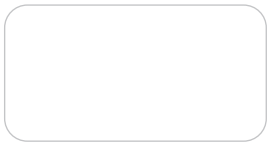
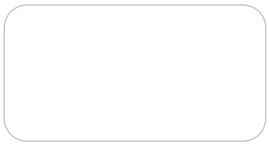
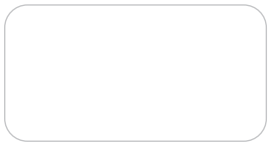
COST ESTIMATE (ALTERNATIVES)

BASELINE	ENHANCED	ENHANCED +
		
Direct Cost Subtotal without GFP	Direct Cost Subtotal without GFP	Direct Cost Subtotal without GFP
Total NET Estimated Cost of Construction	**Total NET Estimated Cost of Construction**	**Total NET Estimated Cost of Construction**
Includes tasks critical to maintaining NPS operations at Building 210.	Includes tasks critical to maintaining NPS operations at Building 210. PLUS, requests made by NPS staff during Pre-Planning.	Includes tasks critical to maintaining NPS operations at Building 210. PLUS, requests made by NPS staff during Pre-Planning, AND design recommendations to further extend the building's life and functionality.

NPS-GATE-BUILDING 210: PRE-PLANNING ANALYSIS
December 14, 2021

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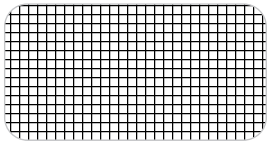
COST ESTIMATE (BASELINE)

BASELINE



Task	%
Structural Remediation	100

NPS-GATE-BUILDING 210: PRE-PLANNING ANALYSIS
December 14, 2021

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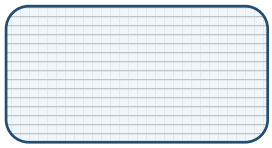
COST ESTIMATE (BASELINE)

BASELINE

Task	%
Structural Remediation	100
New Roof	100

COST ESTIMATE (BASELINE)

BASELINE

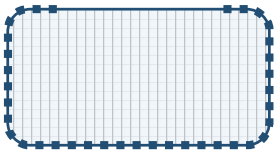


Task	%
Structural Remediation	100
New Roof	100
Exterior Envelope	100

NPS-GATE-BUILDING 210: PRE-PLANNING ANALYSIS
December 14, 2021

COST ESTIMATE (BASELINE)

BASELINE

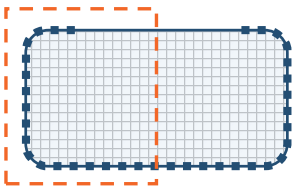


* Historic elevations only; infill at "porches" are not original

Task	%
Structural Remediation	100
New Roof	100
Exterior Envelope	100
Exterior Doors & Windows*	75

COST ESTIMATE (BASELINE)

BASELINE

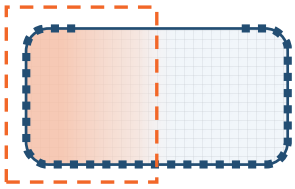


* Remaining balance (50%) to remain, untouched/decommissioned in-place

Task	%
Structural Remediation	100
New Roof	100
Exterior Envelope	100
Exterior Doors & Windows	100
Building Systems*	50

COST ESTIMATE (BASELINE)

BASELINE

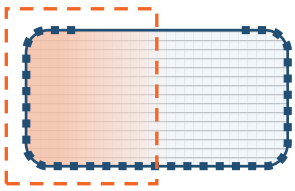


* Remaining balance (50%) to remain, untouched

Task	%
Structural Remediation	100
New Roof	100
Exterior Envelope	100
Exterior Doors & Windows	100
Building Systems	50
Interior Demolition & Fit-out*	50

COST ESTIMATE (BASELINE)

BASELINE

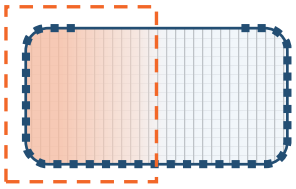


* Hardscape along paths of travel from parking lot & New York Avenue; employee entrance

Task	%
Structural Remediation	100
New Roof	100
Exterior Envelope	100
Exterior Doors & Windows	100
Building Systems	50
Interior Demolition & Fit-out	50
Site Modifications (Accessibility)	20

COST ESTIMATE (BASELINE)

BASELINE



Task	%
Structural Remediation	100
New Roof	100
Exterior Envelope	100
Exterior Doors & Windows	100
Building Systems	50
Interior Demolition & Fit-out	50
Site Modifications (Accessibility)	20

Item No.	Description	Quantity	Unit	Cost/Unit	Total
1	Baseline Modifications to Building 210	90,020	SF	$197	$17,759,555
	Subtotal Direct Construction Costs				**$17,759,555**
	Value of Government Furnished Property (GFP) Included in Direct Cost (see footnote)*				**$0**
				Direct Cost Subtotal without GFP	**$17,759,555**
	Published Location Factor	30.00%			$5,327,867
	Remoteness Factor	0.00%			$0
	Federal Wage Rate Factor	0.00%			$0
	State & Local Taxes	0.00%			$0
	Design Contingency	20.00%			$3,551,911
	Total Direct Construction Costs				**$26,639,333**
	Standard General Conditions	13.00%			$3,463,113
	Government General Conditions	10.00%			$2,663,933
	Historic Preservation Factor	5.00%			$1,331,967
	Subtotal NET Construction Cost				**$34,098,346**
	Overhead	10.00%			$3,409,835
	Profit	8.00%			$2,727,868
	Estimated NET Construction Cost				**$40,236,049**
	Bonds & Permits	2.50%			$1,005,901
	Contracting Method Adjustment	5.00%			$2,011,802
	Inflation Escalation (see footnote)**	0	Months	0.00%	$0
	Total Estimated NET Cost of Construction				**$43,253,752**

* GFP costs are only used when the Government pre-purchases items, or provides other materials out of Government inventory, to be installed by contractor. Adjustments and Markup on GFP only include Inflation Escalation; No other adjustment factors or O&P markup have been applied.

** The Annual Inflation Escalation Factor will be applied by the NPS Project Specialist during submission for funding. All values are in Q4 2021 dollars.

COST ESTIMATE (BASELINE)

- **Project Markups:**
  - Location Factor
    - Baseline material & labor is based on the Washington DC market
    - RSMeans projects 30% for Staten Island, NY *(incl. material, labor, tax, and union wages)*

Item No.	Description	Quantity	Unit	Cost/Unit	Total
1	Baseline Modifications to Building 210	90,020	SF	$197	$17,759,555
	Subtotal Direct Construction Costs				**$17,759,555**
	Value of Government Furnished Property (GFP) Included in Direct Cost (see footnote)*				**$0**
				Direct Cost Subtotal without GFP	**$17,759,555**
	Published Location Factor	30.00%			$5,327,867
	Remoteness Factor	0.00%			$0
	Federal Wage Rate Factor	0.00%			$0
	State & Local Taxes	0.00%			$0
	Design Contingency	20.00%			$3,551,911
	Total Direct Construction Costs				**$26,639,333**
	Standard General Conditions	13.00%			$3,463,113
	Government General Conditions	10.00%			$2,663,933
	Historic Preservation Factor	5.00%			$1,331,967
	Subtotal NET Construction Cost				**$34,098,346**
	Overhead	10.00%			$3,409,835
	Profit	8.00%			$2,727,868
	Estimated NET Construction Cost				**$40,236,049**
	Bonds & Permits	2.50%			$1,005,901
	Contracting Method Adjustment	5.00%			$2,011,802
	Inflation Escalation (see footnote)**	0	Months	0.00%	$0
	Total Estimated NET Cost of Construction				**$43,253,752**

* GFP costs are only used when the Government pre-purchases items, or provides other materials out of Government inventory, to be installed by contractor. Adjustments and Markup on GFP only include Inflation Escalation; No other adjustment factors or O&P markup have been applied.

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COST ESTIMATE (BASELINE)

- **Project Markups:**
  - Location Factor
    - Baseline material & labor is based on Washington DC market
    - RSMeans projects 30% for Staten Island, NY *(incl. material, labor, tax, and union wages)*
  - Design Contingency
    - Recommend 30%; would allot an additional $2,000,000 for unforeseen conditions.

Item No.	Description	Quantity	Unit	Cost/Unit	Total
1	Baseline Modifications to Building 210	90,020	SF	$197	$17,759,555
	Subtotal Direct Construction Costs				**$17,759,555**
	Value of Government Furnished Property (GFP) Included in Direct Cost (see footnote)*				**$0**
	Direct Cost Subtotal without GFP				**$17,759,555**
	Published Location Factor	30.00%			$5,327,867
	Remoteness Factor	0.00%			$0
	Federal Wage Rate Factor	0.00%			$0
	State & Local Taxes	0.00%			$0
	Design Contingency	20.00% **			$3,551,911
	Total Direct Construction Costs				**$26,639,333**

** 20% per NPS direction.

NPS Cost Estimating Handbook:

At the feasibility study stage, Class C estimates generally apply a Design Contingency at or near the 30% range. For Condition Assessment Cost (CAC) estimates the Design Contingency can vary greatly depending on the nature and complexity of the work.

COST ESTIMATE (BASELINE)

- **Project Markups:**
  - Location Factor
    - Baseline material & labor is based on Washington DC market
    - RSMeans projects 30% for Staten Island, NY *(incl. material, labor, tax, and union wages)*
  - Design Contingency
    - Recommend 30%; would allot an additional $2,000,000 for unforeseen conditions.
  - General Conditions
    - Assumed "Standard" percentage can be reduced by 2% if field offices are provided (e.g. vacant office space in Building 120).

Item No.	Description	Quantity	Unit	Cost/Unit	Total
1	Baseline Modifications to Building 210	90,020	SF	$197	$17,759,555
	Subtotal Direct Construction Costs				**$17,759,555**
	Value of Government Furnished Property (GFP) Included in Direct Cost (see footnote)*				**$0**
	Direct Cost Subtotal without GFP				**$17,759,555**
	Published Location Factor	30.00%			$5,327,867
	Remoteness Factor	0.00%			$0
	Federal Wage Rate Factor	0.00%			$0
	State & Local Taxes	0.00%			$0
	Design Contingency	20.00%			$3,551,911
	Total Direct Construction Costs				**$26,639,333**
	Standard General Conditions	13.00%			$3,463,113
	Government General Conditions	10.00%			$2,663,933
	Historic Preservation Factor	5.00%			$1,331,967
	Subtotal NET Construction Cost				**$34,098,346**
	Overhead	10.00%			$3,409,835
	Profit	8.00%			$2,727,868
	Estimated NET Construction Cost				**$40,236,049**
	Bonds & Permits	2.50%			$1,005,901
	Contracting Method Adjustment	5.00%			$2,011,802
	Inflation Escalation (see footnote)**	0	Months	0.00%	$0
	Total Estimated NET Cost of Construction				**$43,253,752**

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COST ESTIMATE (BASELINE)

- **Project Markups:**
  - Location Factor
    - Baseline material & labor is based on Washington DC market
    - RSMeans projects 30% for Staten Island, NY *(incl. material, labor, tax, and union wages)*
  - Design Contingency
    - Recommend 30%; would allot an additional $2,000,000 for unforeseen conditions.
  - General Conditions
    - Assumed "Standard" percentage can be reduced by 2% if field offices are provided (e.g. vacant office space in Building 120).
  - Prices are in Q4 2021 dollars. In today's climate, inflation escalation is at a notable high, approximately 7.5% annually. This could raise costs anywhere from $4 to $13 million.

Item No.	Description	Quantity	Unit	Cost/Unit	Total
1	Baseline Modifications to Building 210	90,020	SF	$197	$17,759,555
	Subtotal Direct Construction Costs				**$17,759,555**
	Value of Government Furnished Property (GFP) Included in Direct Cost (see footnote)*				**$0**
				Direct Cost Subtotal without GFP	**$17,759,555**
	Published Location Factor	30.00%			$5,327,867
	Remoteness Factor	0.00%			$0
	Federal Wage Rate Factor	0.00%			$0
	State & Local Taxes	0.00%			$0
	Design Contingency	20.00%			$3,551,911
	Total Direct Construction Costs				**$26,639,333**
	Standard General Conditions	13.00%			$3,463,113
	Government General Conditions	10.00%			$2,663,933
	Historic Preservation Factor	5.00%			$1,331,967
	Subtotal NET Construction Cost				**$34,098,346**
	Overhead	10.00%			$3,409,835
	Profit	8.00%			$2,727,868
	Estimated NET Construction Cost				**$40,236,049**
	Bonds & Permits	2.50%			$1,005,901
	Contracting Method Adjustment	5.00%			$2,011,802
	Inflation Escalation (see footnote)**	0	Months	0.00%	$0
	Total Estimated NET Cost of Construction				**$43,253,752**

* GFP costs are only used when the Government pre-purchases items, or provides other materials out of Government inventory, to be installed by contractor. Adjustments and Markup on GFP only include Inflation Escalation; No other adjustment factors or O&P markup have been applied.

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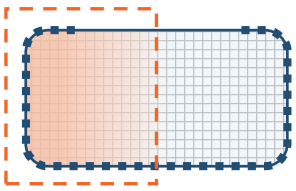
COST ESTIMATE (ENHANCED)

BASELINE



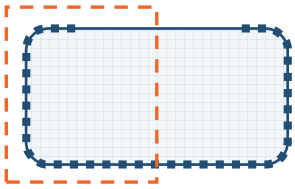
ENHANCED

Task	%
Structural Remediation	100
New Roof	100
Exterior Envelope	100
Exterior Doors & Windows	100
Building Systems	50
Interior Demolition & Fit-out	50
Site Modifications (Accessibility)	20

Task	%

COST ESTIMATE (ENHANCED)

BASELINE



Task	%
Structural Remediation	100
New Roof	100
Exterior Envelope	100
Exterior Doors & Windows	100
Building Systems	50
Interior Demolition & Fit-out	50
Site Modifications (Accessibility)	20

ENHANCED

Task	%
(+) Interior Demolition	100

— Gut entire building to structure, provide NPS fit-out (approximately 50% of building), balance left as "warm, gray shell" for leasing

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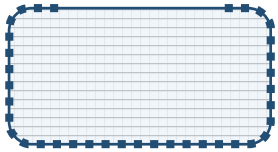
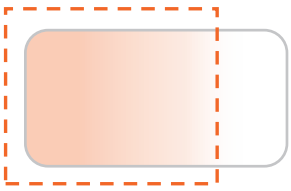
COST ESTIMATE (ENHANCED)

BASELINE



Task	%
Structural Remediation	100
New Roof	100
Exterior Envelope	100
Exterior Doors & Windows	100
Building Systems	50
Interior Demolition & Fit-out	50
Site Modifications (Accessibility)	20

ENHANCED



Task	%
(+) Interior Demolition	100
(+) Unoccupied M/E/P	75

— Gut entire building to structure, provide NPS fit-out (approximately 50% of building), balance left as "warm, gray shell" for leasing

— Modernized replacement of systems (in-kind to existing) for 50% of building (+) full demolition and limited application in non-NPS areas

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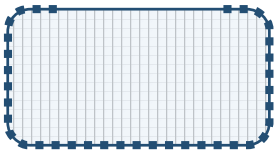
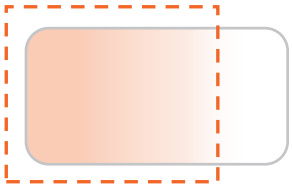
COST ESTIMATE (ENHANCED)

BASELINE



Task	%
Structural Remediation	100
New Roof	100
Exterior Envelope	100
Exterior Doors & Windows	100
Building Systems	50
Interior Demolition & Fit-out	50
Site Modifications (Accessibility)	20

ENHANCED



Task	%
(+) Interior Demolition	100
(+) Unoccupied M/E/P	75
(+) NPS Requests	

- Gut entire building to structure, provide NPS fit-out (approximately 50% of building), balance left as "warm, gray shell" for leasing
- Modernized replacement of systems (in-kind to existing) for 50% of building (+) full demolition and limited application in non-NPS areas
- Curatorial storage with environmental controls meeting NPS museum standards
- Cultural and Natural Resources laboratories with dedicated exhaust air systems and separation vestibules

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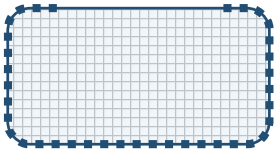
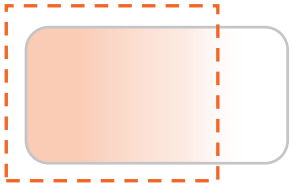
COST ESTIMATE (ENHANCED)

BASELINE



Task	%
Structural Remediation	100
New Roof	100
Exterior Envelope	100
Exterior Doors & Windows	100
Building Systems	50
Interior Demolition & Fit-out	50
Site Modifications (Accessibility)	20

ENHANCED



Task	%
(+) Interior Demolition	100
(+) Unoccupied M/E/P	75
(+) NPS Requests	
(+) Upgraded Finishes	25

- Gut entire building to structure, provide NPS fit-out (approximately 50% of building), balance left as "warm, gray shell" for leasing
- Modernized replacement of systems (in-kind to existing) for 50% of building (+) full demolition and limited application in non-NPS areas
- Curatorial storage with environmental controls meeting NPS museum standards
- Cultural and Natural Resources laboratories with dedicated exhaust air systems and separation vestibules
- Decorative finishes (e.g. restroom tile, lobby wall covering, terrazzo flooring) in 25% of NPS-occupied spaces

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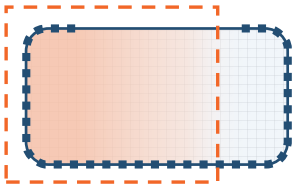
COST ESTIMATE (ENHANCED)

ENHANCED



Task	%
BASELINE	
(+) Interior Demolition	100
(+) Unoccupied M/E/P	75
(+) NPS Requests	
(+) Upgraded Finishes	25

Item No.	Description	Quantity	Unit	Cost/Unit	Total
1	Enhanced Modifications to Building 210	90,020	SF	$221	$19,924,406
	Subtotal Direct Construction Costs				**$19,924,406**
	Value of Government Furnished Property (GFP) Included in Direct Cost (see footnote)*				**$0**
				Direct Cost Subtotal without GFP	**$19,924,406**
	Published Location Factor	30.00%			$5,977,322
	Remoteness Factor	0.00%			$0
	Federal Wage Rate Factor	0.00%			$0
	State & Local Taxes	0.00%			$0
	Design Contingency	20.00%			$3,984,881
	Total Direct Construction Costs				**$29,886,609**
	Standard General Conditions	13.00%			$3,885,259
	Government General Conditions	10.00%			$2,988,661
	Historic Preservation Factor	5.00%			$1,494,330
	Subtotal NET Construction Cost				**$38,254,860**
	Overhead	10.00%			$3,825,486
	Profit	8.00%			$3,060,389
	Estimated NET Construction Cost				**$45,140,735**
	Bonds & Permits	2.50%			$1,128,518
	Contracting Method Adjustment	5.00%			$2,257,037
	Inflation Escalation (see footnote)**	0	Months	0.00%	$0
	Total Estimated NET Cost of Construction				**$48,526,290**

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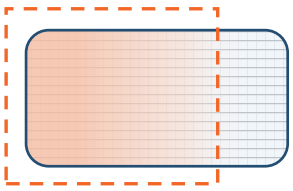
COST ESTIMATE (ENHANCED +)

ENHANCED



Task	%
BASELINE	
(+) Interior Demolition	100
(+) Unoccupied M/E/P	75
(+) NPS Requests	
(+) Upgraded Finishes	25

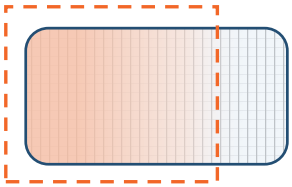
ENHANCED +

Task	%
(+) "Porch" Curtain Walls	100

— Outboard curtain wall system at "porches" in lieu of metal framing and siding

COST ESTIMATE (ENHANCED +)

ENHANCED



Task	%
BASELINE	
(+) Interior Demolition	100
(+) Unoccupied M/E/P	75
(+) NPS Requests	
(+) Upgraded Finishes	25

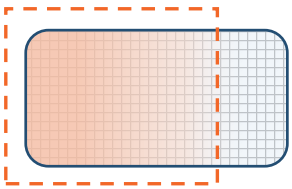
ENHANCED +

Task	%
(+) "Porch" Curtain Walls	100
(+) Site Upgrades	100

- Outboard curtain wall system at "porches" in lieu of metal framing and siding
- Reconfigure New York Avenue accessible path to provide access to Entrances "B" and "C."
- Landscaping allowance
- Signage and furnishings for employee courtyard

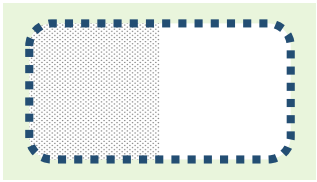
COST ESTIMATE (ENHANCED +)

ENHANCED



Task	%
BASELINE	
(+) Interior Demolition	100
(+) Unoccupied M/E/P	75
(+) NPS Requests	
(+) Upgraded Finishes	25

ENHANCED +

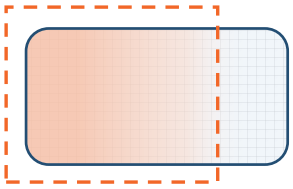


Task	%
(+) "Porch" Curtain Walls	100
(+) Site Upgrades	100
(+) Basement Remediation	50

- Outboard curtain wall system at "porches" in lieu of metal framing and siding
- Reconfigure New York Avenue accessible path to provide access to Entrances "B" and "C."
- Landscaping allowance
- Signage and furnishings for employee courtyard
- Repair basement slab-on-grade for fit-out (assumed 50% of floor)
- Open 50% of infilled basement windows for natural light to occupied spaces

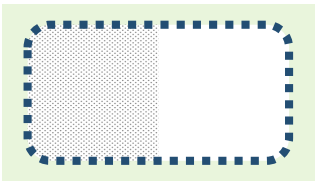
COST ESTIMATE (ENHANCED +)

ENHANCED



Task	%
BASELINE	
(+) Interior Demolition	100
(+) Unoccupied M/E/P	75
(+) NPS Requests	
(+) Upgraded Finishes	25

ENHANCED +



Task	%
(+) "Porch" Curtain Walls	100
(+) Site Upgrades	100
(+) Basement Remediation	50
(+) Upgraded Finishes	75

- Outboard curtain wall system at "porches" in lieu of metal framing and siding
- Reconfigure New York Avenue accessible path to provide access to Entrances "B" and "C."
- Landscaping allowance
- Signage and furnishings for employee courtyard
- Repair basement slab-on-grade for fit-out (assumed 50% of floor)
- Open 50% of infilled basement windows for natural light to occupied spaces
- Decorative finishes in 75% of NPS-occupied spaces

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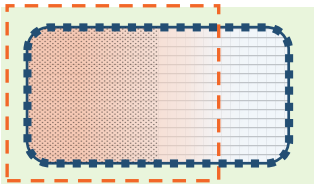
COST ESTIMATE (ENHANCED +)

ENHANCED +



Task	%
BASELINE	
(+) ENHANCED	
(+) "Porch" Curtain Walls	100
(+) Site Upgrades	100
(+) Basement Remediation	50
(+) Upgraded Finishes	75

Item No.	Description	Quantity	Unit	Cost/Unit	Total
1	Enhanced + Modifications to Building 210	90,020	SF	$241	$21,703,377
	Subtotal Direct Construction Costs				**$21,703,377**
	Value of Government Furnished Property (GFP) Included in Direct Cost (see footnote)*				**$0**
	Direct Cost Subtotal without GFP				**$21,703,377**
	Published Location Factor	30.00%			$6,511,013
	Remoteness Factor	0.00%			$0
	Federal Wage Rate Factor	0.00%			$0
	State & Local Taxes	0.00%			$0
	Design Contingency	20.00%			$4,340,675
	Total Direct Construction Costs				**$32,555,066**
	Standard General Conditions	13.00%			$4,232,159
	Government General Conditions	10.00%			$3,255,507
	Historic Preservation Factor	5.00%			$1,627,753
	Subtotal NET Construction Cost				**$41,670,484**
	Overhead	10.00%			$4,167,048
	Profit	8.00%			$3,333,639
	Estimated NET Construction Cost				**$49,171,171**
	Bonds & Permits	2.50%			$1,229,279
	Contracting Method Adjustment	5.00%			$2,458,559
	Inflation Escalation (see footnote)**	0	Months	0.00%	$0
	Total Estimated NET Cost of Construction				**$52,859,009**

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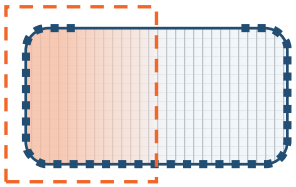
COST ESTIMATE (ALTERNATIVES)

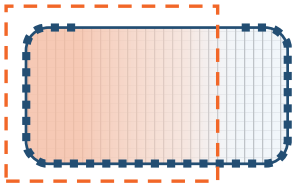
BASELINE



Direct Cost Subtotal without GFP	$ 17,759,555
Total NET Estimated Cost of Construction	**$ 43,253,752**

Includes tasks critical to maintaining NPS operations at Building 210.

ENHANCED

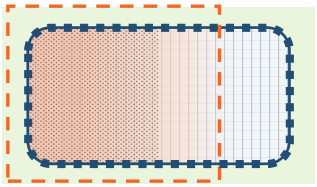


Direct Cost Subtotal without GFP	$ 19,924,406
Total NET Estimated Cost of Construction	**$ 48,526,290**

Includes tasks critical to maintaining NPS operations at Building 210.

PLUS, requests made by NPS staff during Pre-Planning.

ENHANCED +



Direct Cost Subtotal without GFP	$ 21,703,377
Total NET Estimated Cost of Construction	**$ 52,859,009**

Includes tasks critical to maintaining NPS operations at Building 210.

PLUS, requests made by NPS staff during Pre-Planning, AND design recommendations to further extend the building's life and functionality.

ESTIMATE BREAKDOWN (BASELINE)

Baseline Modifications to Building 210

	Approach / Line Item	Direct Cost Subtotal w/o GFP
New Roof	Fully-adhered, single-ply membrane; fall protection system	$ 942,585
Parapet Modifications	Rebuilt with cavity for drainage	$ 475,336
Structural Restoration	Existing to remain and be repaired as needed	$ 520,732
Exterior Wall (Brick) Restoration	Existing to remain and be repaired as needed	$ 1,865,111
"Porch" Modifications	Metal-framed infill with exterior siding; structure remains exposed	$ 198,561
Exterior Doors and Windows	Thermally-broken, metal "replica" windows to match historic photos	$ 1,136,401
Building Systems	Replace in-kind (modernized) to meet current codes; 50% of building	$ 8,593,084
Interior Upgrades	Gut to structure; NPS-occupied area only, assumed 50% of building with hazardous materials abatement	$ 3,353,557
Exterior Accessibility Upgrades	Assumed 20% of hardscape; secondary accessible paths (west side of building)	$ 233,241
Direct Cost Subtotal w/o GFP	Incl. dumpster hauls & allowances for utility modifications ($ 440,947)	**$ 17,759,555**
Total Estimated NET Construction Cost		**$ 43,253,752**

* *all costs include associated demolition of existing*

ESTIMATE BREAKDOWN (BASELINE)

Baseline Modifications to Building 210

	Approach / Line Item	Direct Cost Subtotal w/o GFP	Individual Project Escalation (15%)	Total Estimated NET Cost of Construction
New Roof	Fully-adhered, single-ply membrane; fall protection system	$ 942,585	$ 141,388	$ 2,681,289
Parapet Modifications	Rebuilt with cavity for drainage	$ 475,336	$ 71,300	$ 1,352,145
Structural Restoration	Existing to remain and be repaired as needed	$ 520,732	$ 78,110	$ 1,481,281
Exterior Wall (Brick) Restoration	Existing to remain and be repaired as needed	$ 1,865,111	$ 279,767	$ 5,305,517
"Porch" Modifications	Metal-framed infill with exterior siding; structure remains exposed	$ 198,561	$ 29,784	$ 564,828
Exterior Doors and Windows	Thermally-broken, metal "replica" windows to match historic photos	$ 1,136,401	$ 170,460	$ 3,232,619
Building Systems	Replace in-kind (modernized) to meet current codes; 50% of building	$ 8,593,084	$ 1,288,963	$ 24,443,984
Interior Upgrades	Gut to structure; NPS-occupied area only, assumed 50% of building with hazardous materials abatement	$ 3,353,557	$ 503,034	$ 9,539,567
Exterior Accessibility Upgrades	Assumed 20% of hardscape; secondary accessible paths (west side of building)	$ 233,241	$ 34,986	$ 663,480
Direct Cost Subtotal w/o GFP	Incl. dumpster hauls & allowances for utility modifications ($ 440,947)	**$ 17,759,555**		**$ 49,264,710**
Total Estimated NET Construction Cost		**$ 43,253,752**	** all costs include associated demolition of existing*	

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ESTIMATE BREAKDOWN (ENHANCED)

Enhanced Modifications to Building 210

	Approach / Line Item	Direct Cost Subtotal w/o GFP
New Roof	Fully-adhered, single-ply membrane; fall protection system	$ 942,585
Parapet Modifications	Rebuilt with cavity for drainage	$ 475,336
Structural Restoration	Existing to remain and be repaired as needed	$ 520,732
Exterior Wall (Brick) Restoration	Existing to remain and be repaired as needed	$ 1,865,111
"Porch" Modifications	Metal-framed infill with exterior siding; structure remains exposed	$ 198,561
Exterior Doors and Windows	Thermally-broken, metal "replica" windows to match historic photos	$ 1,136,401
Building Systems	Baseline (+) full demolition and limited application in non-NPS areas	$ 9,980,518
Interior Upgrades	Gut entire building to structure; NPS-occupied fit-out only; curatorial and lab spaces	$ 4,130,974
Exterior Accessibility Upgrades	Assumed 20% of hardscape; secondary accessible paths (west side of building)	$ 233,241
Direct Cost Subtotal w/o GFP	Incl. dumpster hauls & allowances for utility modifications ($ 440,947)	**$ 19,924,406**
Total Estimated NET Construction Cost		**$ 48,526,290**

** all costs include associated demolition of existing*

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ESTIMATE BREAKDOWN (ENHANCED)

Enhanced Modifications to Building 210

	Approach / Line Item	Direct Cost Subtotal w/o GFP	Individual Project Escalation (15%)	Total Estimated NET Cost of Construction
New Roof	Fully-adhered, single-ply membrane; fall protection system	$ 942,585	$ 141,388	$ 2,681,289
Parapet Modifications	Rebuilt with cavity for drainage	$ 475,336	$ 71,300	$ 1,352,145
Structural Restoration	Existing to remain and be repaired as needed	$ 520,732	$ 78,110	$ 1,481,281
Exterior Wall (Brick) Restoration	Existing to remain and be repaired as needed	$ 1,865,111	$ 279,767	$ 5,305,517
"Porch" Modifications	Metal-framed infill with exterior siding; structure remains exposed	$ 198,561	$ 29,784	$ 564,828
Exterior Doors and Windows	Thermally-broken, metal "replica" windows to match historic photos	$ 1,136,401	$ 170,460	$ 3,232,619
Building Systems	Baseline (+) full demolition and limited application in non-NPS areas	$ 9,980,518	$ 1,497,078	$ 28,390,695
Interior Upgrades	Gut entire building to structure; NPS-occupied fit-out only; curatorial and lab spaces	$ 4,130,974	$ 619,646	$ 11,751,015
Exterior Accessibility Upgrades	Assumed 20% of hardscape; secondary accessible paths (west side of building)	$ 233,241	$ 34,986	$ 663,480
Direct Cost Subtotal w/o GFP	Incl. dumpster hauls & allowances for utility modifications ($ 440,947)	**$ 19,924,406**		**$ 55,422,869**
Total Estimated NET Construction Cost		**$ 48,526,290**	* all costs include associated demolition of existing	

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ESTIMATE BREAKDOWN (ENHANCED +)

Enhanced + Modifications to Building 210

	Approach / Line Item	Direct Cost Subtotal w/o GFP
New Roof	Fully-adhered, single-ply membrane; fall protection system	$ 942,585
Parapet Modifications	Rebuilt with cavity for drainage	$ 475,336
Structural Restoration	Baseline (+) repair basement slab-on-grade for occupied spaces; 50% of floor	$ 552,567
Exterior Wall (Brick) Restoration	Existing to remain and be repaired as needed	$ 1,865,111
"Porch" Modifications	Outboard curtain wall; structure is encapsulated and protected	$ 1,659,336
Exterior Doors and Windows	Baseline (+) open infilled basement windows; 50% of openings	$ 1,182,025
Building Systems	Baseline (+) full demolition and limited application in non-NPS areas	$ 9,980,518
Interior Upgrades	Gut entire building to structure; NPS-occupied fit-out only; curatorial and lab space; upgraded finishes	$ 4,185,886
Exterior Accessibility Upgrades	Baseline (+) reconfigured NY Avenue accessible path to two (2) entrances	$ 419,066
Direct Cost Subtotal w/o GFP	Incl. dumpster hauls & allowances for utility modifications ($ 440,947)	**$ 21,703,377**
Total Estimated NET Construction Cost		**$ 52,859,009**

* all costs include associated demolition of existing

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ESTIMATE BREAKDOWN (ENHANCED +)

Enhanced + Modifications to Building 210

	Approach / Line Item	Direct Cost Subtotal w/o GFP	Individual Project Escalation (15%)	Total Estimated NET Cost of Construction
New Roof	Fully-adhered, single-ply membrane; fall protection system	$ 942,585	$ 141,388	$ 2,681,289
Parapet Modifications	Rebuilt with cavity for drainage	$ 475,336	$ 71,300	$ 1,352,145
Structural Restoration	Baseline (+) repair basement slab-on-grade for occupied spaces; 50% of floor	$ 552,567	$ 82,885	$ 1,571,838
Exterior Wall (Brick) Restoration	Existing to remain and be repaired as needed	$ 1,865,111	$ 279,767	$ 5,305,517
"Porch" Modifications	Outboard curtain wall; structure is encapsulated and protected	$ 1,659,336	$ 248,900	$ 4,720,165
Exterior Doors and Windows	Baseline (+) open infilled basement windows; 50% of openings	$ 1,182,025	$ 177,304	$ 3,362,402
Building Systems	Baseline (+) full demolition and limited application in non-NPS areas	$ 9,980,518	$ 1,497,078	$ 28,390,695
Interior Upgrades	Gut entire building to structure; NPS-occupied fit-out only; curatorial and lab space; upgraded finishes	$ 4,185,886	$ 627,883	$ 11,907,219
Exterior Accessibility Upgrades	Baseline (+) reconfigured NY Avenue accessible path to two (2) entrances	$ 419,066	$ 62,860	$ 1,192,080
Direct Cost Subtotal w/o GFP	Incl. dumpster hauls & allowances for utility modifications ($ 440,947)	**$ 21,703,377**		**$ 60,483,350**
Total Estimated NET Construction Cost		**$ 52,859,009**		

** all costs include associated demolition of existing*

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QUESTIONS?

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