Revitalization of the Historic Core (RoHC)
Concept Review Submission

National Capital Planning Commission
28 May 2021
EYP-Loring LLC
Project Name

Revitalization of the Historic Core (RoHC)

Smithsonian Institution Building
1000 Jefferson Dr, SW
Washington DC 20024

Arts and Industries Building
900 Jefferson Dr, SW
Washington DC 20024

Agency and Contact

Smithsonian Institution
Smithsonian Facilities (SF)
Office of Planning, Design and Construction (OPDC)
Capital Gallery
600 Maryland Avenue SW, Suite 5001
P.O. Box 37012 MRC511
Washington DC 20013-7012

Ann Trowbridge, AIA – Associate Director for Planning, Smithsonian Facilities
TrowbridgeA@si.edu

Michelle Spofford – Senior Planning Manager, Smithsonian Facilities
SpoffordM@si.edu
202-633-6558

Project Team

Sharon Park, FAIA – Assoc. Director of Historic Preservation, Smithsonian Facilities
Carly Bond – Historic Preservation Specialist, Smithsonian Facilities
Brenda Sanchez, FAIA – Sr. Design Manager, Smithsonian Facilities
Christopher Lethbridge – Architect/Program Manager, Smithsonian Facilities

Design Team

EYP-Loring, LLC – AE of Record

Silman – Structural and Seismic Engineering
Forell/Elsesser Engineers – Seismic Consulting
RHI (Rhodeside and Harwell) – Landscape Architecture
Simpson Gumpertz & Heger – Building Envelope Consulting
Jensen Hughes – Fire Protection, Life Safety, Accessibility
Sorba (f. Wiles Mensch) – Civil Engineering
Axias (f. Hanscomb Consulting) – Construction Cost Analysis & Estimating
Aerosol Monitoring & Analysis – HazMat Abatement and Analysis
Culinary Advisors – Food Service Design
Phase Shift Consulting – Audio-Visual, Electronic Security
Applied Research Associates – Blast Engineering
Gorove Slade Associates – Traffic Engineering, Materials Handling
C.M. Kling & Associates – Lighting Design
Saunders & Associates - Acoustics
Michael Blades & Associates – Vertical Transportation Systems Design
Building Conservation Services – Materials Conservation Services
Haley & Aldrich – Geotechnical Engineering
# TABLE OF CONTENTS

- **PROJECT OVERVIEW**  
  Page 5

- **NHPA SECTION 106 & OUTREACH AND COORDINATION**  
  Page 18

- **SMITHSONIAN INSTITUTION BUILDING “THE CASTLE”**  
  Page 20

- **ARTS AND INDUSTRIES BUILDING**  
  Page 64

- **UNDERGROUND CONSTRUCTION**  
  Page 92

- **COOLING TOWERS**  
  Page 101

- **GARDENS AND GROUNDS**  
  Page 109

- **PROJECT INFORMATION AND DRAWINGS**  
  Page 139

- **ENVIRONMENTAL AND HISTORICAL CONSIDERATIONS**  
  Page 141
PROJECT OVERVIEW
## PROJECT OVERVIEW

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMITHSONIAN VISION AND MISSION</td>
<td>7</td>
</tr>
<tr>
<td>PROJECT AREA</td>
<td>9</td>
</tr>
<tr>
<td>PROJECT DATA</td>
<td>10</td>
</tr>
<tr>
<td>PROJECT SITE</td>
<td>11</td>
</tr>
<tr>
<td>SOUTH MALL CAMPUS PROJECTS</td>
<td>12</td>
</tr>
<tr>
<td>RoHC MASTER PLAN ALIGNMENT</td>
<td>13</td>
</tr>
<tr>
<td>PROGRAM</td>
<td>16</td>
</tr>
<tr>
<td>DRAFT SCHEDULE</td>
<td>17</td>
</tr>
</tbody>
</table>
SMITHSONIAN VISION AND MISSION

Smithsonian Vision and Mission

The Smithsonian Institution is the world’s largest museum, education, and research complex, with 21 museums, 9 research centers and the National Zoo—shaping the future by preserving our heritage, discovering new knowledge, and sharing our resources with the world.

The Institution was founded in 1846 with funds from the Englishman James Smithson (1765–1829) according to his wishes “under the name of the Smithsonian Institution, an establishment for the increase and diffusion of knowledge.”

As a steward and ambassador of cultural connections, the Smithsonian’s work helps to build bridges of mutual respect and understanding of the diversity of American and world cultures.

Project Background

There is a need for comprehensive rehabilitation of the Smithsonian Institution Building (SIB or “the Castle”) and the Arts and Industries Building (AIB) in order to address physical deterioration, obsolete systems, and non-compliance with construction, accessibility, and life-safety codes. Construction of a Central Utility Plant and enhanced Loading Dock will link and serve the SIB and AIB buildings. Both the SIB and AIB are National Historic Landmarks, listed in the National Register of Historic Places, and part of the National Mall Historic District.

The Smithsonian Institution Building (SIB), familiarly known as “the Castle”, is located on the National Mall in Washington, DC. It was designed by James Renwick, Jr, under the direction of the Smithsonian’s first Secretary, Joseph Henry, and the Board of Regents. When completed in 1855, the building housed all the Smithsonian’s operations including research and administrative offices, lecture and exhibition halls, a library and reading room, chemical laboratories, storage areas for specimens, and living quarters for Joseph Henry and his family. As each successive Secretary has redefined the Smithsonian’s mission and managed its growth, the Castle’s interior spaces have undergone many modifications. While the building’s stewards do their best to maintain and repair it, continuing decay and piecemeal remodeling threaten the integrity of the building. In order to prevent impending catastrophic failure of structural, environmental, mechanical, and electrical systems, the building needs a full system revitalization.

The Arts and Industries Building (AIB) was designed by Adolf Cluss and Paul Schulze to house the rapidly growing collections of the National Museum built between 1879 and 1881. The AIB is the nation’s best-preserved example of nineteenth century world’s fair or exposition architecture. From 2010 to 2014, the building envelope was revitalized, including structural enhancements, replacement of the roof and windows, and restoration of the masonry exterior. Following installation of interim service systems, the building has been used for special events. The Smithsonian now intends to engage in a full interior revitalization of the building and reopen the building to the public.

Implementation of the South Mall Campus Master Plan, approved in 2018, will require excavation below and adjacent to the two buildings to provide an enhanced loading facility and a central utility plant that will serve SIB, AIB, and in the future the Freer and the Quadrangle. The loading facility will permit appropriate segregation of art and non-collections delivery and the handing of waste and recycling. The central utility plant will allow the disconnection of General Services Administration steam and chilled water services and will result in significant cost savings and reduction in carbon footprint. Underpinning, blast mitigation and seismic reinforcement of SIB and AIB will be integrated into the construction of these new facilities.
The last major renovation of the Castle, including upgrade of HVAC, electrical and plumbing systems, was completed more than fifty years ago, in 1968. With the exception of its East Wing, the Castle’s exterior of Seneca sandstone has remained largely unchanged. In order to provide a world-class visitor center and executive office setting, all building elements and systems require replacement or restoration. This includes windows, roof, exterior stonework, mechanical, electrical, plumbing systems, life safety security and information technology systems. The Central Utility Plant will be essential to provide mechanical and electrical infrastructure support.

Objectives

Goals of the Castle revitalization will include:

- Revitalize iconic building for a century of further use
- Restoration of building exterior
- Restoration of major historic interior public spaces
- Mitigation of blast and seismic vulnerability
- Installation of efficient building systems
- Provision of state-of-the-art visitor services and amenities

In order to complete the Revitalization of the Arts and Industries Building for a new programmatic use, the interior of the building requires installation of mechanical, electrical and plumbing systems, life safety and security improvements, and communications infrastructure. Goals of the revitalization will include:

- Revitalize and reopen iconic building to the public
- Restoration of major historic interior public spaces
- Installation of efficient building systems
- Completion of mitigation of blast and seismic vulnerability
- Interior build-out for museum programming

The Central Utility Plant will be essential to provide mechanical and electrical infrastructure support. Goals will include:

- Day one capacity for RoHC project
- Expansion capacity for entire South Mall Campus
- High efficiency and sustainable systems
- Self-sufficiency, redundancy, and resiliency
- Additional underground construction to accommodate service and support to maximize public use of Castle and AIB
SMITHSONIAN REVITALIZATION OF THE HISTORIC CORE

PROJECT OVERVIEW

PROJECT AREA

[Map showing the project area with labels for Washington Monument, U.S. Capitol, and Smithsonian Institution Historic Core.]
Site Area

The project site is located on the National Mall in Washington DC, bounded by the Hirshhorn Museum and Sculpture Garden on the East, the Freer Gallery on the West, Independence Avenue on the South, and Jefferson Drive on the North.

The total area of the site is approximately 6.50 acres. The site contains two existing buildings: the Smithsonian Institution Building (SIB), and the Arts and Industries Building (AIB). The underground Quadrangle (Quad) that is home to the Ripley Center, the Arthur M Sackler Gallery and the Smithsonian National Museum of African Art is adjacent to the site and forms the south site boundary.

Building Areas

Areas are usable (net) square feet:

- Smithsonian Institution Building (SIB) = 92,800 USF
- Arts and Industries Building (AIB) = 144,200 USF
- Below Grade Support & Systems = 119,700 USF
- Below Grade Central Utility Plant = 75,700 SF
- Cooling Towers (NMNH) = 10,800 SF
The "Historic Core" is comprised of the Smithsonian Institution Building (the "Castle") and the Arts and Industries Building. These buildings are the two oldest in the Smithsonian portfolio located on the National Mall.
Projects Underway or in Current SI Capital Plan

1. Hirshhorn Sculpture Garden Revitalization
2. Hirshhorn Museum Envelope Repair Project
3. Revitalization of the Historic Core
4. Freer Gallery of Art Improve Accessibility
5. Haupt Garden Roof In-Kind Replacement
6. Hirshhorn Museum Major Revitalization
PROJECT OVERVIEW  RoHC MASTER PLAN ALIGNMENT

COMPARISON TO THE SOUTH MALL MASTER PLAN – WHAT'S DIFFERENT?

**South Mall Master Plan**
- Blue - New service ramp at the west side of the Freer and new below ground loading dock at the west end of the Castle
- Pink - Below ground Visitor Center
- Purple - Central Utility Plant (CUP)

**RoHC Project**
- Existing service ramp remains. Expanded loading dock at west end of the Castle.
- Pink - Lowering of basement floor, Visitor Center in the SIB.
- Orange - Basement under AIB for mechanical systems and support spaces.
- Purple - CUP infills notch of Quad Building.
- CUP layout is still pending, likely will be 2-3 stories below grade.
- Possibility of a public connection from the SIB to the Quad on the B2 level.
RoHC MASTER PLAN ALIGNMENT

MODIFICATIONS TO THE SMITHSONIAN INSTITUTION BUILDING AND ARTS & INDUSTRIES BUILDING, BASEMENT LEVEL EXPANSION AND CENTRAL UTILITY PLANT

- The below grade construction will create areas for building systems and support spaces that will free up areas in the historic buildings for public uses.
- The Central Utility Plant will initially serve the Historic Core but is sized to eventually serve all buildings in the South Mall Campus.
- CUP layout is still pending, likely will be 2-3 stories below grade.
- Possibility of a public connection from the SIB to the Quad on the B2 level.
Rehabilitation of the historic buildings will address historic preservation issues, provide increased visitor access and use, and create interior environmental conditions that are appropriate for the programmed uses.
A primary objective of the RoHC project is to utilize the buildings as much as possible for public activities.

The new below grade construction is critical to “freeing up” space in the historic buildings.
PROJECT OVERVIEW  DRAFT SCHEDULE

The project schedule incorporates critical tasks such as kick-off dates, phase working periods, major meetings and presentations, quality and constructability, cost management, deliverable milestones, SI review and response periods, external agency submission and review periods, other key SI contractor related tasks, major internal SI related milestones, and estimated bid, award, construction, and commissioning periods.

Key to starting construction activities in November 2022, following SI vacating the SIB and AIB buildings, is a multipackage construction document approach, as follows:

- Early CD Package #1 - Site Preparation, Site Utilities Relocation, Telecommunications Hub Relocation, & Hazardous Materials & Selective Removal
- Early CD Package #2 - Foundations for SIB, AIB, and CUP.
- Building CD Package - Base Building & Fit-out for SIB, AIB, CUP and final Site and Landscape, building commissioning.

The schedule below provides a summary of the intended project schedule with key phases and milestones:

- Schematic Design – Winter 2021
- Design Development – Summer 2022
- Early Construction Document Package – Fall 2022
- Start of Construction – Fall/Winter 2022
- Construction Documents, 65% – Spring 2023
- Construction Documents, 100% – Fall 2023
- Completion of Construction – 2027
- Smithsonian Institution Move In – 2028
NATIONAL HISTORIC PRESERVATION ACT (NHPA) SECTION 106
OUTREACH AND COORDINATION
Coordination with Federal, State and Local Jurisdictions

Smithsonian Directive 418, Smithsonian Institution Historic Preservation Policy, states that although the Smithsonian is not a federal agency as defined in the National Historic Preservation Act (NHPA) of 1966, it is the policy of the Institution to be guided by the principles of the NHPA in managing its historic properties. In addition, for Smithsonian design and construction projects in the District of Columbia that are subject to review and approval by the National Capital Planning Commission, the Institution is deemed to be an agency for the purposes of compliance with Section 106 of the NHPA regulations. (See the Smithsonian Facilities Authorization Act, PL108-72).

The Revitalization of the Historic Core (RoHC) project will be the implementation of elements from the South Mall Campus Master Plan developed by the Smithsonian Institution and completed in 2018. In compliance with the National Environmental Policy Act and Section 106 of the National Historic Preservation Act the Master Plan was subject to public review and comment. An Environmental Impact Statement and Record of Decision were completed in compliance with the NEPA requirements and a Programmatic Agreement was created to complete the Section 106 process. The signatories to the Programmatic Agreement are the National Capital Planning Commission, the National Park Service, the District of Columbia Historic Preservation Office, the Advisory Council on Historic Preservation, and the Smithsonian Institution.

The Smithsonian met with the District of Columbia Department of Transportation in May 2021 to review and coordinate the concept design, for impacts to Jefferson Drive and Independence Avenue.

Public Engagement

The Programmatic Agreement provides the framework for and reinforces the importance of ongoing and future Section 106 consultations as part of the implementation of the South Mall Campus Master Plan. As part of the Section 106 review process the RoHC will hold Consulting Party meetings aligned with the milestone progress of the project, initiated during Concept Design. In parallel with the public meetings the project will be submitted for review to the National Capital Planning Commission, the DC Historic Preservation Office, and the Commission of Fine Arts. All of these formal review processes incorporate public input.

The Section 106 process was initiated in October 2020, and the following meetings have been held virtually:

- 2021-1-13: RoHC Consulting Parties Meeting #1 (Description of the scope of the project and the historic significance of the Castle and the Arts & Industries Building)
- 2021-5-26: RoHC Consulting Parties Meeting #2a (Presentation of the concept design - focus is on the rehabilitation of the Castle and AIB)
- 2021-5-27: RoHC Consulting Parties Meeting #2b (Presentation of the concept design - focus on the central utility plant, cooling towers, and landscape).

The Smithsonian has coordinated review of the RoHC in accordance with the Programmatic Agreement Stipulation 1 – Preliminary Project Consultation. The Signatories were convened for preliminary consultation in October 2020 and April 2021.

The Smithsonian maintains a project specific webpage for the RoHC for Section 106 consulting parties and the public.
SMITHSONIAN INSTITUTION BUILDING
“THE CASTLE”
SMITHSONIAN INSTITUTION BUILDING (SIB)

HISTORY

EXISTING CONDITIONS
  • Preservation Zoning

FUTURE PROGRAM
  • General Program Goals

KEY DESIGN ISSUES
  • Masonry and Building Envelope
  • Roofing
  • Window Replacement
  • Mechanical Systems
  • East Range 4th Floor Corridor
  • Areaways
  • New Basement Egress Doors
  • Seismic Base Isolation
  • Underground Construction

DESIGN INTENT FOR KEY SPACES
  • Basement
  • Great Hall
  • Commons
SMITHSONIAN INSTITUTION BUILDING (SIB) HISTORY

1847 The cornerstone of the building is laid on May 1. Exterior of the East Wing and the East Range is completed by December 31.

1849 The East Wing and East Range are completed and occupied.

1850 The West Wing and the West Range are completed and occupied.

1855 The Great Hall is opened to the public.

1865 A fire destroys the Upper Great Hall and the primary towers.

1871 The floor of the Commons (West Wing) is raised to provide headroom for a basement laboratory.

1881 National Museum Building is completed with collections and specimens transferred from the SIB.

1884 The East Wing and East Range are upgraded and enlarged with “fireproof” construction.

1891 Opening of new National Museum building - transfer of natural history specimens from the SIB.

Primary Period of Significance 1847-1910
1914
Renovation of the Great Hall includes removal of the galleries.

1940
Renovation of the Great Hall insertion of office and storage space at the east and west ends.

1964
The National Museum of History and Technology opens - transfer of all remaining exhibits from the Castle.

1970
The Upper Great Hall is divided with the insertion of a 4th floor and converted to use as offices.
A Historic Structures Report evaluated the building and mapped the exterior and interior into three preservation zones based on the level of sensitivity. Most of the Castle is Priority 1, the most sensitive.
SMITHSONIAN INSTITUTION BUILDING (SIB)  FUTURE PROGRAM

GENERAL PROGRAM GOALS

Design Objectives

- Public use of Great Hall, Schermer Hall, Commons
- Public Meeting space in Upper Great Hall
- Activate the basement with public functions
- Continue to house SI administration in East Wing/Range
- Enhanced Visitor Center on 1st floor and in basement
Longitudinal and transverse sections through the building illustrate the areas devoted to Public functions and Smithsonian Institution activities. The East Wing and East Range (shown in blue) have traditionally housed leadership offices for the Institution and will continue to do so.
SMITHSONIAN INSTITUTION BUILDING (SIB)  KEY DESIGN ISSUES

MASONRY AND BUILDING ENVELOPE

Design Objectives
- Preservation- Retain and conserve historic building fabric to the greatest degree possible
- Design - extend the life of the building envelope (masonry and roofing systems) by repairing failing elements and increasing energy performance.

Background
- The Smithsonian Institution has executed a series of exterior masonry repair projects over the last five years.
- A stockpile of Seneca sandstone, salvaged from demolished structures, is available for use as replacement stones or Dutchmen for this project.

Past Studies

Concept Design
Masonry
- Extend the life of masonry with appropriate, repairs and replacement
- Reduce water absorption and infiltration to reduce deterioration
- Remove staining to improve overall appearance
- Improve access to facilitate regular observation and maintenance

Roofs
- Replace failing roofing and underlayment to prevent water infiltration
- Improve drainage to accommodate heavy rainfall events
- Increase thermal performance with additional insulation (where possible)
SMITHSONIAN INSTITUTION BUILDING (SIB)  KEY DESIGN ISSUES

MASTERY AND BUILDING ENVELOPE

Project Scope

- Clean masonry to reduce staining (biological growth and manganese)
- Masonry restoration
- Provide flashing at horizontal surfaces to reduce water absorption and infiltration
- Plan for future access to masonry around the building to allow regular observation and maintenance
SMITHSONIAN INSTITUTION BUILDING (SIB)  KEY DESIGN ISSUES

MASONRY AND BUILDING ENVELOPE

Previous Repairs on Masonry, Including Sealant in Joints and Surface-Applied Mortar Repairs

Typical Damaged Stone

Existing Cracked Masonry

Off-Site Seneca Sandstone Stockpile

**Project Scope**

- Repair damaged masonry, including whole unit replacement, Dutchman repair, and crack repair
- Remove and replace failed previous repairs
- Repair cracks in mortar and masonry units, including stabilizing masonry as required
- Repoint exterior and interior joints with eroded or missing mortar
SMITHSONIAN INSTITUTION BUILDING (SIB)  KEY DESIGN ISSUES

ROOFING

Roofing Type
- Modified-Bitumen Roofing
- Slate Roofing
- Copper Roofing

Roofing Replacement Priority
- High Priority for Replacement
- Normal Priority for Replacement
- Low Priority for Replacement

Project Scope
- Replace failing roofing with new roofing similar in appearance
- Improve roof drainage and increase capacity to better accommodate heavy rainfall events
- Coordinate with other project objectives to identify synergies with roofing replacement

Typical Copper Roofing

Typical Slate Roofing
SMITHSONIAN INSTITUTION BUILDING (SIB)  KEY DESIGN ISSUES

ROOFING

Typical Broken, Missing, or Loose Slate Shingles
Typical Deterioration of Slate Shingles
Typical Thin Solder at Seams in Copper Seams
Water Below Copper Roofing, Typical

Project Scope

• Provide new underlayments and metal flashing at all replacement roofing
• Replace existing lead-coated copper roofing with new zinc-tin-coated copper roofing
• Replace existing slate roofing with new slate roofing
• Add insulation above the roof deck where possible
SMITHSONIAN INSTITUTION BUILDING (SIB)  KEY DESIGN ISSUES

WINDOW REPLACEMENT

Design Objectives
- Preservation- Window designs are to be appropriate for the period of significance for the building.
- Design- Window designs developed by James Renwick will be referenced as a basis for the overall design.
- Retain surviving historic windows, typically older than 1900
- Salvage representative samples of windows from 1930s

Background
- Most of the existing windows were installed in the 1980s-1990s.
- New windows will need to meet thermal performance criteria and security criteria.

Past Studies
- Windows will be designed to meet security and protection requirements similar to other buildings in this area of the Mall.

Concept Design
- Replace newer windows, 1987-1992, with new windows based on Renwick design
- Retain historic windows in place in two locations - West Range Clerestory and North Apse of the Commons.
- Upgrade windows for compliance with energy codes and security design criteria
SMITHSONIAN INSTITUTION BUILDING (SIB)  KEY DESIGN ISSUES

WINDOW REPLACEMENT – NORTH ELEVATION

HISTORIC WINDOW TO REMAIN
WINDOW TO BE REPLACED

Project Scope

- Windows in green are scheduled to be replaced. The majority of these were replaced between 1987 and 1992.
- Wall strengthening associated with the seismic design and security upgrades will be done on the interior to avoid an adverse effect on the exterior of the building.
- SI will retain a representative example of the limited early windows at the West Range and North Tower.
SMITHSONIAN INSTITUTION BUILDING (SIB)  KEY DESIGN ISSUES

WINDOW REPLACEMENT – WEST ELEVATION

- Project Scope
  - Windows in green are scheduled to be replaced. The majority of these were replaced between 1987 and 1992.
  - Wall strengthening associated with the seismic design and security upgrades will be done on the interior to avoid an adverse effect on the exterior of the building.
  - SI will retain a representative example of the limited early windows at the West Range and North Tower.
SMITHSONIAN INSTITUTION BUILDING (SIB)  KEY DESIGN ISSUES

MECHANICAL SYSTEMS

Design Objectives
• Preservation- Minimize changes to the exterior that are visible from the ground.
• Design- Provide the amount of outside air and exhaust required to provide interior environments that are appropriate for the proposed program, including meeting spaces and the Visitor Center.

Background
• There are existing louvered penthouses on the roof of the Main Building, the East Range and the West Range. There is a louvered cupola on the East Wing. These do not provide sufficient capacity to properly serve the building.

Past Studies

Concept Design
• Utilize existing roof features- louvered penthouses and cupola- to provide air intake and exhaust
• Modify the existing elements to increase the louver area but limit visual impact of the changes
SMITHSONIAN INSTITUTION BUILDING (SIB)  KEY DESIGN ISSUES

MECHANICAL SYSTEMS - EXISTING CONDITIONS

Project Scope

1. Remove existing louvers on East Façade of Main Hall to allow for restoration of historic windows.
2. Remove existing louvered penthouse on East Range Roof.
3. Remove existing mechanical penthouses unsuitable for reuse, such as the dangerous confined space East Range Mechanical Penthouse.
SMITHSONIAN INSTITUTION BUILDING (SIB)  KEY DESIGN ISSUES

MECHANICAL SYSTEMS - PROPOSED OUTSIDE AIR AND EXHAUST

Project Scope

1. Maximize areas of louvered penthouses concealed behind towers and pediments by expanding them without increasing their visibility to serve Main Hall and East Range.
2. Make use of existing historic cupola and associated intakes and exhausts to serve the East Wing.
3. Expand existing louvered penthouses South to maximize their useable area without increasing visibility to serve the West Range and West Wing.
**SMITHSONIAN INSTITUTION BUILDING (SIB)**

**KEY DESIGN ISSUES**

**EAST RANGE 4TH FLOOR CORRIDOR**

**Design Objectives**
- Preservation: New construction visible from the exterior will be compatible with the existing building in materials, massing and detailing.
- Design: Provide a second means of egress from the 4th floor of the East Wing.
- Minimize the profile of the connector by limiting the height.
- Minimize the negative effect of the changes to the east elevation of the Main Building and the west elevation of the East Wing. Where the new construction intersects with the historic walls minimize the removal or modification of the historic materials.

**Background**
- The existing egress from the 4th floor of the East Wing, one interior stair and an emergency pathway across the East Range roof, is not compliant with current code.
- Without improvements the 4th floor cannot be occupied.

**Past Studies**
- Previous studies did not address the life safety egress issues of the 4th floor of the East Wing.

**Concept Design**
- Two means of egress are required by code from the 4th floor of the East Wing.
- SI safety requires the egress path to be enclosed.
- An interior option was also considered for adding a stair in the East Range; this option required converting historic space on floors B-4 to a stairwell and adding an exterior egress door on the north side of the SIB.
- The 4th floor roof connector minimizes the negative affect to the building overall and limits the disturbance to historically significant spaces on the interior.
SMITHSONIAN INSTITUTION BUILDING (SIB)  KEY DESIGN ISSUES

EAST RANGE 4TH FLOOR CORRIDOR

Existing Condition Plan (above). Enlarged Elevation (below)

Current Egress Path and Existing Mechanical Penthouse
Project Scope

- 4th floor of the East Wing has one means of egress. A second means of egress is required for occupancy.
- The existing stairs in the building have the capacity to accommodate the East Wing 4th floor population.
- Adding stairs in the East Wing or East Range would reduce program space and negatively impact historic interior spaces.
- The rooms impacted by Stair E are Adolf Cluss designed historic rooms.
SMITHSONIAN INSTITUTION BUILDING (SIB)  KEY DESIGN ISSUES

EAST RANGE 4\textsuperscript{TH} FLOOR CORRIDOR

Plan of Existing Condition

Plan of Proposed Condition

SMITHSONIAN REVITALIZATION OF THE HISTORIC CORE  43
SMITHSONIAN INSTITUTION BUILDING (SIB)  KEY DESIGN ISSUES

EAST RANGE 4TH FLOOR CORRIDOR

Traditional Massing Connector Study

Modern Massing Connector Study
SMITHSONIAN INSTITUTION BUILDING (SIB)  KEY DESIGN ISSUES

EAST RANGE 4TH FLOOR CORRIDOR

View from Southeast of Existing Condition

View from Southeast of Proposed Condition
SMITHSONIAN INSTITUTION BUILDING (SIB)  KEY DESIGN ISSUES

EAST RANGE 4TH FLOOR CORRIDOR

View of Existing Condition from Northeast at Grade

View of Proposed Condition from Northeast at Grade
SMITHSONIAN INSTITUTION BUILDING (SIB)  KEY DESIGN ISSUES

AREAWAYS

Design Objectives
- Preservation- Minimize changes to the exterior that are visible from the ground.
- Design- Regularize the existing areaways to simplify the design of the seismic joint at the base of the building
- Increase natural light to occupied basement spaces utilizing existing window openings and creating new where appropriate

Background
- There are existing areaways around the SIB that provide light into basement windows. Currently, many are partially or fully obscured by landscaping.
- The existing basement level of SIB is approximately 6ft below grade.
- The basement currently has low ceilings and significant MEP distribution that obscures the historic brick arches and vaults.

Past Studies
- Previous studies did not specifically address this issue.

Concept Design
- The design lowers the basement floor to increase the functionality of the space, limiting the impact of the existing windows.
- All the areaways around the exterior of the building will need to be removed and reconstructed, regardless of when they were constructed, in order to complete the seismic base isolation scope and the insertion of the new below grade structures.
- The seismic/base isolation work moves the mechanical and system service areas to the B1 level and allows the SI to rethink the programmatic use of the existing basement.
- Incorporating natural light into the basement spaces activates the space and creates a welcoming zone for staff and visitors.
SMITHSONIAN INSTITUTION BUILDING (SIB) KEY DESIGN ISSUES

AREAWAYS - EXISTING

- Window in South Areaway Converted to a Door
- Mechanical and SI Gardens South Areaway
- North Areaway
- South Areaway

Existing linear feet of areaways = 393'
Existing linear feet of apron = 220'
SMITHSONIAN INSTITUTION BUILDING (SIB)  KEY DESIGN ISSUES

AREAWAYS – EXISTING

South Elevation of Great Hall Showing Existing Areaways

South Elevation of East Range from Haupt Garden

South Elevation of SIB from Haupt Garden
SMITHSONIAN INSTITUTION BUILDING (SIB)  KEY DESIGN ISSUES

AREAWAYS - PROPOSED

- NEW WINDOWS
- EXISTING EGRESS DOOR (5)
- NEW EGRESS DOOR ON EXTERIOR (2)
- FUTURE AREAWAY (RECESSED WELL)
- FUTURE APRON (AT GRADE ELEMENT)
- PRELIMINARY SEISMIC JOINT LOCATION

Future linear feet of areaways = 575’
Future linear feet of apron = 640’
SMITHSONIAN INSTITUTION BUILDING (SIB)  KEY DESIGN ISSUES

AREAWAYS - PROPOSED

South Elevation of Great Hall Showing Proposed Areaways

Project Scope

- Areaways combine and regularize the existing areaways along the south side of the building.
- The areaways are screened from view by vegetation and will be obscured from public paths in the Haupt Garden.
- New windows would be added to the basement level to provide natural light to new functions in the basement.
- Width of the proposed basement windows are narrower than the width of the windows on the upper floors of this elevation.
Project Scope

- The floor of the areaway is the roof of the new B1 level below grade.
- Areaway retaining wall flush or stepped.
- Railings for fall protection.
- Daylight studies will be done to show the impact of natural light in the basement.
- Seismic joint is conceptually incorporated into the areaway wall – there are a variety of ways to integrate and conceal the joint that will be studied in future phases.
SMITHSONIAN INSTITUTION BUILDING (SIB)  KEY DESIGN ISSUES

NEW BASEMENT EGRESS DOORS

Design Objectives
• Preservation- Minimize changes to the historic building fabric. Where changes are designed minimize the visual impact from the area around the base of the building.
• Design- Create egress doors for life safety based on the increased building population
• Utilize existing doors as a design prototype

Background
• There are three existing doors from the basement to the exterior, all located on the south elevation. These connect to existing areaways with stairs or ramps to grade.

Past Studies
• Previous studies did not specifically address this issue.

Concept Design
• The program for the basement, including meeting space and Visitor services, will require additional egress doors to comply with code.
• Past projects have converted windows on the building to doors. We anticipate following the same strategy for new egress doors on the SIB.
SMITHSONIAN INSTITUTION BUILDING (SIB)  KEY DESIGN ISSUES

NEW BASEMENT EGRESS DOORS

**Project Scope**

- Several egress doors will be required at the basement level of the SIB. Exact locations are still pending.
- Windows on the building have been converted to doors through past projects. We anticipate following the same strategy for any new egress doors on the SIB.
- Treatment of the exterior wall will be reviewed at the next submission.

[Images of egress doors and windows converted to doors]
SMITHSONIAN INSTITUTION BUILDING (SIB)  KEY DESIGN ISSUES

SEISMIC BASE ISOLATION

Design Objectives
• Preservation—Minimize the visual impact of the seismic joint cover at grade around the base of the building.
• Incorporate base isolation systems in the building foundations to comply with code, improve life safety, and safeguard the historic building.

Background
• The masonry construction of the Castle and the profile (unreinforced masonry towers) place the building at risk in the event of a seismic event.
• The Castle was damaged during the Mineral, VA earthquake on 23 August 2011.
• Seismic design compliance is required by code. Compliance is focused in life safety issues for people in and around the building. It is also important in preserving the Castle.

Past Studies
• Prior (2014) report recommends seismic isolation paired with modest wall strengthening methods achieve significant risk mitigation with the greatest sensitivity to the historic character of the building.

Concept Design
• Base isolation is a means of uncoupling the acceleration of the superstructure from the ground motion, to minimize the damage during an earthquake. This is achieved by creating a plane of separation between the superstructure and the foundations.
• It is a method of choice for historic preservation due to the sensitivity to the historic character. The work occurs at the foundations where the detrimental impact on historic fabric will be limited.
• At the Smithsonian Castle, existing masonry walls and piers would be supported on new isolators sitting on the new foundations.
• There are a variety of ways to design the seismic joint system, conceal the covers, and locate the joints in ways that are sensitive to the historic fabric.
**SMITHSONIAN INSTITUTION BUILDING (SIB) KEY DESIGN ISSUES**

**SEISMIC BASE ISOLATION**

**Project Scope**

- Seismic joint cover will be visible at grade, but there are a variety of options to minimize the visual impact and incorporate it into the site conditions.
- Many joint cover examples shown are for areas of the country that experience a large amount of seismic movement.
- The RoHC project will only require a 6-inch seismic joint.

---

Integrated Seismic Joint Cover Examples

---

Section Through Foundation Showing Base Isolation Strategy
SMITHSONIAN INSTITUTION BUILDING (SIB)  KEY DESIGN ISSUES

SEISMIC BASE ISOLATION

Project Scope

- Seismic joint cover will be visible at grade, but there are a variety of options to minimize the visual impact and incorporate it into the site conditions.
- Many joint cover examples shown are for areas of the country that experience a large amount of seismic movement.
- The RoHC project will only require a 6-inch seismic joint.

Salt Lake City County Building

Integrated Seismic Joint Cover Examples

SEISMIC JOINT
SMITHSONIAN INSTITUTION BUILDING (SIB)  

KEY DESIGN ISSUES

UNDERGROUND CONSTRUCTION - BASEMENT AND B1 FLOOR LEVELS

Design Objectives
- Preservation: Maximize the use of historic spaces for public and SI staff.
- Design: Provide sufficient space to allow the systems design to properly serve the proposed program, including meeting space and the Visitor Center.
- Locate mechanical spaces and equipment to meet current codes, provide energy efficiency, and support building operations and maintenance.

Background
Basement
- Historically there was no public program space in the basement.
- Significant modifications over time have resulted in multiple floor elevations.
- Significant systems routing has "hidden" and damaged the 1855 brick groin vaults.

Mechanical Floor
- Piecemeal renovations throughout the Castle have resulted in compromises, not a comprehensive building-wide design. Systems are not designed to provide the appropriate environmental controls for the proposed program, including meeting space and the Visitor Center.
- Equipment occupies valuable historic spaces in basement, 1st, and 2nd floors.
- Limited access to equipment results in challenging maintenance and reduced efficiency.

Past Studies
- Lower basement floor to accommodate public use.
- Locate mechanical equipment in attic and in basement extension (outside the basement footprint).
- Create mechanical crawlspace below basement floor to route ductwork, piping, and conduit.

Concept Design
- Lower basement floor to accommodate public use.
- Full height mechanical floor below basement.
- Locate equipment in attic and level B1 mechanical floor (under SIB).
- Limits crossing seismic isolation joint with ductwork, piping, conduit.
- Floor aligns with SIB extension and Quad level B1 simplifies access for construction and maintenance.
SMITHSONIAN INSTITUTION BUILDING (SIB)  KEY DESIGN ISSUES

UNDERGROUND CONSTRUCTION - BASEMENT AND B1 FLOOR LEVELS

SOUTH MALL MASTER PLAN EXISTING

SOUTH MALL MASTER PLAN PROPOSED

RoHC PROJECT

Basement with utility distribution in the ceiling

Basement with lowered floor & new utility routing below the slab

Basement with lowered floor

Utility zone for AHU’s & equipment routing

SIB Extension & Connector Road for Service & Support
SMITHSONIAN INSTITUTION BUILDING (SIB)  KEY DESIGN ISSUES

UNDERGROUND CONSTRUCTION - LEVEL B1 MECHANICAL FLOOR

**Project Scope**

- Full height mechanical floor below SIB Basement
- Limits crossing seismic isolation joint with ductwork, piping, conduit
- Floor aligns with SIB extension and Quad level B1 - simplifies access for construction and maintenance
SMITHSONIAN INSTITUTION BUILDING (SIB)  DESIGN INTENT FOR KEY SPACES

BASEMENT

Rendering of Potential Space Use

Existing Basement

Existing Condition

Historical Context (1900)

Project Scope

• Lower floor to facilitate public functions
• Celebrate the historic materials and construction
• Locate rest rooms and visitor services functions to avoid impact to Great Hall
SMITHSONIAN INSTITUTION BUILDING (SIB)  DESIGN INTENT FOR KEY SPACES

GREAT HALL

Rendering of Potential Space Use
Existing First Floor
Existing Condition
Historical Context (1867)

Project Scope

- Reclaim the historic footprint by recapturing end bays
- Reconstruct historic mezzanines/galleries- increasing available space for exhibits and functions
- Emphasize that this is the “Front door” of the Smithsonian and Visitor Center
SMITHSONIAN INSTITUTION BUILDING (SIB)  DESIGN INTENT FOR KEY SPACES

COMMONS

Rendering of Potential Space Use

Existing First Floor

Existing Condition

Historical Context (1914)

Project Scope

• Lower floor to 1851 level eliminating the need for ramps in Schermer Hall
• Preserve and restore the space
• Provide technology for use as exhibit space and public functions

Smithsonian Institution
ARTS AND INDUSTRIES BUILDING
### ARTS & INDUSTRIES BUILDING (AIB)

**HISTORY**

66

**EXISTING CONDITIONS**

- Preservation Zone Diagrams 69
- Previous Exterior Work 70

**FUTURE PROGRAM**

- Existing Vs Future 71
- General Program Goals 72
- Historical Context 73
- Climate Control Diagrams 74

**KEY DESIGN ISSUES**

- Mechanical Systems- Louvers 75
- Mechanical Systems- Areaways 78
- New Egress Doors on Southwest and East Facades 80
- New Egress Door at Northwest Annex 82
- New Exit Doors at North Tower 84

**DESIGN INTENT FOR KEY SPACES**

- North Hall 88
- Special Exhibition 89
- NW Court - Marketplace 90
- Range 91
As originally envisioned the Arts and Industries Building (AIB) had an open plan, allowing a visitor to create their own path through the building. The galleries were added to provide critically needed exhibit space. In the later 20th century modifications were focused on creating office space, resulting in the loss of many of the grand, open spaces.
A Historic Structures Report evaluated the building and mapped the exterior and interior into three preservation zones based on the level of sensitivity. Most of the Arts and Industries Building is Priority 1, the most sensitive.
ARTS & INDUSTRIES BUILDING (AIB)  EXISTING CONDITIONS

PREVIOUS EXTERIOR WORK

Exterior work in progress, 2014

Completed exterior work
ARTS & INDUSTRIES BUILDING (AIB)  FUTURE PROGRAM

EXISTING VS. FUTURE

- **Third Floor**: 6,200 USF
- **Second Floor**: 66,200 USF
- **First Floor**: 92,000 USF
- **Basement**: 6,100 USF

**Existing Usable Space**

**Future Usable Space**
The new basement level will create space for mechanical/electrical equipment and support space for Smithsonian staff. This will allow the historic spaces on the 1st and 2nd floors to be utilized primarily for public functions.
ARTS & INDUSTRIES BUILDING (AIB)  FUTURE PROGRAM

HISTORICAL CONTEXT

Hall – Historical Context (1903)

Court – Historical Context (1903)

Range – Historical Context (1880)
Zoning

- Providing precision climate control ("exhibit environmental requirements") throughout the building would require significant changes to the historic building envelope.
- A limited zone of precision climate control will be created to accommodate special objects or exhibit loans.
- Thermal transition zones in the Halls will be utilized to save energy and eliminate condensation risk at the exterior building envelope.
Design Objectives
- Preservation- Minimize changes to the exterior that are visible from the ground.
- Design- Utilize existing window openings in Court clerestories as louvered openings for intake and exhaust.

Background
- Mechanical systems in the building need to be upgraded to meet new program requirements.

Past Studies
- Previous studies did not specifically address this issue.

Concept Design
- Strategy locates all the mechanical louvers on the south side of the building, away from the primary Mall entrance.
**ARTS & INDUSTRIES BUILDING (AIB)**

**KEY DESIGN ISSUES**

**MECHANICAL SYSTEMS – LOUVERS**

**EXISTING CONDITIONS**

---

**Project Scope**

- The building has louvers in historic window openings for air intake/exhaust (indicated in red).
ARTS & INDUSTRIES BUILDING (AIB)  KEY DESIGN ISSUES

MECHANICAL SYSTEMS – LOUVERS
PROPOSED OUTSIDE AIR INTAKE/EXHAUST

Project Scope

• We will be using the same strategy, but the louvers will be grouped in the SE and SW Courts (indicated in red).
ARTS & INDUSTRIES BUILDING (AIB)   KEY DESIGN ISSUES

MECHANICAL SYSTEMS - AREAWAYS

Design Objectives
• Preservation- Minimize changes to the historic building fabric. Where changes are required minimize the visual impact from the area around the building.

Background
• Mechanical systems in the building need to be upgraded to meet new program requirements.

Past Studies
• Previous studies did not specifically address this issue.

Concept Design
• Create intake and exhaust louvers for the CUP and the AIB basement equipment rooms
• Minimize the visual impact to the AIB exterior
ARTS & INDUSTRIES BUILDING (AIB)  KEY DESIGN ISSUES

MECHANICAL SYSTEMS - AREWAYS
PROPOSED OUTSIDE AIR INTAKE/EXHAUST
ARTHES & INDUSTRIES BUILDING (AIB)  KEY DESIGN ISSUES

NEW EGRESS DOORS AT SOUTHWEST AND EAST FACADES

Design Objectives

• Preservation- Minimize changes to the historic building fabric. Where changes are required minimize the visual impact from the area around the building.
• Create new egress doors in the east and west elevations as part of new fire-rated stairs.
• Minimize the negative effect of the door openings on the exterior masonry.

Background

• Life safety studies indicate that fire stairs are required to safely egress the 2nd floor (mezzanine) and the upper floors of the Pavilions.
• These stairs are also required to provide egress from the new basement.
• To comply with code these stairs must discharge directly to the exterior.

Past Studies

• Program Study (2019) included this arrangement at the North Tower entry.

Concept Design

• The new fire stairs have been located in the first bay adjacent to the NE, SE, and SW Pavilions.
• The egress door to the exterior is located below grade to avoid damaging the window and decorative brickwork.
• The doors discharge into new areaways with steps up to grade.
• The door and areaway at the NE corner will require modifications to the Ripley Garden.
**ARTS & INDUSTRIES BUILDING (AIB)  KEY DESIGN ISSUES**

**NEW EGRESS DOORS AT SOUTHWEST AND EAST FACADES**

**Partial Exterior Elevation at Southwest Annex**

**Existing Condition**

**Key Plan of New Egress Door**

**Project Scope**

- Create code compliant egress with new stairs and exterior doors adjacent to the four Pavilions
- Create the door openings below the decorative banding
ARTS & INDUSTRIES BUILDING (AIB)  KEY DESIGN ISSUES

NEW EGRESS DOOR AT NORTHWEST ANNEX

Design Objectives
- Preservation - Minimize changes to the historic building fabric. Where changes are required minimize the visual impact from the area around the building.
- Create new egress door on the west elevation adjacent to the NW Pavilion as part of new fire-rated stairs.
- Minimize the negative effect of the door opening on the exterior masonry.

Background
- Life safety studies indicate that fire stairs are required to safely egress the 2nd floor (mezzanine) and the upper floors of the Pavilions.
- These stairs are also required to provide egress from the new basement.
- To comply with code these stairs must discharge directly to the exterior.

Past Studies
- Program Study (2019) included this arrangement at the North Tower entry.

Concept Design
- The new fire stairs at the NW corner are located in the second bay from the Pavilion. This is driven by the retention of the historic stair in the NW Pavilion and to avoid the historic limestone steps on the south elevation of the Pavilion.
- The egress door to the exterior is located below grade to avoid damaging the window and decorative brickwork.
- The door discharges into a new areaway with steps up to grade.
ARTS & INDUSTRIES BUILDING (AIB) KEY DESIGN ISSUES

NEW EGRESS DOOR AT NORTHWEST ANNEX

Partial Exterior Elevation at Northwest Annex

Existing Door, NW Pavilion

Key Plan of New Egress Door

Project Scope

• Create code compliant egress with new stairs and exterior doors adjacent to the four Pavilions
• Create the door openings below the decorative banding
KEY DESIGN ISSUES

NEW EXIT DOORS AT NORTH TOWER

Design Objectives
- Preservation- Minimize changes to the historic building fabric. Where changes are required minimize the visual impact from the area around the building.
- Design- To facilitate the security screening process provide separate entry and egress pathways at the main entrance at the North Tower.

Background
- The main entry to the building will be at the North Tower, facing the Mall.
- Visitor projections anticipate 6,000 visitors on a busy day, with as many as 3,000 during a peak period.
- Separating the incoming visitor traffic from those exiting will prevent confusion and possible problems in the security screening process.

Past Studies
- Program Study (2019) included this arrangement at the North Tower entry.

Concept Design
- Existing windows on the east and west elevations of the North Tower will be modified to serve as exit door locations. The door will be at grade.
- The plan of the North Tower will be modified to create a pathway to the exit doors.
- Ramps will be created at the exterior to connect the exit doors to the sidewalk.
ARTS & INDUSTRIES BUILDING (AIB)  KEY DESIGN ISSUES

NEW EXIT DOORS AT NORTH TOWER

Modifications to Insert New Exit Door

- New Entry-Exit Sequence to accommodate Public Circulation & Security
ARTS & INDUSTRIES BUILDING (AIB)  KEY DESIGN ISSUES

NEW EXIT DOORS AT NORTH TOWER

Modifications to Insert New Exit Door

- Remove existing window (installed as part of the exterior rehabilitation)
- Remove existing sill
- Remove and salvage brick below window opening
- Install new exit door (modeled on existing historic exterior doors)
- Install new transom window, shortened version of existing
ARTS & INDUSTRIES BUILDING (AIB)  KEY DESIGN ISSUES

NEW EXIT DOORS AT NORTH TOWER
ARTS & INDUSTRIES BUILDING (AIB)  

DESIGN INTENT FOR KEY SPACES

NORTH HALL

Rendering of Potential Space Use

Existing Condition

Historical Context (1903)

Existing First Floor

Project Scope

- Restore the floors and wall finishes in the four primary Halls
- Remove inserted systems and materials that visually compete with the historic materials and features
- Provide systems and technology that are visually compatible and that provide flexibility for a range of future uses.

Smithsonian Institution
**SPECIAL EXHIBITION**

**Project Scope**

- Remove mechanical equipment and rest rooms in three of the Courts. All four Courts to be public functions.
- Retain the surviving elements of the historic galleries and reconstruct missing elements.
ARTS & INDUSTRIES BUILDING (AIB)  DESIGN INTENT FOR KEY SPACES

NW COURT - MARKETPLACE

Rendering of Potential Space Use

Historical Context (1903)

Existing First Floor

Existing Condition

Project Scope

• Remove mechanical equipment and rest rooms in three of the Courts. All four Courts to be public functions
• Retain the surviving elements of the historic galleries and reconstruct missing elements.
ARTS & INDUSTRIES BUILDING (AIB)  DESIGN INTENT FOR KEY SPACES

RANGE

Rendering of Potential Space Use

Project Scope

- Remove floor infill at Ranges to maximize the benefit of the arched windows.
- Retain the surviving elements of the historic galleries and reconstruct missing elements.

Existing Condition

Historical Context (1880)

Existing First Floor

Smithsonian Institution
UNDERGROUND CONSTRUCTION
UNDERGROUND CONSTRUCTION

EXISTING CONDITIONS

FUTURE PROGRAM
  • Underground Construction

94

95
UNDERGROUND CONSTRUCTION  FUTURE PROGRAM

UNDERGROUND CONSTRUCTION - CONCEPT

Design Objectives
• Preservation- Maximize the use of historic spaces for public and SI staff.
• Design- Locate mechanical spaces and equipment to meet current codes, provide energy efficiency, and support building operations and maintenance.

Background
• Excavation beneath the Castle will be limited to the consolidated loading facility..., to increase the ceiling height of the Castle basement level, and excavation below the basement level to accommodate utility distribution, footings, and seismic measures – Programmatic Agreement, Stipulation 5.A.

Past Studies
• Prior studies showed equipment and program space below the water table, requiring enhanced waterproofing.
• Some level of risk is inherent when placing mechanical, plumbing and life safety equipment below the water table.

Concept Design
• Locates all the equipment and program areas except the cistern/thermal storage above the water table.
• Reduces slurry wall construction at AIB connection.
• AIB basement is a double-sided corridor leaving more program space for AIB mechanical rooms.
• Consolidating new construction below levels already being impacted.
• Provides additional support for the SIB base isolators adjacent to the SIB extension on the B2 level.
• Accommodates additional program that was required once the independent SIB and AIB planning studies were merged.
UNDERGROUND CONSTRUCTION  FUTURE PROGRAM

UNDERGROUND CONSTRUCTION – OVERALL B1 PLAN

LOADING DOCK EXPANSION
CONNECTOR ROAD

BASEMENT LEVEL EXPANSION
(OUTSIDE HISTORIC BUILDING FOOTPRINT)

SIB B1

LOADING DOCK

CUP
(DESIGNED FOR ENTIRE SOUTH MALL CAMPUS)

AIB B1

Smithsonian Institution
UNDERGROUND CONSTRUCTION - OVERALL B3 PLAN

RELOCATED TO B2
The new SIB Extension/Connector Road will be located between the SIB and the Quad Building.
Floor Levels will match the Existing Quad Building.
• The new Central Utility Plant (CUP) will be located between the AIB and the Quad Building.

• The CUP will initially serve the SIB and AIB but is designed to serve all the buildings in the South Mall Campus.

• Floor Levels will match the Existing Quad Building.

• The lowest level of the CUP will be no lower than the Quad Building.
COOLING TOWERS
COOLING TOWERS

INFORMATION 103

STRATEGIES FOR REDUCING COOLING TOWER LOADS 104

SOUTH CAMPUS INVESTIGATION 105

PROPOSED LOCATION 107
  • NMNH Site
  • Connection Options- Direct Bore and Existing Tunnel 108
Design Objectives
- Preservation- Locate the cooling towers to minimize the negative effects on the buildings and gardens. Screen the new towers as much as possible.
- Design- Improve energy efficiency and reliability for the building systems on the South Mall Campus.
- Utilize alternative heat discharge opportunities to minimize the number of cooling tower cells.
- Design the system to supply the entire South Mall Campus.

Background
- The South Mall Campus is currently connected to the GSA steam plant. This supply is not energy efficient and can go off-line unannounced, placing the South Mall Campus buildings and collections at risk.

Past Studies
- Program Studies (2019, 2020) anticipated equipment either inside the Central Utility Plant or to the east of the AIB.

Concept Design
- The cooling towers proposed location is the SW corner of the National Museum of Natural History Site, mirroring an existing cooling tower at the SE corner of the site.
- The new cooling towers will be screened with construction that matches the existing cooling towers.
- The new cooling towers will need to be connected to the South Mall Campus Central Utility Plant (CUP). Two options are being studied- reuse of the existing steam pipe tunnel that crosses the Mall or direct boring below grade.
COOLING TOWERS STRATEGIES FOR REDUCING COOLING TOWER LOADS

<table>
<thead>
<tr>
<th>Cooling Tower Enclosure Size (Nominal Tons)</th>
<th>Enclosure Length</th>
<th>Enclosure Width</th>
<th>Enclosure Area</th>
<th>Percent of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Only Cooling Towers (5000 - 0)</td>
<td>166</td>
<td>50</td>
<td>8300</td>
<td>100%</td>
</tr>
<tr>
<td>Towers with SS Heat Reject. (5000 - 5000)</td>
<td>144</td>
<td>50</td>
<td>7200</td>
<td>87%</td>
</tr>
<tr>
<td>Towers with Thermal Ice Storage (5000 - 1000)</td>
<td>125</td>
<td>50</td>
<td>6250</td>
<td>75%</td>
</tr>
<tr>
<td>Towers with SS and Ice (5000 - 1500)</td>
<td>104</td>
<td>50</td>
<td>5200</td>
<td>63%</td>
</tr>
<tr>
<td>Towers with 750 Wells (5000 - 1500)</td>
<td>104</td>
<td>50</td>
<td>5200</td>
<td>63%</td>
</tr>
<tr>
<td>Towers with 55, Ice, and 250 Wells (5000 - 3000)</td>
<td>83</td>
<td>50</td>
<td>4150</td>
<td>50%</td>
</tr>
<tr>
<td>Towers with SS, Ice, and 750 Wells (5000 - 3000)</td>
<td>59</td>
<td>50</td>
<td>2950</td>
<td>36%</td>
</tr>
<tr>
<td>Towers with 100% Geothermal</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0%</td>
</tr>
</tbody>
</table>
Design Objectives

- Minimize the visual impact of the cooling towers.
- Multiple locations within the South Mall Campus were evaluated.
Above Grade Option on East Side of AIB

Below Grade Option on East Side of AIB

**Design Objectives**

- Potential above grade and below grade locations on South Campus were studied.
- Both would have a negative effect to the Ripley Garden.
- The above grade option would have a negative effect on the adjacent buildings would be constructed over the 9th Street tunnel.
- The below grade option would place the equipment under the AIB.

---

Smithsonian Institution
COOLING TOWERS  PROPOSED LOCATION

Design Objectives

- Building cooling towers across the National Mall at Southwest corner of NMNH site.
- Location resolves difficult site constraints on South Campus.
- Reduces visual and noise negative impacts to Haupt Garden, Ripley Garden, and the historic buildings.
- Design of the new cooling tower enclosure would mimic the existing enclosure at the southeast corner of the site.
**COOLING TOWERS PROPOSED LOCATION**

**CONNECTION OPTIONS**
**DIRECT BORE AND EXISTING TUNNEL**

1. New cooling tower plant to serve South Campus
2. Direct bore for condenser water routing from Cooling Towers to SIB
3. Existing steam tunnel. Potential route for condenser water piping - Cooling Towers to SIB

**Design Objectives**

- Connect to the South Campus CUP under the National Mall. This can be done in an existing steam tunnel or with a new direct bore.

Smithsonian Institution
GARDENS AND GROUNDS
GARDENS AND GROUNDS

HISTORY 111

EXISTING CONDITIONS 113

KEY DESIGN ISSUES 115
- Area of Potential Disturbance 116
- Goals and Drivers - Rehabilitation 117
- Perimeter Security 120
- Accessibility Improvements 132
- New Egress

SOUTH OF SMITHSONIAN INSTITUTION BUILDING 135
- Evolution 136
- Rehabilitation of Character Defining Features of the Haupt Garden 137
- Vegetation 138
- African Art Museum Pavilion Fountain Garden
**GARDENS AND GROUNDS**

**HISTORY**

**Landscape Evolution**

- The landscape of the Smithsonian Institution Historic Core is one that has evolved dramatically since it was first established in the 19th Century.

**Historic Designations**

- Although the Smithsonian Institution Building, the Arts and Industries Building, and the Freer Gallery of Art are all individually listed in the National Register of Historic Places, the accompanying gardens are not so-designated and do not fall within the period of significance attributed to the listed buildings.

- For the National Mall Historic District, the gardens of the Smithsonian Institution Historic Core are documented as part of the landscape setting of the buildings and objects, they are not counted as contributing resources.

- The Smithsonian Quadrangle Historic District was added to the DC Inventory of Historic Sites in 2017. The Quadrangle was determined individually ineligible by the US Department of the Interior.

**Concept Design**

- Anticipated changes to the landscape to support the RoHC project are proposed to be minimal with an emphasis on rehabilitation of site character and accommodating new program and improvements.
LANDSCAPE EVOLUTION

Castle and South Yard, Facing Northwest (circa 1885)

National Museum, Facing East from South Yard (1880)

AIB South Elevation (1975)

East Garden and AIB with the Downing Urn (1975)

Victorian Garden and AIB, Facing Southeast (1980)

Smithsonian Castle, Facing West (1975)
GARDENS AND GROUNDS EXISTING CONDITIONS
GARDENS AND GROUNDS EXISTING CONDITIONS
GARDENS AND GROUNDS KEY DESIGN ISSUES

AREA OF POTENTIAL DISTURBANCE
GARDENS AND GROUNDS  KEY DESIGN ISSUES

GOALS AND DRIVERS - REHABILITATION
PERIMETER SECURITY

Background

- 2004 Mall-Wide Perimeter Security Concept Design developed by Beyer Blinder Belle
- 2018 South Mall Campus Master Plan recommended following guidance from 2004
- Smithsonian Institution and A/E Team collaborating to establish requirements and scope of perimeter security for the RoHC project

Design Objectives

- Enhance Perimeter Security along Jefferson Drive and Independence Ave within RoHC project area
- Follow Contextual and Unified Approach as recommended by the 2004 Mall-Wide Perimeter Security Concept Design
- Integrate and conceal perimeter security measures within the site’s existing features and landscape to the extent possible
- Envision design approach as an extension applied Mall-Wide
GARDENS AND GROUNDS  KEY DESIGN ISSUES

PERIMETER SECURITY

2004 Perimeter Security Concept Study

Smithsonian Institution
GARDENS AND GROUNDS  KEY DESIGN ISSUES

PERIMETER SECURITY

JEFFERSON DRIVE PERIMETER SECURITY CONCEPT

INDEPENDENCE AVENUE PERIMETER SECURITY CONCEPT

LEGEND

- DECORATIVE CUSTOM BOLLARDS
- RETRACTABLE BOLLARDS
- DECORATIVE HARDENED FENCE PANELS
- HARDENED WALL
- HARDENED LIGHT STANDARD
- HARDENED DECORATIVE URN PLANTER
- HARDENED PEDESTRIAN SEATING

SCALE IN FEET
0 10 20 30 40 50

SCALE IN METERS
0 10 20 30 40 50
GARDENS AND GROUNDS  KEY DESIGN ISSUES

ACCESSIBILITY IMPROVEMENTS

Background

• Since the 1970s, the Smithsonian Institution has made updates and additions to their facilities to comply with modern accessibility standards.
• In the 1980s, a ramp to the Castle North Tower's west side was installed to improve accessibility. More recently, an accessible ramp was added to the South Tower entrance.
• In the early 1990s, modifications to the North and West Entrances of the AIB were made for accessibility; at the North Entrance, this included the addition of a concrete ramp and handrails.

Design Objectives

• Enhance accessibility at the SIB and AIB to provide universal access to the buildings.
• Retain the historic fabric to the extent practicable and integrate accessibility improvements into the landscape and buildings.

Smithsonian Institution
GARDENS AND GROUNDS  KEY DESIGN ISSUES

ACCESSIBILITY IMPROVEMENTS - SIB NORTH TOWER EAST ENTRANCE EVOLUTION

East Entrance (1920)  West Entrance (1867)
GARDENS AND GROUNDS  KEY DESIGN ISSUES

ACCESSIBILITY IMPROVEMENTS - SIB NORTH ENTRANCE EXISTING CONDITIONS
GARDENS AND GROUNDS  KEY DESIGN ISSUES

ACCESSIBILITY IMPROVEMENTS - SIB NORTH ENTRANCE ENTRY/EXIT SEQUENCE
GARDENS AND GROUNDS  KEY DESIGN ISSUES

ACCESSIBILITY IMPROVEMENTS - SIB NORTH ENTRANCE PROPOSED CONCEPT
ACCESSIBILITY IMPROVEMENTS - SIB SOUTH ENTRANCE EXISTING CONDITIONS
GARDENS AND GROUNDS  KEY DESIGN ISSUES

ACCESSIBILITY IMPROVEMENTS - SIB SOUTH ENTRANCE PROPOSED CONCEPT
GARDENS AND GROUNDS  KEY DESIGN ISSUES

ACCESSIBILITY IMPROVEMENTS - AIB NORTH ENTRANCE EXISTING CONDITIONS
GARDENS AND GROUNDS  KEY DESIGN ISSUES

ACCESSIBILITY IMPROVEMENTS - AIB NORTH ENTRANCE ENTRY/EXIT SEQUENCE
ACCESSIBILITY IMPROVEMENTS - AIB NORTH ENTRANCE PROPOSED CONCEPT

- Exposed aggregate concrete sidewalk
- Granite steps, 1 ribber added
- Lamp post, typ.
- Granite curb
- Stone wall, potential use as security feature
- Existing brick retaining wall
- FFE 8.82 (28.94)
- Dedicated exit
- Terrace surface to meet flush with main entry for accessibility
- Dedicated exit
- Rehabilitation & raised stone terrace
- Urn, typ.
GARDENS AND GROUNDS  KEY DESIGN ISSUES

ACCESSIBILITY IMPROVEMENTS - AIB SOUTH ENTRANCE EXISTING CONDITIONS
GARDENS AND GROUNDS  KEY DESIGN ISSUES

ACCESSIBILITY IMPROVEMENTS - AIB SOUTH ENTRANCE PROPOSED CONCEPT
GARDENS AND GROUNDS  KEY DESIGN ISSUES

NEW EGRESS - AIB WEST EXISTING CONDITIONS
GARDENS AND GROUNDS  KEY DESIGN ISSUES

NEW EGRESS - AIB WEST PROPOSED CONCEPT

ELEVATION LOOKING EAST

PLAN

SMITHSONIAN REVITALIZATION OF THE HISTORIC CORE
KEY DESIGN ISSUES

NEW EGRESS - AIB EAST EXISTING CONDITIONS

Key Plan of New Egress Door

1. WATER FEATURE TO AIB

2. VIEW WEST TO AIB

3. VIEW EAST FROM PROPOSED DOOR LOCATION

4. VIEW SOUTH FROM PROPOSED DOOR LOCATION
GARDENS AND GROUNDS SOUTH OF SMITHSONIAN INSTITUTION BUILDING

EVOLUTION

South Yard (c.1885)

South Yard (1960s)

Victorian Garden (1977)

Quadrangle Construction (1986)
GARDENS AND GROUNDS SOUTH OF SMITHSONIAN INSTITUTION BUILDING

REHABILITATION OF CHARACTER DEFINING FEATURES OF THE HAUPT GARDEN

- Plantings to be replaced in kind to the extent practicable given new on-structure condition
- Downing urn to be returned to this, or nearby location, in coordination with NPS
- Fountain garden to be rehabilitated
- Paving to be rehabilitated, typ.

Legend:
- Area of potential disturbance
- Quadrangle historic district
- Haupt garden

Smithsonian Institution
GARDENS AND GROUNDS SOUTH OF SMITHSONIAN INSTITUTION BUILDING

VEGETATION - HAUPT GARDEN

Design Objectives

• Replace existing vegetation in the spirit of the existing character while accommodating new below-grade improvements
• Coordinate tree plantings adjacent to the Castle for improved façade maintenance.
• Coordinate with NPS on the eventual siting of the Downing Urn
GARDENS AND GROUNDS   SOUTH OF SMITHSONIAN INSTITUTION BUILDING

AFRICAN ART MUSEUM PAVILION FOUNTAIN GARDEN

Design Objectives

- Carefully document Fountain Garden hardscape and water features; salvage and rehabilitate after insertion of CUP
- Replace existing vegetation in the spirit of the existing character while accommodating new below-grade improvements
PROJECT INFORMATION AND DRAWINGS
Site Plan

Refer to the Gardens and Grounds section for concept level site plans, a description of historic resources located within the project area, and the proposed approach to addressing these resources.

There will be no appreciable changes to topography as part of the RoHC project. The majority of the landscaping will be replaced in kind. Local modifications related to accessibility, areaways, and egress will happen locally at the buildings for code compliance.

Transportation and Circulation

This project will not impact the overall site transportation or circulation routes serving the South Campus. The following related elements will be altered as part of the RoHC project:

Loading Dock
The project includes improvements to the existing loading dock at Level B1 of the Quad. Utilizing the new below-grade construction adjacent to the Quad, the loading dock will be expanded to provide adequate dedicated spaces for proper handling of the museum’s collections and create separation from non-collections delivery and services for food, recycling and waste.

The expanded Quad loading dock will provide incoming and outgoing services for the Castle, AIB, Freer, Sackler, NMAFA, and the CUP. For all the museums, the loading dock will support collections unloading, shipping and receiving, inspection, documentation, some crating/uncrating, crate storage, and holding.

AIB Parking Lot
A paved asphalt parking lot and service area occupies a 0.25-acre space adjacent the southeast elevation of the AIB; the parking lot is for SI use only and is not accessible to the public. Used primarily for service vehicles, select employee vehicles and large deliveries that cannot be accommodated in the loading dock, the RoHC project will reduce the size of the parking lot to allow a new circulation and/or garden zone adjacent to the East entrance of the AIB.

Photographs

Refer to the Gardens and Grounds as well as the Project Overview sections for aerial photographs of the impacted project areas.
ENVIRONMENTAL AND HISTORICAL CONSIDERATIONS
## ENVIRONMENTAL AND HISTORICAL CONSIDERATIONS

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>HISTORIC PRESERVATION</td>
<td>143</td>
</tr>
<tr>
<td>NATURAL RESOURCES</td>
<td>144</td>
</tr>
<tr>
<td>FLOODING</td>
<td>146</td>
</tr>
<tr>
<td>STORMWATER MANAGEMENT</td>
<td>148</td>
</tr>
</tbody>
</table>
Historic Preservation

This project will continue to comply with the stipulations of the Programmatic Agreement for the South Mall Campus Master Plan.

The historic properties identified in the map and tables (image right) indicate properties within the Area of Potential Effects that are individually listed in, or have been determined as eligible for individual listing in, the National Register of Historic Places. The Area of Potential Effects and affect historic properties is set by the PA for the South Mall Campus Master Plan.
Environmental and Historical Considerations

Natural Resources - South Mall Campus Master Plan Final EIS
The RoHC project is using information from the Smithsonian Institution South Mall Campus Master Plan Final EIS (2018); that evaluation remains unchanged. The following text is directly from this report.

4.2 What resource issues have been eliminated from further analysis?

The topics below would not be effected or would be negligibly effected by each of the Master Plan Alternatives evaluated in the EIS. In general, negligible effects are effects that are localized and immeasurable. Topics that have either no or negligible impacts are briefly discussed in this section and then dismissed from further consideration or evaluation.

4.2.1 Geology
The South Mall Campus is within the Atlantic Coastal Plain physiographic province (USGS, 1994), which is characterized by alternating layers of silt, sand, and clay underlain by metamorphic and igneous rock (DC WRRC, 1995). Specifically, the South Mall Campus is within the Quaternary (Pleistocene) geologic map unit, consisting of sand, gravel, and/or peat intercut with silt and clay beds containing scattered pebbles and wood fragments. The depth to bedrock at the South Mall Campus is between 120 to 140 feet below the surface (GSA/NCPC/Edaw Inc, 1980). Implementation of the South Mall Campus Master Plan would not alter the geology of the project area. Therefore, this impact topic was not studied in detail in this EIS.

4.2.2 Wildlife and Vegetation
The South Mall Campus consists of five principal buildings and four designed gardens, in addition to subsidiary structures, circulation features, and infrastructure. The gardens include a mixture of native and exotic plants. Other landscaped areas within the South Mall Campus consist of turfgrass and ornamental trees, shrubs, hedges, and vines. No natural vegetation exists onsite. Any vegetation that would be removed with implementation of the Master Plan Alternatives would be replaced with similar vegetation, resulting in a negligible, short-term, direct, adverse impact to vegetation. No long-term impacts are anticipated because vegetation removed during construction would be reestablished. Impacts to vegetation as it relates to historic landscapes are discussed in further detail in Section 4.10 Visual Quality. Therefore, vegetation has been dismissed from further analysis.

None of the landscaped areas located within the South Mall Campus have been specifically designed to attract native birds or wildlife, but they may support birds such as sparrows, pigeons, crows, robins, and other bird species common to urban environments. Due to the South Mall Campus’ location in a heavily trafficked urban area, wildlife species in the project area are limited to those highly adapted to urban environments, such as gray squirrels, chipmunks, rats, bats, and possibly raccoons. Wildlife and birds may be temporarily displaced during construction activities due to noise. The removal of any trees would be done outside the nesting season. These species would be expected to return following construction, resulting in a negligible, short-term, indirect, adverse impact to wildlife. No long-term impacts would occur. Therefore, wildlife has been dismissed from further analysis.
ENVIRONMENTAL AND HISTORICAL CONSIDERATIONS

4.2.3 THREATENED AND ENDANGERED SPECIES

The Endangered Species Act (ESA) of 1973 protects and recovers imperiled species and the ecosystems upon which they depend. Under the ESA, species may be listed as either endangered or threatened. “Endangered” means a species is in danger of extinction throughout all or a significant portion of its range. “Threatened” means a species is likely to become endangered within the foreseeable future. Under Section 7 of the ESA, federal agencies are required to consult with USFWS to ensure that their actions do not adversely affect listed species.

On behalf of NCPC and SI, Stantec Consulting Services Inc. consulted the USFWS Information for Planning and Conservation (IPaC) system and the District Department of Energy and Environment (DOEE) in compliance with Section 7 of the ESA. In an Official Species List generated on January 31, 2017, USFWS confirmed that no federally-listed endangered or threatened species or critical habitats are present near the South Mall Campus, and no additional coordination under Section 7 of the ESA is required. The Fish and Wildlife Division of the DOEE was contacted on February 13, 2017. In a letter dated February 14, 2017, DOEE indicated that the South Mall Campus does not harbor any listed species. All consultation items related to threatened and endangered species can be found in Appendix A. As no listed species or critical habitat are present within the South Mall Campus, threatened and endangered species have been dismissed from further analysis.
Groundwater Conditions

Based on the available data and recent explorations and testing, groundwater is generally present at about 9 to 11 m (30 to 36 ft) below ground surface, which is at or below sea level. This suggests that water levels are artificially depressed due to existing improvements in the vicinity of the site which could include the 9th and 12th Street tunnels. The measured groundwater levels and the potential impacts of the existing improvements in the project vicinity, climate change and sea level rise to long-term groundwater levels at the site are being evaluated.

Central Utility Plant

The CUP is planned to be constructed two levels below grade, with a cistern located on the third level below grade. Construction of below-grade space will be facilitated by using the below-grade foundation walls of the existing Quad building and enabled by construction of either new slurry walls or the installation of a temporary steel sheet pile support of excavation system and underpinning of the SIB and AIB.

Resiliency

The overarching goal for the SI RoHC project is to build resiliently and sustainably. Resiliency is the ability to prepare, absorb, and recover from adverse events. The Smithsonian (SI) is a forward-looking institution and has already published several plans that outline goals for reducing emissions, increasing sustainability, and adapting to climate change. The Climate Change Adaptation Plans (CCAP) and the Strategic Sustainability Performance Plans provide a guide for designing with durability, integration, and flexibility. Design strategies are being identified to support the goals of the CCAP and the Strategic Sustainability Performance Plans to incorporate into the project.

Climate Ready DC is the District of Columbia’s plan to adapt to a changing climate; many of the elements listed in this publication align with the CCAP and directly apply to this project. Using the list of climate change related risks and vulnerabilities from the CCAP, a list of considerations and potential design applications for the RoHC is being developed.
Floodplains

No existing or future flood risks are anticipated. The RoHC stormwater management program discussed in the next section will further reduce the impact on downstream properties by reducing runoff leaving the site.

The RoHC project is using information from the Smithsonian Institution South Mall Campus Master Plan Final EIS (2018). That document indicates:

4.2.6 Floodplains

The South Mall Campus is located on FEMA Flood Insurance Rate Map (FIRM) Number 1100010019C, effective September 27, 2010. The Potomac Park flood control levee, located just south of the intersection of 17th Street, SW and Constitution Avenue, NW, was altered in 2014 to provide a more reliable removable flood control system that meets FEMA’s standards. As a result, FEMA has issued a Letter of Map Revision (LOMR), effective September 14, 2016 (Appendix A), that includes the South Mall Campus.

As shown on both the FIRM and LOMR, the majority of the South Mall Campus is outside of the 100-year and 500-year floodplain. The Hirshhorn Sculpture Garden is within the 500-year floodplain, which has a 0.2 percent chance of flooding annually. The Sculpture Garden is not considered a critical facility and therefore is not required to be located outside of the 500-year floodplain. Existing and future sculptures within the Sculpture Garden are not likely to increase flood levels, impede flood flow, or adversely impact floodplain function.

National Flood Hazard Layer FIRMette

This map complies with the FEMA standards for the use of digital flood maps. It is not valid for regulatory purposes. The data displayed on this map were updated from the FEMA Flood Insurance Rate Maps (FIRMs). The flood hazard information is derived directly from the authorized, FEMA, web services provided by FEMA. This map is a digital version of the FIRMs and their associated data and is subject to change due to new data becoming available. The Flood Insurance Rate Maps (FIRMs) are used to determine Federal flood insurance rate information. The flood hazard information is derived directly from the authorized, FEMA, web services.
ENVIRONMENTAL AND HISTORICAL CONSIDERATIONS

Existing Stormwater Management

The existing site is roughly 44% impervious and 56% pervious with no on-site stormwater management retention or reuse program. All stormwater is collected, conveyed, and discharged directly to the District of Columbia’s (District) sewer system. The existing public sewer system in the area of the National Mall is a combined sewer system (CSS) in which stormwater and sanitary sewage are conveyed separately from their on-site sources, but discharge into the same main in the street.

STORMWATER MANAGEMENT

Proposed Stormwater Management

Keeping in line with SI’s goals of sustainable design practices, resiliency, and environmental protection, the project will introduce a stormwater management program that will take a holistic and cross-discipline approach. Rather than discharging stormwater directly into the District’s CSS, the project will collect and convey as much runoff as is technically feasible, storing it in an underground cistern constructed within the proposed Central Utility Plant (CUP). Stored water will be used to not only supplement irrigation demands but will provide a makeup water source for the new cooling towers.

Stormwater management will be designed in accordance with EISA-438 and DOEE regulations. Initial stormwater retention volume calculations have been derived from standard DOEE compliance criteria. The required target for DOEE is the 90th-percentile storm event, equating to a precipitation depth of 1.2-inches in the District. This results in a cistern capable of approximately 120,000 gallons of storage.

This is the minimum criteria to be met. To meet sustainability goals for Leadership in Energy and Environmental Design (LEED) certification, the project will target retention of the 95th-percentile storm event, equating to a precipitation depth of 1.7-inches in the District. A LEED alternate design option allows for retention of post-development stormwater runoff to mimic the natural pre-development (or “meadow”) conditions. Both options will result in a greater retention volume requirement, and therefore a larger storage structure. This volume is likely to change during the course of design as the reuse program and demand quantities are refined, and as the total area of potential disturbance is confirmed. DOEE will be the authority for review and approval of the Stormwater Management Plan and Erosion and Sediment Control Plan.