National Air and Space Museum
Building Exterior, Vestibules and Site Improvements

Exterior Cladding Options

Independence at 6th Street, SW
Washington, DC

Smithsonian Institution

Information Presentation

April 6, 2017
Review Timeline

- **July 2014**
  - Information Presentation NASM Comprehensive Facilities Master Plan

- **July 2016**
  - Concept Design NASM Building Exterior, Vestibules and Site Improvements:
    - Revitalization of landscape and portions of perimeter security
    - Addition of security vestibules at the north and south entrances
    - Incorporation of Photovoltaics

- **April 2017**
  - Information Presentation NASM Exterior Cladding Options

- **July 2017**
  - Preliminary Site and Building Plans NASM Building Exterior Vestibules and Site Improvements
Previous Commission Review (July 2016)

Proposed South Vestibule along Independence Avenue

Proposed North Vestibule along Jefferson Drive

Proposed West Terrace – Delta Solar
Previous Commission Review (July 2016)

Proposed South Vestibule along Independence Avenue

Proposed North Vestibule along Jefferson Drive

Proposed West Terrace – Delta Solar
Background

North Façade along Jefferson Drive

South Façade along Independence Avenue

President Gerald Ford during the NASM Ribbon Cutting Ceremony on July 1, 1976
Relationship with the National Mall: Symmetry
Relationship with the National Mall: Symmetry

The National Mall
Historic District
Relationship with the National Mall: Massing

Existing view looking east toward the U.S. Capitol Building from the Washington Monument
Relationship with the National Mall: Exterior Cladding

1. National Gallery of Art West Building, designed by John Russell Pope, opened in 1941

2. National Gallery of Art East Building, designed by I. M. Pei, opened in 1978

3. National Gallery of Art Sculpture Garden, designed by Laurie D. Olin, opened in 1999

4. National Museum of American History, designed by McKim, Mead and White, opened in 1964
Existing Conditions

Interior-exterior stone cladding relationship

Existing warped and cracked Tennessee Pink
Next Steps

Draft EA Released for 30-day public comment period - *March 31 to May 1, 2017*

Joint NEPA/Section 106 public meeting
Friday, April 7
10:00 am
Smithsonian Facilities

On-site Cladding Mockup Review
Opportunity No. 1
Thursday, April 6
5:30 pm

On-site Cladding Mockup Review
Opportunity No. 2
Friday, April 7
11:00 am

Analyze Public and Agency Comments

Memorandum of Agreement

Finding of No Significant Impact
Ultra High Performance Concrete
Tennessee Pink Limestone
Ultra High Performance Concrete
Echo Lake Granite
Tennessee Pink Limestone
Saint Claire Limestone
Existing Site Context
NASM Mall Building Background

- **1958** – planned location authorized by President Eisenhower
- **1971** – Congress appropriated $41 million for building’s construction
- **1972-1973** – design by Hellmuth, Obata & Kassabaum (HOK)
- **1976** – opened to the public on July 1 as part of Nation’s Bicentennial
- **1995-1997** – last previous major work on stone façade
- **1997-2001** – skylight & window wall replacement
NASM Mall Building Background

• **Contributes to** the National Mall National Register Historic District

• **Entry on Axis with** National Gallery of Art West Building and has same exterior cladding

• **Stone façade** is exclusive weather barrier

• **Mechanical systems** date to the building’s construction
Project Scope and Goals

• Replace building systems to provide a safe and appropriate environment for visitors, staff, and artifacts.

• Reduce carbon emissions and energy consumption.

• Improve access, queuing and security screening conditions by revitalizing the terraces, entrances and improve overall visitor experience.
Project Components

• **Cladding** and Glazing Replacement
• Terrace and Perimeter Security Improvement
• Expanded Vestibules and Canopies
• Solar Panels Addition

And inside—

• New Building Systems
• Exhibit Gallery and Amenities Improvements
Proposed Site Plan

(Concept Design July 2016)
Terraces and Landscape  (Concept Design July 2016)
North Vestibule & Canopy  (Concept Design July 2016)
South Vestibule & Canopy  (Concept Design July 2016)
View from Southwest

(Concept Design July 2016)
1300 Rooftop PV Panels

(Concept Design July 2016)
Cladding Existing Conditions
Existing Wall Section
- Thin stone is the only weather barrier
- Thin insulation sprayed directly on stone
- Stone is one face of return air plenum

Proposed Wall Section
- Stone or UHPC cladding
- Increased insulation
- Separate protected weather barrier inside wall
- Cladding not part of air plenum
Cladding Material Alternatives

Tennessee Marble: Match Original

Different Stone With Similar Characteristics

Ultra High Performance (UHPC) Concrete Panels

Ceramic or Titanium: Considered and Dismissed
Replace-in-kind: 2 ½ - 3” Tennessee Pink

(Formal name is Holston Limestone)

Pros:
• Matches existing exterior cladding in kind (warm color tone and fine linear veining pattern modulates scale of monolithic façade) and intended to match NGA West Building
• Matches existing interior wall cladding that will remain
• High density limestone meets durability requirements with thickness at 3” and properly detailed wall section
• Stone has 100+ year longevity

Cons:
• Requires add’l quarry start-up
• Significant wastage in fabrication of large, thick panels due to nature of stone beds

National Museum of American History (1964)
National Gallery of Art West (1937-1941); East (1978)
National Air and Space Museum (1976)
Cladding Material Alternatives

**ST CLAIR LIMESTONE**

**Pros:**
- Fine, linear veining pattern comparable to TN Pink
- High density, durable limestone (100+ year stone longevity)

**Cons:**
- Light gray color tone does not match existing pink tone

*Other limestone considered (Silver Shadow) found to be too soft for use at building base*

**ECHO LAKE GRANITE**

**Pros:**
- Pink tone (when dry) comparable to TN Pink
- High density, durable granite (100+ year stone longevity)

**Cons:**
- Fine, linear veining pattern not present (very busy swirling texture that is less compatible with interior Tennessee Pink)
- Darkens considerably when wet

**ULTRA HIGH PERFORMANCE CONCRETE (UHPC)**

**Pros:**
- Color and tone customizable
- High density and durable
- Can incorporate recycled aggregate salvaged from existing cladding

**Cons:**
- Manufactured material relatively new – longevity promising but as yet unproven
- Man-made appearance may not be compatible with monumental, iconic buildings on the National Mall

*Other man-made materials considered: Engineered (sintered) stone; metals such as titanium. Longevity of these newer materials as yet unproven.*
Cladding Material Mockup
Tennessee Pink Color Variations

Existing TN Marble East Elevation

TN Marble Mockup North & East Elevations

TN Marble Mockup South & West Elevations

TENNESSEE MARBLE COLOR RANGE KEY

Cladding Material Alternatives

- St Clair Mockup
  South & East Elevations

- Echo Lake Mockup
  South & West Elevations

- UHPC Mockup
  South & West Elevations
## Public Process Schedule Next Steps

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<thead>
<tr>
<th>Milestone</th>
<th>Date</th>
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<tr>
<td>Environmental Assessment Public Review and Comment Period</td>
<td>March 31- May 1</td>
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<tr>
<td>Public Cladding Mockup Reviews</td>
<td>April 6, 5:30-6:30 pm</td>
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<td>NE corner of NASM terrace</td>
<td>April 7, 11:00-11:30 am</td>
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<tr>
<td>EA/Section 106 Public Meeting at Capital Gallery Suite 5001, 600 Maryland Avenue SW</td>
<td>April 7, 10:00 -11:00 am</td>
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<tr>
<td>NCPC Site Visit + Informational Briefing</td>
<td>April 6</td>
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<tr>
<td>CFA Site Visit /Informational Briefing Updated Concept Review-Cladding</td>
<td>April 20 or May 18</td>
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<td>May 18</td>
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<tr>
<td>NCPC Preliminary Design Review</td>
<td>July, 13</td>
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<tr>
<td>NCPC Final Design Review</td>
<td>July 13 or Sept. 7</td>
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<tr>
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