



Executive Director's Recommendation

Commission Meeting: April 2, 2020

PROJECT Hirshhorn Museum and Sculpture Garden - Exterior Building Repairs Hirshhorn Museum and Sculpture Garden Independence Avenue, SW and 7th Street, SW Washington, DC	NCPC FILE NUMBER 7889
SUBMITTED BY Smithsonian Institution	NCPC MAP FILE NUMBER 1.71(38.00)45086
REVIEW AUTHORITY Federal Projects in the District per 40 U.S.C. § 8722(b)(1) and (d)	APPLICANT'S REQUEST Approval of preliminary and final building plans
	PROPOSED ACTION Approve preliminary and final building plans
	ACTION ITEM TYPE Consent Calendar

The Smithsonian Institution (SI) has submitted preliminary and final plans for repairs to the building envelope at the Hirshhorn Museum. The building is now 45 years old and is in need of repairs due to aging, weather, and deficiencies in the original envelope design. In particular, the building's exterior precast panels have issues with their structural attachments. The existing building envelope also lacks a vapor, air and water-resistive barrier, and has no insulation. As a result, there is currently moisture infiltration into the building, including the gallery walls and floors. The lack of insulation also causes poor energy performance.

The project scope includes the in-kind replacement of the exterior façade panels with new panels to match the existing material. A three-inch offset will be provided in the building envelope section to allow for waterproofing and insulation. The joint system will match the existing design. In addition, the balcony glazing facing the National Mall will be replaced to closely match the existing condition. New accessible doors will be provided, and the glazing system will be blast-resistant. Finally, the roof is also at the end of its life and must be replaced.

The Commission reviewed and expressed support for the project in July 2019. Since that time, SI has further refined the plans and installation details. The original concrete aggregate was verified, and mock-up panels were prepared to confirm it closely matched the existing building. The historic preservation review process was completed through the development of a memorandum of agreement.

KEY INFORMATION

- The Hirshhorn Museum and Sculpture Garden is SI's museum of modern and contemporary art.

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- Designed by Gordon Bunshaft of Skidmore, Owings and Merrill, the Hirshhorn campus is located on Independence Avenue SW, framed by 7th Street to the east, the Mary Livingston Ripley Garden to the west, and across Jefferson Drive, the sculpture garden opens to the National Mall along its northern edge. The museum and sculpture garden are organized around the 8th Street north-south axis, aligning with the National Gallery of Art's Sculpture Garden and the National Archives across the National Mall to the north.
 - The museum building is a cylindrical volume raised fourteen feet above the ground on sculptural concrete piers. The building contains four above-ground stories clad in precast concrete panels with an exposed aggregate surface. The precast panels encircle the building in bands of alternating heights, with minimal joints. A single opening on the exterior of the drum is located on the third story and features a glazed recess and balcony facing north toward the National Mall. The center of the drum opens to a circular courtyard with a shallow fountain.
 - The Hirshhorn Museum and Sculpture Garden have been determined individually eligible for the National Register of Historic Places, while already considered contributing elements to the National Mall listing. The Determination of Eligibility identifies the following features as character-defining: drum-shape building form with central courtyard, sculptural cast-in-place concrete piers, precast concrete panels, coffered ground-level ceiling, third story balcony and glazing, and the entrance lobby with revolving doors.
 - The Smithsonian Institution's South Mall Campus Master Plan was approved by the Commission on June 7, 2018. It included recommendations to improve and revitalize both the Hirshhorn Museum and the Sculpture Garden.
 - The Commission provided comments on the concept design for the museum building's exterior repairs on July 11, 2019, and expressed support for the project goals and intent. The Commission also found the proposed dimensional change in the building section will generally not alter the perception of the building, particularly as the panel joint pattern is retained, and the precast concrete aggregate matches the original design.
 - To fulfill the Section 106 requirements for the South Mall Master Plan, both the Smithsonian Institution and NCPC signed a Programmatic Agreement (PA) in 2018.
 - Beginning in 2016, SI began a series of tests and evaluations of the building envelope. Those investigations looked at the exterior precast concrete panels, glazing systems, and the roof. The analysis identified a number of challenges that are to be addressed as part of the repair project.

RECOMMENDATION

The Commission:

Approves the Smithsonian Institution's application for preliminary and final buildings plans for exterior repairs to the Hirshhorn Museum Building.

Notes the Hirshhorn Museum building is 45 years old, and due to the effects of aging, weather, and design deficiencies in the original building envelope, is in need of repair.

Notes the Smithsonian Institution has proposed the in-kind replacement of the precast concrete panels on the exterior façade, with an additional three-inch space to accommodate waterproofing, insulation, and structural attachment.

PROJECT REVIEW TIMELINE

Previous actions	June 7, 2018 – Approval of South Mall Campus Master Plan. July 11, 2019 – Approved comments on the Concept design for exterior building repairs.
Remaining actions (anticipated)	– None.

PROJECT ANALYSIS

Executive Summary

The Hirshhorn Museum building is 45 years old, and due to the effects of aging, weather, and design deficiencies in the original building envelope, the Smithsonian Institution has identified a number of areas that will need to be repaired. The applicant has conducted a multi-year study to better understand these challenges and to make recommendations that will be problem-solving, while considering the historic eligibility of the building. Following concept review, SI furthered refined the plans and installation details. The original concrete aggregated was verified, and mock-up panels were prepared to confirm it closely matched the existing building. The historic preservation review process was completed through the development of a memorandum of agreement. Therefore, staff recommends the **Commission approve the Smithsonian Institution's application for preliminary and final buildings plans for exterior repairs to the Hirshhorn Museum Building.**

Analysis

At 45 years old, the Hirshhorn Museum building faces a number of challenges, and is in need of repairs due to aging, weather, and deficiencies in the original envelope design. In particular, the building's exterior precast panels have issues with their structural attachments. The existing building envelope also lacks a vapor, air and water-resistive barrier, and no insulation exists. As a result, there is currently moisture infiltration into the building, including the gallery walls and floors. Lack of insulation also causes poor energy performance, and the roof is nearing the end of its life. The Smithsonian Institution has undertaken a comprehensive evaluation of the approach necessary to address these challenges. In doing so, they have also identified certain project goals.

These include:

- Improve building envelope performance to reduce energy consumption and protect museum collections with a stable environment.
- Prevent water infiltration and condensation on the interior of the building.
- Closely match the character and appearance of the existing precast concrete panels.
- Closely replicate the existing profiles of balcony glazing.
- Improve safety with upgraded precast and glazing attachments to meet blast requirements.
- Improve balcony doors to meet accessibility requirements.

The final design includes three major components. First, the existing outer façade panels will be removed and replaced in-kind with a material matching the original design. The new façade will be offset three inches to allow for waterproofing and insulation. The panel design and joints will match the existing conditions. Second, the balcony glazing system will be replaced to closely match the existing conditions. The new glazing system will be blast-resistant, and doors will be modified to meet current accessibility standards. Finally, the roof assembly will be replaced. The drainage system will be improved as part of the project. No changes will be visible from the ground level and the profile of the building will not change. Staff's analysis focuses on these three components in the sections that follow.

Building Background

Designed by Gordon Bunshaft of Skidmore, Owings and Merrill, the Hirshhorn campus is located on Independence Avenue SW, framed by 7th Street to the east, the Mary Livingston Ripley Garden to the west, and across Jefferson Drive, the sculpture garden opens to the National Mall along its northern edge. The museum and sculpture garden are organized around the 8th Street north-south axis, aligning with the National Gallery of Art's Sculpture Garden and the National Archives across the National Mall to the north. The museum was opened to the public in 1974.

The museum building is a cylindrical volume raised fourteen feet above the ground on sculptural concrete piers. The building contains four above-ground stories clad in precast concrete panels with an exposed aggregate surface. The precast panels encircle the building in bands of alternating heights, with minimal joints. A single opening on the exterior of the drum is located on the third story and features a glazed recess and balcony facing north toward the National Mall. The center of the drum opens to a circular courtyard with a shallow fountain.

The Hirshhorn Museum and Sculpture Garden have been determined individually eligible for the National Register of Historic Places, while already considered contributing elements to the National Mall listing. The Determination of Eligibility identifies the following features as character-defining: drum-shape building form with central courtyard, sculptural cast-in-place concrete piers, precast concrete panels, coffered ground-level ceiling, third story balcony and glazing, and the entrance lobby with revolving doors.

Current Conditions and Findings

Beginning in 2016, SI began a series of tests and evaluations of the building envelope. Those investigations looked at the exterior precast concrete panels, glazing systems, and the roof. Other tests were performed on the sculpture garden wall and the museum plaza walls. The investigations identified a number of challenges that are to be addressed as part of the repair project. Regarding the precast panels, the design team found compromised structural attachments at many locations. This included cracking and spalling on a number of the concrete panels. The investigation also found small bearing areas on some of the relieving angles, and a defect in a wedge insert, likely due to a manufacturing defect. Since 2018, SI has been monitoring the façade to address any potential life-safety issues.

As noted previously, the exterior façade assembly lacks a vapor, air, and water-resistive barrier and insulation. As a result, water infiltration occurs around balcony joints and condensation occurs on the interior side of the concrete structural wall. Significant condensation has been noted by the design team, with approximately 15-20% of the second level insulation wet. Water infiltration is causing deterioration of gallery plaster walls and seepage is occurring through the structural slab at the 2nd floor. Water stains and organic growth have also been found in the second level. Finally, because the façade lacks insulation, SI has indicated that the Hirshhorn building is the most inefficient SI museum building in terms of energy consumption. Improving energy performance is therefore one of the goals of the project.

Exterior Façade Replacement

Given these findings, the applicant is proposing several repairs to the building envelope. The first, and most significant, includes removing the existing precast panels and replacing them in-kind. An additional three-inch façade offset will also be provided, in addition to the existing one-inch gap. This will accommodate two-inch thick insulation, a one-inch air gap, and a one-inch space for the anchor attachments. The new insulation will help improve energy performance, while the additional gap and an applied water barrier will help prevent infiltration and condensation on the interior of the building. Due to the additional spacing, the entire drum of the building will essentially grow three inches outward on all sides. Based upon the submitted renderings, staff does not find that this dimensional change is particularly significant or perceptible. The applicant proposes to retain the same joint pattern and to match the concrete aggregated in the precast panels.

As noted previously, the precast concrete panels that form the façade of the building are character defining features of the museum. Because of the dimensional changes in the building section, as well as some existing deterioration, the existing panels cannot be reused. Replacement of the panels in-kind will require matching the original concrete and aggregate. SI has identified the original aggregate as Swenson Pink Granit and determined it is available and will serve as the aggregate material. Today, Swenson Pink is called Millennium Granite, and comes from the same quarry in Maine.

SI began a limited cleaning of the existing façade to compare and confirm the material color and appearance. According to the applicant, the proposed new aggregate will be the same as the

original. Additional analysis and studies were prepared and shared as the project advanced. Staff notes that SI continued to work the DC State Historic Preservation Officer, the Advisory Council on Historic Preservation, and other consulting parties as part of the Section 106 process to further reduce any potential changes to the character-defining features of the building. Ultimately, the consulting parties determined that there was an adverse effect to the historic resource, primarily due to the wholesale replacement of the original material. As such, a Memorandum of Agreement was executed on March 18, 2020 to resolve the adverse effect.

The applicant did evaluate whether it would be possible to reuse the existing precast panels in lieu of replacing them. Further analysis identified several challenges with this approach. In particular, reusing the panels would not allow the additional space necessary for insulator or waterproofing. Further, some panels are already chipped or spalling, and it would be difficult or impossible to reuse them. Given these challenges, SI decided to not pursue this option.

Balcony Glazing Replacement

A single opening on the exterior of the drum is located on the third story and features a glazed recess and balcony facing north toward the National Mall. As part of the repair project, the glazing will be replaced with a new blast-resistant system. The general configuration and appearance of the glazing system will not be altered. However, minor adjustment will be made at the balcony doors, which will be replaced with a new design that meets accessibility requirements. This includes changes at the bottom of the doors on the push side for use by mobility aids. The balcony concrete pavers, which were installed as part of a temporary repair in 2017, will also be replaced. Overall, however, there will not be a significant visual change as part of the balcony project.

Roof Replacement

The current roof has a low slope with four area drains that collect runoff. The assembly is a built-up roof on insulation and coverboard. Parapet walls surround the roof on both the exterior façade and courtyard side so that the area is not visible from the ground. The current assembly does not meet minimum slope requirements for drainage, and it suffers from defects in the perimeter flashing. As a result, the entire roof will be replaced. The drainage profile will be adjusted to achieve slope requirements, where possible, and a hot applied rubberized asphalt will be used. Pavers will form the top surface, but the assembly could be retrofitted in the future to accommodate a green roof. From the ground level, there will be no visible changes to the roofline.

CONFORMANCE TO EXISTING PLANS, POLICIES AND RELATED GUIDANCE

Comprehensive Plan for the National Capital

Staff has reviewed policies from the Urban Design, Historic Preservation, and Visitors & Commemoration Elements, and the analysis and recommendations are intended to support consistency with the Comprehensive Plan.

National Historic Preservation Act

Both the Smithsonian Institution and NCPC have independent responsibilities to comply with Section 106 of the National Historic Preservation Act (NHPA). To fulfill the Section 106 requirements for the South Mall Master Plan, both the Smithsonian Institution and NCPC, a Programmatic Agreement was signed in 2018. The Smithsonian Institution has initiated the Section 106 process for this project, with Public Meeting #1 held on 4/10/19, and creation of a project web site. The Smithsonian has also engaged with the NCPC, CFA, DC SHPO, NPS, and the Advisory Council on Historic Preservation as required by the South Mall Master Plan Programmatic Agreement. In the consultation, it was determined that the project would result in adverse effects to the historic resource, primarily resulting in the whole replacement of original material, even with the in-kind aggregate, and the new offset. A Memorandum of Agreement (MOA) was executed on March 18, 2020. The MOA includes a number of mitigation measures, including HABS/HALS recordation of the Hirshhorn Museum and Sculpture Garden.

National Environmental Policy Act

NCPC is the lead agency for compliance with the National Environmental Policy Act (NEPA). The revitalization of the Hirshhorn Museum Building was among the projects identified in the Environmental Impact Statement (EIS) prepared as part of the South Mall Master Plan. At concept review, no NEPA is required.

CONSULTATION

Coordinating Committee

Without objection at its March 11, 2020 meeting, the Committee forwarded the proposed preliminary and final building plans to the Commission with the statement that the proposal has been coordinated with all participating agencies. DOEE noted that the project may trigger stormwater management reviews and additional follow-up was encouraged. The SHPO coordinated contingent upon finalizing and executing a draft Section 106 Memorandum of Agreement. The participating agencies were NCPC; the DC SHPO; the District of Columbia Department of Transportation (DDOT); the District Department of Energy and Environment; the General Services Administration; and the Washington Metropolitan Area Transit Authority.

U.S. Commission of Fine Arts

The U.S. Commission of Fine Arts approved the project by the polling of their members, as discussed in a letter from the Commission dated March 22, 2020. See attached.

ONLINE REFERENCE

The following supporting documents for this project are available online at www.ncpc.gov:

- Submission Package
- Major NEPA/106 Documents or Letters, FONSI

Prepared by Lee Webb
03/14/2020

POWERPOINT (ATTACHED)

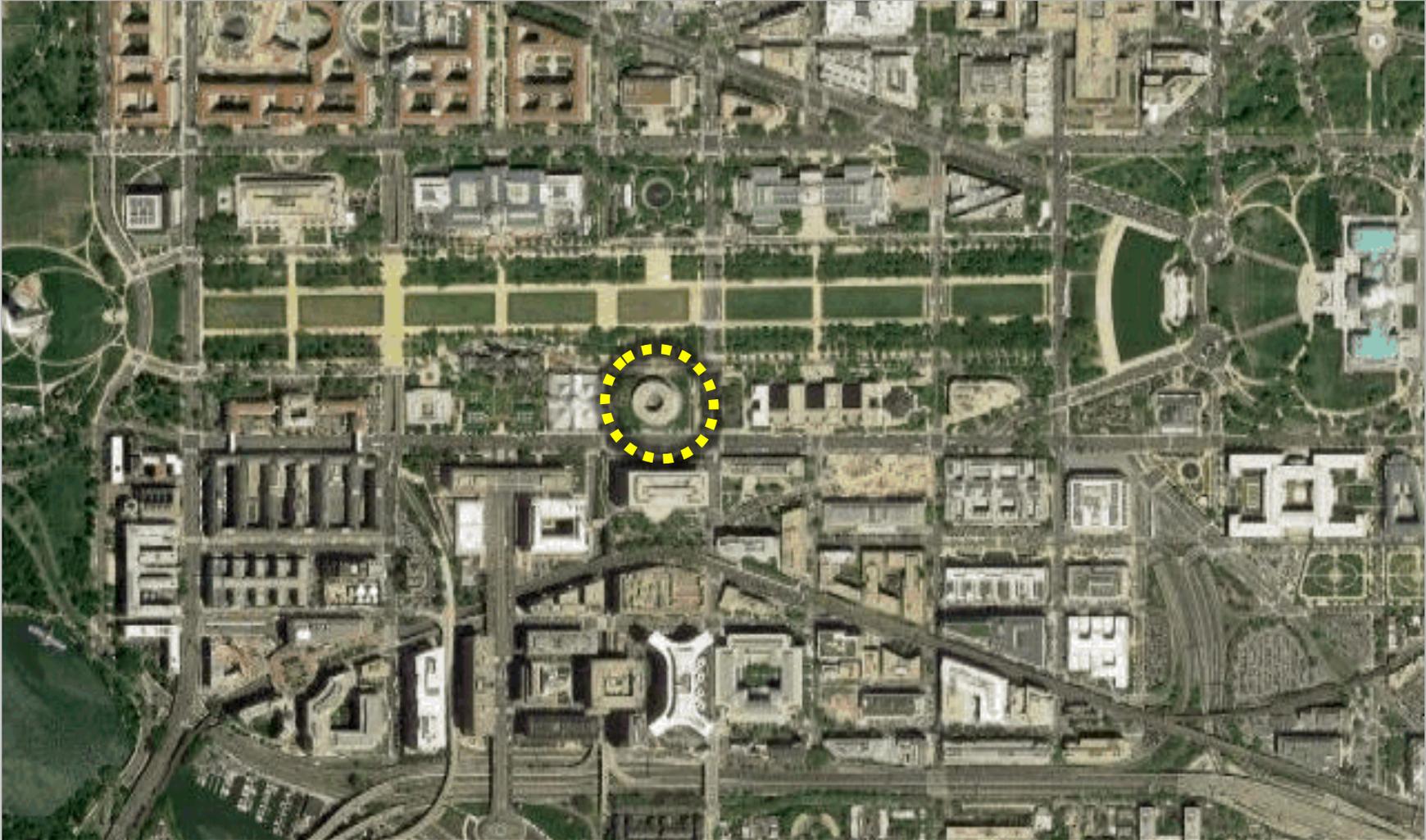
Hirshhorn Museum and Sculpture Garden - Exterior Building Repairs

Independence Avenue, SW and 7th Street, SW, Washington DC

Approval of Preliminary and Final Building Plans

Smithsonian Institution

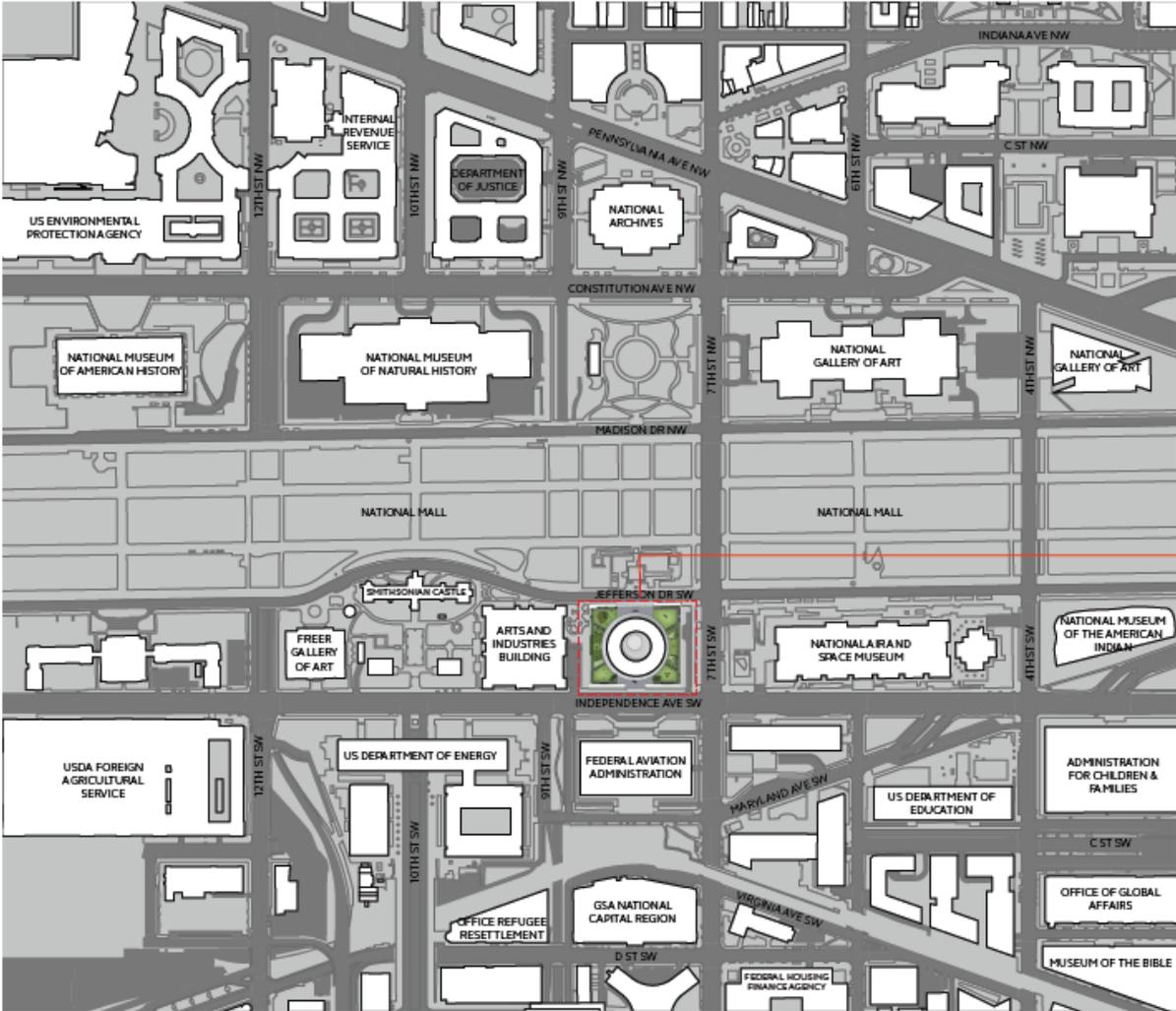
Site Location



Location Map

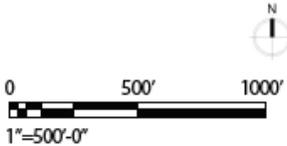
Vicinity Map

VICINITY MAP



PROJECT AREA

**Hirshhorn Museum
and Sculpture Garden**



Historic Photographs

HISTORIC PHOTOGRAPHS



View from Sculpture Garden, 1974



View from Sculpture Garden, 1974



Aerial view, 1981



Historic construction photograph, 1973



Historic construction photograph, 1973



Historic construction photograph, 1973

Hirshhorn Museum Existing Condition Photographs

EXISTING CONDITIONS PHOTOGRAPHS

Existing Building Facade Precast Panels



East facade precast panels



South facade precast panels



East facade precast panels



Facade soffit panels



North facade precast panels



View from the Sculpture Garden

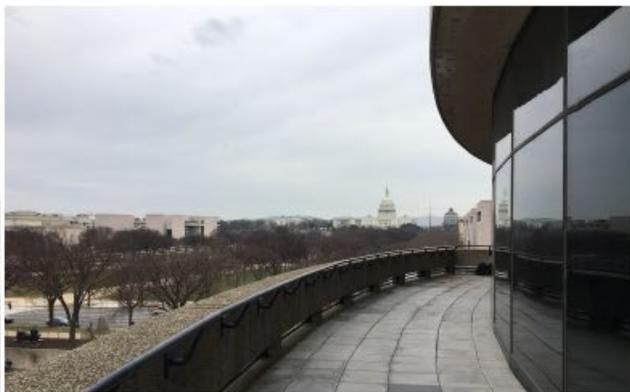
Existing Balcony Glazing

EXISTING CONDITIONS PHOTOGRAPHS

Existing Balcony Glazing



Balcony storefront



Balcony pavers and rail



Balcony soffit



Balcony rail and facade panel



Balcony glazing interior side



Balcony glazing integrated electric heating devices

Existing Roof

EXISTING CONDITIONS PHOTOGRAPHS

Existing Roof



Rooftop equipment



Inner parapet



Outer parapet



HVAC unit



Roof assembly and fall arrest system

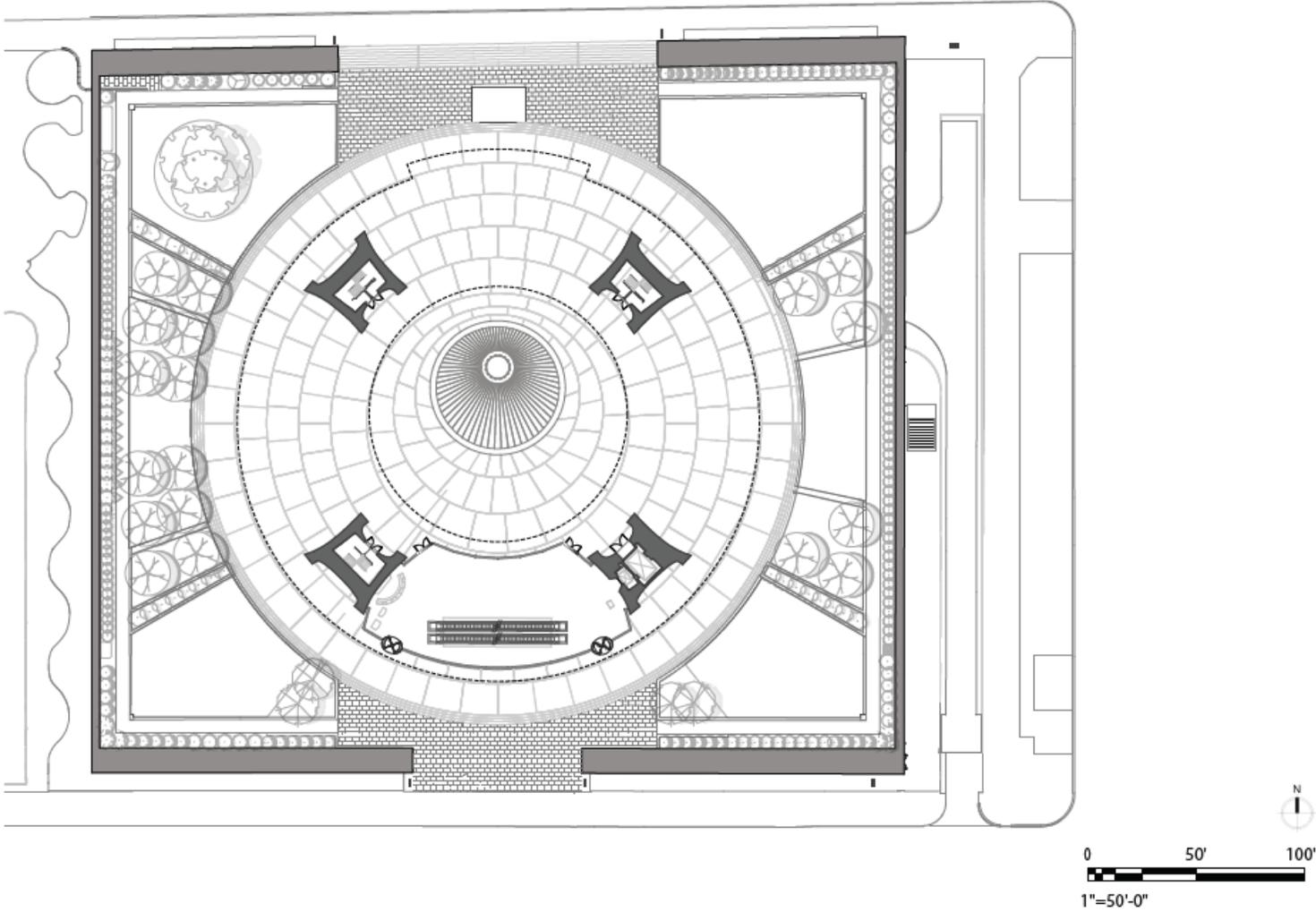


Roof assembly and roof drain

Existing Conditions Site Plan, First Level

EXISTING CONDITIONS

First Level Floor Plan and Site Plan

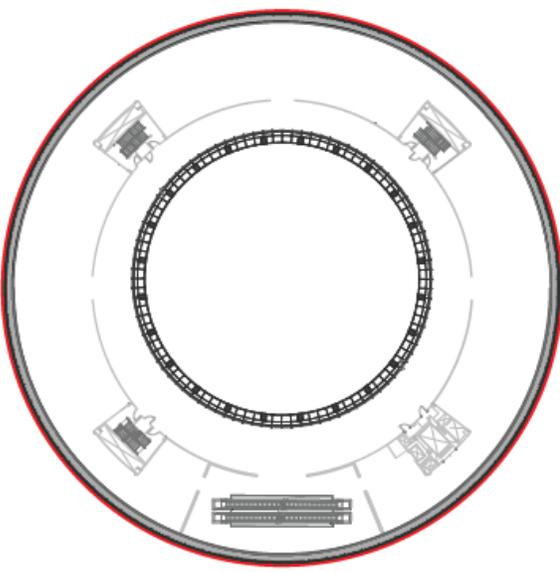


Existing Conditions Building Floor Plans

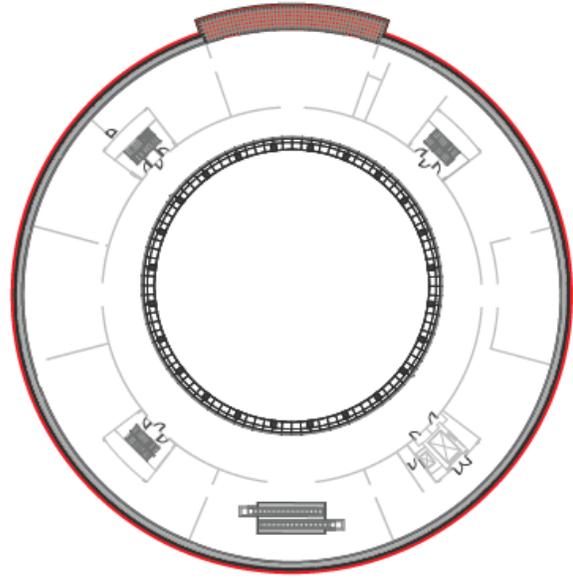
EXISTING CONDITIONS

Existing Building Floor Plans

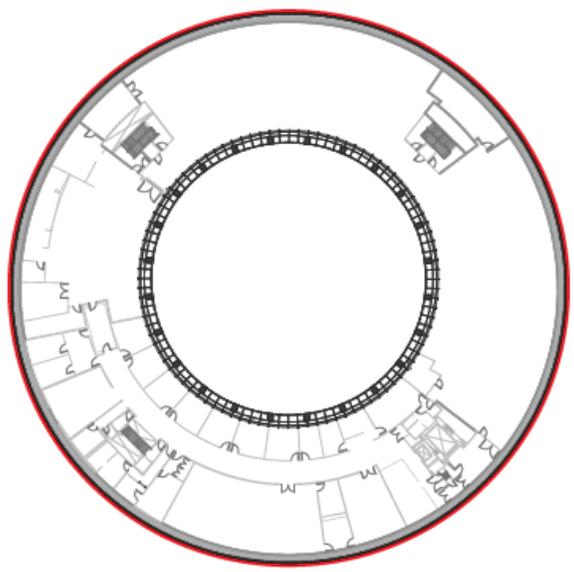
— SCOPE OF PROPOSED REPAIRS



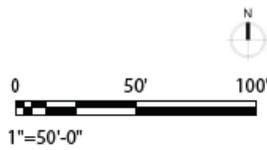
2ND LEVEL FLOOR PLAN
Gallery Spaces



3RD LEVEL FLOOR PLAN
Gallery Spaces



4TH LEVEL FLOOR PLAN
Administrative Offices
Conservation Lab
Collections

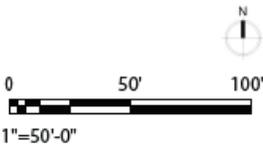
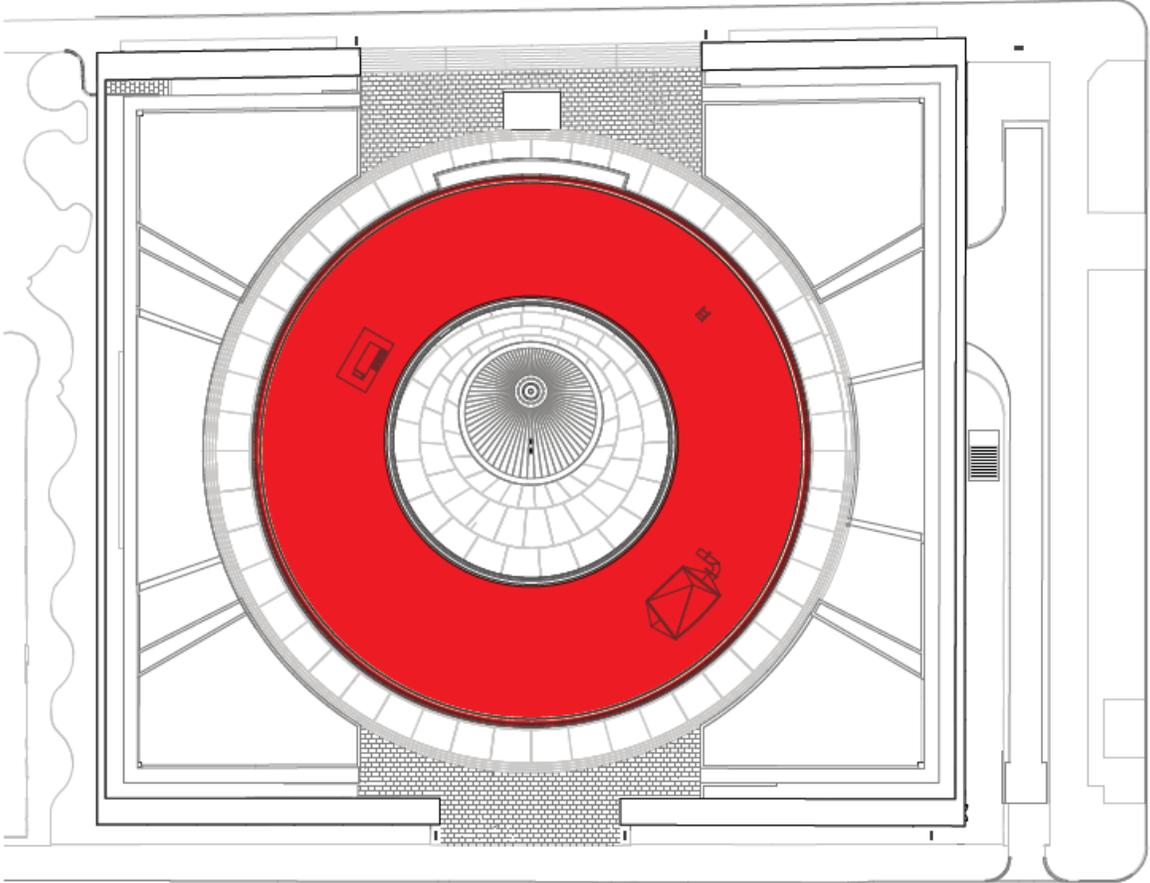


Existing Conditions Roof and Site Plan

EXISTING CONDITIONS

Roof Plan and Site Plan

SCOPE OF PROPOSED REPAIRS



Existing Conditions

EXISTING CONDITIONS

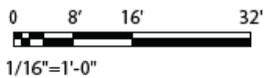
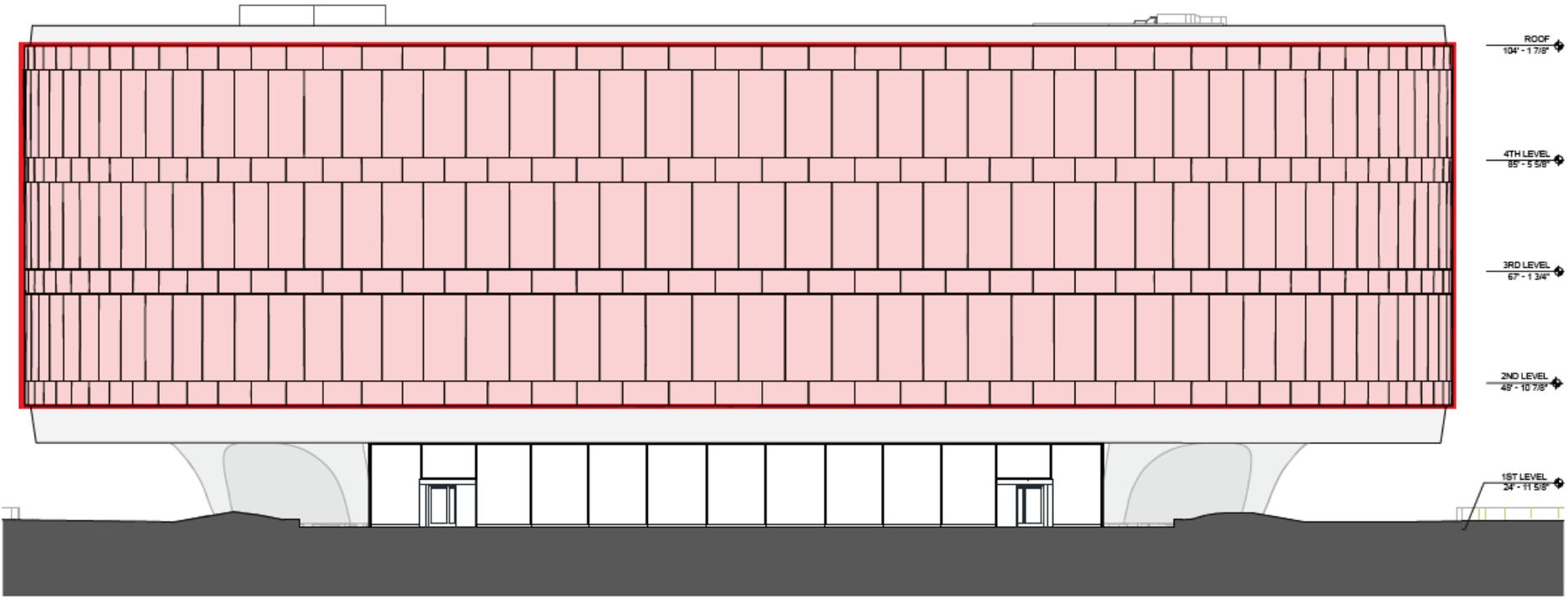
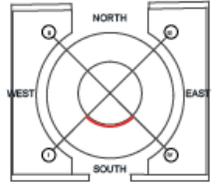


Existing Condition, South Building Elevation

EXISTING CONDITIONS

Building Elevation: South

SCOPE OF PROPOSED REPAIRS



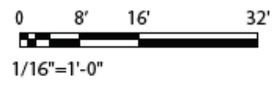
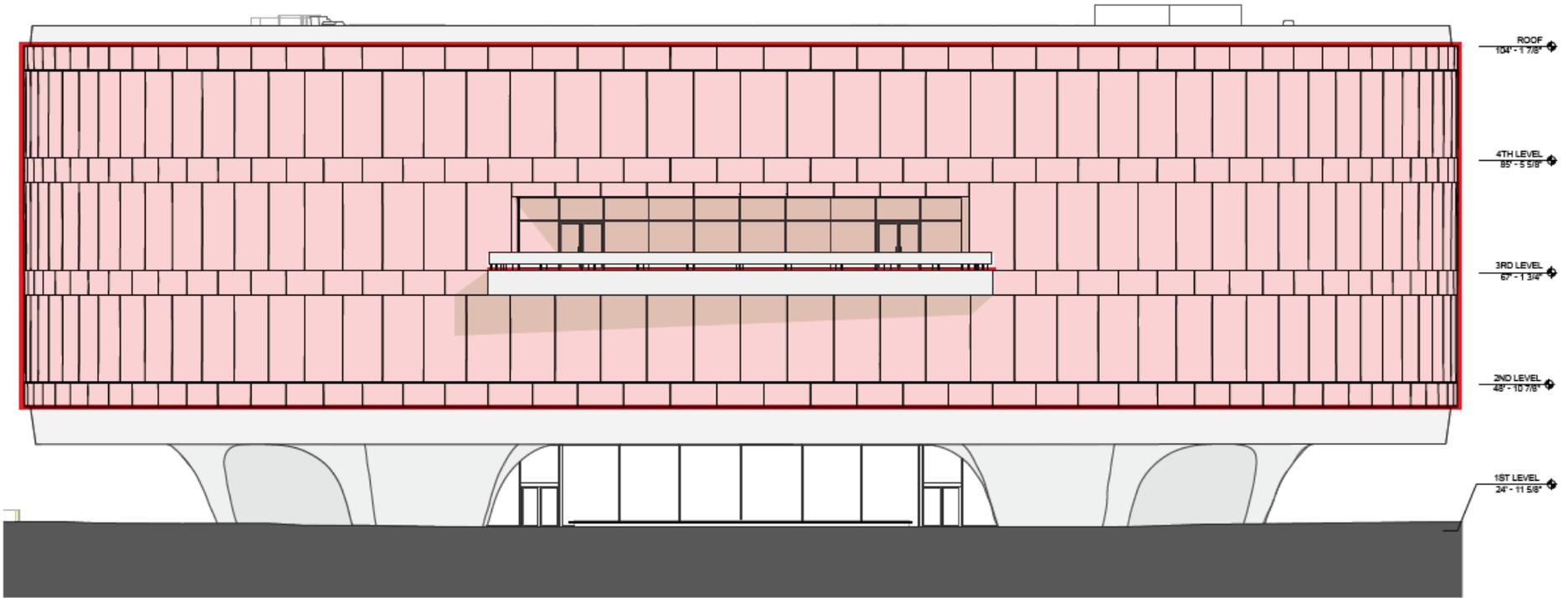
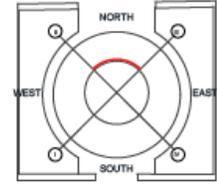
Existing Condition, North Building Elevation

EXISTING CONDITIONS

Building Elevation: North

Balcony waterproofing and pavers to be replaced. Guardrail and CIP concrete balcony structure not part of the project.

SCOPE OF PROPOSED REPAIRS

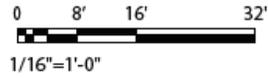
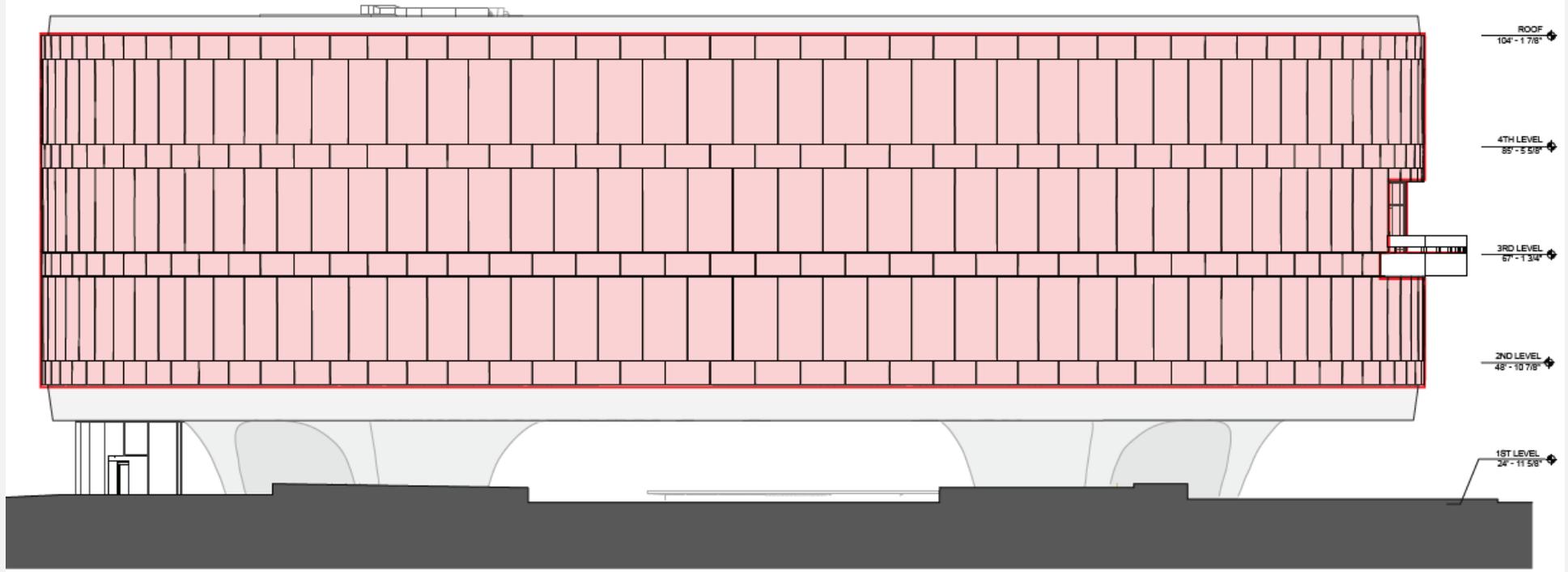
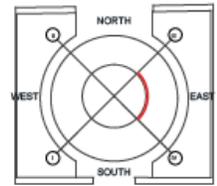


Existing Conditions, East Building Elevation

EXISTING CONDITIONS

Building Elevation: East

SCOPE OF PROPOSED REPAIRS

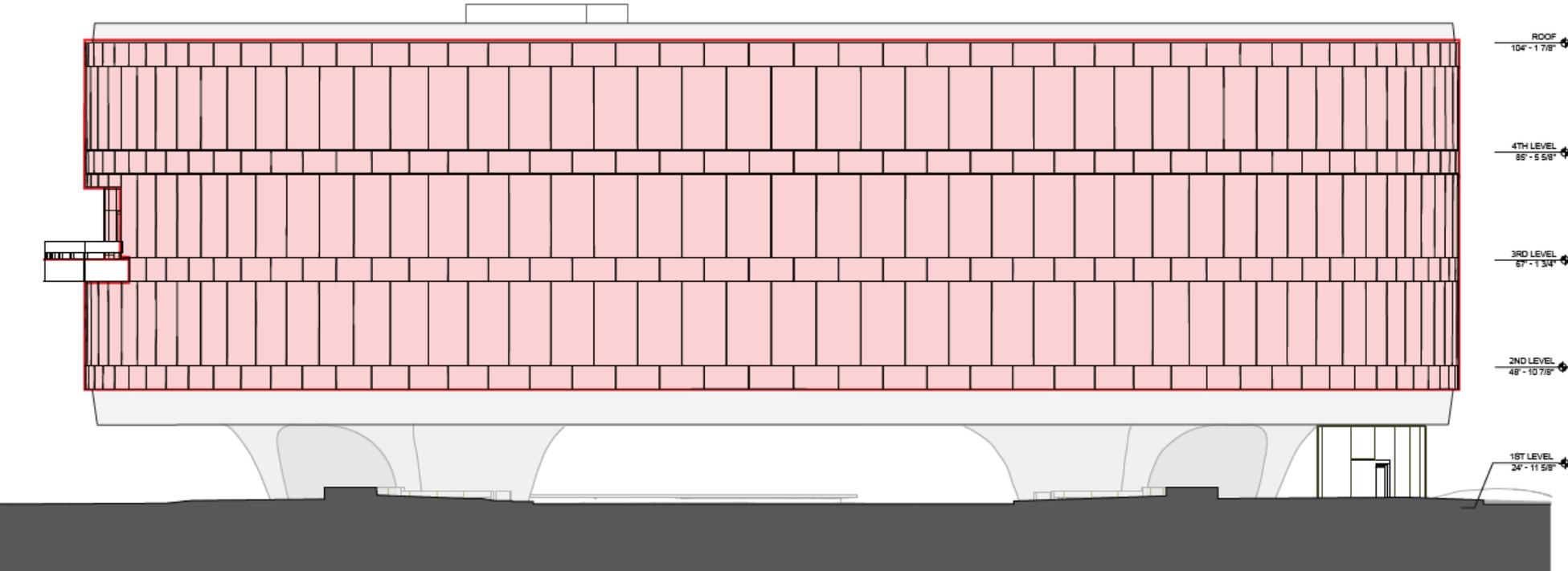
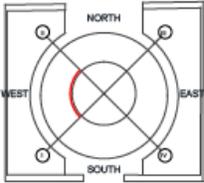


Existing Conditions, West Building Elevation

EXISTING CONDITIONS

Building Elevation: West

SCOPE OF PROPOSED REPAIRS



Existing Precast Panels and Cavity Width

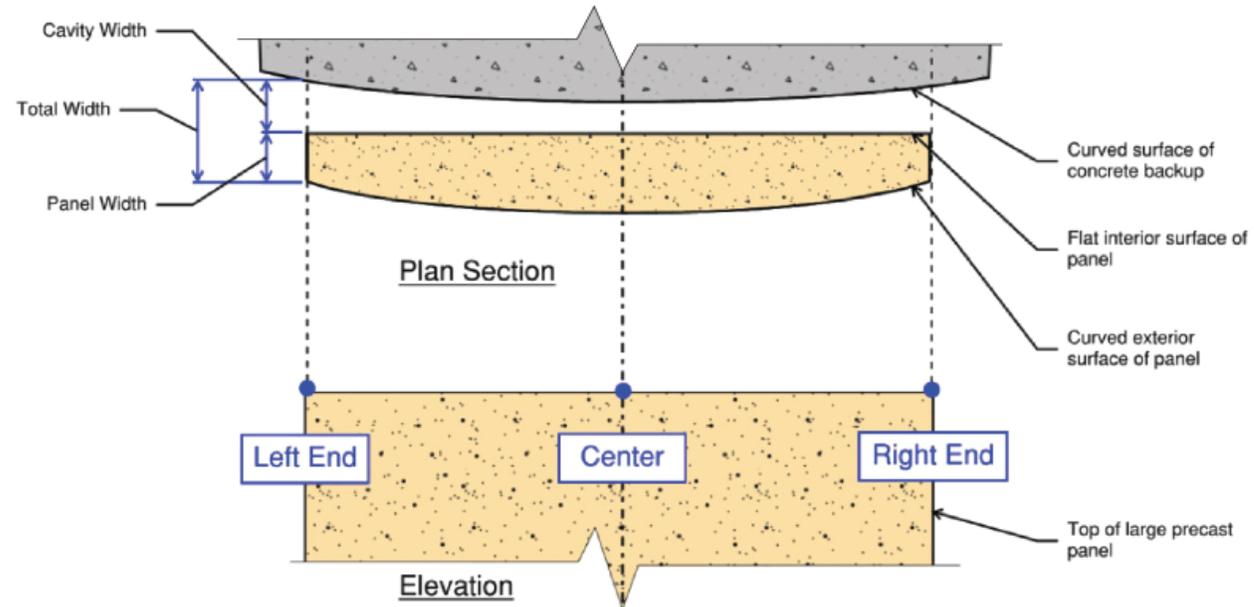
EXISTING FACADE PANEL CONDITIONS

Existing Precast Panels and Cavity Width

The Design Team conducted an extensive facade survey and confirmed that the existing cavity (air gap) width behind the precast panels varies. The cavity width varies due to the geometry of the panels and irregularities of the concrete drum. The minimum existing cavity width is approximately one inch.

The panels are comprised primarily of two typical sizes:

- Large Standard Panel = 7'-6 25/32" x 14'-3 1/4"
- Small Standard Panel = 7'-6 25/32" x 4'-0"

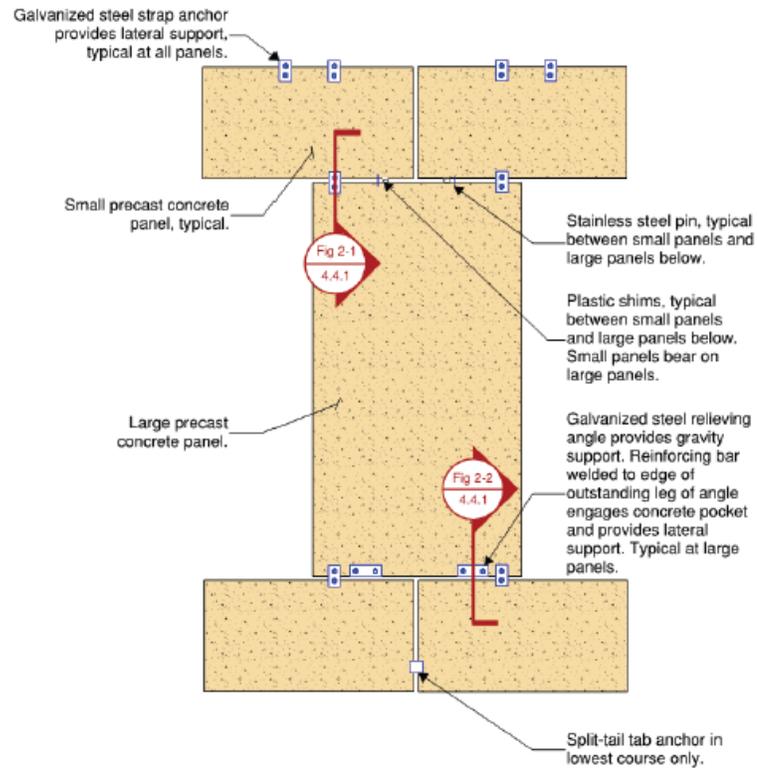


	Panel Width		Cavity Width		Total Width	
	<i>Center</i>	<i>Ends</i>	<i>Center</i>	<i>Ends</i>	<i>Center</i>	<i>Ends</i>
Minimum	3.5"	3.5"	1.25"	1"	5.5"	5.25"
Maximum	5"	4.75"	3.25"	3.75"	7.75"	7.75"
Average	4.5"	4"	2"	2.5"	6.5"	6.5"

Existing Precast Panels and Attachments

EXISTING FACADE PANEL CONDITIONS

Existing Precast Panels and Attachments



PARTIAL FACADE BACK SIDE ELEVATION - OUTER RING / TYPICAL

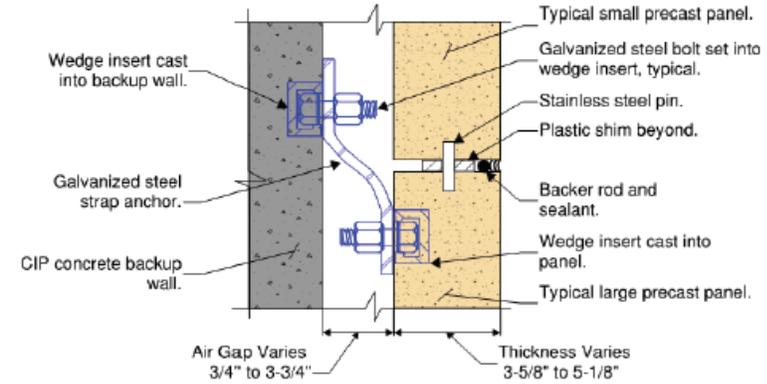


Fig.2-1 SECTION DETAIL - STRAP ANCHOR / TYPICAL

4.4.1

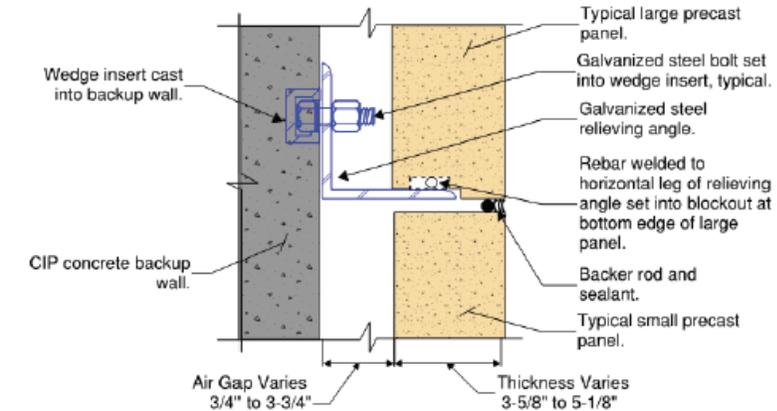


Fig.2-2 SECTION DETAIL - RELIEVING ANGLE / TYPICAL

4.4.1

Existing Precast Panels and Attachments

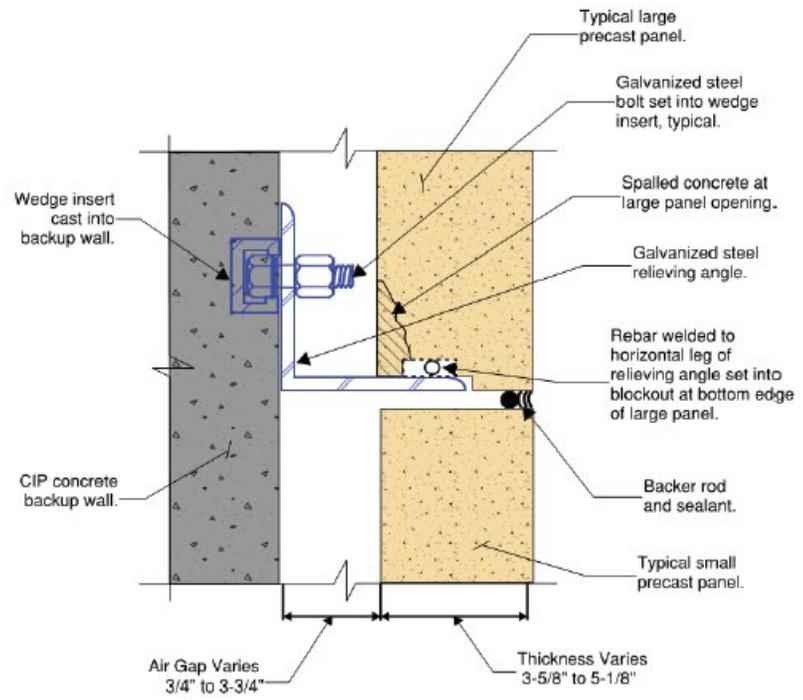
EXISTING FACADE PANEL CONDITIONS

Existing Precast Panels and Attachments

CRACKED CONCRETE AT THE RELIEVING ANGLE



SPALLED CONCRETE AT THE RELIEVING ANGLE



SECTION DETAIL - RELIEVING ANGLE / TYPICAL

Existing Precast Panels and Attachments

EXISTING CONDITIONS

Existing Precast Panels and Attachments



Overall photo of exterior precast concrete panel cladding on outer ring: Note the interchanging rows of large and small panels and staggered vertical joints between rows.



Irregular bearing surface on bottom side of panel not fully in contact with relieving angle



Backside of the concrete panel is cracked adjacent to the bearing surface on the relieving angle



Hard plastic shims (ovals) between small panel (above) and large panel (below)



Large panel bearing on small panel below and uneven spacing between panels



Flame cut slotted hole in strap plate connection to backup wall

Existing Precast Panels and Attachments

EXISTING CONDITIONS

Existing Precast Panels and Attachments



Strap anchor: Shims filling gap and strap bent



Relieving angle: Corrosion, spalling, and uneven panel bearing



Concrete back-up wall: Water saturation



Concrete panel intentionally chipped for anchorage installation



View of the bottom edge of a large panel: The back edge of the recessed pocket has spalled off the panel and does not engage the relieving angle bar



Concrete spalling adjacent to relieving angle bearing surface

Existing Conditions, Moisture Issues

EXISTING CONDITIONS

Evidence of moisture inside enclosure assemblies from condensation and water infiltration



Pink discoloration of water finding test paper indicates moisture in the glass foam insulation of the Second Level Slab Assembly.



Delamination and flaking plaster at the base of the wall finishes at the second level gallery due to the moisture inside the wall assembly.



Water finding test paper indicates the presence of moisture on the interior face of the backup wall behind an electrical outlet.

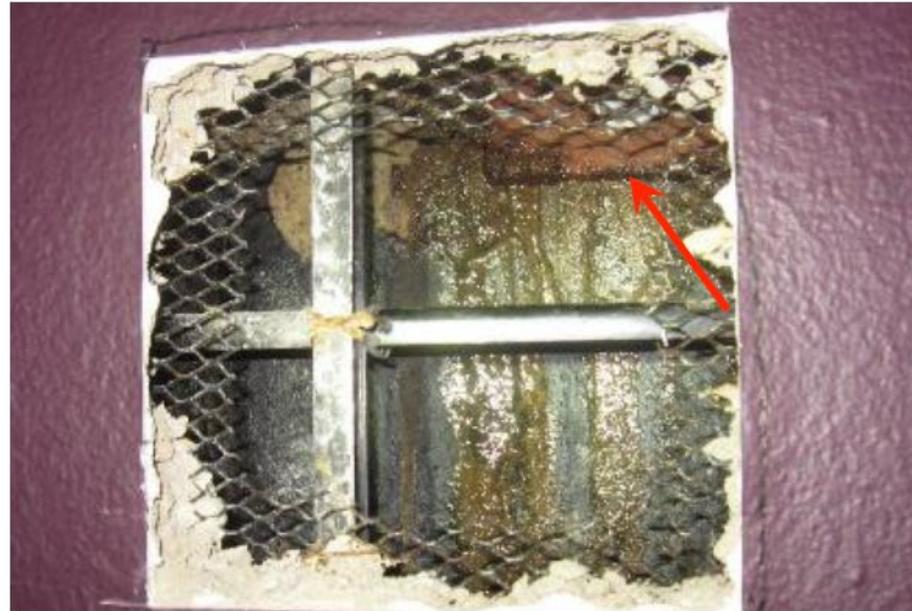
Existing Conditions, Moisture Issues

EXISTING CONDITIONS

Evidence of moisture inside enclosure assemblies from condensation and water infiltration



The interior plaster finishes are applied to expanded metal lath that is supported by steel framing (arrows). The framing and lath have surface corrosion and the backup wall is covered with a black coating that is stained.



The backup wall is covered with water stains and organic growth emanating from the top of the second level wall. The bottom edge of the steel angle support is visible (arrow).

Comparison of Cavity Conditions

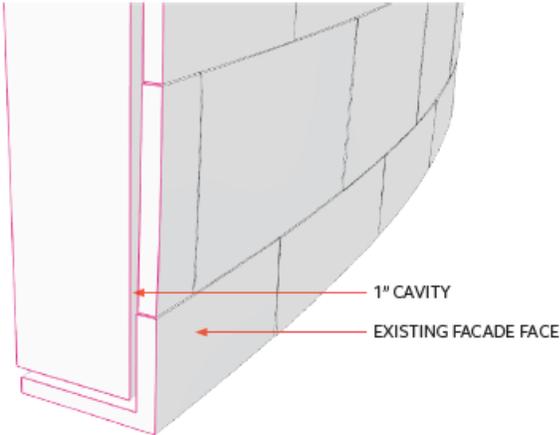
COMPARISON OF THE EXISTING AND PROPOSED CONDITIONS

Precast panel cavity width and proposed 3" facade offset

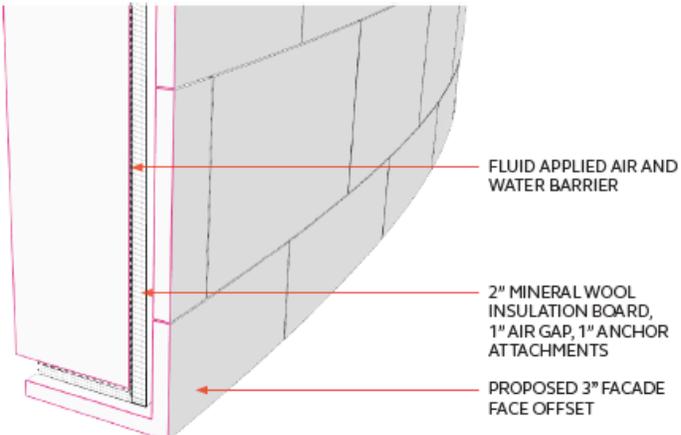
The Hirshhorn's existing enclosure system completely lacks a vapor, air, or water-resistive barrier, and insulation. This condition results in ongoing water infiltration and condensation during the cold months of the year along the interior side of the solid concrete structural back-up wall. The field survey confirmed the minimum existing average cavity dimension is one inch.

To improve energy performance the Design Team used prescriptive Energy Code requirements to define the minimum thickness of the required wall assembly. This assembly will prevent water infiltration and condensation on the interior of the building.

- 32" Existing Concrete backup wall
- Fluid Applied Air and Water Barrier
- 2" Mineral wool board insulation
- 1" Air Gap
- 1" Anchor Attachment
- 5" Minimum precast panel thickness



EXISTING CONDITION
The cavity between the existing precast panels and the back-up structural wall varies. The minimum existing average dimension is one inch.



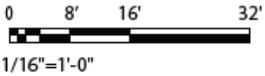
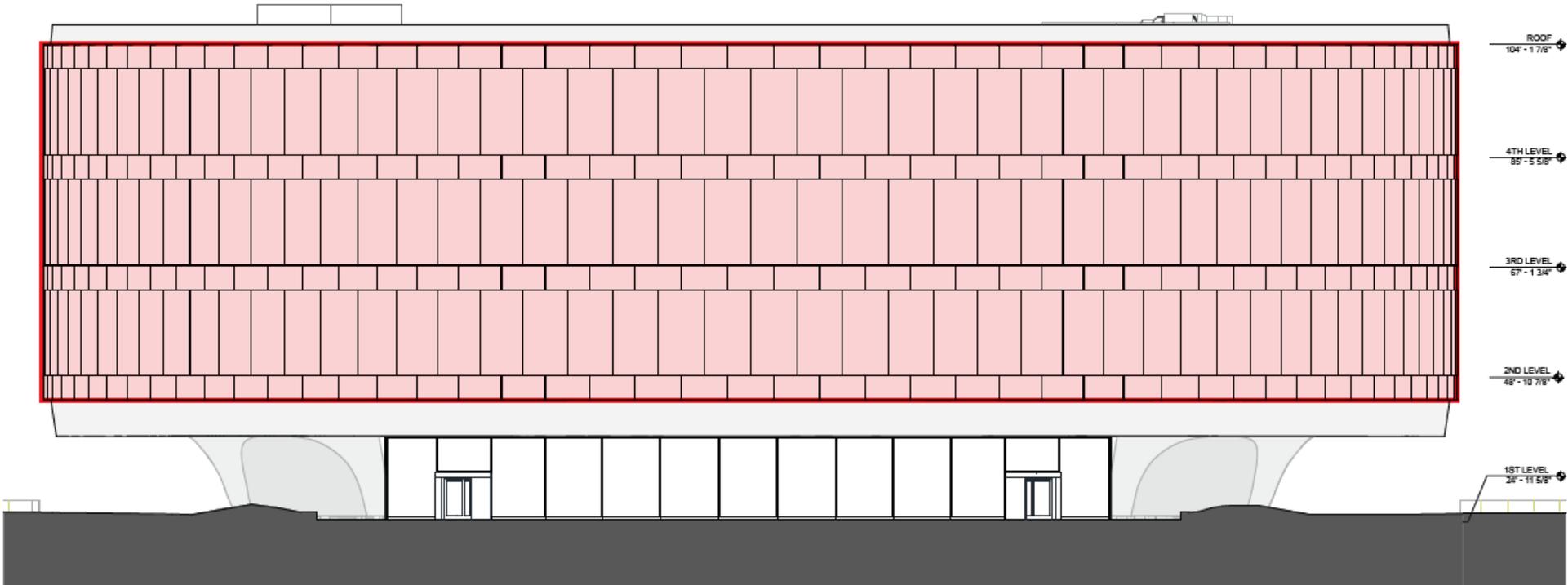
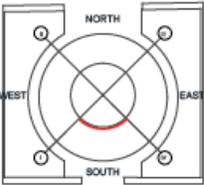
PROPOSED NEW PRECAST PANELS WITH 3" OFFSET
The proposed 3" facade offset results from a minimum cavity width of four inches to accommodate 2" thick insulation, a 1" air gap, and 1" for the anchor attachments as well as unforeseen conditions. The new precast panel attachment details will meet blast requirements.

Proposed Precast Panels, South Building Elevation

PROPOSED PRECAST PANELS

Building Elevation: South

SCOPE OF PROPOSED REPAIRS



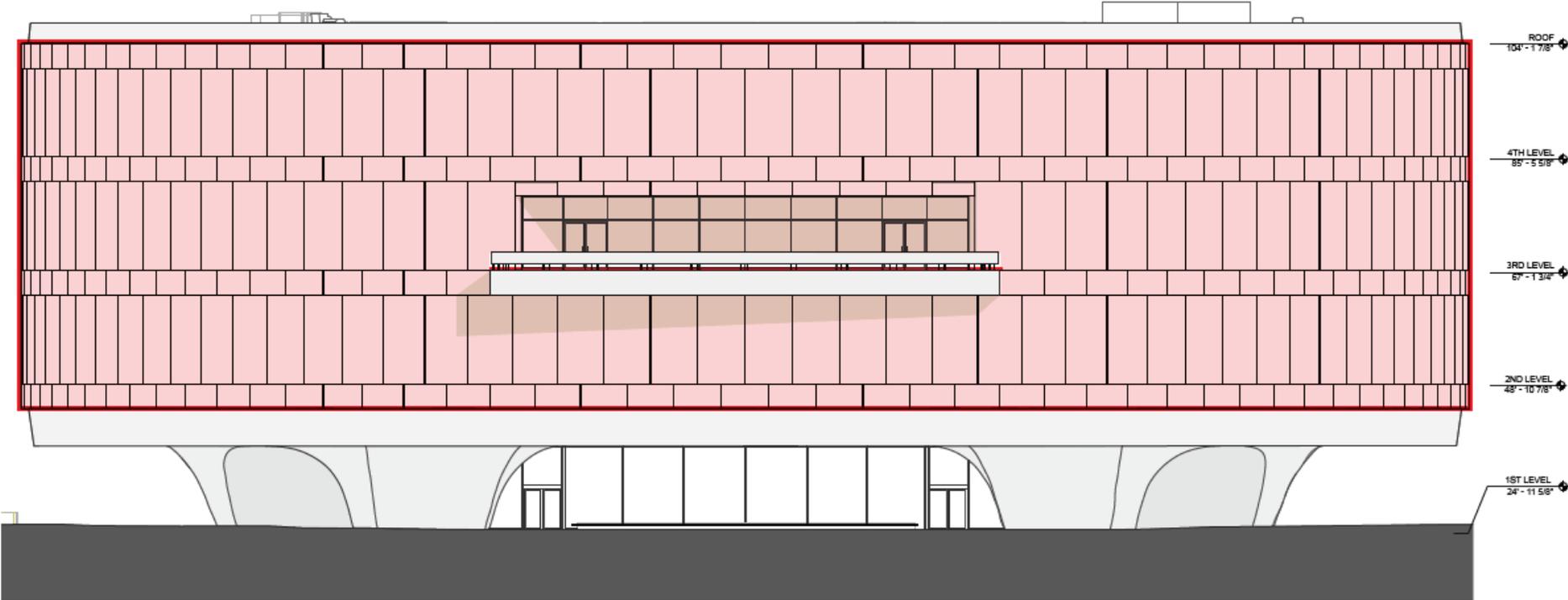
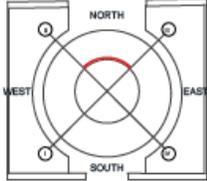
Proposed Precast Panels, North Building Elevation

PROPOSED PRECAST PANELS

Building Elevation: North

Balcony waterproofing and pavers to be replaced. Guardrail and CIP concrete balcony structure not part of the project.

 SCOPE OF PROPOSED REPAIRS

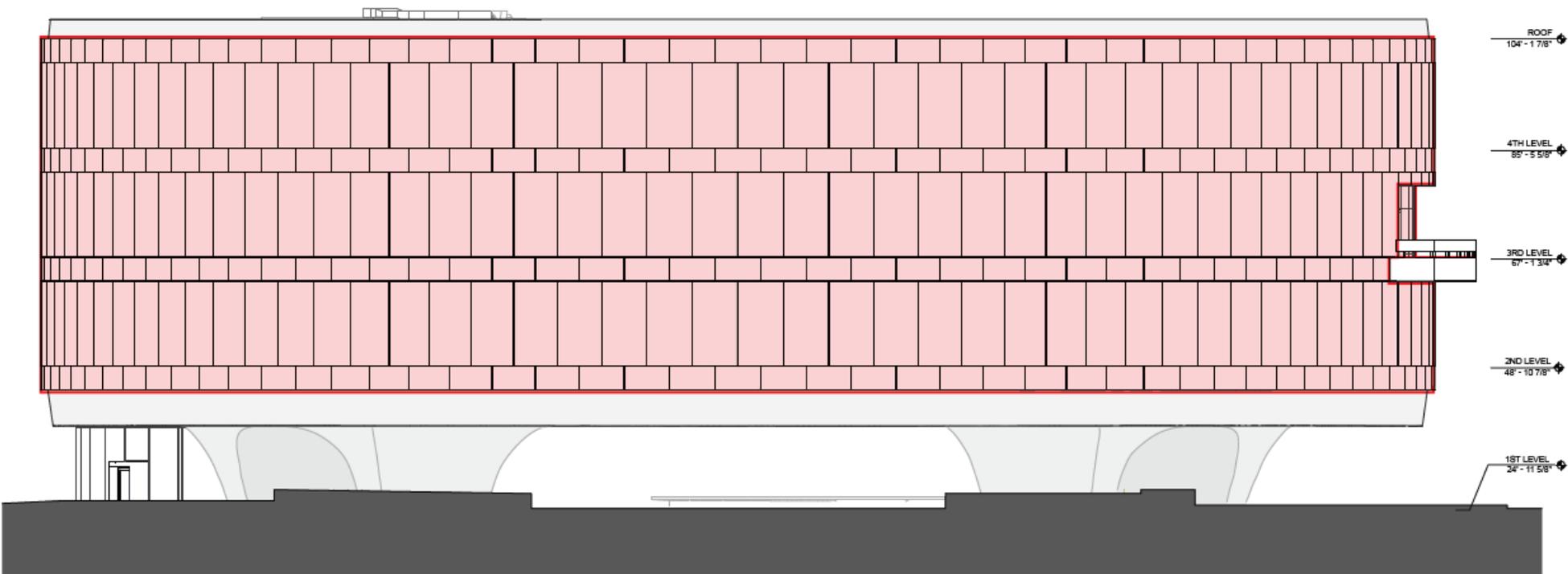
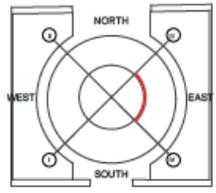


Proposed Precast Panels, East Building Elevation

PROPOSED PRECAST PANELS

Building Elevation: East

SCOPE OF PROPOSED REPAIRS

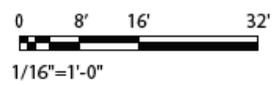
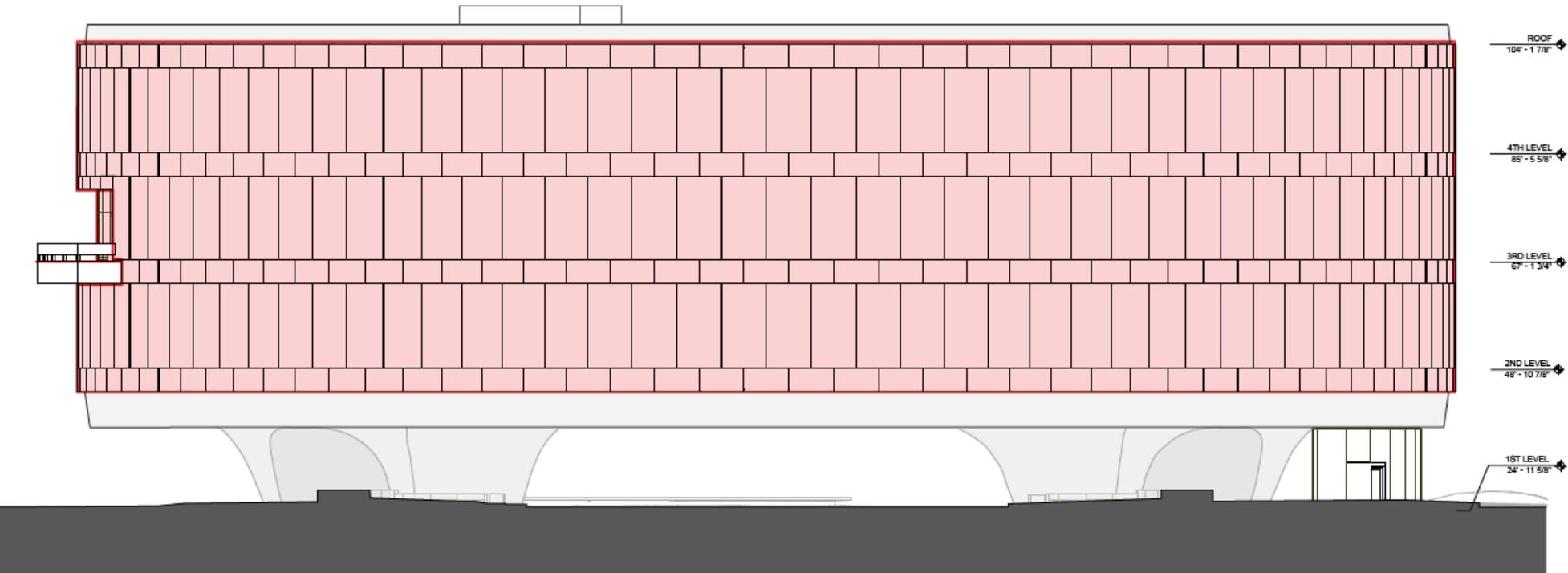
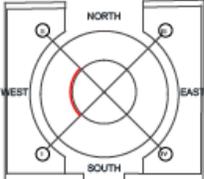


Proposed Precast Panels, West Building Elevation

PROPOSED PRECAST PANELS

Building Elevation: West

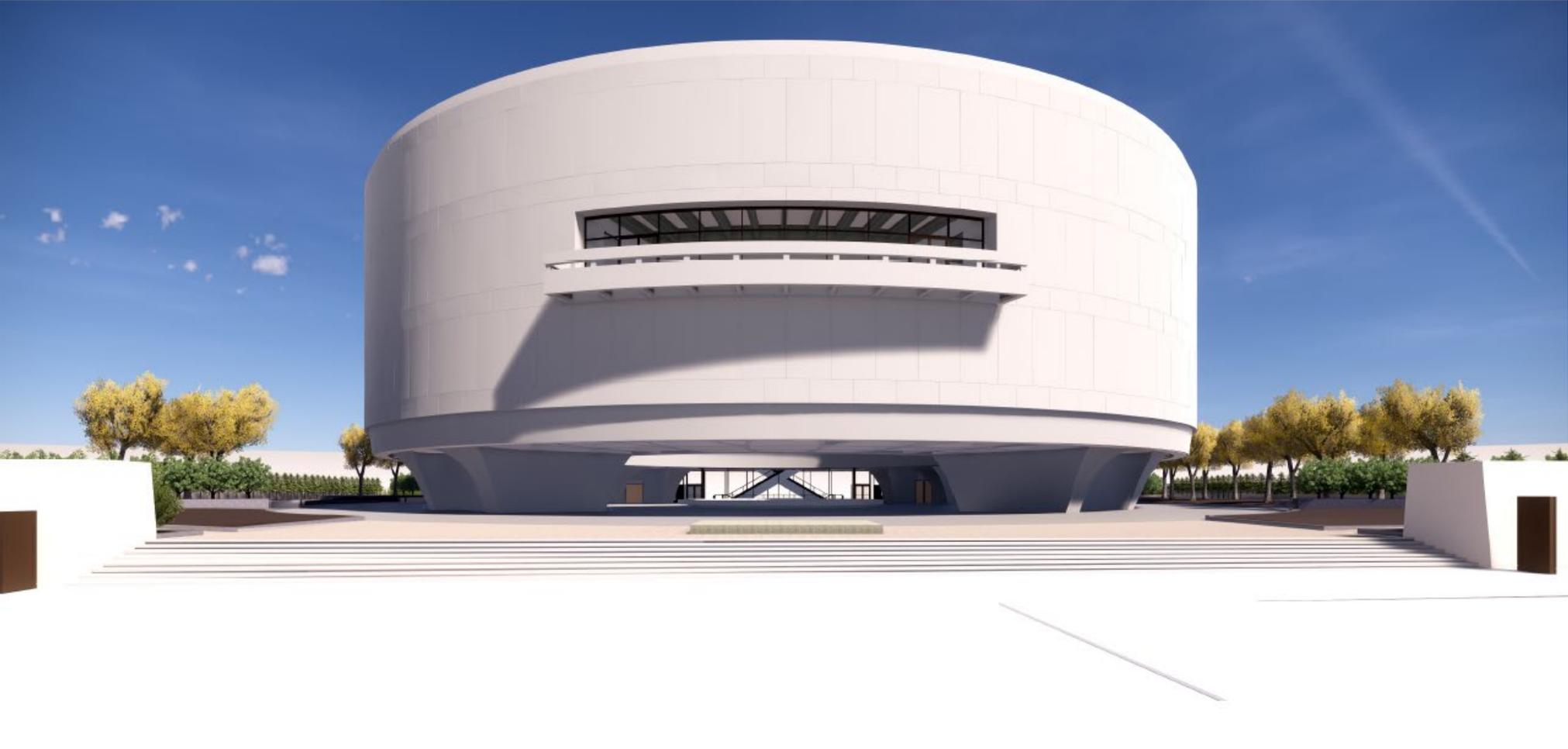
SCOPE OF PROPOSED REPAIRS



North Elevation View, Existing Precast Panels

EXISTING PRECAST PANELS

North Elevation View

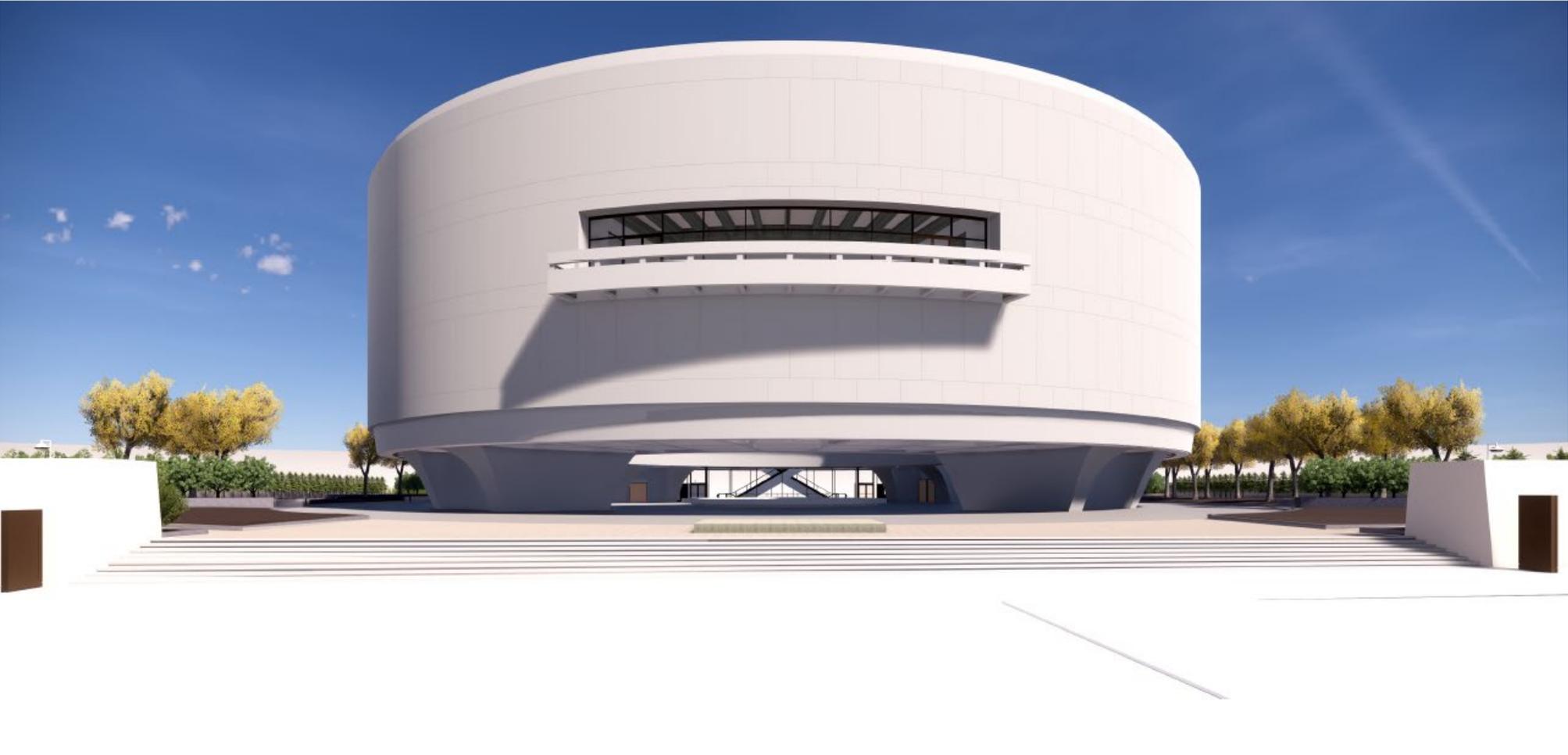


North Elevation View, Proposed Precast Panels, 3" Offset

PROPOSED PRECAST PANELS

North Elevation View

ILLUSTRATING PROPOSED PANELS WITH 3" OFFSET



South Elevation View, Existing Precast Panels

EXISTING PRECAST PANELS

South Elevation View



South Elevation View, Proposed Precast Panels, 3" Offset

PROPOSED PRECAST PANELS

South Elevation View

ILLUSTRATING PROPOSED PANELS WITH 3" OFFSET



Main Entrance and Panel Soffit Existing Condition

EXISTING PRECAST PANELS

Main Entrance and Panel Soffit Condition



Main Entrance and Panel Soffit Condition, with 3" Offset

PROPOSED PRECAST PANELS

Main Entrance and Panel Soffit Condition

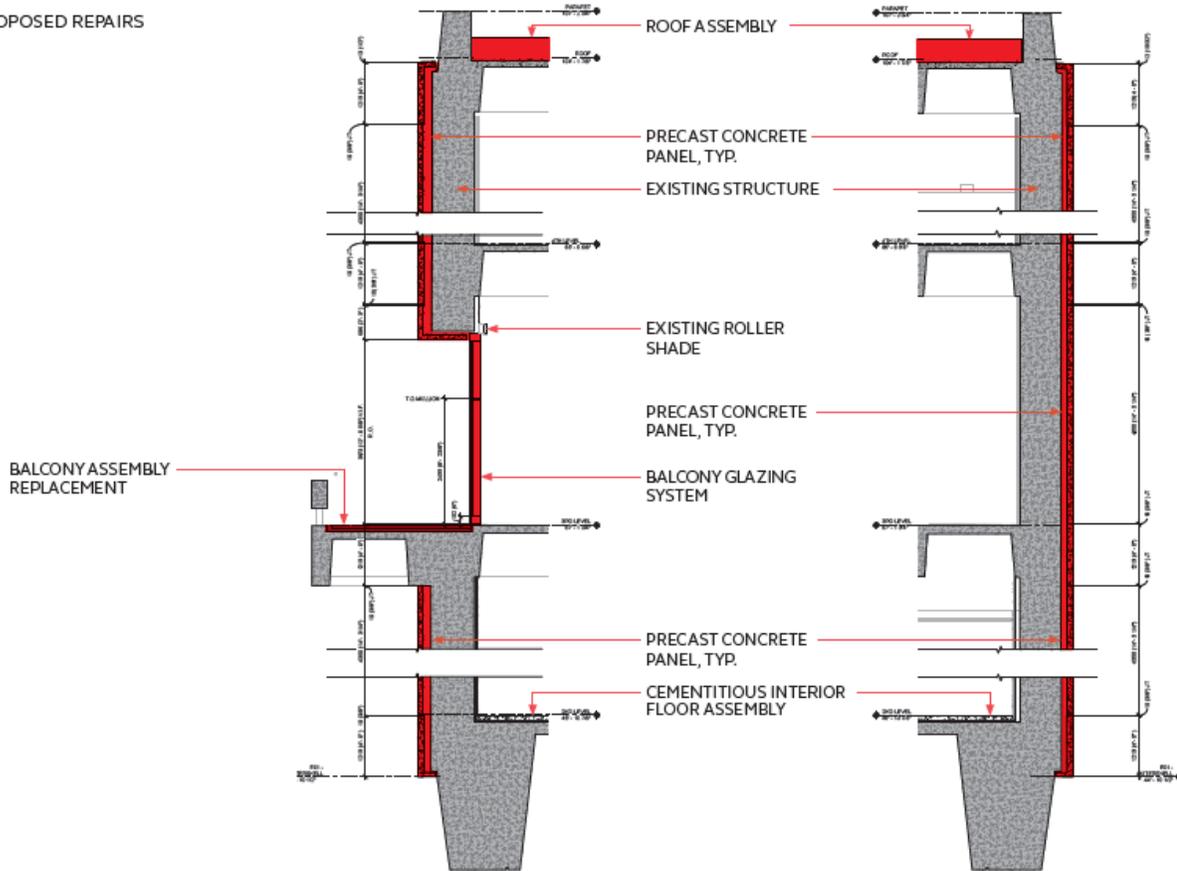
ILLUSTRATING PROPOSED PANELS WITH 3" OFFSET



Typical Wall Sections

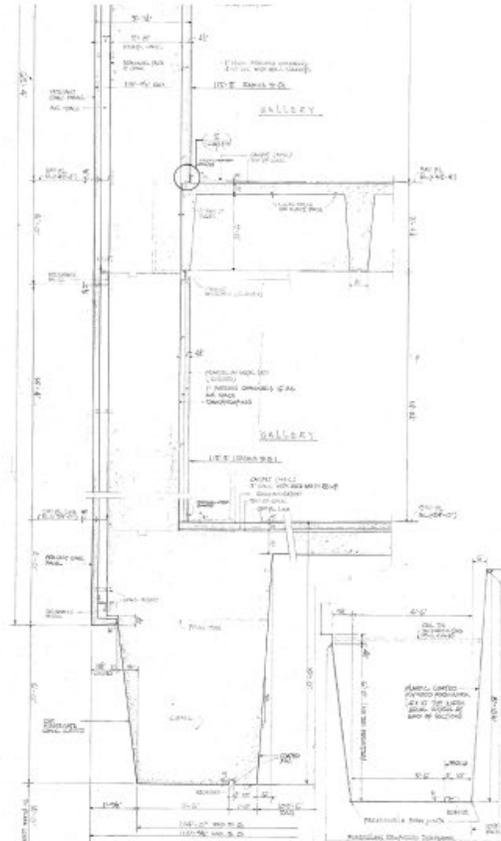
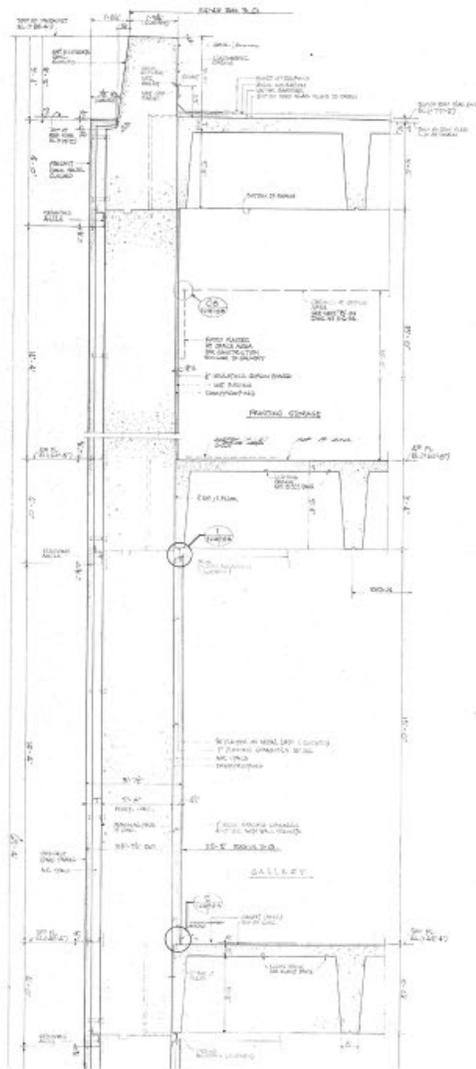
TYPICAL WALL SECTIONS

■ SCOPE OF PROPOSED REPAIRS



Existing Precast Panel Details

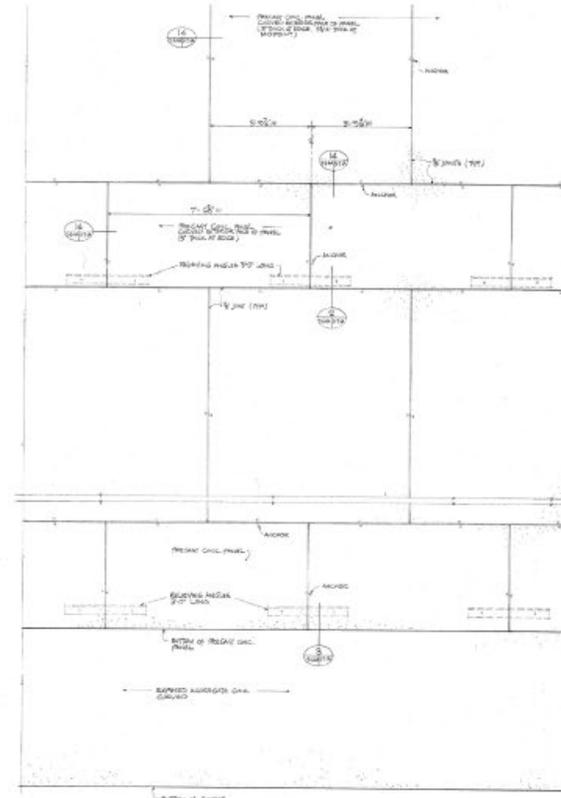
EXISTING PRECAST PANEL DETAILS



A TYPICAL EXTERIOR WALL SECTION
SCALE 1/4" = 1'-0"

- NOTES**
1. PANEL REINFORCEMENT SHALL BE AS SHOWN AND SHALL BE REINFORCED WITH #4 BARS AT 12" ON CENTER.
 2. JOINTS SHALL BE REINFORCED WITH #4 BARS AT 12" ON CENTER.
 3. JOINTS SHALL BE REINFORCED WITH #4 BARS AT 12" ON CENTER.
 4. JOINTS SHALL BE REINFORCED WITH #4 BARS AT 12" ON CENTER.
 5. JOINTS SHALL BE REINFORCED WITH #4 BARS AT 12" ON CENTER.
 6. JOINTS SHALL BE REINFORCED WITH #4 BARS AT 12" ON CENTER.

GRID FOUNDATION
SCALE 1/4" = 1'-0"



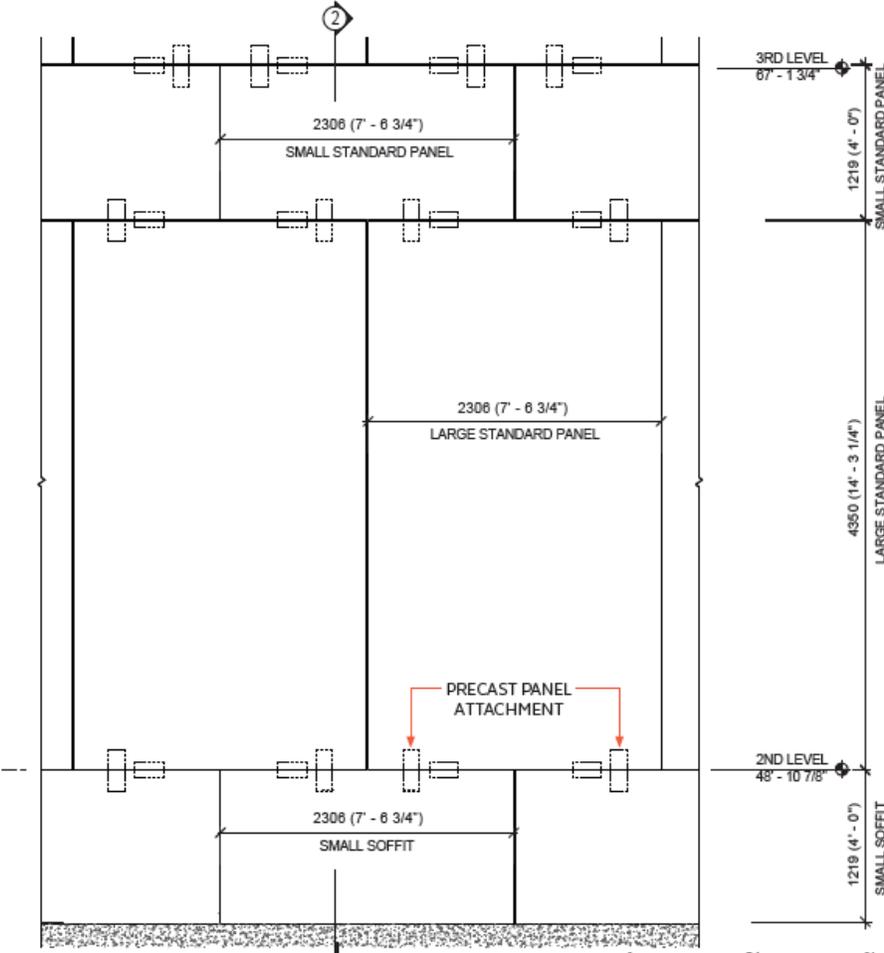
PART ELEVATION
SCALE 1/4" = 1'-0"



PART PLAN (SHOWING REINFORCEMENT)
SCALE 1/4" = 1'-0"

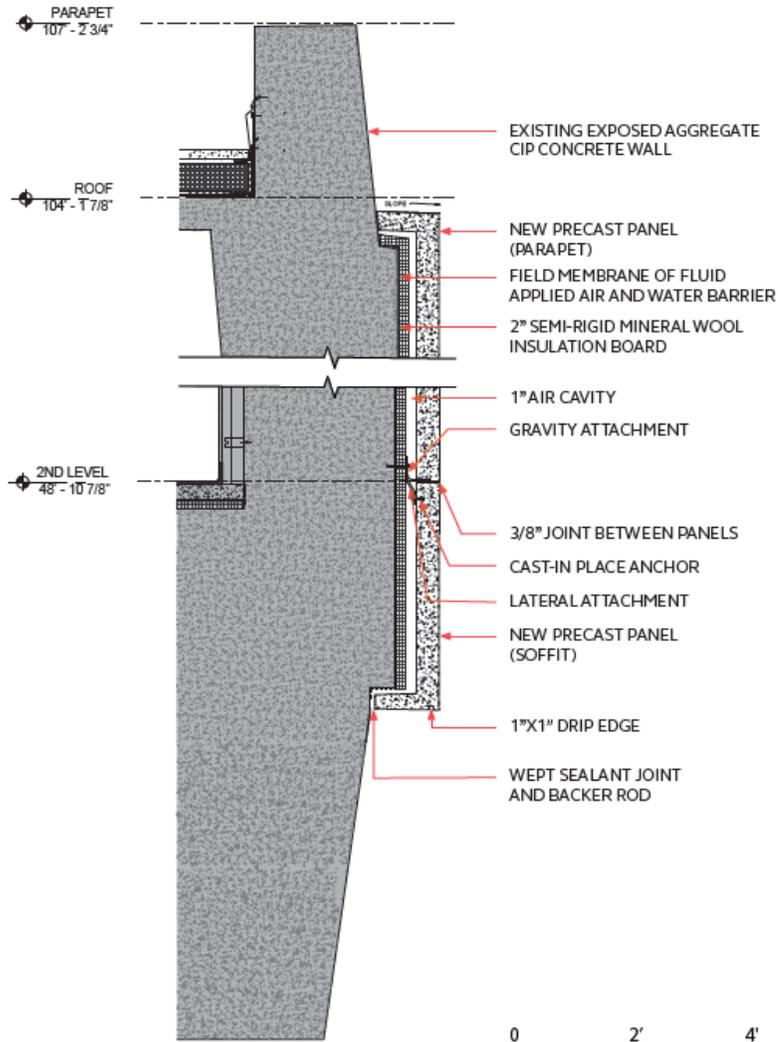
Proposed Precast Panel Details

PROPOSED PRECAST PANEL DETAILS



1. ENLARGED ELEVATION DETAIL - PRECAST PANEL

1"=3'-0"

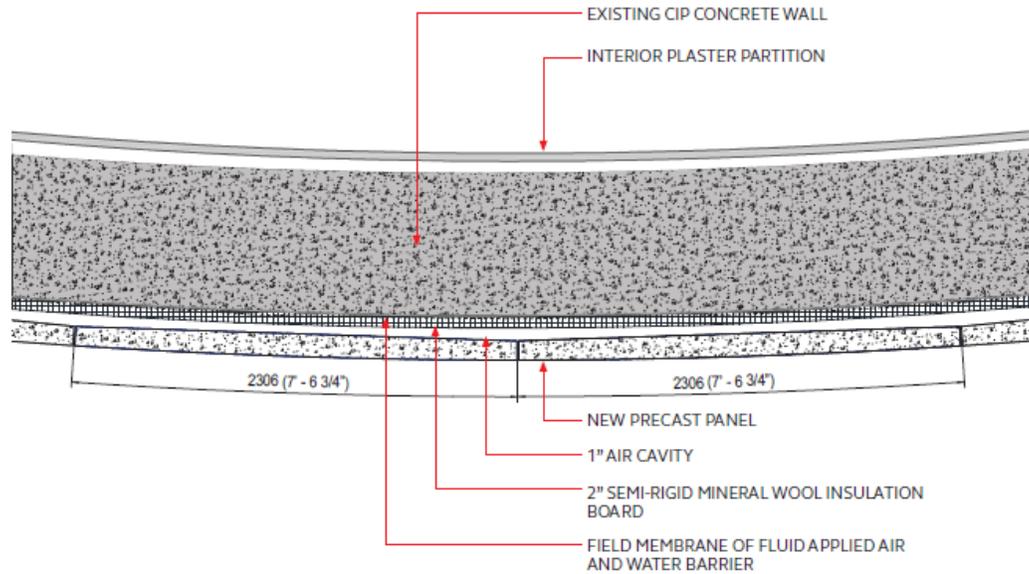


2. OUTER RING PRECAST PANEL DETAIL

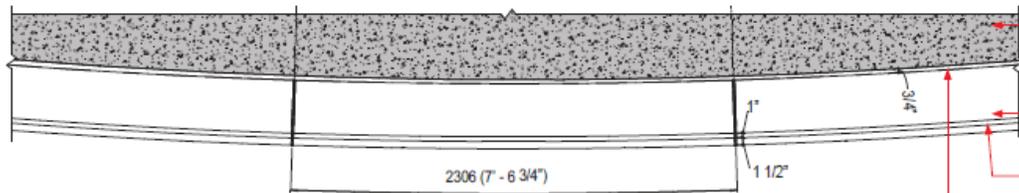
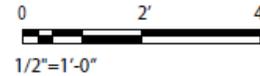
1/2"=1'-0"

Proposed Precast Panel Details

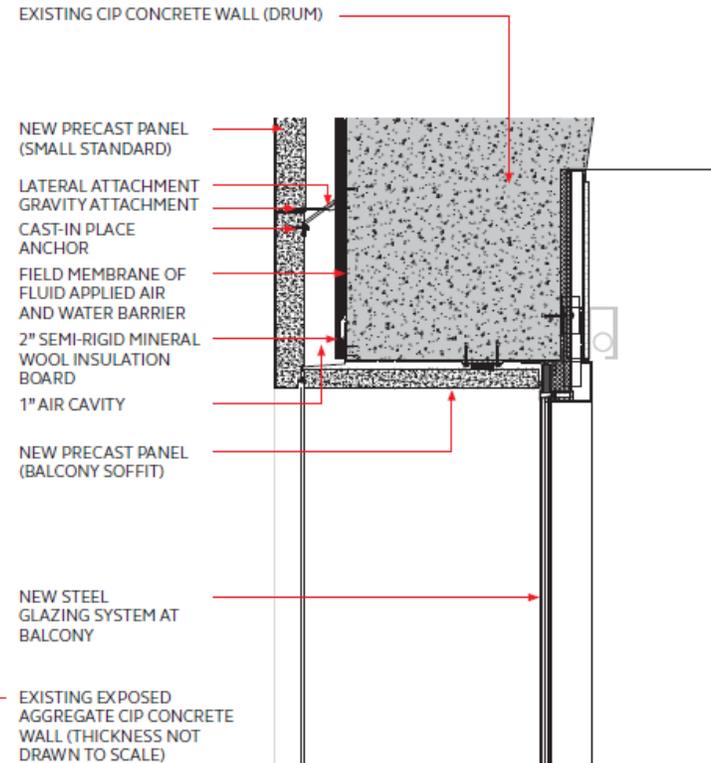
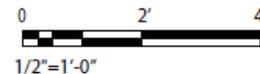
PROPOSED PRECAST PANEL DETAILS



1. ENLARGED PLAN DETAIL



2. ENLARGED RCP DETAIL OF THE FACADE SOFFIT

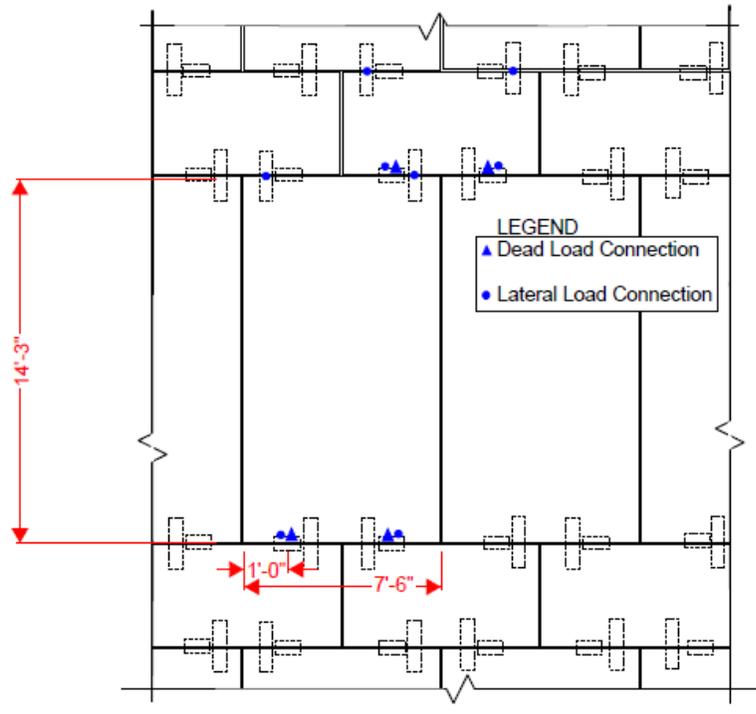


3. BALCONY SOFFIT DETAIL

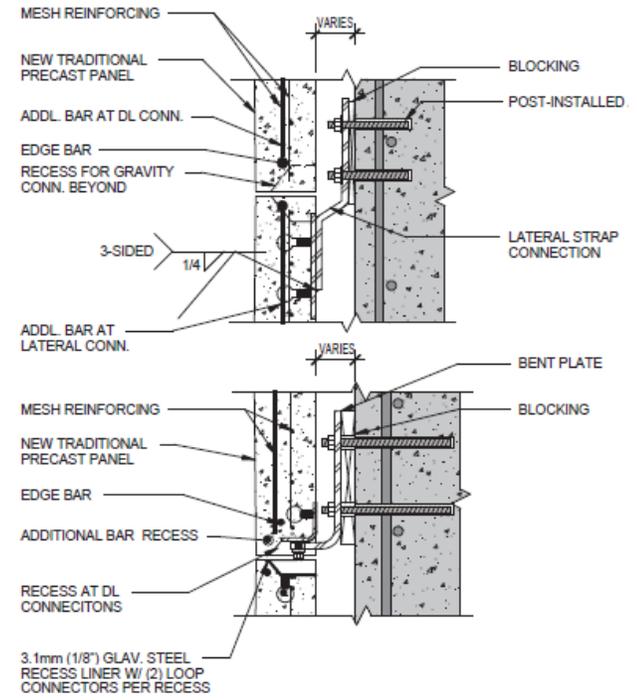


Proposed Precast Panel Attachment Details

PROPOSED PRECAST PANEL ATTACHMENT DETAILS



1. ENLARGED TYPICAL ELEVATION DETAIL



2. ENLARGED TYPICAL FACADE STRUCTURAL SECTION DETAIL

Proposed Precast Panel Aggregate Material

PROPOSED PRECAST PANEL AGGREGATE MATERIAL



1. MILLENNIUM GRANITE QUARRY AGGREGATE | WELLS, ME
According to SI Records, the original aggregate used for the HMSG precast panels was quarried in Wells, ME and was called Swenson Pink Granite. The Swenson Pink Granite is available today as Millennium Granite. The Design Team confirmed that the Millennium Granite, provided by Millennium Granite Quarry (located in Wells, ME) is the exact match for the existing HMSG precast aggregate material and is commercially available.



2. STONY CREEK QUARRY AGGREGATE | STONY CREEK, CT
During the HMSG Envelope Testing and Investigation Project (2016-2019), a specialist Conservator developed a report describing the existing building materials and alternative material sources. Stony Creek granite, provided by Stony Creek Quarry (located in Stony Creek, CT), was identified as alternative aggregate for the precast facade panels.

Proposed Precast Panel Aggregate Material

PROPOSED PRECAST PANEL AGGREGATE MATERIAL

The Smithsonian completed a cleaning project for limited areas of the facade to confirm the facade material appearance. Once these facade areas were properly cleaned, the design team developed material samples and full-scale precast mockup panels. These samples are available for external agencies to review. The precast samples and mockup panels indicate that the proposed basis of design aggregate matches the existing precast panel material. The color of the concrete matrix and the amount of the aggregate exposure was confirmed by comparing it with the cleaned facade surface.

Existing building precast concrete panel



1. MILLENNIUM QUARRY AGGREGATE, WELLS, ME
Precast material sample. Basis of Design material

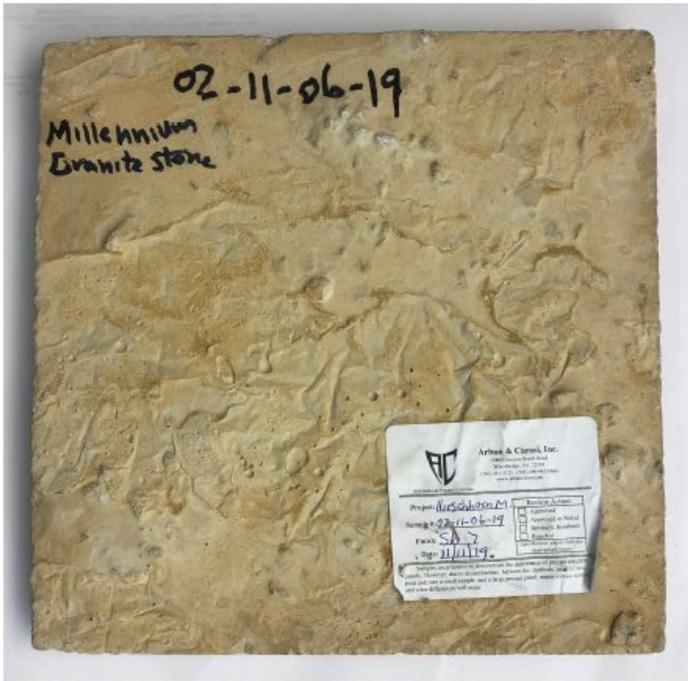
Existing building precast concrete panel



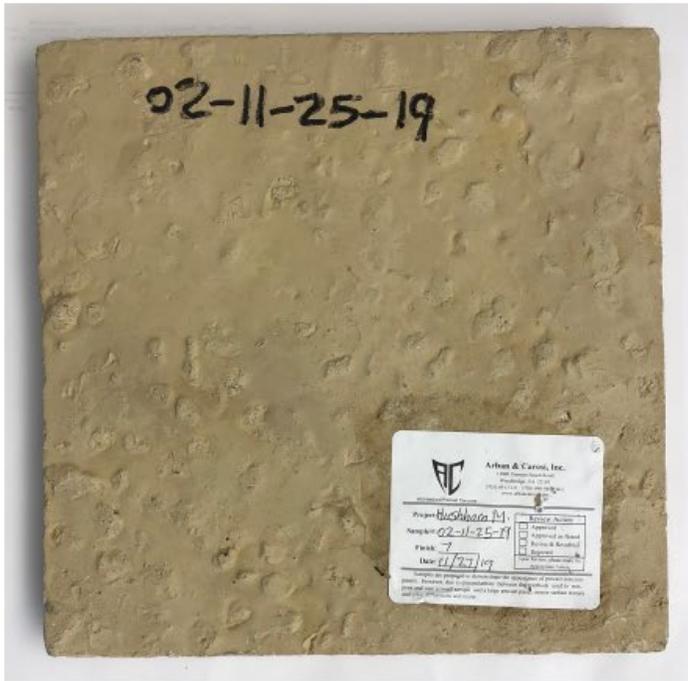
2. STONY CREEK QUARRY AGGREGATE, STONY CREEK, CT
Precast material sample. Alternate material

Proposed Precast Panel Aggregate Material

PROPOSED PRECAST PANEL AGGREGATE MATERIAL



1. MILLENNIUM GRANITE PRECAST SAMPLE
Basis of Design material



2. STONY CREEK GRANITE PRECAST SAMPLE
Alternate material

Proposed Precast Panel Mockup Review

PROPOSED PRECAST PANEL MOCKUP REVIEW



MILLENNIUM GRANITE
PRECAST PANEL
BASIS OF DESIGN MATERIAL

STONY CREEK GRANITE
PRECAST PANEL
ALTERNATE MATERIAL

1. PRECAST PANEL MOCKUP AT THE HMSG SITE



MILLENNIUM GRANITE
PRECAST PANEL
BASIS OF DESIGN MATERIAL

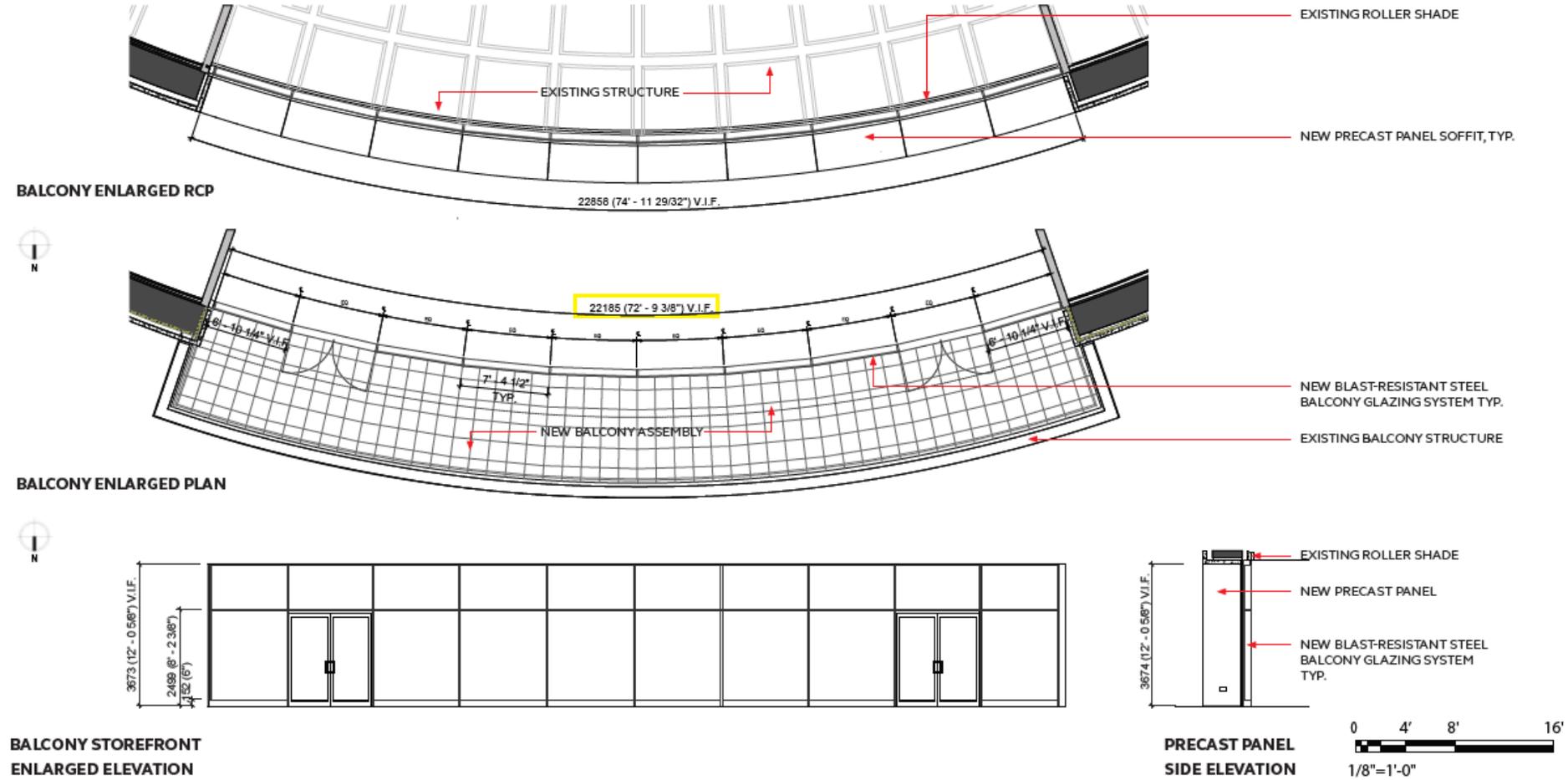
STONY CREEK GRANITE
PRECAST PANEL
ALTERNATE MATERIAL

2. PRECAST PANEL MOCKUP AT THE PRECAST PLANT

Balcony Glazing Replacement Plan

BALCONY GLAZING REPLACEMENT. PLAN, RCP and ELEVATIONS

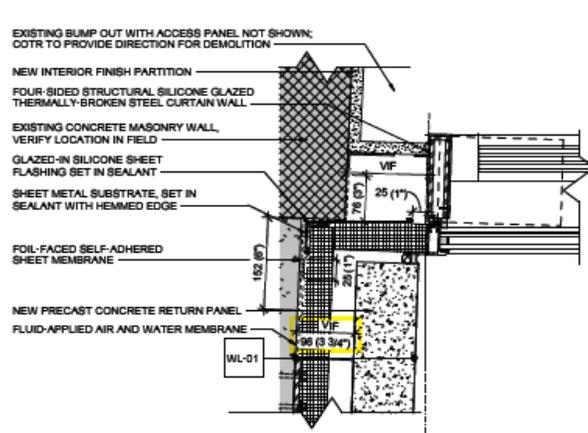
Most dimensions of the balcony glazing system geometry will closely match the original design. Proposed minor geometry adjustments are highlighted on the drawings. The overall width of the glazing system will be reduced to accommodate the 3" panel offset on the west and east ends of the glazing. The glazing will meet blast requirements and will improve thermal performance.



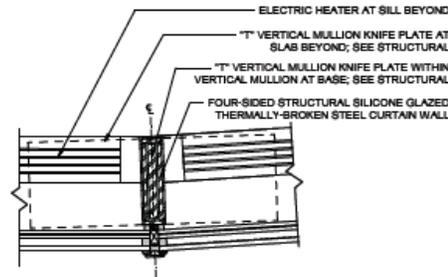
Balcony Glazing Replacement Details

BALCONY GLAZING REPLACEMENT I DETAILS

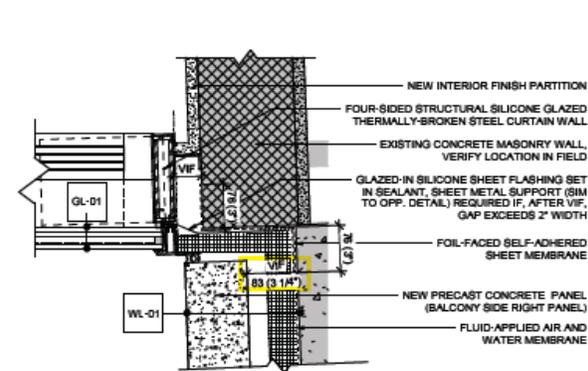
Most dimensions of the balcony glazing system geometry will closely match the original design. Proposed minor geometry adjustments are highlighted on the drawings. The overall width of the glazing system will be reduced to accommodate the 3" panel offset on the west and east ends of the glazing.



BALCONY MULLION JAMB DETAIL @ EAST END



BALCONY INTERMEDIATE VERTICAL MULLION



BALCONY MULLION JAMB DETAIL @ WEST END



EXISTING BALCONY GLAZING PLAN DETAILS

Roof Replacement, Roof Drainage Profile

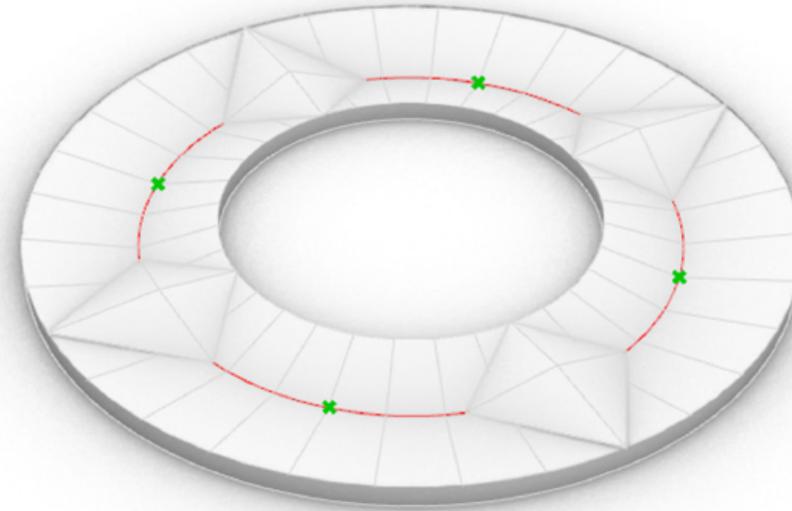
ROOF REPLACEMENT | ROOF DRAINAGE PROFILE

The Hirshhorn Museum is covered by a low-slope roof that is supported by the coffered concrete roof structure. The roof is internally drained and has short concrete parapets along the exterior elevation and the courtyard elevation. The existing roof assembly is a ballasted built-up roof set onto tapered rigid insulation and perlite coverboard. The roof slopes to four area drains located above the four concrete piers that support the second floor.

Through digital analysis, the design team sought to improve the roof drainage profile to achieve a $\frac{1}{4}$ in. per ft. slope wherever possible. The project team found through our analysis that the creation of additional slope in the concrete slab substrate is impractical with weight limitations, the existing parapet geometry that must be preserved to maintain the historic appearance of the building, and the existing drain locations.

In order to accommodate the existing roof slopes, the proposed roofing assembly will include a hot-applied rubberized asphalt (HRA membrane bonded continuously to the existing structural concrete roof slab). The existing roof has $\frac{1}{16}$ to $\frac{1}{8}$ inch slope per foot draining to a circular valley concentric with the building's perimeter. Section 1511 of the 2018 IBC and Section 705 of the 2018 IEBC allow existing low-sloped roofs to be replaced without meeting contemporary slope requirements for new construction.

Properly designed and constructed HRA membranes are durable with a long track record of successful performance in similar applications over structural concrete decks, and HRA will provide acceptable performance at slopes less than $\frac{1}{4}$ inch per foot. With this approach, the roofing is applied directly to the substrate, and insulation and ballast are provided above the membrane. Ballast will be comprised of pavers over the insulation. The roof assembly is not visible from the street level and the roof replacement project will not result in any changes of the non-visible rooftop equipment profiles.

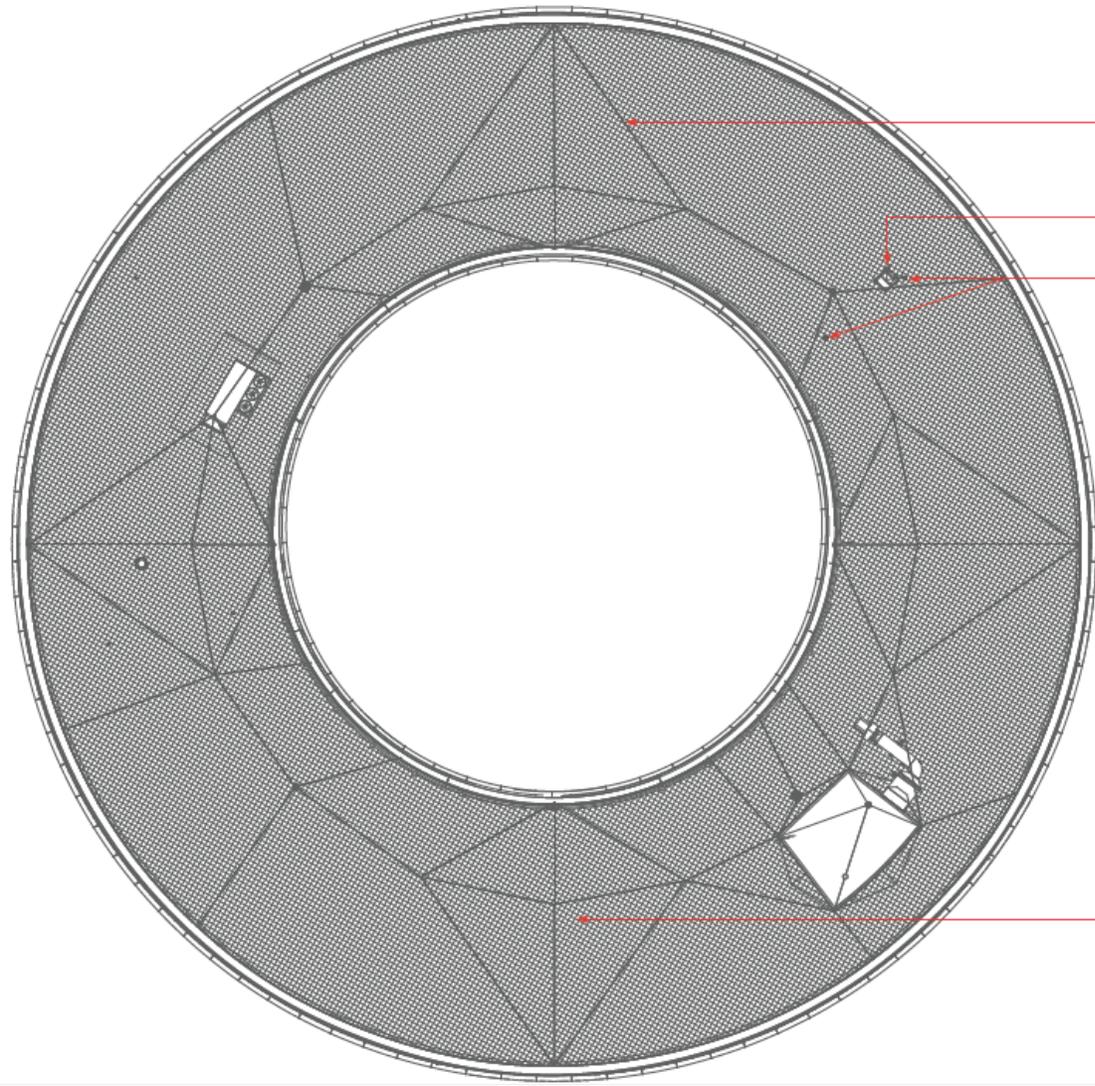


EXISTING ROOF DRAINAGE PROFILE

Roof Replacement, Proposed Roof Plan

ROOF REPLACEMENT | PROPOSED ROOF PLAN

● NEW FALL ARREST POST ANCHOR



EXISTING SLOPE

NEW ROOF ACCESS HATCH

FALL ARREST POST ANCHOR

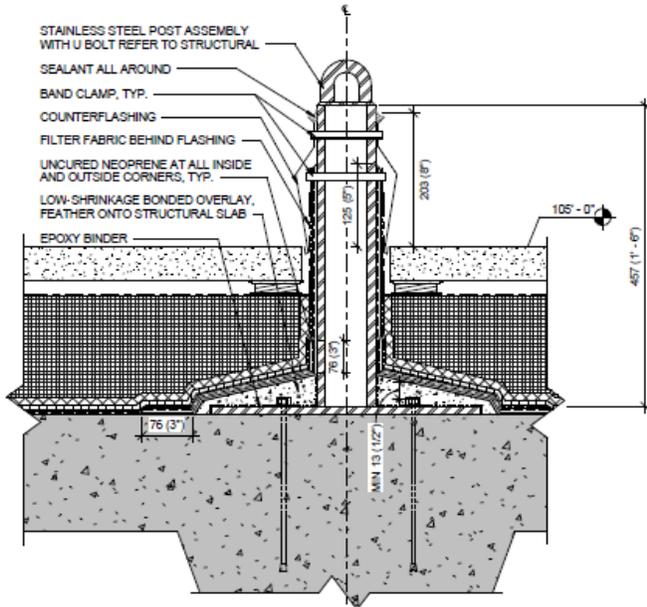
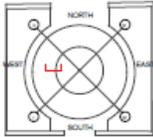
NEW ROOF ASSEMBLY
W/12"X12" PAVERS AND
12"X24" BORDER PAVERS



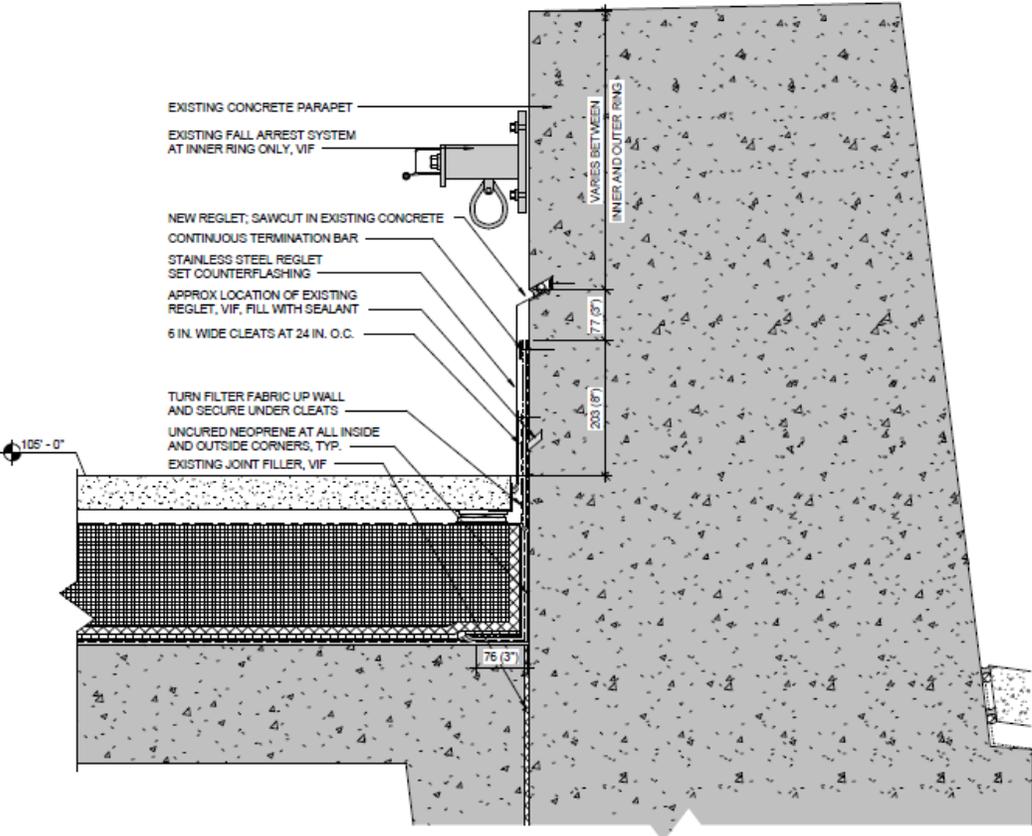
0 25' 50'
1"=25'-0"

Roof Replacement, Proposed Roof Details

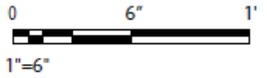
ROOF REPLACEMENT | PROPOSED ROOF DETAILS



ROOF ANCHOR POST

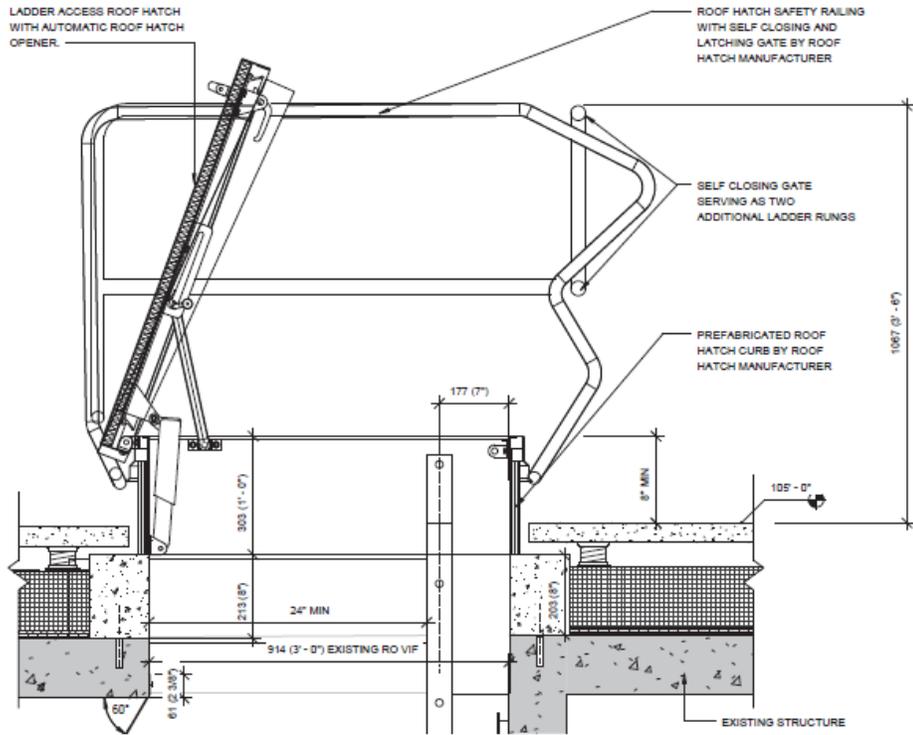


ROOF AT INNER RING PARAPET

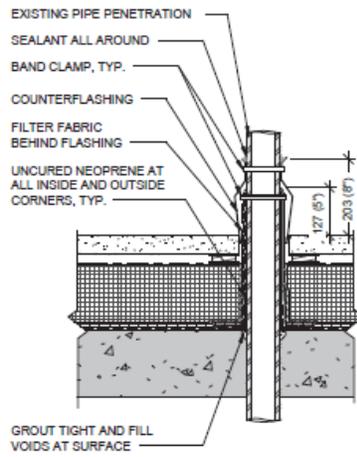


Roof Replacement, Proposed Roof Details

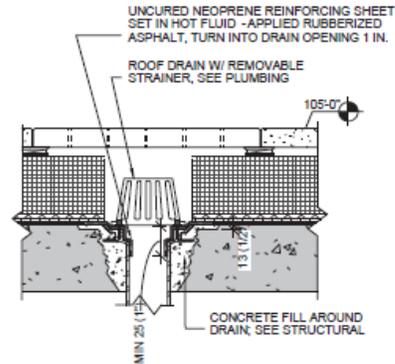
ROOF REPLACEMENT | PROPOSED ROOF DETAILS



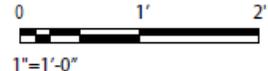
ROOF ACCESS HATCH



TYPICAL ROOF PIPE



TYPICAL ROOF DRAIN



U. S. COMMISSION OF FINE ARTS

ESTABLISHED BY CONGRESS 17 MAY 1910

401 F STREET NW SUITE 312 WASHINGTON DC 20001-2728 202-504-2200 FAX 202-504-2195 WWW.CFA.GOV

20 March 2020

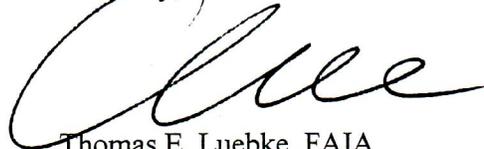
Dear Ms. Chiu:

Due to the Novel Coronavirus (Covid-19) pandemic and national health emergency, the Commission of Fine Arts cancelled its public meeting scheduled for 19 March 2020, and the Commission members were not able to hear a final design presentation on the facade replacement and repair for the Hirshhorn Museum, located at Independence Avenue and 7th Street, SW. However, based on their review of the submitted design, the Commission members have voted by poll to provide the following recommendations and comments.

The Commission members recommended approval of the project, with the understanding that the materials such as precast concrete panels, balcony flooring, glazing systems, and exterior doors are replaced in kind. The proposed concrete mix for the replacement precast concrete panels using Swenson Pink (Millennium) granite aggregate to match cast-in-place elements is approved per the inspection of a mockup by the Commission staff and historic preservation stakeholders on 22 January 2020.

This recommendation will be placed on the administrative agenda for confirmation at the Commission's next public meeting. As always, the staff is available to assist you with future submissions.

Sincerely,



Thomas E. Luebke, FAIA
Secretary

Melissa Chiu, Director
Hirshhorn Museum and Sculpture Garden
Independence Avenue and 7th Street, SW
Washington, DC 20560

cc: Kirill Pivovarov, CallisonRTKL